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REPUBLIC OF SOUTH AFRICA

DETAILS OF THE SPECIALIST, DECLARATION OF INTEREST AND UNDERTAKING UNDER OATH

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Application for authorisation in terms of the National Environmental Management Act, Act No. 107 of 1998, as amended and the Environmental Impact Assessment (EIA) Regulations, 2014, as amended (the Regulations)

PROJECT TITLE

ENVIRONMENTAL AUTHORISATION FOR THE PROPOSED 100MWP PHOTOVOLTAIC PLANT ASSOCIATED WITH THE TUBATSE FERROCHROME SMELTER, STEELPOORT, FETAKGOMO TUBATSE LOCAL MUNICIPALITY, LIMPOPO.

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1. SPECIALIST INFORMATION

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2. DECLARATION BY THE SPECIALIST

I, Wouter Fourie, declare that –

- I act as the independent specialist 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 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 regulation 48 and is punishable in terms of section 24F of the Act.


Signature of the Specialist

PGS Heritage

Name of Company:

Date

22/09/2021

3. UNDERTAKING UNDER OATH/ AFFIRMATION

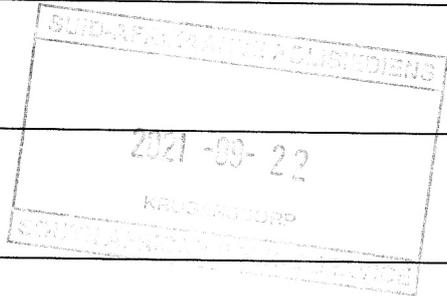
I, Worak Fauri swear under oath / affirm that all the information submitted or to be submitted for the purposes of this application is true and correct.

[Signature]
Signature of the Specialist

POS HERITAGE
Name of Company

27/09/2021
Date

70D43174
[Signature]
Signature of the Commissioner of Oaths



2021-09-22
Date



PGS
HERITAGE

**PROPOSED 100MW PV PLANT AT THE SAMANCOR CHROME
OPERATIONS, STEELPOORT, LIMPOPO**

Heritage Impact Assessment

Issue Date: 20 May 2021
Revision No.: 2.0 (6 September 2021)
Project No.: 514HIA



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Declaration of Independence

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

Disclosure of Vested Interest

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

HERITAGE CONSULTANT:

PGS Heritage (Pty) Ltd

CONTACT PERSON:

Wouter Fourie

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Email: wouter@pgsheritage.com

SIGNATURE:



ACKNOWLEDGEMENT OF RECEIPT

Report Title	<i>Proposed 100MW PV Plant at the Samancor Chrome Operations, Steelpoort, Limpopo</i>		
Control	Name	Signature	Designation
Author	Wouter Fourie		Principal Heritage Specialist
Reviewed			

CLIENT: Royal Haskoning DHV (Pty) Ltd

CONTACT PERSON: Malcolm Roods
 Tel: +27 (0) 11 798 6000
 E-mail: Malcolm.Roods@rhdhv.com

SIGNATURE: _____

EXECUTIVE SUMMARY

PGS Heritage (Pty) Ltd (PGS) was appointed by Royal Haskoning DHV (Pty) Ltd (RHDHV) to undertake a Heritage Impact Assessment (HIA) which will serve to inform the Environmental Impact Assessment (EIA) and Environmental Management Programme (EMPr) for the 100MW PV Plant at the Samancor Chrome Operations, Steelpoort, Limpopo.

Heritage resources are unique and non-renewable and as such, any impact on such resources must be seen as significant. The HIA has shown that the study area and surrounding area has some heritage resources situated within the proposed development boundaries. Through data analysis and a site investigation, the following issues were identified from a heritage perspective.

The HIA has shown that the study area and surrounding area has some heritage resources situated within the proposed development boundaries. Through data analysis and a site investigation, the following issues were identified from a heritage perspective.

Heritage Sites

During the field work several heritage features and resources were identified and logged. A total of 57 points of interest were logged that resulted in the delineation and identification of 24 separate heritage sites. These consist of **five burial grounds** (Site 1-1, 1-7, 2-1, 2-2 and 2-3 this is indicated as a stone feature that could possibly be a grave) with a **High heritage significance and a heritage grading of IIIA**. The **nine historic recent structures**. These are 1-2, 1-3, 1-4, 1-5, 1-6, 2-4, 2-5, 5-5 and 5-7, vary in significance from **medium to low and a grading of IIIB**. The archaeological finds consisting of 9 archaeological sites (Site 3-1, 3-2, Site 4-1, 4-2, and Sites 5-1, 5-2, 5-3, 5-4 and 5-6) has in most cases a rating of **Medium significance and a grading varying between IIIC and IIIA at the highest**. Site 5-8 represents a possible memorial now in disuse it was rated as having a Low heritage significance but with a possible local significance.

Burial Grounds and graves

Burial grounds have a high heritage rating and a heritage grading of IIIA. According to the SAHRA graves management policy a buffer of at least 30-meters must be kept around burial grounds and graves

Archaeological sites

The identified archaeological sites have a low to high heritage significance. Sites alternatives 2, 3 and 5 will have the least impact on identified archaeological sites, although mitigation work will be required for sites 3 and 5 as identified in the management guidelines of this report. The archaeological site identified on site 4 will require extensive mitigation work to mitigate the impact before any development

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

On completion of the mitigation work the developer can apply for a destruction permit with the backing of the mitigation report

Palaeontological Impacts

The SAHRIS Palaeo sensitivity Map rates the palaeontological sensitivity of the geology as low and will only require the inclusion of a chance finds procedure in the EMP.

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

Preceding any collection of fossil material, the specialist would need to apply for a collection permit from SAHRA. Fossil material must be curated in an accredited collection (museum or university collection), while all fieldwork and reports should meet the minimum standards for palaeontological impact studies suggested by SAHRA.

Preferred alternatives

From a heritage perspective the first management principle is conservation in situ. The locality of burial grounds and graves on alternatives Site 1 and Site 2 will require the adjustment of designs for these alternatives, but do not exclude the whole area.

The position and significance of the archaeological sites at site alternatives 3, 4 and 5 will require the implementation of mitigation as described in section 7, however these mitigation measures will be costly for site alternative 4 due to the extent and significance of the archaeological site.

General

It is the author's considered opinion that overall impact on heritage resources can be mitigated to Low with the implementation of mitigation measures. Provided that the recommended mitigation measures are implemented, the impact would be acceptably Low or could be totally mitigated to the degree that the project could be approved from a heritage perspective. The

management and mitigation measures as described in Section 7 of this report have been developed to minimise the project impact on heritage resources.

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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; and
- 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 3 300 000 years ago.

Fossil

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

Heritage

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

Heritage resources

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

- places, buildings, structures, and equipment of cultural significance;
- places to which oral traditions are attached or which are associated with living heritage;
- historical settlements and townscapes;
- landscapes and natural features of cultural significance;
- geological sites of scientific or cultural importance;
- archaeological and palaeontological sites;
- graves and burial grounds, and
- sites of significance relating to the history of slavery in South Africa;

Holocene

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

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 Iron Age

The archaeology of the period between 900-1300AD, associated with the development of the Zimbabwe culture, defined by class distinction and sacred leadership.

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.

Table 1 – List of abbreviations used in this report

Abbreviations	Description
AIA	Archaeological Impact Assessment
APHP	Association of Professional Heritage Practitioners
ASAPA	Association of South African Professional Archaeologists
CRM	Cultural Resource Management
EIA	Environmental Impact Assessment
EMPr	Environmental Management Programme
EIAs practitioner	Environmental Impact Assessment Practitioner
ESA	Earlier Stone Age
GN	Government Notice
GPS	Global Positioning System
HIA	Heritage Impact Assessment
I&AP	Interested & Affected Party
IAIASA	International Association for Impact Assessment South Africa
LCTs	Large Cutting Tools
LIA	Late Iron Age
LSA	Late Stone Age
MIA	Middle Iron Age
MSA	Middle Stone Age
NEMA	National Environmental Management Act, 1998 (Act No 107 of 1998)
NHRA	National Heritage Resources Act, 1999 (Act No 25 of 1999)
NCW	Not Conservation Worthy
PGS	PGS Heritage (Pty) Ltd
PHRA	Provincial Heritage Resources Authority
PIA	Palaeontological Impact Assessment
PSSA	Palaeontological Society of South Africa
SADC	Southern African Development Community
SAHRA	South African Heritage Resources Agency
SAHRIS	South African Heritage Resources Information System

