



PGS HERITAGE

Heritage Impact Assessment for the Proposed Redstone PV near Danieskuil in the Kgatelopele Local Municipality, Mgcwau District, Northern Cape Province.

Heritage Impact Assessment

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REVISION HISTORY

Version	Issue Date	Description of Changes
1.0	07/07/2026	First draft
1.1	09/07/2026	Amendment

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Specialist Declaration for assessments undertaken for application for authorisation in terms of the National Environmental Management Act (Act 107 of 1998) as amended and the Environmental Impact Assessment Regulations (Government Notice 982, Government Gazette 38282, 4 December 2014) as amended

I, Duncan Mclean declare that –

- I act as the independent specialist in this application;
- I am aware of the procedures and requirements for the assessment and minimum criteria for reporting on identified environmental themes in terms of sections 24(5)(a) and (h) and 44 of the National Environmental Management Act (Act 107 of 1998) as amended, when applying for environmental authorisation which were promulgated in Government Notice 320 (Government Gazette 43110, 20 March 2020) and in Government Notice 1150 (Government Gazette 43855, 30 October 2020).
- 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 the specialist report relevant to this application, 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 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;
- All the particulars furnished by me in this form are true and correct; and
- I realise that a false declaration is an offence in terms of the Environmental Impact Assessment Regulations (Government Notice R982, Government Gazette 38282, 4 December 2014) as amended and is punishable in terms of section 24F of the National Environmental Management Act (Act 107 of 1998).
- I will take into account, to the extent possible, the matters listed in section 38 of the National Heritage Resources Act (Act 25 of 1999) when preparing the application and any report relating to the application.

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ACKNOWLEDGEMENT OF RECEIPT

Report Title	Heritage Impact Assessment for the Proposed Redstone PV near Danieskuil in the Kgatelopele Local Municipality, Mgcwau District, Northern Cape Province.			
Control	Name	Signature	Designation	
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This Heritage Impact Assessment report has been compiled considering the Environmental Impact Assessment Regulations (Government Notice 982, Government Gazette 38282, 4 December 2014) Appendix 6 as amended by Government Notice 326 (Government Gazette 40772, 7 April 2017) requirements for specialist reports as indicated in the table below:

Requirements Environmental Impact Assessment Regulations (Government Notice 982, Government Gazette 38282, 4 December 2014) Appendix 6 as amended	Relevant section in report
1.(1) (a) (i) Details of the specialist who prepared the report	Page iii 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 B
(b) A declaration that the person is independent in a form as may be specified by the competent authority	Page iii 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 5.2
(d) The duration, date and season of the site investigation and the relevance of the season to the outcome of the assessment	Section 4.3
(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
(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 Environmental Management Program	Section 6
(l) Any conditions for inclusion in the Environmental Assessment	Section 6
(m) Any monitoring requirements for inclusion in the Environmental Management Program or Environmental Assessment	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 Environmental Management Program, 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 HIA or PIA

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EXECUTIVE SUMMARY

PGS Heritage (Pty) Ltd was appointed by Environmental Impact Management Services (Pty) Ltd to undertake a Heritage Impact Assessment for the Redstone Photovoltaic plant in the Kgatelopele Local Municipality, Mgcwau District, Northern Cape Province.

During the study, no cultural heritage resources were located or identified within the study area.

Palaeontology

A standalone Palaeontological Desktop Assessment was done by Elize Butler (Associate Palaeontologist for PGS Heritage; see Butler 2026).

Mitigation measures

Mitigation measures with regards to chance finds are described in **Table 9** of this report.

Conclusion

It is the combined considered opinion of the heritage specialists that the proposed project will have no direct impact on any identified heritage resources in the study area. However, due to the subterranean nature of heritage resources, a chance finds procedure must be implemented if any unknown heritage resources are to be uncovered.

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

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ABBREVIATIONS AND TERMINOLOGY

Abbreviations	Description
AD	Anno Domini
AIA	Archaeological Impact Assessment
ASAPA	Association of South African Professional Archaeologists
BESS	Battery Energy Storage System
BA	Basic Assessment
BGG	Burial Ground and Graves
CFP	Chance Finds Procedure
CRM	Cultural Resource Management
CV	Curriculum Vitae
DFFE	Department of Forestry, Fisheries and the Environment
EA	Environmental Authorization
ECO	Environmental Control Officer
EIA	Environmental Impact Assessment
EIMS	Environmental Impact Management Services (Pty) Ltd
EMPr	Environmental Management Program
ESA	Early Stone Age
GN 320	Government Notice 320 (Government Gazette 43110, 20 March 2020)
GN 326	Government Notice 326 (Government Gazette 40772, 7 April 2017)
GN 982	Government Notice 982 (Government Gazette 38282, 4 December 2014)
GPS	Global Positioning System
HIA	Heritage Impact Assessment
HWC	Heritage Western Cape
LSA	Late Stone Age
LIA	Late Iron Age
MSA	Middle Stone Age
NCW	Not Conservation Worthy
NEMA	National Environmental Management Act (Act 107 of 1998) as amended
NHRA	National Heritage Resources Act (Act 25 of 1999) as amended
PDA	Paleontological Desktop Assessment
PGS	PGS Heritage (Pty) Ltd
PIA	Paleontological Impact Assessment
PHRA	Provincial Heritage Resources Authority
PV	Photovoltaic
SAHRA	South African Heritage Resources Agency
SAHRIS	South African Heritage Resources Information System
SPP	Solar Power Plant

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 10 m of such representation,

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- 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 Maritime Zones Act (Act 15 of 1994), and any cargo, debris or artefacts found or associated therewith, which is older than 60 years or which the South African Heritage Resources Agency 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 earlier stone age between 700 000 and 2 500 000 years ago (Refer **Figure 1**).

Fossil

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

Heritage

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

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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 National Heritage Resources Act (Act 25 of 1999) as amended,

- 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 12 000 years ago (Refer **Figure 1**).

Late Stone Age

The archaeology of the later stone age associated with fully modern people during the last 30 000 years (Refer **Figure 1**).

Late Iron Age (Early Farming Communities)

The archaeology of the last 1000 years up to the 1800's, associated with settled lifeways, iron-working and farming activities such as herding and agriculture (Refer **Figure 1**).

Middle Stone Age

The archaeology of the middle stone age between 30 000-300 000 years ago, associated with early modern humans (Refer **Figure 1**).

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.

Tracklogs

Movements during field survey documented by means of Global Positioning System.

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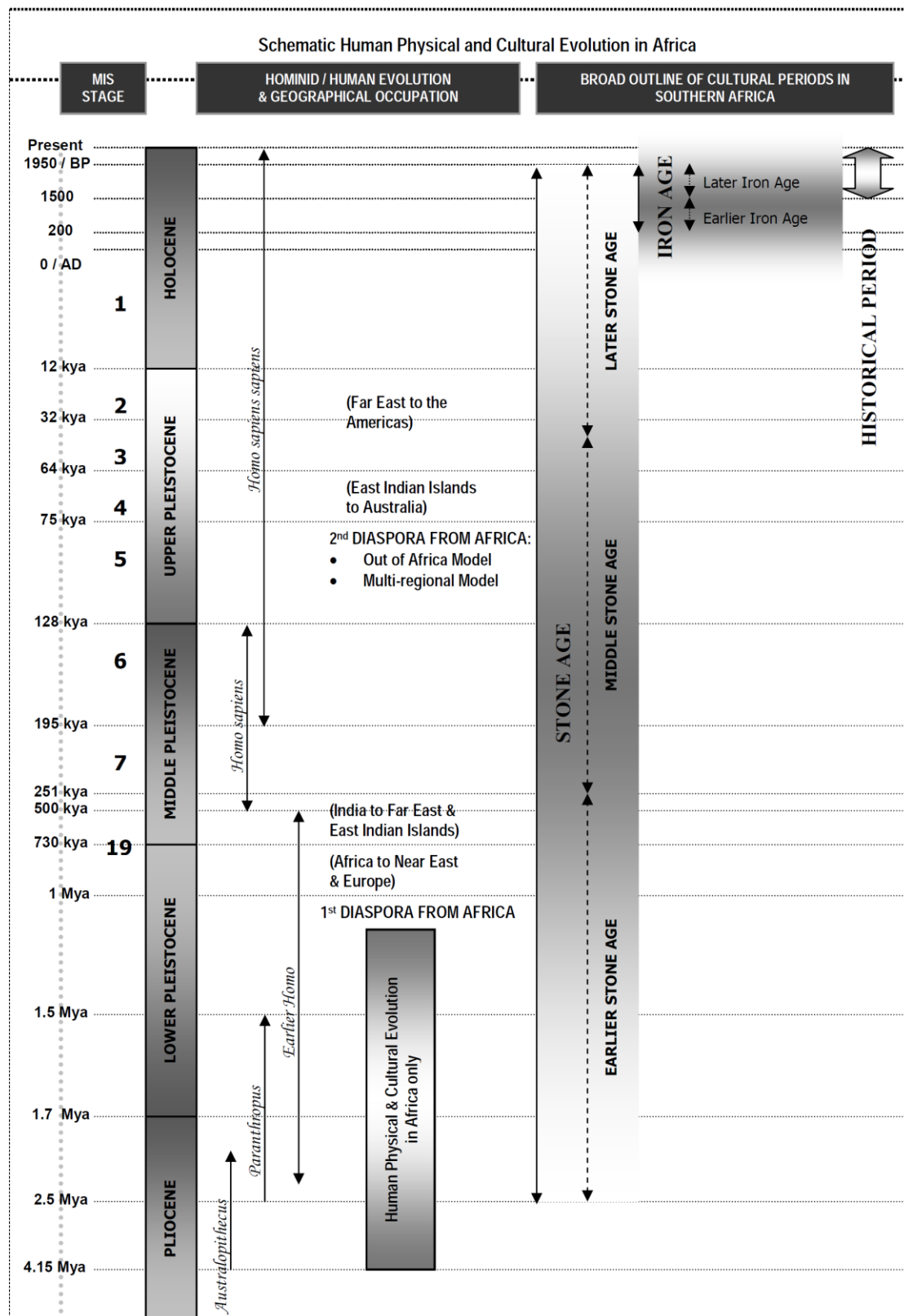


Figure 1 – Human and Cultural Timeline in Africa.