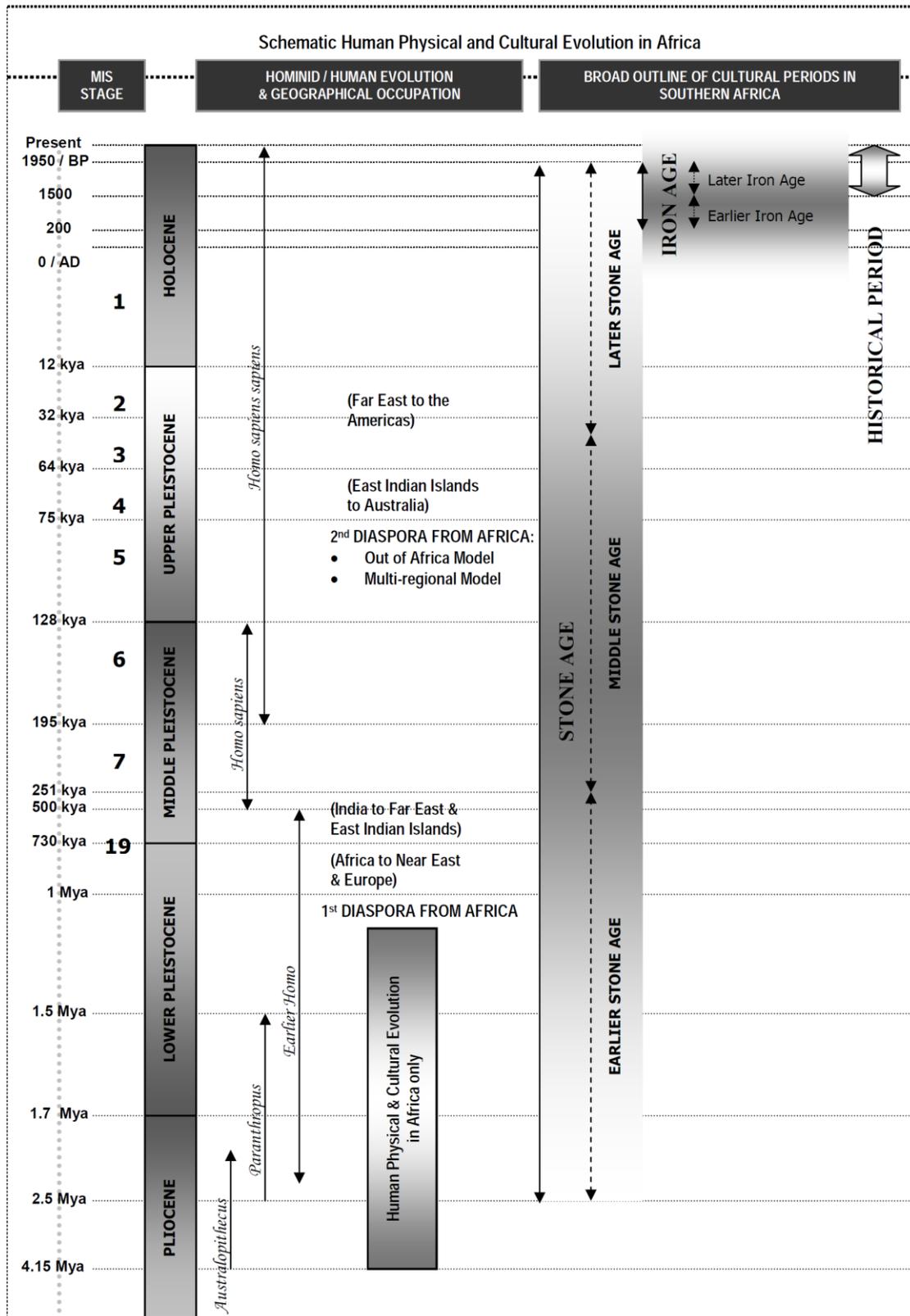


Figure 1 – Human and Cultural Timeline in Africa (Morris, 2008)

1 INTRODUCTION

PGS Heritage (Pty) Ltd (PGS) was appointed by Royal Haskoning DHV (Pty) Ltd (RHDHV) to undertake a Heritage Impact Assessment (HIA) which will serve to inform the Environmental Impact Assessment (EIA) and Environmental Management Programme (EMPr) for the 100MW PV Plant at the Samancor Chrome Operations, Steelpoort, Limpopo.

1.1 Scope of the Study

The aim of the study is to identify possible heritage sites and finds that may occur in the proposed development area. The HIA aims to inform the EIA in the development of a comprehensive EMPr to assist the project applicant in responsibly managing the identified heritage resources in order to protect, preserve, and develop them within the framework provided by the National Heritage Resources Act (Act 25 of 1999) (NHRA).

1.2 Specialist Qualifications

This HIA was compiled by PGS.

The staff at PGS have 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.

Wouter Fourie, the Project Coordinator and author is registered with the 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).

Ruan van der Merwe field archaeologist holds a BA (Hons) in Archaeology.

Wynand van Zyl field archaeologist holds a BA (Hons) in Archaeology.

1.3 Assumptions and Limitations

Not detracting in any way from the comprehensiveness of the research undertaken, it is necessary to realise that the heritage resources located during the desktop research and fieldwork do not necessarily represent all the possible heritage resources present within the area.

Such observed or located heritage features and/or objects may not be disturbed or removed in any way until such time that the heritage specialist has been able to make an assessment as to the significance of the site (or material) in question. This applies to graves and cemeteries as well.

The overall visibility for fieldwork was hampered by dense vegetation on all 5 alternative sites, with site alternative 4 and 5 extremely overgrown.

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 2** and the applicable section in this report noted.

Table 2 - 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 4.5	
2.2 (b) a preliminary on-site inspection to identify if there are any discrepancies with the current use of land and environmental status quo versus the environmental sensitivity as identified on the national web-based environmental screening tool, such as new developments, infrastructure, indigenous/pristine vegetation, etc.	4.1	-
2.3(a) confirms or disputes the current use of the land and environmental sensitivity as identified by the national web-based environmental screening tool;	section 4.1	-
2.3(b) contains motivation and evidence (e.g., photographs) of either the verified or different use of the land and environmental sensitivity;	section 4.1	-

1.4.2 NEMA – Appendix 6 requirements

The HIA report has been compiled considering the NEMA Appendix 6 requirements for specialist reports as indicated in the table below. For ease of reference, the table below provides cross-references to the report sections where these requirements have been addressed. It is important to note, that where something is not applicable to this HIA, this has been indicated in the table below.

Table 3 - Reporting requirements as per NEMA Appendix 6 for specialist reports

Requirements of Appendix 6 – GN R326 EIA Regulations of 7 April 2017	Relevant section in report	Comment where not applicable.
1.(1) (a) (i) Details of the specialist who prepared the report	Page 2 of Report – Contact details and company	-
(ii) The expertise of that person to compile a specialist report including a curriculum vita	Section 1.2 – refer to Appendix B	-
(b) A declaration that the person is independent in a form as may be specified by the competent authority	Page ii of the report	-
(c) An indication of the scope of, and the purpose for which, the report was prepared	Section 2.1	-
(cA) An indication of the quality and age of base data used for the specialist report	Section 3	-
(cB) a description of existing impacts on the site, cumulative impacts of the proposed development and levels of acceptable change;	Section 6	-
(d) The duration, date and season of the site investigation and the relevance of the season to the outcome of the assessment	Section 3	-
(e) a description of the methodology adopted in preparing the report or carrying out the specialised process inclusive of equipment and modelling used	Section 3 and Appendix A	-
(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 alternative;	Section 5	
(g) An identification of any areas to be avoided, including buffers	Section 4.6	
(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;		
(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 8	
(k) Any mitigation measures for inclusion in the EMPr	Section 7.11	
(l) Any conditions for inclusion in the environmental authorisation		None required
(m) Any monitoring requirements for inclusion in the EMPr or environmental authorisation	Section 7.11	
(n)(i) A reasoned opinion as to whether the proposed activity, activities or portions thereof should be authorised and	Section 8	
(n)(iA) A reasoned opinion regarding the acceptability of the proposed activity or activities; and		

Requirements of Appendix 6 – GN R326 EIA Regulations of 7 April 2017	Relevant section in report	Comment where not applicable.
(n)(ii) If the opinion is that the proposed activity, activities, or portions thereof should be authorised, any avoidance, management and mitigation measures that should be included in the EMPr, and where applicable, the closure plan	Section 8	-
(o) A description of any consultation process that was undertaken during the course of carrying out the study		Not applicable. A public consultation process was handled as part of the EIA and EMP process.
(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.	NEMA Appendix 6 and GN648	

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

2 SITE LOCATION AND DESCRIPTION

2.1 Locality and Site Description

The project area is located on portions of the farm Goudmyn 337KT and Olifantspoortje 319KT within the Fetakgomo Local Municipality of the Sekhukhune District Municipality, Limpopo Province. The sites are in and around the town of Steelpoort (**Figure 2**).

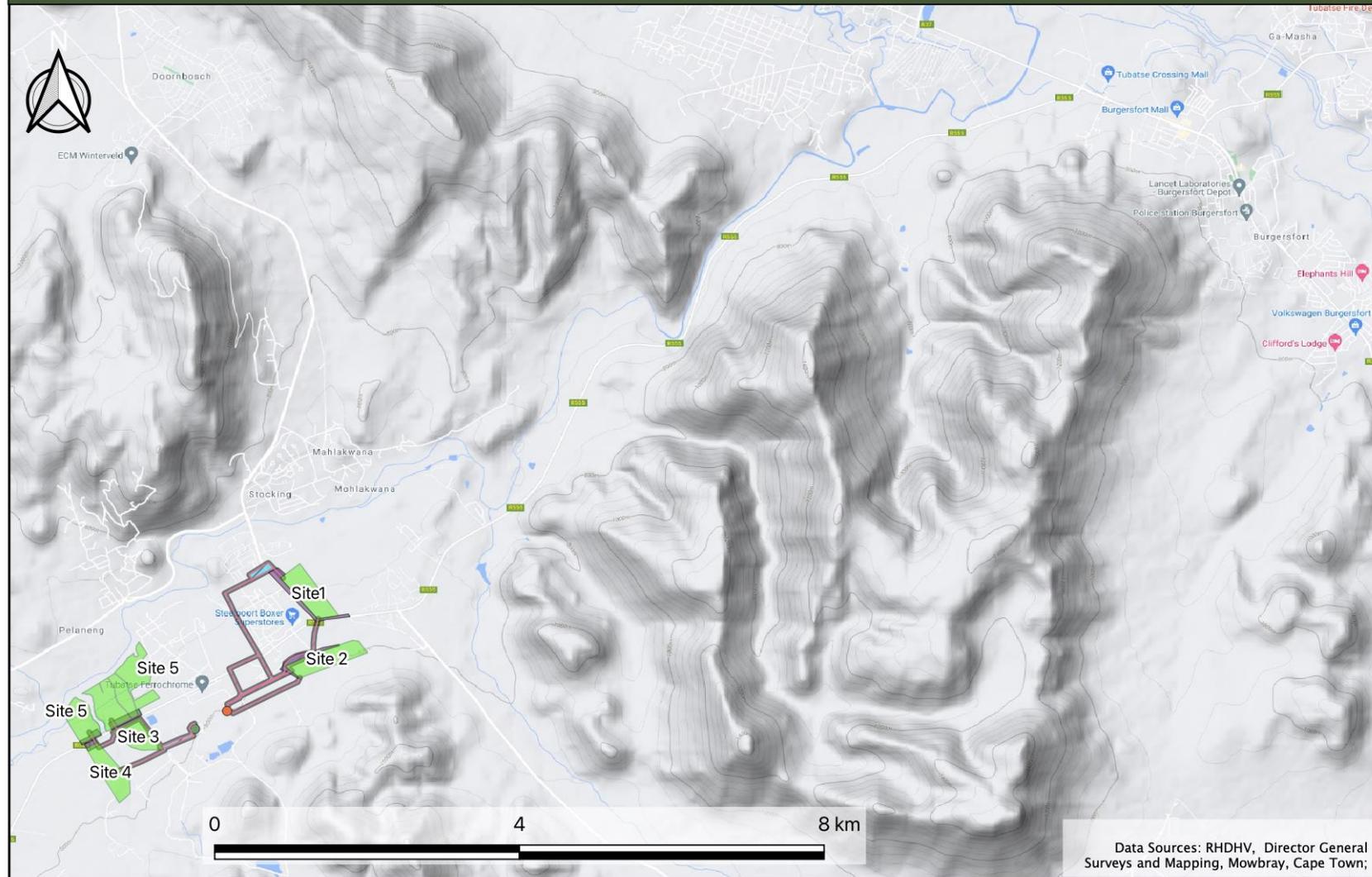


Figure 2 – Locality map of the proposed development footprints and alternatives

2.2 Project description

The proposed PV plant converts the solar radiation into electric energy by using photovoltaic solar arrays. The name plate rating of the plant will be a minimum of 100MWp.

The plant will be spread over several sites shown in the site plan.

Each of the PV plants will consist of the following infrastructure:

- Solar PV panels that will be able to deliver up to 100MWp to the Samancor grid.
- Inverters that convert direct current (DC) generated by the PV modules into alternating current (AC) to be exported to the electrical grid.
- Inverter and transformer combination – each power block will have a centralised inverter which converts the DC power generated by the PV panels, to AC power and a transformer which transforms the power to a higher voltage of 33 kV to facilitate transmitting the power over longer distances to connect to the East and West Plant Substations; and
- Instrumentation and Control consisting of hardware and software for remote plant monitoring and operation of the facility.

Associated infrastructure includes:

- Mounting structures for the solar panels in a fixed tilt configuration.
- Cabling between the structures, to be laid underground where practical.
- New 33 kV powerlines (either overhead lines or underground cables) between the various sites and the Tubatse East and West substation buildings.
- Containerized switchgear substation at Tubatse East and West MV substations for connecting to the Tubatse substation busbars.
- Water provision infrastructure (i.e. storage tank/ s, etc.) for PV panel cleaning.
- Battery Energy Storage System (BESS).
- Internal access roads (4- 6 m wide roads will be constructed but existing roads will be used as far as possible) and fencing (approximately 1.8 m in height), gates and access control.

3 METHODOLOGY

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

Step I – Literature Review and sensitivity analysis¹: The background information to the field survey relies greatly on previous studies completed for the project to determine known sensitivities, as well as the heritage background research completed for this report.

¹ According to Notice 648 of the Government Gazette 45421

Step II – Physical Survey: A physical survey was conducted by vehicle through the proposed project area by a qualified heritage specialist. The survey was conducted between March and April 2021, aimed at locating and documenting sites falling within and adjacent to the proposed development footprint.

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

3.1 Site Significance

Site significance classification standards use is based on the heritage classification of s3 in the NHRA and developed for implementation keeping in mind the grading system approved by SAHRA for archaeological impact assessments. The update classification and rating system as developed by Heritage Western Cape (2016) is implemented in this report.

Site significance classification standards prescribed by the Heritage Western Cape Guideline (2016), were used for the purpose of this report (**Table 4** and **Table 5**).

Table 4 - 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 example: Mapungubwe Cultural Landscape	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 example: Schoemansdal, Louis Trichardt, Soutpansberg District	May be declared as a Provincial Heritage Site managed by LiHRA. 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: Koni ruins, Lydenburg	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

Grading	Description of Resource	Examples of Possible Management Strategies	Heritage 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 5 - 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: Moorddrift Monument, Potgietersrus	May be declared as a Provincial Heritage Site managed by LiHRA.	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, consequently, 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

Grading	Description of Resource	Examples of Possible Management Strategies	Heritage Significance
NCW	A resource that, after appropriate investigation, has been determined to not have enough heritage significance to be retained as part of the National Estate.	No further actions under the NHRA are required. This must be motivated by the applicant and approved by the authority. Section 34 can even be lifted by LiHRA for structures in this category if they are older than 60 years.	No research potential or other cultural significance

4 CURRENT STATUS QUO

4.1 Site Description

The five alternatives evaluated were overgrown and dense vegetation characterised most of the sites. A mix of grass and bushveld dominate the alternative sites. While sites 4 and 5 has dense riverine vegetation in the drainage lines that flows towards the Steelpoort river.



Figure 3 – View of the general conditions at site alternative 4



Figure 4 – View of the general conditions at site alternative 3



Figure 5 – View of the general conditions at site alternative 3



Figure 6 – View of the general conditions at site alternative 5

5 HISTORICAL BACKGROUND

5.1 Archaeological Overview of the Study Area and Surroundings

DATE	DESCRIPTION
The Study Area and Surroundings during the Stone Age	
The South African Stone Age is the longest archaeologically-identified phase identified in human history and lasted for millions of years.	
2.5 million - 250 000 years ago	<p>The Early Stone Age is the first and oldest phase identified in South Africa's archaeological history and comprises two technological phases. The earliest of these technological phases is known as Oldowan, which is associated with crude flakes and hammerstones and dates to some 2 million years ago.</p> <p>The second technological phase in the earlier stone age of Southern Africa is known as the Acheulian and comprises more refined and better-made stone artefacts such as the cleaver and bifacial hand axe. The Acheulian dates back to approximately 1.5 million years ago.</p> <p>Stone artefacts dating to the Early Stone Age have been identified by previous archaeological surveys on some of the farms included in the study area and immediate surrounds, including Onverwacht 292KT, Hendrikplaats 281KT and Winterveld 293KT (Pistorius 2005; 2006)</p>
250 000 to 40 000 years ago	<p>The Middle Stone Age is the second oldest phase identified in South Africa's archaeological history. This phase is associated with flakes, points and blades manufactured by means of the so-called 'prepared core' technique.</p> <p>During previous archaeological surveys, scatters of Middle Stone Age lithics have been identified on some of the farms included in the study area and immediate surrounds, including Onverwacht 292KT, Hendrikplaats 281KT and Winterveld 293KT (Pistorius 2005; 2006)</p>
40 000 years ago to the historic past	<p>The Later Stone Age is the third archaeological phase identified and is associated with an abundance of very small artefacts known as microliths. A well-known feature of the Later Stone Age is rock art in the form of rock paintings and engravings.</p> <p>Stone artefacts dating to the Early Stone Age have been identified by previous archaeological surveys on some of the farms included in the study area and immediate surrounds, including Onverwacht 292KT, Hendrikplaats 281KT and Winterveld 293KT (Pistorius 2005; 2006)</p>
The Study Area and Surroundings during the Iron Age	
The arrival of early farming communities during the first millenium, heralded in the start of the Iron Age for South Africa. The Iron Age is that period in South Africa's archaeological history associated with pre-	

DATE	DESCRIPTION
	colonial farming communities who practiced cultivation and pastoralist farming activities, metal working, cultural customs such as lobola and whose settlement layouts show the tangible representation of the significance of cattle (known as the Central Cattle Pattern) (Huffman, 2007).
AD 450 – AD 750	<p>The Mzonjani facies of the Kwale Branch of the Urewe Ceramic Tradition is the earliest Iron Age presence for which archaeological evidence had been found in the surroundings of the study area. The key features on the decoration of the ceramics from this facies comprise punctuates on the rim and spaced motifs on the shoulder of the vessel (Huffman, 2007).</p> <p>No sites associated with the Mzonjani facies are known to be located within the study area or its immediate surroundings.</p>
AD 750 – AD 1000	<p>The Doornkop facies of the Happy Rest Sub-branch of the Kalundu Ceramic Tradition is the second Iron Age presence in the study area and surroundings. The key features on the decoration of the ceramics from this facies comprise multiple herringbone bands in neck (Huffman, 2007).</p> <p>No significant sites associated with the Doornkop facies are known to be located within the study area. This said, one site with Doornkop pottery and burnt floors was identified by a previous survey on the farm Maandagshoek 254 KT, which is located immediately north of the study area (Roodt 2006).</p>
AD 1000 – AD 1300	<p>The Eiland facies of the Happy Rest Sub-branch of the Kalundu Ceramic Tradition is the third Iron Age presence for which archaeological evidence had been found in the surroundings of the study area. The key features on the decoration of the ceramics from this facies comprise fine herringbone with ladder stamping (Huffman, 2007).</p> <p>No significant sites associated with the Eiland facies are known to be located within the study area. This said, one site with Eiland pottery was identified by a previous survey on the farm Maandagshoek, which is located immediately north of the study area.</p>
AD 1300 – AD 1500	<p>The Kgopolwe facies of the Happy Rest sub-branch of the Kalundu Ceramic tradition is the fifth Iron Age presence for which archaeological evidence had been found in the surroundings of the study area. The key features on the decoration of the ceramics from this facies comprise multiple incised bands separated by colour and lip decoration on bowls (Huffman, 2007).</p> <p>Sites with Kgopolwe facies ceramics have been identified in the surroundings of the study area. In fact, one of the sites identified during the present fieldwork contains Kgopolwe pottery (see site MDK 7).</p>
AD 1650 - AD 1840	<p>The Marateng facies of the Moloko Branch of the Urewe Ceramic Ceramic Tradition is the sixth Iron Age facies to be identified within the surroundings of the study area. The key features of the decoration used on the ceramics from this facies include incised arcades on upper shoulder separating black and red (Huffman, 2007). The Marateng facies can be associated with modern Pedi.</p>

DATE	DESCRIPTION
	One of the sites identified during the present fieldwork contains Marateng pottery (see site MDK 3).

5.2 Aspects of the History of the Study Area and Surroundings

5.2.1 Late Iron Age and Historic Black Settlement

5.2.2 The situation during the early nineteenth century

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

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

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

5.2.3 Khumalo Ndebele

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

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

Mzilikazi then turned his attention to the area between the Olifants and Steelpoort Rivers, which was the heartland of the Bapedi. In the ensuing military activities, the Pedi paramount leader Phetedi, as well as

most of his brothers, were killed. However, one of the brothers managed to escape northwards and survived. He was Sekwati.

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

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

5.2.4 Bapedi

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

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

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

5.3 Voortrekkers and the establishment of Ohrigstad and Lydenburg

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



Figure 7 - Andries Hendrik Potgieter (Pienaar, 1990:136).