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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 Redstone Photovoltaic (PV) plant in the Kgatelopele Local Municipality, Mgcwau District, Northern Cape Province.

A standalone PDA was completed by Elize Butler (Palaeontologist associated with PGS).

1.1 Scope of the Study

The aim of the study is to identify heritage sites and finds that may occur in the proposed project area. The HIA aims to inform the Environmental Impact Assessment (EIA) to assist the developer in managing the discovered heritage resources in a responsible manner, in order to protect, preserve, and develop them within the framework provided by the National Heritage Resources Act (Act 25 of 1999) as amended (NHRA).

1.2 Specialist Qualifications

This HIA report was compiled by PGS.

The staff at PGS has a combined experience of over 100 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.

Duncan Mclean, the author of this report, has been involved in archaeological fieldwork and excavations for the last four years. He holds an Honours degree (BA Hons) in Archaeology from the University of Pretoria and is registered with the Association of Southern African Professional Archaeologists (ASAPA) as a Professional Archaeologist.

Alexander Andreou, Heritage Advisory Unit Manager and reviewer of this report, wields over a decade of transdisciplinary experience within the heritage resources management sector. He specialises in spatial biographies and urban archaeology. He holds an MPhil in Conservation of the Built Environment from the University of Cape Town, and a PhD in Development Studies, in the sub-field of Critical Architecture and Urbanism from the University of Pretoria. He is a registered member of the Association of Professional Heritage Practitioners (APHP), Association of Southern African Professional Archaeologists (APHP), and The International Association for Impact Assessment (IAIASa).

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1.3 Assumptions and Limitations

Not detracting in any way from the comprehensiveness of the fieldwork undertaken, it is necessary to acknowledge 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, amongst others the subterranean nature of some archaeological sites and existing vegetation cover.

Fieldwork was also focussed on areas that were not previously disturbed by Agricultural fields, thus concentrating on areas with the highest potential to yield indications of the possible presence of heritage resources.

Therefore, should any heritage features and/or objects be located or observed outside the identified heritage sensitive areas during construction activities, a heritage specialist must be contacted immediately. Such observed or located heritage features and/or objects may not be disturbed or removed in any way until such time as the heritage specialist has been able to make an assessment of the significance of the site (or material) in question. This also applies to Burial Grounds and Graves (BGG). If any BGG are located or observed during the course of the development, the procedures and requirements pertaining to BGG 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:

- Government Notice 320 (Government Gazette 43110, 20 March 2020) (GN 320) - general requirements for undertaking an initial site sensitivity verification where no specific assessment protocol has been identified,
- EIA Regulations (Government Notice 982 (Government Gazette 38282, 4 December 2014)) Appendix 6 (GN 982) as amended by Government Notice 326 (Government Gazette 40772, 7 April 2017) (GN 326),
- NHRA.

1.4.1 Government Notice 320 (Government Gazette 43110, 20 March 2020)

Although minimum standards for Archaeological Impact Assessment (AIA) (2007) and Paleontological Impact Assessment (PIA) (2012) were published by the South African Heritage Resources Agency (SAHRA), GN 320 requires sensitivity verification for a site, for which no specific assessment protocol related to any theme has been identified, on the national web based

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environmental screening tool. The requirements for GN 320 are listed in **Table 1** and the applicable section in this report noted.

Table 1: Reporting requirements for GN 320.

GN 320	Relevant section in report	Where not applicable in this report
2.2 (a) a desktop analysis, using satellite imagery;	section 4.3	
2.2 (b) a preliminary on-site inspection to identify if there are any discrepancies with the current use of land and environmental status quo versus the environmental sensitivity as identified on the national web-based environmental screening tool, such as new developments, infrastructure, indigenous/pristine vegetation, etc.	section 4.1	
2.3(a) confirms or disputes the current use of the land and environmental sensitivity as identified by the national web-based environmental screening tool;	section 4.1	
2.3(b) contains motivation and evidence (e.g. photographs) of either the verified or different use of the land and environmental sensitivity;	section 4.1	

1.4.2 Environmental Impact Assessment Regulations (Government Notice 982, Government Gazette 38282, 4 December 2014) Appendix 6 as amended by Government Notice 326 (Government Gazette 40772, 7 April 2017) requirements

This HIA report has been compiled considering the GN 326 Appendix 6 requirements for specialist reports.

1.4.3 Heritage screening - Department of Forestry, Fisheries and the Environment

A heritage screening was conducted by means of the Department of Forestry, Fisheries and the Environment (DFFE) National Web-based Environmental Screening Tool as required by GN 982.

DFFE issued guidelines in April 2025 concerning the application of the screening tool in relation to cultural heritage, archaeology, and palaeontological themes. The guidelines indicate that the "theme layer represents a limited number of known" heritage and palaeontological resources. These resources are widely distributed and may be present at any development site within South Africa. The guidelines state the following in terms of -

- HIA "Therefore, a Heritage Impact Assessment (HIA) must be undertaken for all developments, irrespective of the sensitivity shown on the archaeological and cultural heritage theme layer"

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- PIA “Therefore, a Palaeontological Impact Assessments (PIAs) [sic] must be undertaken for all developments as per the PalaeoSensitivity Map provided on [South African Heritage Resources Information System] SAHRIS, irrespective of the sensitivity shown on the palaeontology theme layer.”

The guidelines further stipulate the requirements for both an HIA and PIA must:

Table 2: HIA and PIA guidelines

HIA	PIA
- meet the requirements of section 38(3) of the NHRA or section 41(1) of the KwaZulu-Natal Amafa and Research Institute Act, 2018 (Act No. 5 of 2018) (KNARIA), should the development be in KwaZulu-Natal (KZN); - must be undertaken by a qualified heritage specialist; - be undertaken in line with GN 326 Appendix 6; and - for HIA submitted to SAHRA the report must also comply with the requirements of the “2007 Minimum Standards: Archaeological and Palaeontological Components of Impact Assessment Reports”, accessible at https://sahris.sahra.org.za.	- meet the requirements of section 38(3) of the NHRA or section 41(1) of the KNARIA should the development be in KZN; - must be undertaken by a qualified palaeontological specialist; - be undertaken in line with GN 326 Appendix 6; and - for PIA submitted to SAHRA, the report must comply with the requirements of the “2012 Minimum Standards: Palaeontological Components of Heritage Impact Assessments” [sic], accessible at https://sahris.sahra.org.za.

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According to the heritage screening report, the project area has a **Low Heritage Sensitivity**