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

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

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

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

5.3.1 *Relations between the Voortrekkers and Bapedi during Sekwati's reign*

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

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

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

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

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

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

5.3.2 *Relations between the Whites and Bapedi during Sekhukhune's reign*

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

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

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

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

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

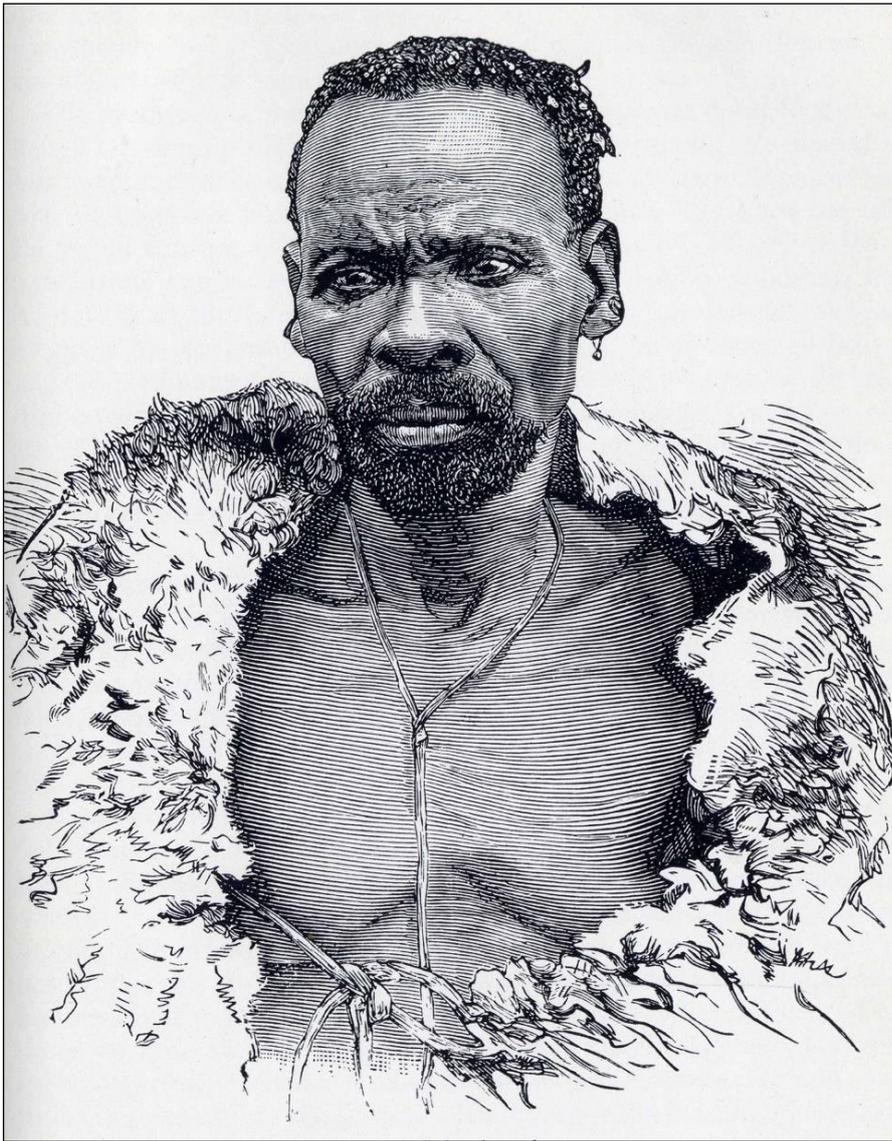


Figure 8 – Sekhukhune, ruler of the Bapedi (Grosskopf, 1957).

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

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

5.4 Archival/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.

Topographic maps (1:50 000) for various years (1963,1979 and 1999) were assessed to observe the development of the area, as well as the location of possible historical structures and burial grounds. The maps were also used to assess the possible age of structures located, to determine whether they could be considered as heritage sites. Map overlays were created showing the possible heritage sites identified within the areas of concern, as can be seen below (**Figure 9**).

The relevant topographical maps include:

- First Edition of 2430CA Steelpoort Topographic Map 1:50000, surveyed in 1963 and drawn in 1965 by the Trigonometrical Survey Office and published by the Government Printer in 1965.
- Second Edition of 2430CA Steelpoort Topographic Map 1:50000, published by the Chief Directorate, Surveys and Mapping in 1979.

All the map sheets consulted depict the points in the project area with huts and other structures, as well as old agricultural fields. Historical roads are also depicted.

Furthermore, no SG Diagrams are available for the Farm Goudmyn 337 from the Chief Surveyor-General database (<http://csg.dla.gov.za/>).

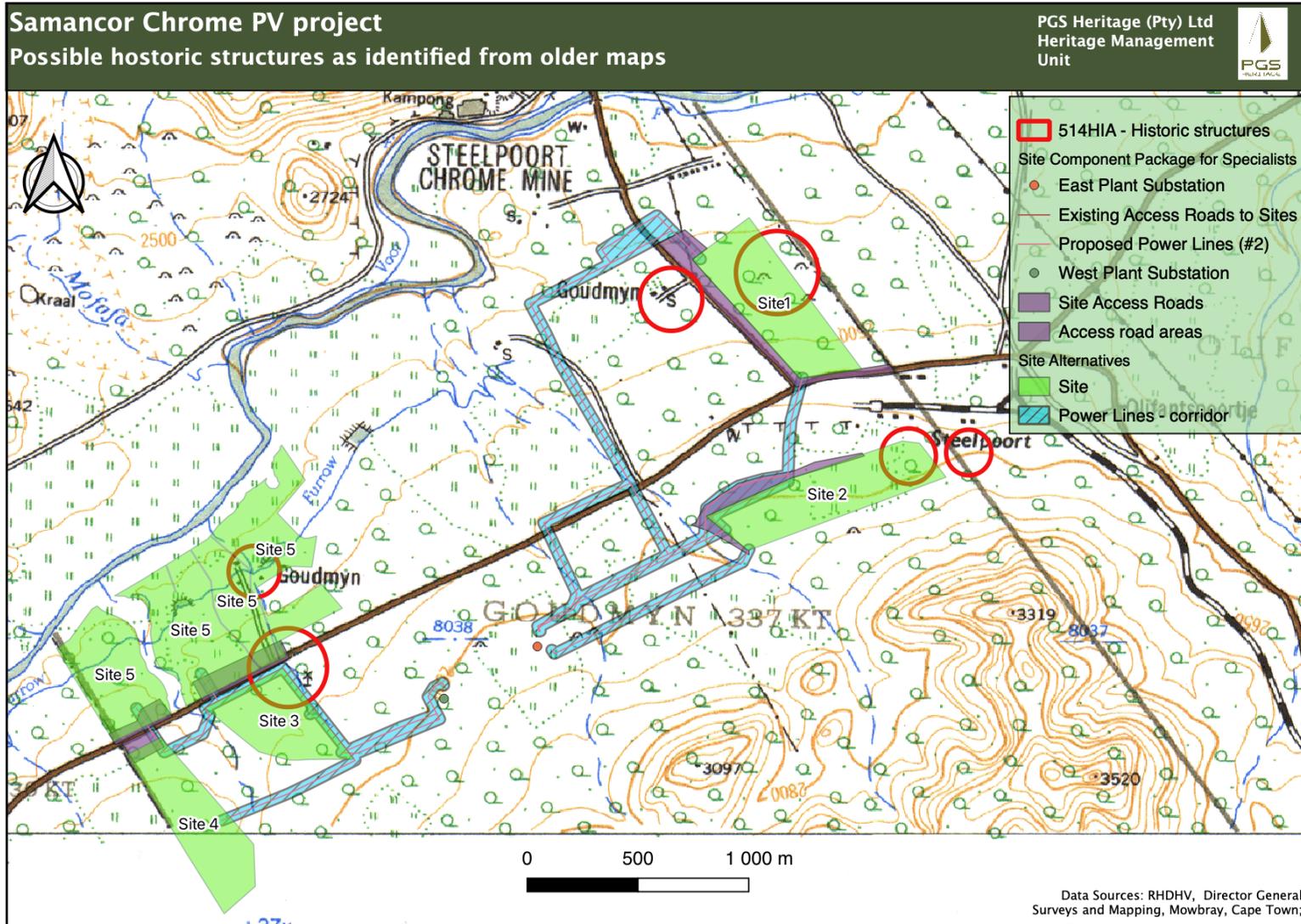


Figure 9 – First Edition of 2430CA Steelport Topographic Map 1:50000 dating to 1963, with several possible heritage features (red polygons) located in the project area.

5.5 Findings of the historical desktop study

The findings can be compiled as follows and have been combined to produce a heritage sensitivity map for the project based on the desktop assessment.

5.5.1 Heritage Screening

A Heritage Screening Report was compiled by the Department of Environmental Affairs National Web-based Environmental Screening Tool as required by Regulation 16(1)(v) of the Environmental Impact Assessment Regulations 2014, as amended According to the Heritage Screening Report, the project area has a low to high archaeological and cultural heritage sensitivity (**Figure 10**) and a medium palaeontological sensitivity (**Figure 11**).

5.5.2 Heritage Sensitivity

The sensitivity maps were produced by overlying:

- Satellite Imagery.
- Current Topographical Maps; and
- First to third edition Topographical Maps dating from the 1960s to 1970s.

This enabled the identification of possible heritage sensitive areas that included:

- Dwellings.
- Clusters of dwellings (homesteads, huts, and farmsteads);
- Archaeological Sensitive areas; and
- Structures/Buildings.

By superimposition and analysis, it was possible to rate these structure/areas according to age and thus their level of protection under the NHRA. Note that these structures refer to possible tangible heritage sites as listed in **Table 6**.

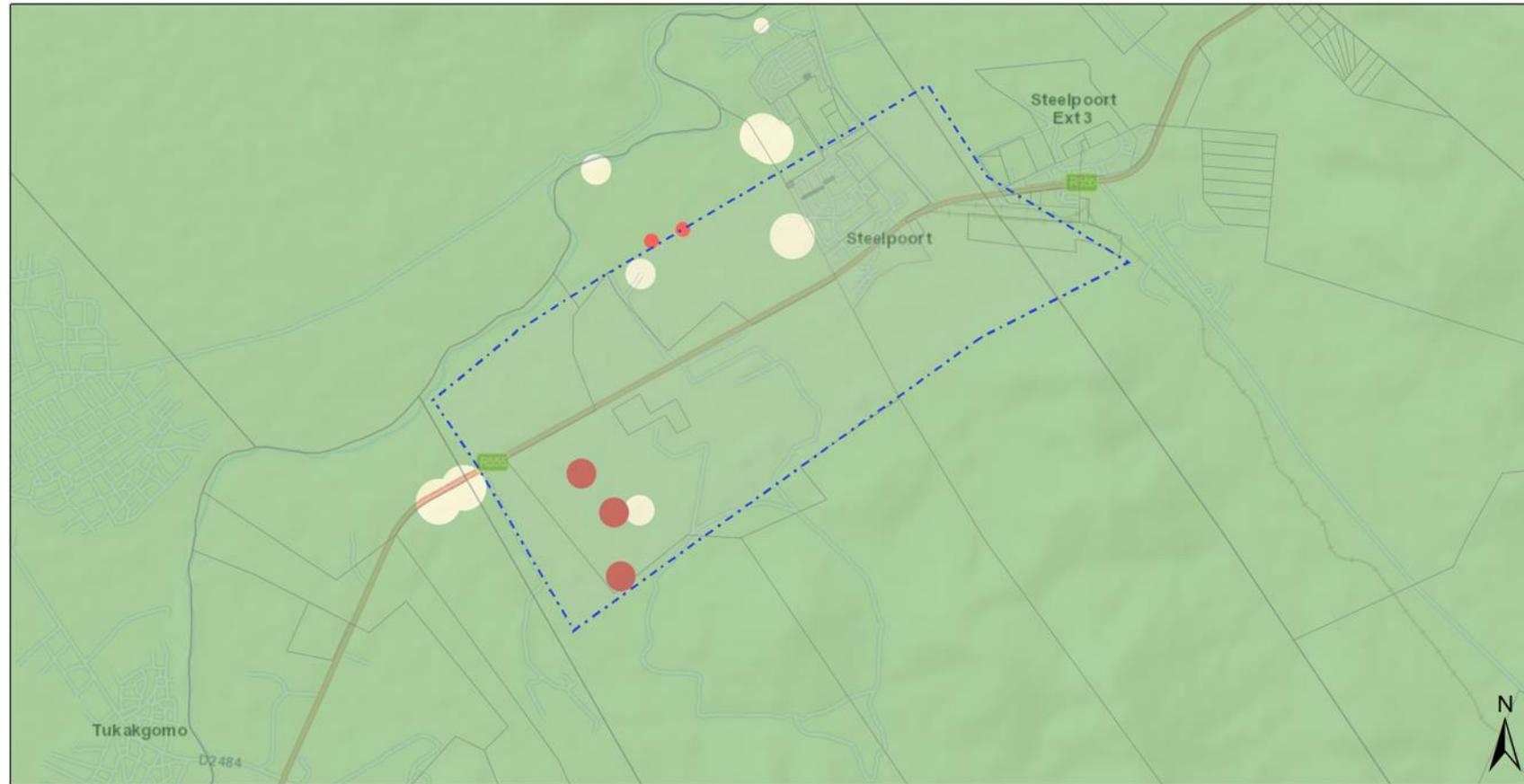
Table 6 -Tangible heritage sites in the study area

Name	Description	Legislative protection
Archaeology - Iron Age Sites	Older than 100 years	NHRA Sect 3 and 35
Architectural Structures	Possibly older than 60 years	NHRA Sect 3 and 34
Graves and Burial Grounds	60 years or older	NHRA Sect 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 in **Table 7**.

Table 7 - Landform type to heritage find matrix

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



10 May 2021

Legend

Site Area	Cadastre	Public Place	
EIA Application Development Footprint	Erven	Archaeological and Cultural Heritage Combined Sensitivity	
EIA Application Site	Farm Portion		Very High
National Jurisdiction Area	Farm		High
	Agri Holding	Low	

0 1.25 2.5 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

Copyright: 2021,
 National Department of Environmental Affairs,
 Government of South Africa

Figure 10 - Heritage Screening map for archaeology and cultural heritage. Source: Department of Environmental Affairs

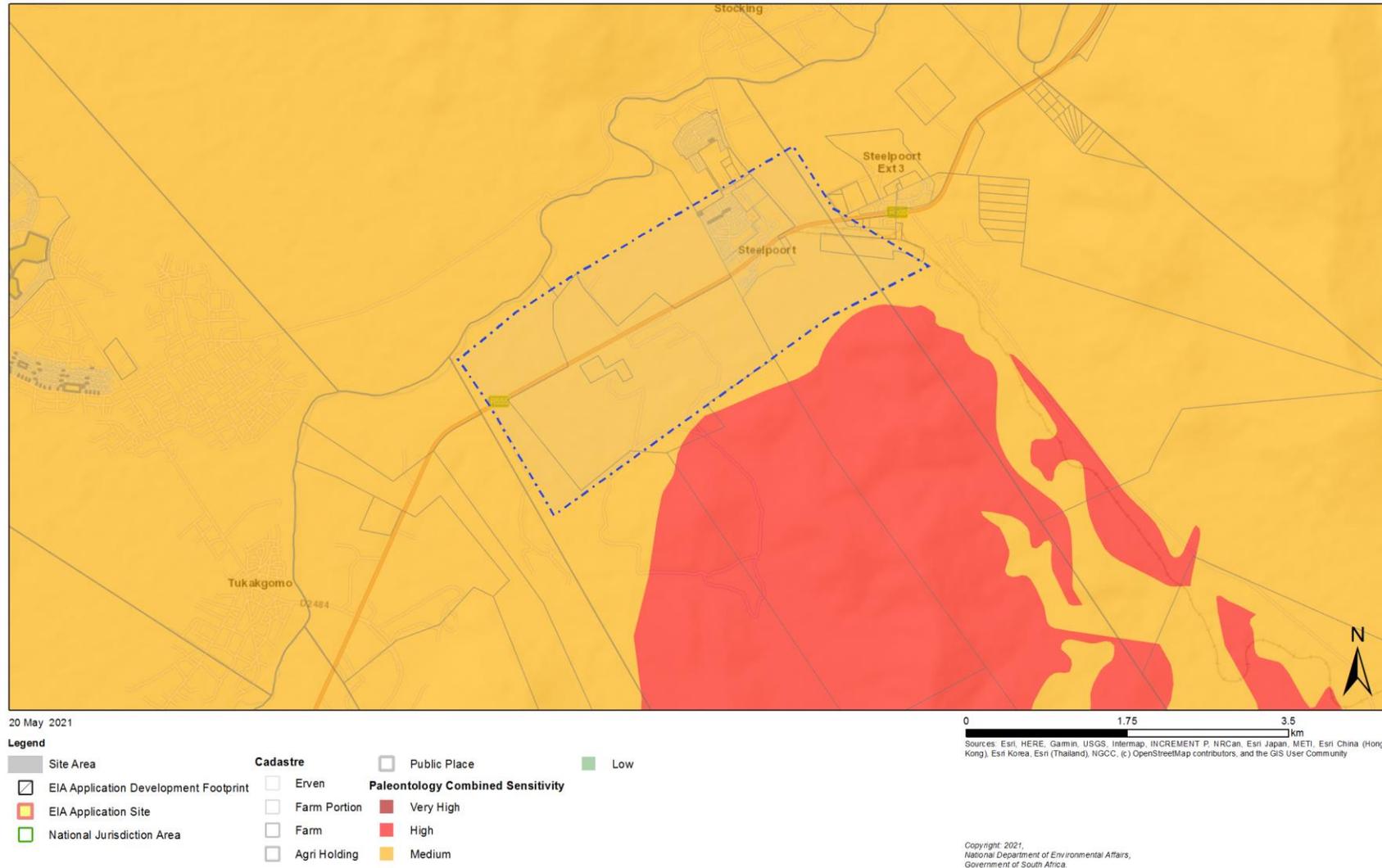


Figure 11 - Heritage Screening map for palaeontological sensitivity. Source: Department of Environmental Affairs

6 FIELDWORK AND FINDINGS

A controlled surface survey was conducted on foot on **15, 19 and 26 April 2021** by two archaeologist and heritage specialists from PGS. The tracklogs (in red) for the survey are indicated in **Figure 12**.

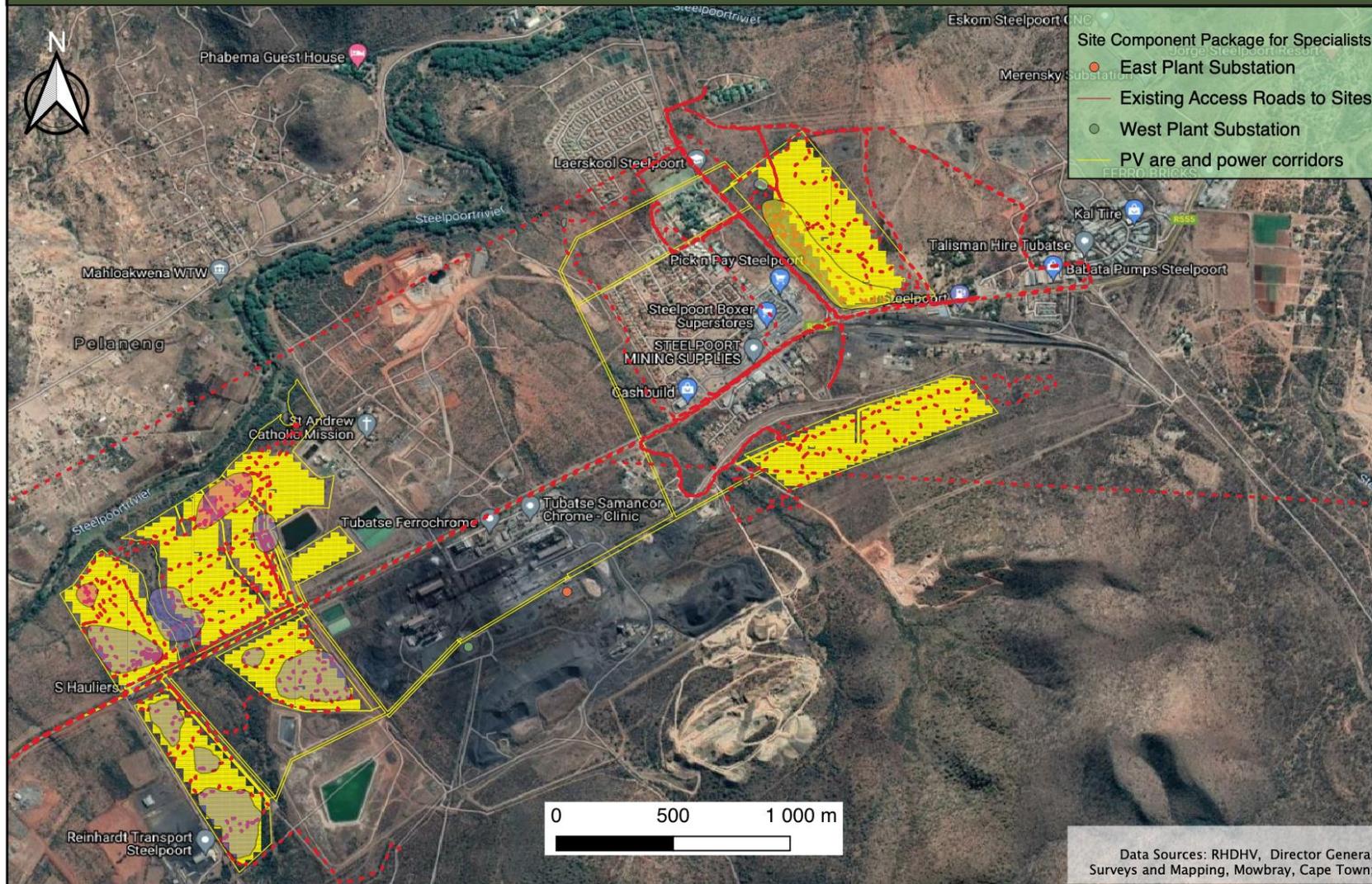
During the field work several heritage features and resources were identified and logged. A total of 57 points of interest were logged that resulted in the delineation and identification of 24 separate heritage sites. These consist of **five burial grounds** (Site 1-1, 1-7, 2-1, 2-2 and 2-3 this is indicated as a stone feature that could possibly be a grave) with a **High heritage significance and a heritage grading of IIIA**. The **nine historic recent structures**. These are 1-2, 1-3, 1-4, 1-5, 1-6, 2-4, 2-5, 5-5 and 5-7, vary in significance from **medium to low and a grading of IIIB**. The archaeological finds consisting of 9 archaeological sites (Site 3-1, 3-2, Site 4-1, 4-2, and Sites 5-1, 5-2, 5-3, 5-4 and 5-6) has in most cases a rating of **Medium significance and a grading varying between IIIC and IIIA at the highest**. Site 5-8 represents a possible memorial now in disuse it was rated as having a Low heritage significance but with a possible local significance².