Heritage Screening Report Map

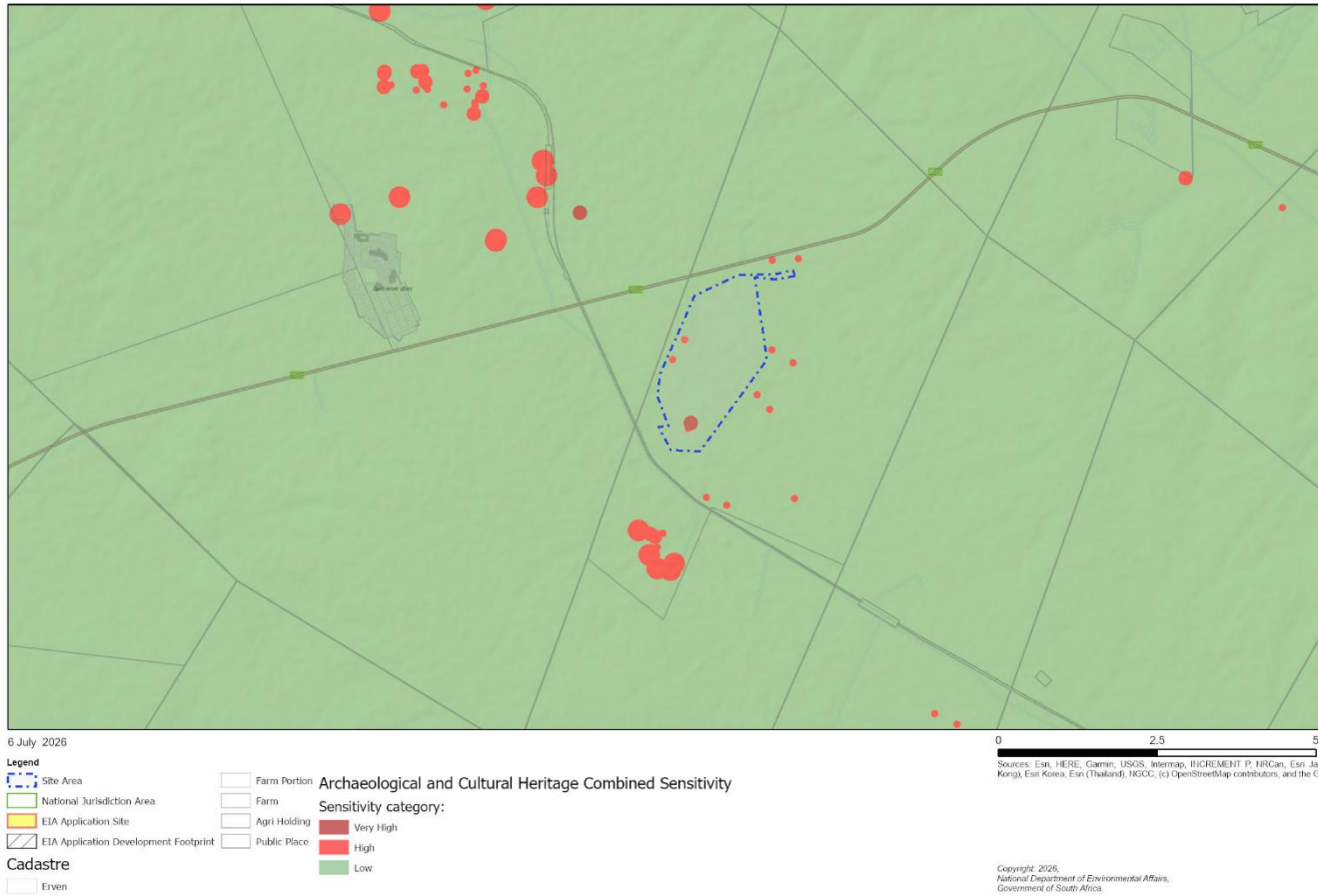


Figure 9). The fieldwork is in agreement with the screening report as no cultural heritage resources were located in the area.

1.4.4 National Heritage Resources Act (Act 25 of 1999) as amended

- 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 Resources 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.

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Section 24(2) of the National Environmental Management Act (Act 107 of 1998) as amended (NEMA) requires environmental authorisation from the environmental authority for certain activities that have been identified and must undergo an EIA or BA process. Similarly, section 38 of the 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 co-ordination 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 a HIA, it must be conducted as one of the EIA specialist studies.

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

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

2 TECHNICAL DETAILS OF THE PROJECT

2.1 Locality

The study area is located near 30km West of Danielskuil along the R385 (**Figure 2**).

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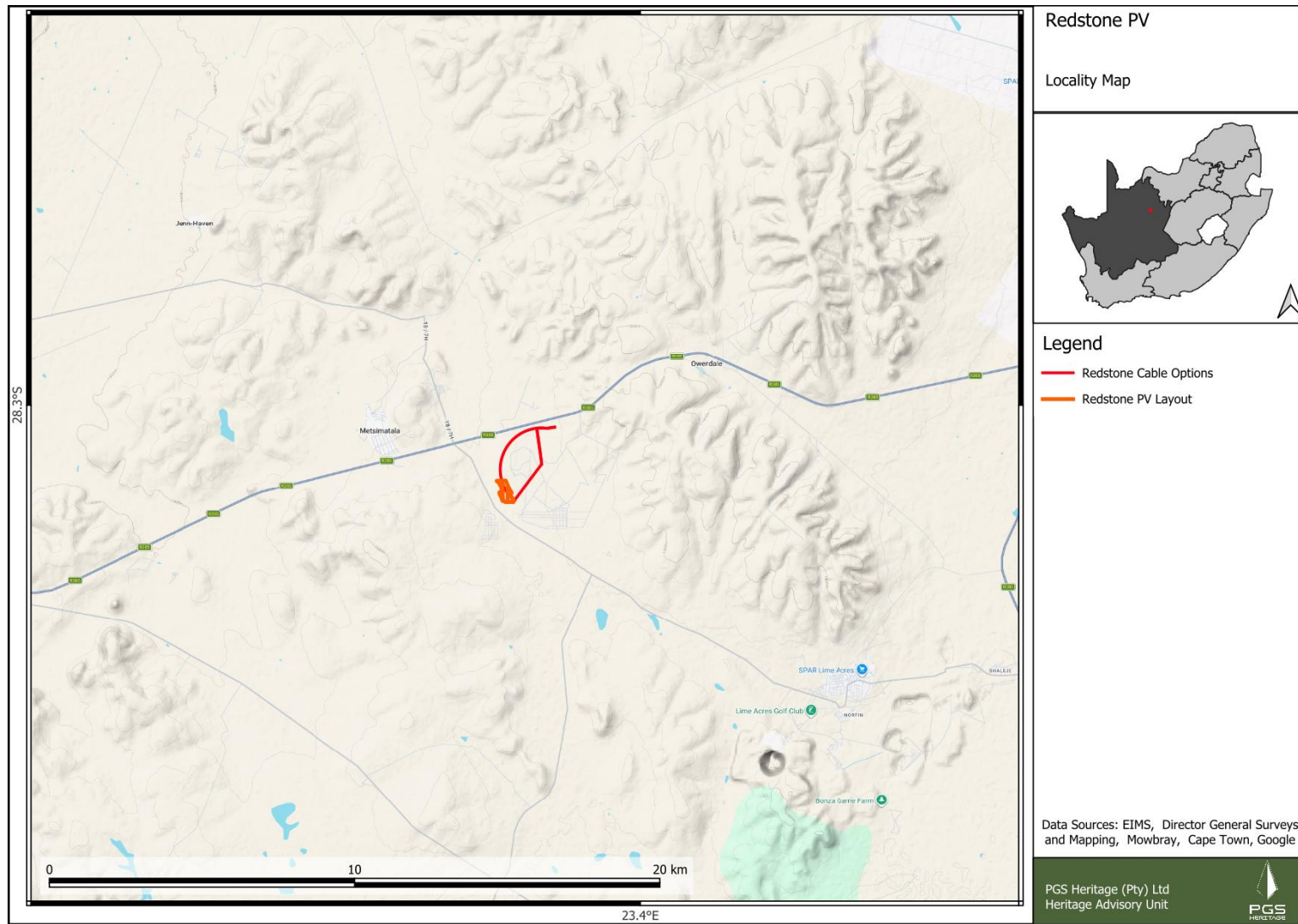


Figure 2 – Redstone PV locality map.

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2.2 Technical Project Description

2.2.1 Project description

The proposed Redstone Solar Photovoltaic (PV) Facility and Battery Energy Storage System (BESS) will be developed within the existing Redstone Concentrated Solar Power (CSP) project area on the Remaining Extent of Farm 469 near Postmasburg in the Northern Cape. The project is intended to provide a dedicated renewable energy source for the auxiliary electricity requirements of the operational Redstone CSP facility, thereby reducing reliance on externally supplied electricity and improving overall operational efficiency.

The PV facility will comprise a solar array with a generation capacity of up to approximately 19.5 MW (DC) and a design capacity of approximately 15 MW (AC), covering an area of approximately 19.5 ha. The facility will include associated electrical infrastructure such as inverter stations, transformers, underground cabling, and connection infrastructure linked to the CSP internal electrical network.

To enhance system reliability and operational flexibility, the project will include a Battery Energy Storage System (BESS) with a storage capacity of up to approximately 30 MWh. The BESS will store surplus solar energy generated during peak production periods and provide dispatchable power when required, ensuring a stable and reliable auxiliary power supply to the CSP facility. Battery units will be housed within containerised enclosures and integrated into the site's electrical infrastructure.

The project will utilise existing access roads, services, and operational infrastructure associated with the Redstone CSP facility wherever possible, thereby minimising the need for additional infrastructure development and reducing the overall environmental footprint of the development.

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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 Redstone PV. The applicable maps, tables and figures are included, as stipulated in the NHRA and NEMA. The HIA process consists of three steps:

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

Step II – Physical Survey: A physical survey was conducted by a combination of vehicle and pedestrian access through the proposed project area by one qualified heritage specialist and one field assistant and was aimed at locating and documenting sites falling within and adjacent to the proposed development footprint (see Section 4.3).