The following sections provides a breakdown of the different heritage resources identified and provides a heritage significance grading for each site.

² The site numbering convention is done by grouping the sites per alternative development areas. Site 1 in development area 1 is thus numbered: Site 1-1

Samancor Chrome PV project Fieldwork Tracklogs

PGS Heritage (Pty) Ltd
Heritage Management
Unit



Data Sources: RHDHV, Director General
Surveys and Mapping, Mowbray, Cape Town;

Figure 12 – Map indicating tracklogs of the fieldwork conducted for the study

Table 8 - Sites identified during the heritage survey for Alternative 1

Site number	Lat	Lon	Description	Heritage Significance	Heritage Rating
Site 1-1	24°43'30.81"S	30°12'22.39"E	Large cemetery situated within site 1 of the study area. The cemetery contains more than 120 graves of which the oldest is dated to the 1940. The graves are a combination of packed stone, granite, and brick packed graves.	High	IIA



Figure 13 – site 1-1 a large cemetery containing 120 graves.



Figure 14 – Alternate view of cemetery at site 1-1

Site number	Lat	Lon	Description	Heritage Significance	Heritage Rating
Site 1-2	24°43'40.40"S 24°43'49.07"S 24°43'48.96"S	30°12'27.94"E 30°12'34.52"E 30°12'38.44"E	Packed stone feature. Site 1-2 forms part of a large series of low packed stone features that resemble stone walling. These features are however degraded, and half buried making any substantial interpretation difficult.	Medium	IIIB



Figure 15 –Packed stone feature.



Figure 16 –Alternate view showing high concentration of Aloes

Site number	Lat	Lon	Description	Heritage Significance	Heritage Rating
Site 1-3	24°43'46.97"S	30°12'46.82"E	Cement water trough located on the eastern edge of the study area at Alternative 1. Probably part of a past farmstead.	Low	NCW



Figure 17 - Cement water trough at Site 1-3

Site number	Lat	Lon	Description	Heritage Significance	Heritage Rating
Site1-4	24°43'42.35"S	30°12'37.73"E	Series of broken-down structures and foundations. These structures were built using brick. Cement and packed stone elements. Site 1-4 seems historical in age.	Low	IIIC



Figure 18 – A series of broken-down structure and foundations.



Figure 19 – Alternate view of Site 1-4

Site number	Lat	Lon	Description	Heritage Significance	Heritage Rating
Site 1-5	24°43'36.91"S	30°12'38.41"E	Site 1-5 marks a packed stone feature of possible foundation.	Low	IIIC



Figure 45 – Packed stone feature or foundation at Site 1-5

Site number	Lat	Lon	Description	Heritage Significance	Heritage Rating
Site 1-6	24°43'27.28"S	30°12'29.81"E	Broken down foundation hidden among tall grass cover.	Low	IIC



Figure 47 –Broken down foundation hidden among tall grass at Site 1-6

Site number	Lat	Lon	Description	Heritage Significance	Heritage Rating
Site 1-7	24°43'37.01"S	30°11'52.61"E	SB009 marks a small cemetery located directly underneath the proposed powerline layout. The cemetery contains about 20 graves of various styles including granite and packed stone graves. Some graves are enclosed by metal bars. The oldest date located was 1966. The cemetery is divided into two separate sections on either side of a small stream.	High	IIIA



Figure 20 – Small cemetery at Site 1-7



Figure 21 – Alternate view of Site 1-7

Table 9 - Sites identified during the heritage survey for Alternative 2

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



Figure 22 – Cemetery at Site 2-1



Figure 23 – Alternate view of cemetery at Site 2-1

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



Figure 24 – Possible graves

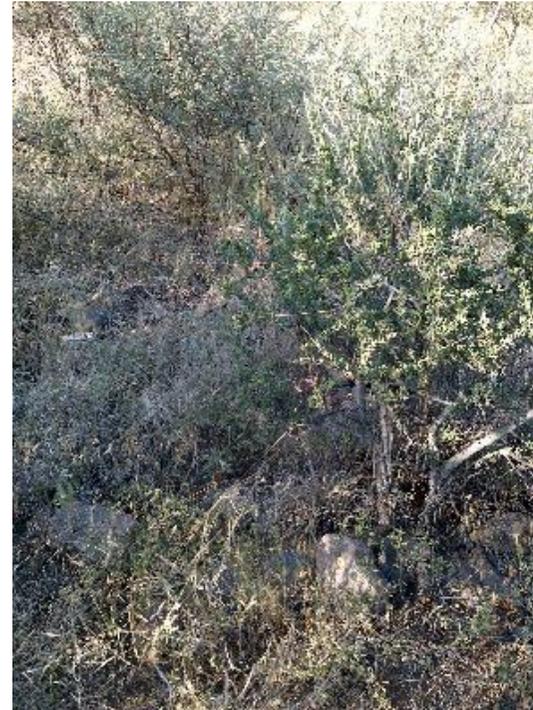


Figure 25 – Alternate view of Possible graves at Site 2-2

Site number	Lat	Lon	Description	Heritage Significance	Heritage Rating
Site 2-3	24°44'8.82"S	30°12'29.99"E	Site 2-3 marks a packed stone feature that could possibly be an historical grave location.	Medium	IIIA



Figure 34 –Packed stone feature at Site 2-3

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



Figure 26 – Packed stone feature at Site 2-4



Figure 27 – Packed stone feature

Site number	Lat	Lon	Description	Heritage Significance	Heritage Rating
Site 2-5	24°44'3.70"S	30°13'1.78"E	Site 2-5 marks two large cement features. The first is a rectangular brick and cement structure with multiple small reservoirs built into the centre. The second is a large cement water reservoir that is still half filled with water. These structures are not being used anymore but probably relates to the mining activity within the area.	Low	NCW



Figure 35 – Cement structure at Site 2-5



Figure 36 – Large cement water reservoir at Site 2-5

Table 10 - Sites identified during the heritage survey of Alternative 3

Site number	Lat	Lon	Description	Heritage Significance	Heritage Rating
Site 3-1 and 3-2	24,7438924S 24,74595S	30,18716E 30,18650E	The area is characterised by several low stone wall foundations, grain bin platforms and a general background scatter of ceramics. The ceramics herringbone decoration is indicative of the material identified on site alternative 4 and 5. Although a small sample the motives can be associated with the Doornkop faeces of the Iron Age.	Medium	IIIB



Figure 28 – Exposed archaeological deposit with ceramics



Figure 29 – Herringbone decoration

Table 11 - Sites identified during the heritage survey of Alternative 4

Site number	Lat	Lon	Description	Heritage Significance	Heritage Rating
Site 4-1 and 4-2	24,75067S 24,75069S 24,74860S	30,18457E 30,18317E 30,18148E	<p>The site covers an area of approximately 300-400 meters on the eastern section of alternative 4. The archaeological remains are characterised by low stone walling, numerous grain bin platforms. A few huts out lines could be discern in the thick undergrowth.</p> <p>A low-density ceramic scatter is present over the site with numerous decorate shards found. Most of these shards have a herringbone motive in single and double bands.</p>	Medium to High	IIIA



Figure 30 – Well defined grain bin platforms



Figure 31 – Herringbone decoration

Site number	Lat	Lon	Description	Heritage Significance	Heritage Rating
			 <p data-bbox="488 1082 801 1114"><i>Figure 32 – Lower grinder</i></p>		 <p data-bbox="1227 944 1944 976"><i>Figure 33 – Stone foundations of a hut and surrounding wall</i></p>

Table 12 - Sites identified during the heritage survey of Alternative 5

Site number	Lat	Lon	Description	Heritage Significance	Heritage Rating
Site 5-1	24°44'34.11"S 24°44'32.51"S	30°10'40.10"E 30°10'39.99"E	This cluster is located on the northwest corner of the study area of alternative 5. The area sits near a natural drainage line and can be described as a rocky area due to the consistent erosion taking place around this area. A widespread moderate density scatter of MSA lithic material was identified within this area.	Low	IIIC



Figure 34 – Rocky terrain containing most of the lithic artefacts.



Figure 35 – Lithic assemblage

Site number	Lat	Lon	Description	Heritage Significance	Heritage Rating
Site 5-2	24°44'42.14"S 24°44'42.85"S 24°44'42.11"S 24°44'43.22"S	30°10'49.10"E 30°10'50.11"E 30°10'42.88"E 30°10'44.71"E	The site is situated towards the southwest corner of the study area at Site 5. This area is dominated by multiple series of low packed stone features including what seems to be remnants of stone walling, circular features, and possible grain bin stands. The area is overgrown and makes identifying the full extent of these features difficult. Remnants of low packed stone features among the tall grass as well as an open area devoid of stone features indicative of a cattle byre.	Medium	IIIB



Figure 36 –Packed stone feature among aloes



Figure 37 – Alternate view of Site 5-2

Site number	Lat	Lon	Description	Heritage Significance	Heritage Rating
			 <p data-bbox="376 746 949 778"><i>Figure 38 – Site 5-2 - Low packed stone feature.</i></p>		
			 <p data-bbox="376 1302 949 1334"><i>Figure 39 – Upper Grindstone located at Site 5-2</i></p>		
				 <p data-bbox="1249 746 1957 778"><i>Figure 35 – Packed stone feature, Possible grain bin stand.</i></p>	

Site number	Lat	Lon	Description	Heritage Significance	Heritage Rating
Site 5-3	24°44'38.61"S	30°10'42.15"E	Situated near the southern edge of the study area close to the main road running towards Burgersfort. Site 5-3 is characterised as a similar pattern to the other clustered areas where a combination of low packed stone features together with a concentration in aloes indicate the presence of archaeological material. marks an area with multiple packed stone features. These features resemble grain bin stands.	Medium	IIIB



Figure 40 – Packed stone feature, Possible Grain Bin stand



Figure 41 – Circular packed stone feature.

Site number	Lat	Lon	Description	Heritage Significance	Heritage Rating
			 <p data-bbox="344 1013 981 1045"><i>Figure 59 – Large rock with multiple Grinding cupules</i></p>		 <p data-bbox="1218 1027 1989 1091"><i>Figure 58 – Small rocky hill with low packed stone features and a concentration of aloes</i></p>

Site number	Lat	Lon	Description	Heritage Significance	Heritage Rating
Site 5-4	24°44'21.79"S 24°44'21.04"S 24°44'20.22"S 24°44'18.62"S 24°44'16.99"S 24°44'22.47"S	30°10'57.93"E 30°11'0.09"E 30°10'58.99"E 30°10'59.63"E 30°11'3.37"E 30°10'57.00"E	This cluster of sites are all located within the large drainage line that runs downstream towards the Steelpoort river. This area is dominated by a moderate scatter of MSA Lithic artefacts. The highest density scatter was with 10-15 lithic artefacts per m ² .	Medium	IIIB



Figure 42 – General site around drainage line.



Figure 43 – Erosion around drainage line exposing the original riverbed.



Figure 44 – sample Lithic assemblage for Site 5-4



Figure 45 – sample Lithic assemblage for Site 5-4



Figure 46 – sample Lithic assemblage for Site 5-4

Site number	Lat	Lon	Description	Heritage Significance	Heritage Rating
Site 5-5	24°44'21.77"S	30°11'7.16"E	Recent historic stone-built weir and drainage line is in an overgrown gully area.	Low	NCW



Figure 47– Watergate at Site 5-5



Figure 48 – Canal/Furrow feature that extends across the entire study area.

Site number	Lat	Lon	Description	Heritage Significance	Heritage Rating
Site 5-6	24°44'26.03"S	30°11'6.95"E	The position in Site 5-6 indicates a small number of ceramic sherds that were located next to the small gravel road. Some of the ceramics have indicative decoration associated with the Doornkop faeces of the Iron Age.	Medium	IIIB



Figure 49 – Ceramic sherds located at Site 5-6



Figure 50 – Ceramic sherds located next to road at Site 5-6

Site 5-7	24°44'31.96"S	30°11'5.76"E		Low	IIIC
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Site number	Lat	Lon	Description	Heritage Significance	Heritage Rating
			Site 5-7 marks a dumping area that seems to contain historical material. The material found was extremely fragmented therefor an estimated age could not be obtained		
			 <p style="text-align: center;"><i>Figure 51 – Waste dump</i></p>	 <p style="text-align: center;"><i>Figure 52 – Waste dump alternate view</i></p>	
Site 5-8	24,74151S	30,18555E	The site 5-8 seems to be a former local monument or grave that was exhumed. The memorial plinth and headstone are still present, but a large hole is left where the possible burial was done. Research on SAHRIS could not show any permits or registration of a memorial in the vicinity of this site.	Low	IIIC

Site number	Lat	Lon	Description	Heritage Significance	Heritage Rating
			 <p data-bbox="367 842 958 879"><i>Figure 53 – View of remains of the grave dressing</i></p>		
				 <p data-bbox="1283 834 1928 871"><i>Figure 54 – No inscriptions or information on the plinth</i></p>	

6.1 Sensitivity assessment outcome

From the desktop assessment high to low heritage sensitive areas were identified. Many of the heritage sensitive areas identified during the desktop search consisted of old structures and buildings that fall outside the study area.

During the field work several heritage features and resources were identified and logged. A total of 57 points of interest were logged that resulted in the delineation and identification of 24 separate heritage sites. These consist of five burial grounds (**Site 1-1, 1-7, 2-1, 2-2 and 2-3**) with a High heritage significance and a heritage grading of IIIA. The nine historic recent structures (**Site 1-2, 1-3, 1-4, 1-5, Site 2-3-5, and Site 5-5**) vary in significance from medium to low and a grading of IIIB. The archaeological finds consisting of 9 archaeological sites (**Site 3-1-2, Site 4-1-2, and Sites 5-1-3, 5-6**) has in most cases a rating of Medium significance and a grading varying between IIIC and IIIA at the highest. **Site 5-8** represents a possible memorial now in disuse it was rated as having a Low heritage significance but with a possible local significance.

7 PALAEOLOGY

According to the PalaeoMap of SAHRIS the Palaeontological Sensitivity of the proposed area of the project footprint occurs (**Figure 55**) there is a low chance of finding fossils in this area.

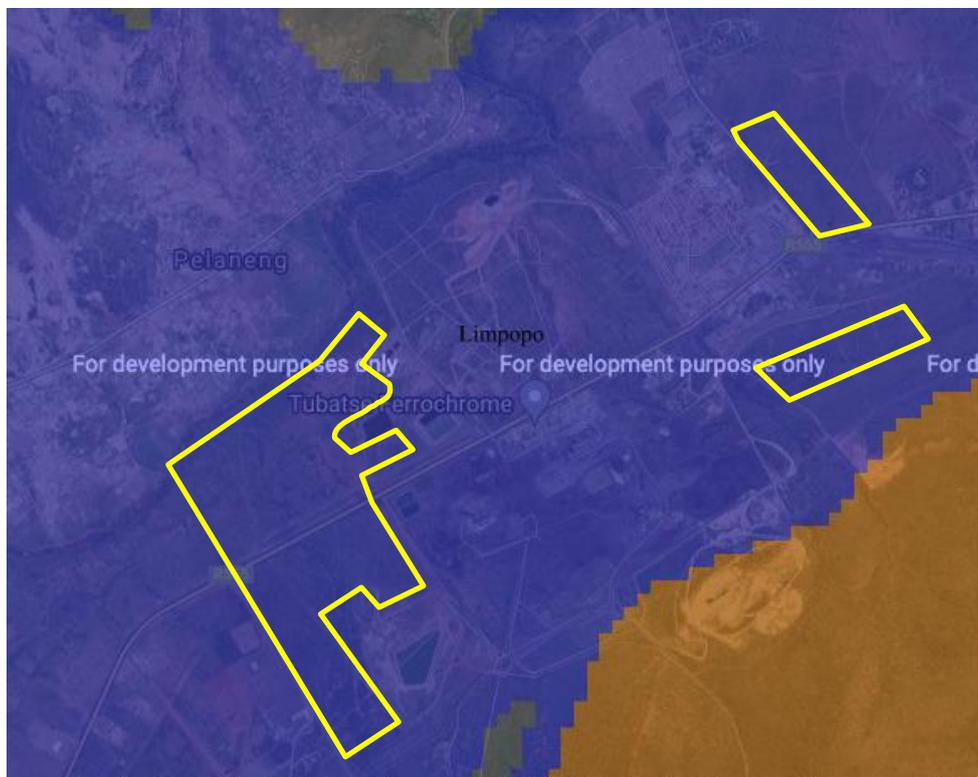


Figure 55 - Extract of the 1 in 250 000 SAHRIS PalaeoMap map (Council of Geosciences).
Approximate location of the proposed development is indicated in yellow.

As per the requirements of the SAHRIS a chance finds protocol is included in section 7.9 of this report.

8 IMPACT ASSESSMENT

The impact significance rating process serves two purposes: firstly, it helps to highlight the critical impacts requiring consideration in the management and approval process; secondly, it shows the primary impact characteristics, as defined above, used to evaluate impact significance.

The impacts will be ranked according to the methodology described below. Where possible, mitigation measures will be provided to manage impacts. To ensure uniformity, a standard impact assessment methodology will be utilised so that a wide range of impacts can be compared with each other. The impact assessment methodology makes provision for the assessment of impacts against the following criteria:

- Significance;
- Spatial scale;
- Temporal scale;
- Probability; and
- Degree of certainty.

A combined quantitative and qualitative methodology was used to describe impacts for each of the assessment criteria. A summary of each of the qualitative descriptors along with the equivalent quantitative rating scale for each of the criteria is given in **Table 13**.

Table 13 - Quantitative rating and equivalent descriptors for the impact assessment criteria

RATING	SIGNIFICANCE	EXTENT SCALE	TEMPORAL SCALE
1	VERY LOW	Proposed site	Incidental
2	LOW	Study area	Short-term
3	MODERATE	Local	Medium/High-term
4	HIGH	Regional / Provincial	Long-term
5	VERY HIGH	Global / National	Permanent

A more detailed description of each of the assessment criteria is given in the following sections.

8.1 Significance Assessment

Significance rating (importance) of the associated impacts embraces the notion of extent and magnitude but does not always clearly define these since their importance in the rating scale is very relative. For example, the magnitude (i.e., the size) of area affected by atmospheric pollution may be extremely large (1 000 km²) but the significance of this effect is dependent on the concentration or level of pollution. If the concentration is great, the significance of the impact would be HIGH or VERY HIGH, but if it is diluted it would be VERY LOW or LOW. Similarly, if 60 ha of a grassland type are destroyed the impact would be VERY HIGH if only 100 ha of that grassland type

were known. The impact would be VERY LOW if the grassland type was common. A more detailed description of the impact significance rating scale is given in **Table 14** below.