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 reporting, 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 - <10/50 m²
 - Medium - 10-50/50 m²
 - High - >50/50 m²
- 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

The applied site significance classification standards are based on the heritage classification of section 3 of the NHRA and developed for implementation according to the grading system approved

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by SAHRA for AIA. The updated classification and rating system as developed by Heritage Western Cape (HWC) (2021) was implemented in this report

Site significance classification standards prescribed by the HWC Guideline (2016), were used for the purposes of this report (**Table 3** and **Table 4**).

Table 3: Rating system for archaeological resources.

Grading	Description of Resource	Examples of Possible Management Strategies	Heritage Significance
I	Heritage resources with qualities so exceptional that they are of special national significance. Current examples: Langebaanweg (West Coast Fossil Park), Cradle of Humankind	May be declared as a National Heritage Site managed by SAHRA. Specific mitigation and scientific investigation can be permitted in certain circumstances with sufficient motivation.	Highest Significance
II	Heritage resources with special qualities which make them significant, but do not fulfil the criteria for Grade I status. Current examples: Blombos, Paternoster Midden.	May be declared as a Provincial Heritage Site managed by a Provincial Heritage Authority (PHRA). 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 NHRA 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

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Grading	Description of Resource	Examples of Possible Management Strategies	Heritage Significance
Not Conservation Worthy (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 4: Rating system for built environment resources.

Grading	Description of Resource	Examples of Possible Management Strategies	Heritage Significance
I	Heritage resources with qualities so exceptional that they are of special national significance. Current examples: Robben Island	May be declared as a National Heritage Site managed by SAHRA.	Highest Significance
II	Heritage resources with special qualities which make them significant in the context of a province or region, but do not fulfil the criteria for Grade I status. Current examples: St George's Cathedral, Community House	May be declared as a Provincial Heritage Site managed by Provincial Heritage Authority.	Exceptionally High Significance
II	Such a resource contributes to the environmental quality or cultural significance of a larger area and fulfils one of the criteria set out in section 3(3) of the NHRA 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

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Grading	Description of Resource	Examples of Possible Management Strategies	Heritage Significance
IIIC	Such a resource is of contributing significance to the environs. These are heritage resources which are significant in the context of a streetscape or direct neighbourhood.	This grading is applied to buildings and/or sites whose significance is contextual, i.e. in large part due to its contribution to the character or significance of the environs. These buildings and sites should, as a consequence, only be regulated if the significance of the environs is sufficient to warrant protective measures, regardless of whether the site falls within a Conservation or Heritage Area. Internal alterations should not necessarily be regulated.	Low Significance
NCW	A resource that, after appropriate investigation, has been determined to not have enough heritage significance to be retained as part of the National Estate.	No further actions under the NHRA are required. This must be motivated by the applicant and approved by the authority. Section 34 of the NHRA 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 PGS and is explained in **Appendix A**.

4 CURRENT STATUS QUO

4.1 Site Description

The Redstone PV plant is situated adjacent to the south of the Redstone CSP (**Figure 3**). It is located on a farm in which sheep husbandry is taking place (**Figure 4**). Although the farm is adjacent to the CSP, they are separated by gates and a fence (**Figure 5**).

Vegetation in the development footprint is mainly characterised by the Ghaap Plateau Vaalbosveld. Due to its proximity to Kuruman, other vegetation types in the area also consist of the Kuruman Mountain Bushveld and Thornveld. The Ghaap Plateau Vaalbosveld consists of an open shrubland with dense patchy shrubland areas with a well-developed grass layer and substantial wood species such as Acacias and Vaalbos (Mucina and Rutherford, 2006, **Figure 6**).

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Figure 3 – Redstone CSP to the north of the study area.



Figure 4 – Sheep husbandry in the area.



Figure 5 – Outer CSP fence separating the study area from the existing CSP.



Figure 6 - Mixture of open and dense shrublands.

4.2 Overview of the study area and surrounding landscape

DATE	DESCRIPTION
The Study Area and Surroundings during the Stone Age	
The archaeological literature does not contain much information on the Stone Age archaeology of this area. It is likely that this reflects a lack of research rather than the fact that Stone Age sites are not found in this area.	
2.5 million to 250 000 years ago	The Earlier Stone Age (ESA) is the first and oldest 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 to approximately 1.5 million years ago.

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	The Kuruman area has a very long Stone Age record, especially in and around the Kuruman Hills. The most important nearby site is Wonderwerk Cave (70km N of the study area), a National Heritage Site between Danielskuil and Kuruman, which preserves archaeological deposits spanning the Earlier, Middle and Later Stone Ages, with evidence of human activity extending back perhaps close to 2 million years (sahra.org.za). The cave has yielded Earlier Stone Age material, Acheulean hand-axe traditions, Middle Stone Age deposits, pigment use, engraved objects, Later Stone Age artefacts, ostrich-eggshell beads and rock art (wonderwerkcaves.com). Another great example of both an earlier Stone Age and Middle Stone Age site is the Kathu complex just east of the Sishen Mine (Beaumont 2004).
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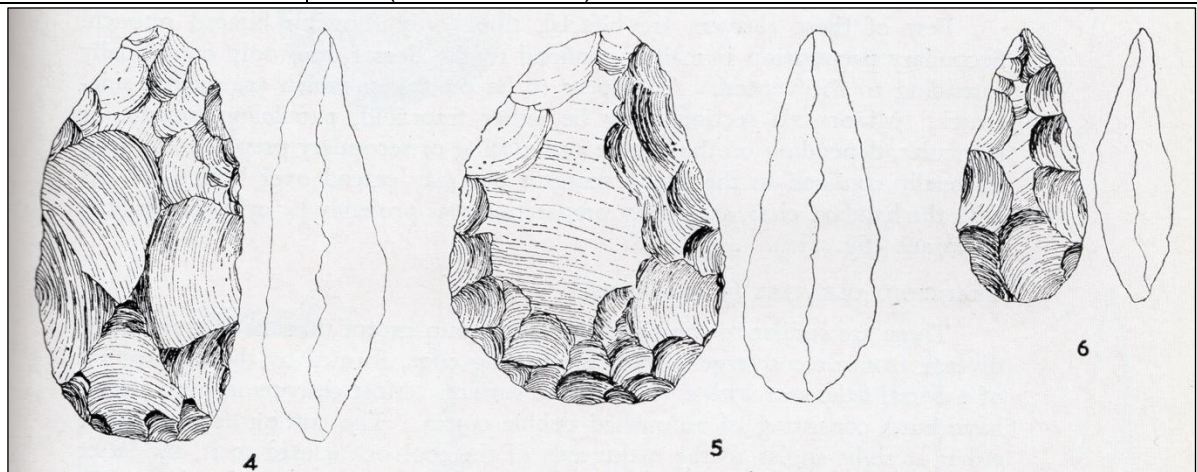


Figure 7 – Example of Early Stone Age handaxes associated with the Later Acheulian. These handaxes were identified at Blaaubank near Rooiberg. Cropped section of an illustration published in Mason (1962:199).

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. An important Middle Stone Age locality is Ga-Mohana Hill North Rock Shelter, about 82 km north-west of Kuruman, where stratified Middle and Later Stone Age deposits include knapped stone artefacts, fauna, ostrich eggshell fragments and beads, with the oldest Middle Stone Age occupation dated to around 105 000 years ago (Wilkins 2023).
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. A well-known feature of the Later Stone Age is rock art in the form of rock paintings and engravings. As described above, an important example of later Stone Age material is from the Ga-Mohana Hill North Rock Shelter which also contains rock art which can often be associated with the later Stone Age (Wilkins 2023). These sites highlight the reusability of the Kuruman landscape by hunter-gatherer peoples, especially around hills, shelters, pans and water sources.
The Study Area and Surroundings during the Iron Age	
1600s – 1800s	Evidence for Iron Age sites within the broader Kuruman–southern Kalahari region is more sparse than the Stone Age record. There are no substantial Iron Age sites near the study area. The closest Iron Age site is located 75km northwest of the study area on a ridge just above the Mashoweng River and is known as Dithakong. The site was roughly inhabited from 1600s into the

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	historical period around the early 1800s. The site contains extensive dry-stone walling, which is a part of the Type Z settlement. Stone walling is highly associated with farmer communities and peoples of the Iron Age (https://en.wikipedia.org/wiki/Dithakong).
The Study Area and Surroundings during the Historical Period	
The Historical Period within the study area and surroundings commenced with the arrival of newcomers to this area. Kuruman became closely associated with the Tswana-speaking communities of the region and with the major spring known as Gasegonyane or the Eye of Kuruman, which provided a reliable water source in the semi-arid Kalahari-edge landscape (visitkuruman.co.za). The area later became an important mission centre when the London Missionary Society established a mission in the Kuruman area in 1816. The mission moved to its present site at Seodin in 1824 (visitkuruman.co.za). Robert and Mary Moffat lived and worked there for much of the 19th century, and the mission became famous for education, printing and the translation of the Bible into Setswana. The Moffat Church was completed in 1838, before the formal town of Kuruman was laid out (visitkuruman.co.za). Kuruman later developed as a colonial and settlement centre, supported by water from the Eye, agriculture, cattle farming, transport routes and mining activity in the surrounding Northern Cape landscape.	
The Study Area and Surroundings during the South African War	
On 11 October 1899 war broke out between Britain and the two Boer republics of the Orange Free State and Transvaal (Zuid-Afrikaansche Republiek). The war-ravaged large parts of South Africa for almost three years. One of the features of this conflict was the early use of concentration camps to control the movement of the enemies of the British, as well as besieging British towns.	
1899 - 1900	During the South African War (1899-1902) a number of battles and skirmishes were fought in the wider area, though none inside the present development area. An example of a battle which took place in the area, however, consists of the Siege of Kuruman. The siege of Kuruman took place between November 12, 1899, to January 1, 1900, during the Second Anglo-Boer War. The town was besieged by a large Boer force led by General J.P. Snyman and defended by approximately 35 Cape Police officers under Captain Bates, 30 local civilians, and around 50 local tribesmen. Although the Boer force vastly outnumbered the British defence, the British defence with the help of the locals managed to hold the Boer force back for 7 weeks. However, due to the size of the Boer force, they eventually successfully besieged the town of Kuruman on the 12 November 1900, only sustaining 3 deaths and 15 injuries (www.battletoursza.com).
The Study Area and Surroundings during the Twentieth Century	
The general surroundings of the study area underwent significant changes and development during the twentieth century, including the further establishment and development of asbestos mines as well as extensive development of farms in the area.	
Late 1800s – 2002/2003	Asbestos Mining started predominantly around Prieska in the late 1800s and then extended to Kuruman by the early 1900s. During the first world war, blue asbestos mining in the Kuruman and Prieska areas boomed due to the highly sought after heat resistant, insulation, and industrial properties of the blue asbestos. However, due to the dangers of inhaling blue asbestos for both the miners and nearby settlements, the mining industry declined around 1975. Consequently, around 2002/2003, mining of blue asbestos completely halted (teWaterNaude 2014).

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 assessed, by overlaying the study

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area on the images or map sheets, to observe the development of the area and to identify and locate historical structures, possible BGG and/or archaeological sites protected under section 34 and 36 of the NHRA, present in, or immediately adjacent to, the area.

Historical topographic maps 1:50 000 scale **2823AD** - current and historical editions (1970 and current) were available for utilisation in the background study. As can be seen on the historical maps (**Figure 8**), the area had been left open with a nearby railway track and some farmsteads outside the study area.

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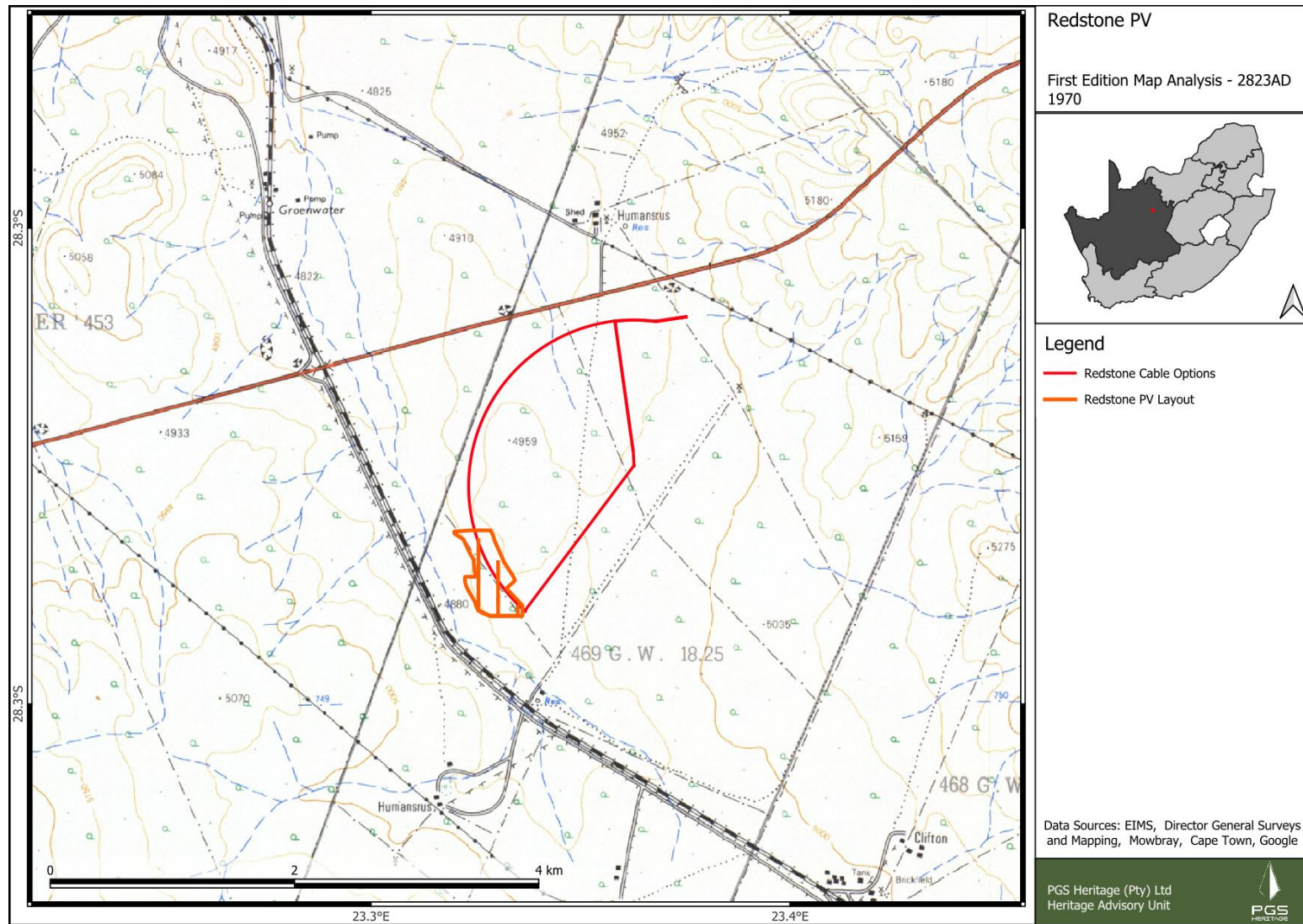


Figure 8 – A First Edition historical map from 2823AD 1970.

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

A search of the 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:

- Webley, L. & Halkett, D. 2008. Phase 1 Heritage Impact Assessment: Proposed Prospecting on the Farms Adams 328 and Erin 316, Kuruman, Ga-Segonyana Municipality, Northern Cape. Archaeology Contracts Office, University of Cape Town, prepared for Zama Mining Resources (Pty) Ltd. **The study identified several heritage resources, including two ephemeral Middle Stone Age scatters, graves, possible hand-excavated wells, twentieth-century farm buildings, workers' cottages, kraals, dams, boreholes and a small MSA/LSA artefact scatter near a well.**
- Pelser, A.J. 2012. Report on an Archaeological Impact Assessment for the Proposed Housing Development on Erf 675, Kuruman, Northern Cape. Archaeos Culture & Cultural Resource Consultants. **A number of low significance stone tools were located across the study area.**
- Van Der Walt, J. 2012. Archaeological Impact Assessment for the Proposed Prospecting Right of a Quarry on the Farm Gamohaam 438 Portion 1, Kuruman Magisterial District. Heritage Contracts and Archaeological Consulting CC, prepared for Site Plan Consulting CC / Afrimat. **No heritage sites were located during the study.**
- Wiltshire, N. 2018. Kuruman WEF for the Proposed Development of the Phase 2 Kuruman Wind Farm Facility, Kuruman, Northern Cape Province: Scoping Report. CTS Heritage. **The study identified Early, Middle and Later Stone Age sites, possible rock art, ruined farm infrastructure, old mines, graves and burial grounds, built-environment resources and some mining heritage sites.**
- Matabane, A.M. 2021. A Heritage Impact Assessment Report for the Proposed Construction of the N14/R31 Bypass Road in Kuruman, Ga-Segonyane Local Municipality, Northern Cape Province, South Africa. Reach Archaeology Consulting, prepared for Lesekha Consulting. **The study identified a historical resource which consists of the historical Kuruman Nature Reserve entrance gate.**
- Fivaz, H. & Engelbrecht, J. 2021. Phase 1 HIA Report: Proposed Subdivision, Rezoning and Development of Erf 4440, Kuruman, Ga-Segonyana Local Municipality, John Taolo Gaetsewe District Municipality, Northern Cape. Ubique Heritage Consultants, prepared for EnviroAfrica. **The study identified one isolated Middle Stone Age lithic and one unfenced Burial ground.**

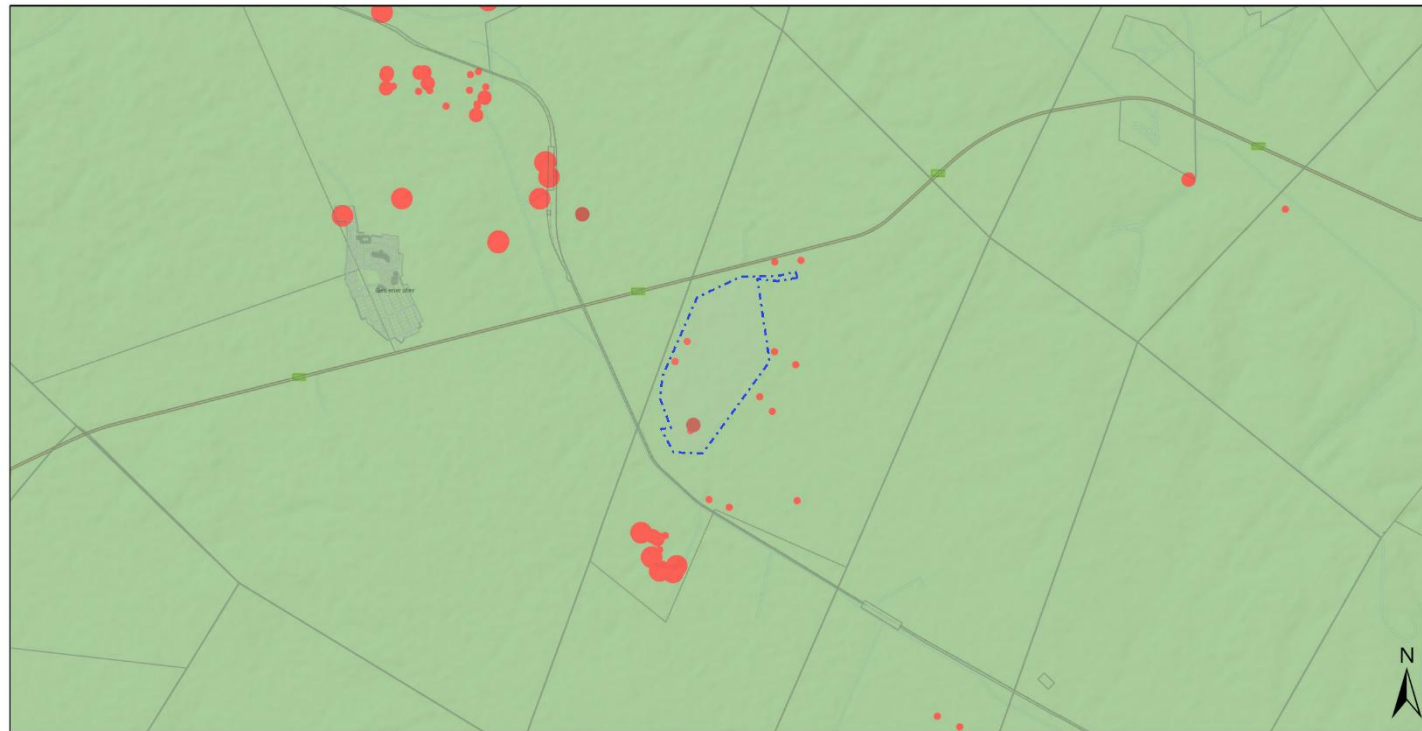
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4.2.3 *Heritage screening*

A heritage screening was conducted by means of the DFFE National Web-based Environmental Screening Tool as required GN 982. According to the heritage screening report, the project area has a Low Heritage Sensitivity (**Figure 9**). The fieldwork is in agreement with the sensitivity suggested by the DFFE screening tool, as no heritage resources were located.

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Heritage Screening Report Map



6 July 2026

Legend

-  Site Area
-  National Jurisdiction Area
-  EIA Application Site
-  EIA Application Development Footprint

Cadastre

-  Erven

-  Farm Portion
-  Farm
-  Agri Holding
-  Public Place

Archaeological and Cultural Heritage Combined Sensitivity

Sensitivity category:

-  Very High
-  High
-  Low

0 2.5 5 km

Sources: Esri, HERE, Garmin, USGS, Intermap, INCREMENT P, NRCan, Esri Japan, METI, Esri China (Hong Kong), Esri Korea, Esri (Thailand), NGCC, (c) OpenStreetMap contributors, and the GIS User Community

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National Department of Environmental Affairs,
Government of South Africa.

Figure 9 – Screening tool map indicating a low sensitivity for Cultural Heritage.

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4.2.4 Heritage sensitivity

Analysis of topographical 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 the NHRA. **Table 5** lists the possible tangible heritage sites identified in the vicinity of the study area and the relevant legislative protection.

Table 5: Tangible heritage site in the study area.

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

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

Table 6: Landform type to heritage find matrix.

LANDFORM TYPE	HERITAGE TYPE
Crest and foot hill	LSA and MSA scatters, Late Iron Age (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 findings¹

The fieldwork was conducted on the 30th June 2026. Their movement on site was tracked by means of Global Positioning System (GPS) indicated as tracklogs on the map in **Figure 10**.

During the study, no heritage resources were identified or located in the study area.

¹ Site in this context refers to a place where a heritage resource is located and not a proclaimed heritage site as contemplated under Section 27 of the NHRA.

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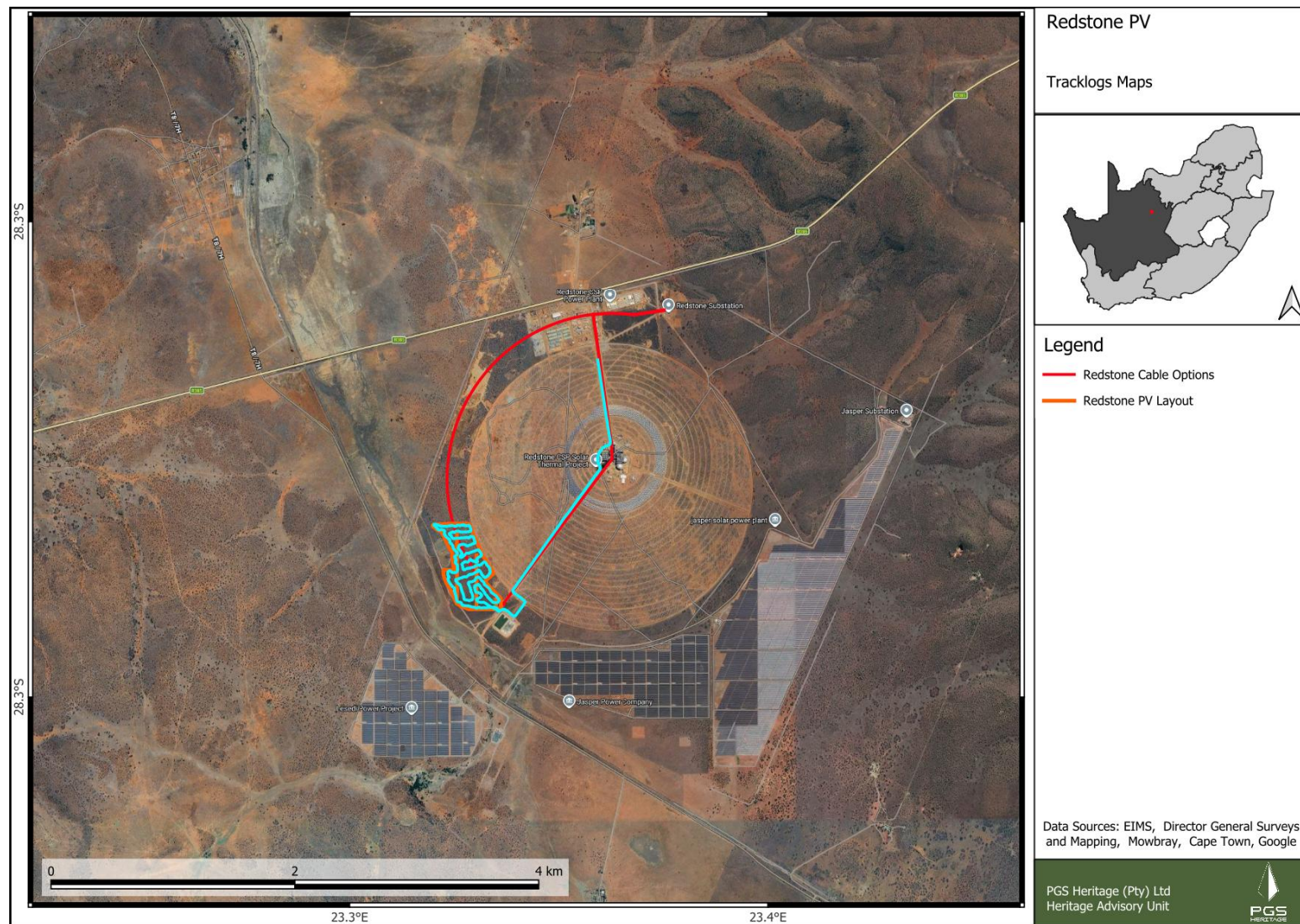


Figure 10 – Fieldwork tracklogs (tracks in light blue).

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4.4 Palaeontology

A standalone Palaeontological Desktop Assessment (PDA) was done by Elize Butler (Associate Palaeontologist for PGS Heritage; see Butler 2026).

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 Redstone PV study area:

5.1 Details of all alternatives considered

5.1.1 NO-GO ALTERNATIVE

This alternative considers the option of the proposed project not being undertaken.

5.2 Impact assessment summary table

Implementing the impact assessment methodology as supplied by EIMS, provides an assessment of the impacts of the proposed project.

5.2.1 Chance Finds

The HIA notes that the archaeological significance and potential of archaeology in the area is rated as **Low**. The impact significance for chance finds is rated as Negative **Medium** before and **Low** after mitigation.

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Table 7: Chance Finds.

Identifier	Discipline	Impact	Alternative	Phase	Event	Pre-Nature	Pre-Extent	Pre-Duration	Pre-Magnitude	Pre-Reversibility	Consequence	Pre-Probability	Pre-Mitigation Significance	Pre-Mitigation Significance	Post-Nature	Post-Extent	Post-Duration	Post-Magnitude	Post-Reversibility	Consequence2	Post-Probability	Post-mitigation Significance Score	Post-Mitigation Significance	Confidence	Cumulative Impact	Irreplaceable loss	Priority Factor	Final score	Final Significance
1	Heritage & Archaeology	Damage/destruction to unknown archaeological and heritage material		Construction	Normal operations or events	- 1	2	5	2	5	- 3, 5	2	- 7	Medium -	- 1	2	5	1	5	- 3, 25	1	- 3, 25	Low -	Low	1	1	1, 00	3, 25	Low -

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5.3 Cumulative Impacts

Although there was a lack of cultural heritage resources located within the study area, the previous HIA by Webley (2010) and Fourie (2011) identified various cultural heritage resources within the area, primarily stone tool sites and BGGs. Due to the subterranean nature of heritage finds and previous stone tools located within the area, the cumulative impact is slightly higher. However, it is still considered low from a heritage perspective.

6 MANAGEMENT RECOMMENDATIONS AND GUIDELINES

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

6.1 Construction and operational phases

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

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

During the construction phase, it is important to recognise any significant material being unearthed, making the correct judgment on which actions should be taken. It is recommended that the following Chance Finds Procedure (CFP) 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 Environmental Control Officer (ECO) as well as team leaders in the identification of heritage resources and artefacts **during the implementation of the Environmental Management Program (EMPr)**.
- An appropriately qualified heritage practitioner/archaeologist must be identified to be called upon in the event that any possible heritage resources or artefacts are identified.

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- 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 a 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 context as identified during the desktop and fieldwork phase. Soil clearance for infrastructure as well as the proposed reclamation activities, could uncover the following:

- Unmarked BGG
- Iron Age artefacts such as ceramics and metal tools
- Stone Age concentrations

6.4 Timeframes

It must be kept in mind that mitigation and monitoring of heritage resources discovered during construction activity will require permitting for collection or excavation of heritage resources and lead times must be worked into the construction time frames. **Table 8** gives guidelines for lead times on permitting.

Table 8: Lead times for permitting and mobilisation.

Action	Responsibility	Timeframe
Preparation for field monitoring and finalisation of contracts	The contractor and service provider	1 month
Application for permits to do necessary mitigation work	Service provider – Archaeologist and SAHRA	3 months
Documentation, excavation and archaeological report on the relevant site	Service provider – Archaeologist	3 months
Handling of chance finds – BGG/Human Remains	Service provider – Archaeologist and SAHRA	2 weeks
Relocation of BGG affected by the development	Service provider – Archaeologist, SAHRA, Local and Provincial Government	6 months

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6.5 Heritage Management Plan for Environmental Management Plan

Table 9: Heritage Management Plan for EMP 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/Unknown archaeological finds	Implement a chance to find procedure in cases where possible heritage finds are uncovered.	Construction	During construction	Applicant (i.e. Applicant's Project/site Manager) Contractor's ESO 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

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7 CONCLUSIONS AND RECOMMENDATIONS

PGS was appointed by EIMS to undertake a HIA for the Redstone PV in the Kgatelopele Local Municipality, Mgcwau District, Northern Cape Province.

During the study, no cultural heritage resources were located or identified within the study area.

Palaeontology

A standalone PDA was done by Elize Butler (Associate Palaeontologist for PGS Heritage; see Butler 2026).

7.1 Mitigation measures

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

7.2 General

It is the combined considered opinion of the heritage specialists that the proposed project will have no direct impact on any identified heritage resources in the study area. However, due to the subterranean nature of heritage resources, a chance finds procedure must be implemented if any unknown heritage resources are to be uncovered.

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

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<https://en.wikipedia.org/wiki/Dithakong>

<https://www.Moffat Mission - Visit Kuruman.co.za>

<https://en.wikipedia.org/wiki/Kuruman>

<https://www.sahra.org.za/wonderwerk-cave>

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APPENDIX A

EIMS Impact Methodology

EIMS: IMPACT ASSESSMENT METHODOLOGY

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 approach may be altered or substituted on a case-by-case basis if the specific aspect being assessed requires such- such instances require prior EIMS Project Manager approval. The broad approach to the significance rating methodology is to determine the significance (S) of an environmental risk or impact by considering the consequence (C) of each impact (comprising Nature, Extent, Duration, Magnitude, and Reversibility) and relating this to the probability/ likelihood (P) of the impact occurring. The S 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 S to determine the overall final significance rating (FS). The impact assessment will be applied to all identified alternatives.

Determination of Significance

The final significance (FS) of an impact or risk is determined by applying a prioritisation factor (PF) to the post-mitigation environmental significance. The significance 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 below.

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Criteria for Determining Impact Consequence

Aspect	Score	Definition
Nature	- 1	Likely to result in a negative/ detrimental impact
	+1	Likely to result in a positive/ beneficial impact
Extent	1	Activity (i.e. Highly localised, limited to the area applicable to the specific activity)
	2	Site (i.e. within the development property or site boundary, or the area within a few hundred meters of the site)
	3	Local (i.e. beyond the site boundary within the Local administrative boundary (e.g. Local Municipality) or within consistent local geographical features, or the area within 5 km of the site)
	4	Regional (i.e. Far beyond the site boundary, beyond the Local administrative boundaries within the Regional administrative boundaries (e.g. District Municipality), or extends into different distinct geographical features, or extends between 5 and 50 km from the site).
	5	Provincial / National / International (i.e. extends into numerous distinct geographical features, or extends beyond 50 km from the site).
Duration	1	Immediate (<1 year, quickly reversible)
	2	Short term (1-5 years, less than project lifespan)
	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/ operation/ decommissioning).
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, or affected environmental components are already degraded)
	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; or where change affects area of potential conservation or other value, or use of resources).
	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; or where change affects high conservation value areas or species of conservation concern)

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	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; or disturbance to pristine areas of critical conservation value or critically endangered species)
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 very high time and cost.
	5	Irreversible Impact.

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

It is noted that both environmental risks as well as environmental impacts should be identified and assessed. Environmental Risk can be regarded as the potential for something harmful to happen to the environment, and in many instances is not regarded as something that is expected to occur during normal operations or events (e.g. unplanned fuel or oil spills at a construction site). Probability and likelihood are key determinants or variables of environmental risk. Environmental Impact can be regarded as the actual effect or change that happens to the environment because of an activity and is typically an effect that is expected from normal operations or events (e.g. vegetation clearance from site development results in loss of species of concern). Typically, the probability of an unmitigated environmental impact is regarded as highly likely or certain (management and mitigation measures would ideally aim to reduce this likelihood where possible). In summary, environmental risk is about what could happen, while environmental impact is about what does happen.

Probability/ Likelihood Scoring

Probability	1	Improbable (Rare, the event may occur only in exceptional circumstances, the possibility of the impact materialising is very low as a result of design, historic experience, or implementation of adequate corrective actions; <5% chance).
	2	Low probability (Unlikely, impact could occur but not realistically expected; >5% and <20% chance).
	3	Medium probability (Possible, the impact may occur; >20% and <50% chance).
	4	High probability (Likely, it is most probable that the impact will occur- > 50 and <90% chance).
	5	Definite (Almost certain, the impact is expected to, or will, occur, >90% chance).

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

$$S = C \times P$$

Determination of Significance

5- Very High ¹	5	10	15	20	25
4- High	4	8	12	16	20
3- Medium	3	6	9	12	15

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	2- Low	2	4	6	8	10
	1- Very low	1	2	3	4	5

¹ In the event that an impact or risk has very high or catastrophic consequences, but the likelihood/probability is low, then the resultant significance would be Low-medium. This does in certain instances detract from the relative important of this impact or risk and must consequently be flagged for further specific consideration, management, mitigation, or contingency planning

		1- Improbable	2- Low	3- Medium/ Possible	4- High/ Probable	5- Highly likely/ Definite
	Probability					

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

Significance Scores

S Score	Description
≤4.25	Low (i.e. where this impact is unlikely to be a significant environmental risk/ reward).
>4.25, ≤8.5	Low-Medium (i.e. where the impact could have a significant environmental risk/ reward).
>8.5, ≤13.75	High-Medium (i.e. where the impact could have a significant environmental risk/ reward).
>13.75	High (i.e. where the impact will have a significant environmental risk/ reward).

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

Impact Prioritization

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

Cumulative impacts; and

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 impacts' post-mitigation significance (post-mitigation). This prioritisation factor does not aim to detract from the significance 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 post-mitigation significance based on the assumption that relevant suggested management/mitigation impacts are implemented.

Table 5: Criteria for Determining Prioritisation

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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.
	Low (1)	Where the impact is unlikely to result in irreplaceable loss of resources.

Irreplaceable Loss of Resources (LR)	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:

$$\text{Priority} = CI + LR$$

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 below).

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 (FS), the PF is multiplied by the post-mitigation significance 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 higher significance).

Final Environmental Significance Rating

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Significance Rating	Description
<-25	Very High (Impacts in this class are extremely significant and pose a very high environmental risk. In certain instances these may represent a fatal flaw. They are likely to have a major influence on the decision and may be difficult or impossible to mitigate. Offset's may be necessary).
<-13.75 to -25	High negative (These impacts are significant and must be carefully considered in the decision-making process. They have a high environmental risk or impact and require extensive mitigation measures).
-8.5 to -13.75	Medium-High negative (i.e. Impacts in this class are more substantial and could have a significant environmental risk. They may influence the decision to develop in the area and require more robust mitigation measures).
<-4.25 to <-8.5	Medium- Low negative (i.e. These impacts are slightly more significant than low impacts but still do not pose a major environmental risk. They might require some mitigation measures but are generally manageable).

Significance Rating	Description
-1 to -4.25	Low negative (i.e. Impacts in this class are minor and unlikely to have a significant environmental risk. They do not influence the decision to develop in the area and are typically easily mitigated).
0	No impact
1 to 4.25	Low positive
>4.25 to <8.5	Medium-Low positive
8.5 to 13.75	Medium-High positive
>13.75	High positive

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.

Nature	-1	Likely to result in a negative/ detrimental impact	CONSEQUENCE	ENVIRONMENTAL SIGNIFICANCE
	1	Likely to result in a positive/ beneficial impact		
Extent	1	Activity (i.e. Highly localised, limited to the area applicable to the specific activity)		
	2	Site (i.e. within the development property or site boundary, or the area within a few hundred meters of the site)		
	3	Local (i.e. beyond the site boundary within the Local administrative boundary (e.g. Local Municipality) or within consistent local geographical features, or the area within 5 km of the site)		

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	4	Regional (i.e. Far beyond the site boundary, beyond the Local administrative boundaries within the Regional administrative boundaries (e.g. District Municipality), or extends into different distinct geographical features, or extends between 5 and 50 km from the site).		
	5	Provincial / National / International (i.e. extends into numerous distinct geographical features, or extends beyond 50 km from the site).		
Duration	1	Immediate (<1 year, quickly reversible)		
	2	Short term (1-5 years, less than project lifespan)		
	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/ operation/ decommissioning).		
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, or affected environmental components are already degraded)		
	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; or where change affects area of potential conservation or other value, or use of resources).		
	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; or where change affects high conservation value areas or species of conservation concern)		
	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; or disturbance to pristine areas of critical conservation value or critically endangered species)		
Reversibility	1	Impact is reversible without any time and cost.		
	2	Impact is reversible without incurring significant time and cost.		
	3	Impact is reversible only by incurring significant time and cost.		
	4	Impact is reversible only by incurring prohibitively high time and cost.		
	5	Irreversible Impact		
Probability	1	Improbable (Rare, the event may occur only in exceptional circumstances, the possibility of the impact materialising is very low as a result of design, historic experience, or implementation of adequate corrective actions; <5% chance).	PROBABILITY	
	2	Low probability (Unlikely, impact could occur but not realistically expected; >5% and <20% chance).		
	3	Medium probability (Possible, the impact may occur; >20% and <50% chance).		
	4	High probability (Likely, it is most probable that the impact will occur - > 50 and <90% chance).		
	5	Definite (Almost certain, the impact is expected to, or will, occur, >90% chance).		
Cumulative Impact	1	Low: Considering the potential incremental, interactive, sequential, and synergistic cumulative impacts, it is unlikely that the impact will result in spatial and temporal cumulative change.	PRIORITISATION FACTOR	
	2	Medium: Considering the potential incremental, interactive, sequential, and synergistic cumulative impacts, it is probable that the impact will result in spatial and temporal cumulative change.		

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	3	High: Considering the potential incremental, interactive, sequential, and synergistic cumulative impacts, it is highly probable/definite that the impact will result in spatial and temporal cumulative change.
Irreplaceable loss of resources	1	Low: Where the impact is unlikely to result in irreplaceable loss of resources.
	2	Medium: Where the impact may result in the irreplaceable loss (cannot be replaced or substituted) of resources but the value (services and/or functions) of these resources is limited.
	3	High: Where the impact may result in the irreplaceable loss of resources of high value (services and/or functions).
Degree of Confidence	Low	<30% certain of impact prediction

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APPENDIX B
PGS Team CVs

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DUNCAN MCLEAN

Professional Heritage Practitioner

PROFILE

I hold an advanced degree in Archaeology from the University of Pretoria, with a specialisation in Iron Age studies of Southern Africa and a focus on faunal analysis. My academic background is complemented by practical experience in museum archaeology and heritage management.

Through my studies and laboratory work, I have developed expertise in historical artefact identification and research. My professional experience with PGS Heritage has further honed my skills in archaeological mitigations, site monitoring, and surveys across various scales.

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EDUCATION

University of Pretoria
2020-2022
BA Degree - Majors in Archaeology and Ancient Cultures

University of Pretoria
2023
BA Hons - Archaeology

WORK EXPERIENCE

PGS Heritage – Archaeologist

2025 - present
As a member of the Heritage Advisory Unit for PGS Heritage, I am currently a CRM practitioner focusing on conducting Heritage Impact Assessments, Heritage Management Plans, and Site Sensitivity Verification Reports across the country.

PGS Heritage – Junior Archaeologist

2024- 2025
My experience encompasses leading small teams in various mitigation projects, ranging from small to large-scale, primarily in the Komatipoort region and near Brits. My responsibilities included utilising GPS systems, conducting site and artefact photography, and performing site monitoring. I have conducted archaeological monitoring near Steelpoort and Komatipoort, as well as HIAs, HMPs, and SSVRs.

Internship at PGS Heritage

2023
Assisted with surveys and the processes behind surveying, as well as gained insight into a large-scale mitigation project in the Komatipoort region.

Tutoring

2022
Tutored primarily History at a high school level as opportunities arose.

PROFESSIONAL AFFILIATION

ASAPA Accredited Professional Archaeologist – Association of Southern African Professional Archaeologists

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ALEXANDER ANDREOU

Heritage Practitioner &
Built Environment
Specialist

PROFILE

My professional career includes research, curation, conservation, risk mitigation, critical urbanism, and legislative compliance. I hold two advanced postgraduate degrees; with my MPhil research focusing on (re)interpretation in the archaeological praxis, and my PhD research on the role of heritage built environment and what I coined as 'archived buildings' in the creation and recording of public and social histories.

My work at PGS Heritage is centered on leading the Built Environment Unit, which focuses on the safeguarding and activation of South Africa's historic fabric.

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EDUCATION

University of Pretoria
2011 - 2013
BA Archaeology & Ancient Cultures

University of Pretoria
2015
Post-Graduate Diploma Museum and Heritage Studies

University of Cape Town
2019 - 2021
MPhil Conservation of the Built Environment

University of Pretoria
2023 - 2025
PhD Development Studies (Research Chair for Critical Architecture and Urbanism)

WORK EXPERIENCE

PGS Heritage Group of Companies
(South Africa, Lesotho, Mozambique, and Portugal)
Senior Heritage Specialist
2025 - present

I support the advancement of PGS Heritage's presence within the built heritage sector, providing specialist input on conservation management strategies, interpretive frameworks, and practical application of national heritage legislation within development and planning contexts. My role includes authorship, editorial, and technical review support for HIAs and related reports, as well as archival and historical research.

Nedbank Group Ltd
Heritage & Arts Manager (i.a.)
2016 - 2025

Led a series of dynamic and multidisciplinary roles that blended cultural stewardship with practical management. It ensured that Nedbank's heritage and art assets were safe guarded in alignment with best practice and national legislation. The role wove together archival expertise with strategic initiatives, ensuring the preservation, accessibility, and visibility of the institution's historical legacy.

University of Pretoria Museums
Cultural Officer (i.a.)
2014 - 2016

Championed public engagement, documentation, and preservation across UP's museological collections, specifically the Mapungubwe gold, bone, ivory, and ceramics. I contributed to key research, access, and conservation initiatives through collaborative, community-focused projects and international partnerships.

PROFESSIONAL AFFILIATION

Accredited Heritage Practitioner
Association of Professional Heritage Practitioners

Accredited Archaeologist
Association of Southern African Professional Archaeologists