Table 14 - Description of the significance rating scale

RATING		DESCRIPTION
5	Very high	Of the highest order possible within the bounds of impacts which could occur. In the case of adverse impacts: there is no possible mitigation and/or remedial activity which could offset the impact. In the case of beneficial impacts, there is no real alternative to achieving this benefit.
4	High	Impact is of substantial order within the bounds of impacts, which could occur. In the case of adverse impacts: mitigation and/or remedial activity is feasible but difficult, expensive, time-consuming or some combination of these. In the case of beneficial impacts, other means of achieving this benefit are feasible but they are more difficult, expensive, time-consuming or some combination of these.
3	Moderate	Impact is real but not substantial in relation to other impacts, which might take effect within the bounds of those which could occur. In the case of adverse impacts: mitigation and/or remedial activity are both feasible and easily possible. In the case of beneficial impacts: other means of achieving this benefit are about equal in time, cost, effort, etc.
2	Low	Impact is of a low order and therefore likely to have little real effect. In the case of adverse impacts: mitigation and/or remedial activity is either easily achieved or little will be required, or both. In the case of beneficial impacts, alternative means for achieving this benefit are likely to be easier, cheaper, more effective, less time consuming, or some combination of these.
1	Very low	Impact is negligible within the bounds of impacts which could occur. In the case of adverse impacts, almost no mitigation and/or remedial activity are needed, and any minor steps which might be needed are easy, cheap, and simple. In the case of beneficial impacts, alternative means are almost all likely to be better, in one or several ways, than this means of achieving the benefit. Three additional categories must also be used where relevant. They are in addition to the category represented on the scale, and if used, will replace the scale.
0	No impact	There is no impact at all - not even a very low impact on a party or system.

8.2 Spatial Scale

The spatial scale refers to the extent of the impact i.e., will the impact be felt at the local, regional, or global scale. The spatial assessment scale is described in more detail in **Table 15**.

Table 15 - Description of the significance rating scale

RATING		DESCRIPTION
5	Global/National	The maximum extent of any impact.
4	Regional/Provincial	The spatial scale is moderate within the bounds of impacts possible and will be felt at a regional scale (District Municipality to Provincial Level).
3	Local	The impact will affect an area up to 10 km from the proposed site.
2	Study Site	The impact will affect an area not exceeding the Eskom property.
1	Proposed site	The impact will affect an area no bigger than the ash disposal site.

8.3 Duration Scale

To accurately describe the impact, it is necessary to understand the duration and persistence of an impact in the environment. The temporal scale is rated according to criteria set out in

Table 16.

Table 16 - Description of the temporal rating scale

RATING		DESCRIPTION
1	Incidental	The impact will be limited to isolated incidences that are expected to occur very sporadically.
2	Short-term	The environmental impact identified will operate for the duration of the construction phase or a period of less than 5 years, whichever is the greater.
3	Medium/High term	The environmental impact identified will operate for the duration of life of facility.
4	Long term	The environmental impact identified will operate beyond the life of operation.
5	Permanent	The environmental impact will be permanent.

8.4 Degree of Probability

Probability or likelihood of an impact occurring will be described as shown in

Table 17 below.

Table 17 - Description of the degree of probability of an impact occurring

RATING	DESCRIPTION
1	Practically impossible
2	Unlikely
3	Could happen
4	Very Likely
5	It's going to happen / has occurred

8.5 Degree of Certainty

As with all studies it is not possible to be 100% certain of all facts, and for this reason a standard “degree of certainty” scale is used as discussed in **Table 18**. The level of detail for specialist studies is determined according to the degree of certainty required for decision-making. The impacts are discussed in terms of affected parties or environmental components.

Table 18 - Description of the degree of certainty rating scale

RATING	DESCRIPTION
Definite	More than 90% sure of a particular fact.
Probable	Between 70 and 90% sure of a particular fact, or of the likelihood of that impact occurring.
Possible	Between 40 and 70% sure of a particular fact or of the likelihood of an impact occurring.
Unsure	Less than 40% sure of a particular fact or the likelihood of an impact occurring.
Can't know	The consultant believes an assessment is not possible even with additional research.
Don't know	The consultant cannot, or is unwilling, to make an assessment given available information.

8.6 Quantitative Description of Impacts

To allow for impacts to be described in a quantitative manner in addition to the qualitative description given above, a rating scale of between 1 and 5 was used for each of the assessment criteria. Thus, the total value of the impact is described as the function of significance, spatial and temporal scale as described below:

$$\text{Impact Risk} = \frac{(\text{SIGNIFICANCE} + \text{Spatial} + \text{Temporal}) \times \text{Probability}}{3 \quad \quad \quad 5}$$

An example of how this rating scale is applied is shown in **Table 19**.

Table 19 - Example of Rating Scale

Impact	Significance	Spatial Scale	Temporal Scale	Probability	Rating
	LOW	Local	Medium/High-term	Could Happen	
Impact to air	2	3	3	3	1.6

Note: The significance, spatial and temporal scales are added to give a total of 8, that is divided by 3 to give a criteria rating of 2,67. The probability (3) is divided by 5 to give a probability rating of 0,6. The criteria rating of 2,67 is then multiplied by the probability rating (0,6) to give the final rating of 1,6.

The impact risk is classified according to five classes as described in the **Table 20** below.

Table 20 - Impact Risk Classes

RATING	IMPACT CLASS	DESCRIPTION
0.1 – 1.0	1	Very Low
1.1 – 2.0	2	Low
2.1 – 3.0	3	Moderate
3.1 – 4.0	4	High
4.1 – 5.0	5	Very High

Therefore, with reference to the example used for air quality above, an impact rating of 1.6 will fall in the Impact Class 2, which will be a low impact.

8.7 Heritage Impacts

During the field work several heritage features and resources were identified and logged. A total of 57 points of interest were logged that resulted in the delineation and identification of 24 separate heritage sites. These consist of **five burial grounds** (Site 1-1, 1-7, 2-1, 2-2 and 2-3 this is indicated as a stone feature that could possibly be a grave) with a **High heritage significance and a heritage grading of IIIA**. The **nine historic recent structures**. These are 1-2, 1-3, 1-4, 1-5, 1-6, 2-4, 2-5, 5-5 and 5-7, vary in significance from **medium to low and a grading of IIIB**. The archaeological finds consisting of 9 archaeological sites (Site 3-1, 3-2, Site 4-1, 4-2, and Sites 5-1, 5-2, 5-3, 5-4 and 5-6) has in most cases a rating of **Medium significance and a grading varying**

between IIIC and IIIA at the highest. Site 5-8 represents a possible memorial now in disuse it was rated as having a Low heritage significance but with a possible local significance.

Samancor Chrome PV project
Heritage Resources – Site 1

PGS Heritage (Pty) Ltd
 Heritage Management
 Unit

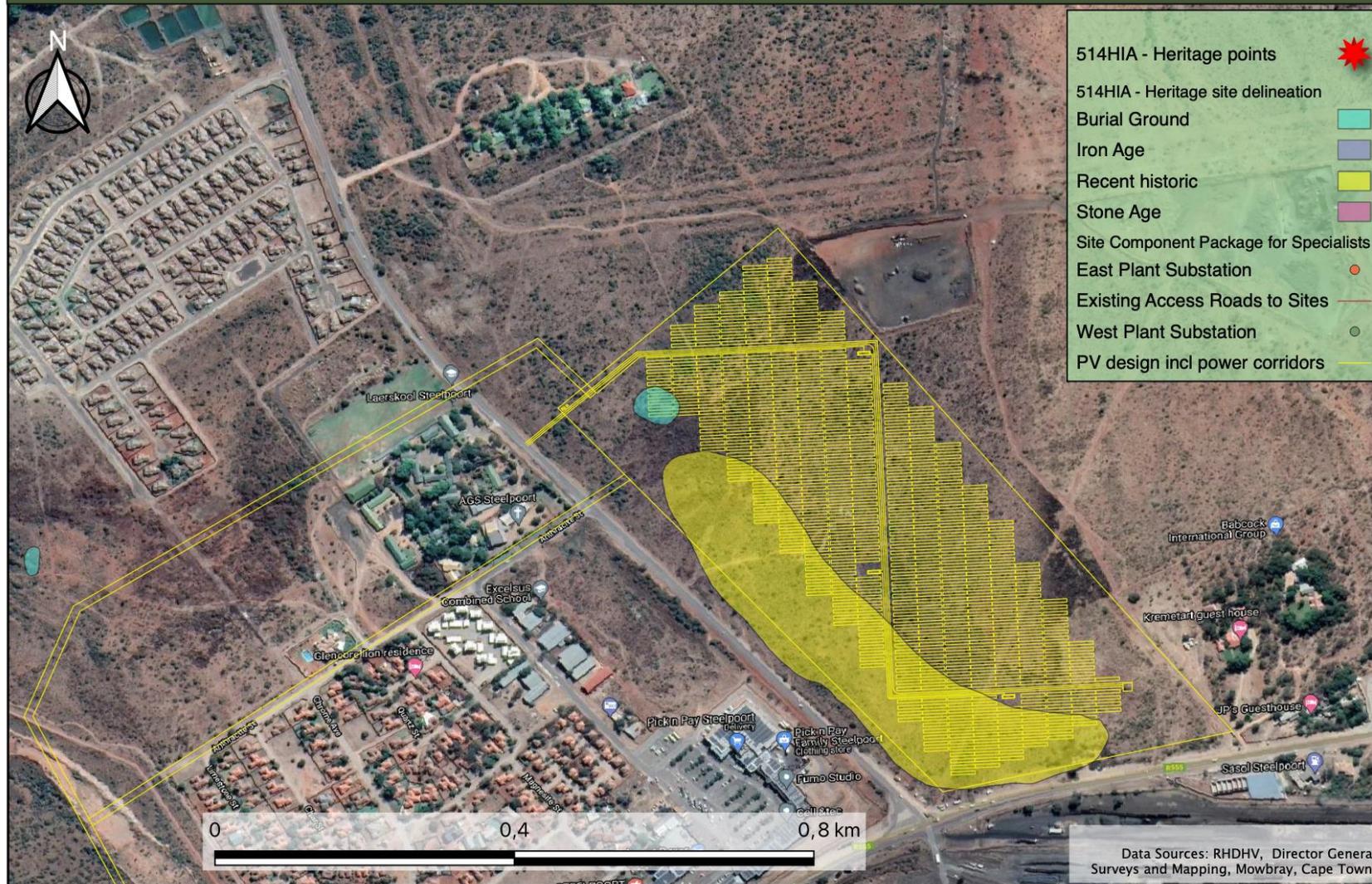


Figure 56 – Locality of the heritage resource in relation alternative site 1

Samancor Chrome PV project Heritage Resources – Site 2

PGS Heritage (Pty) Ltd
Heritage Management
Unit

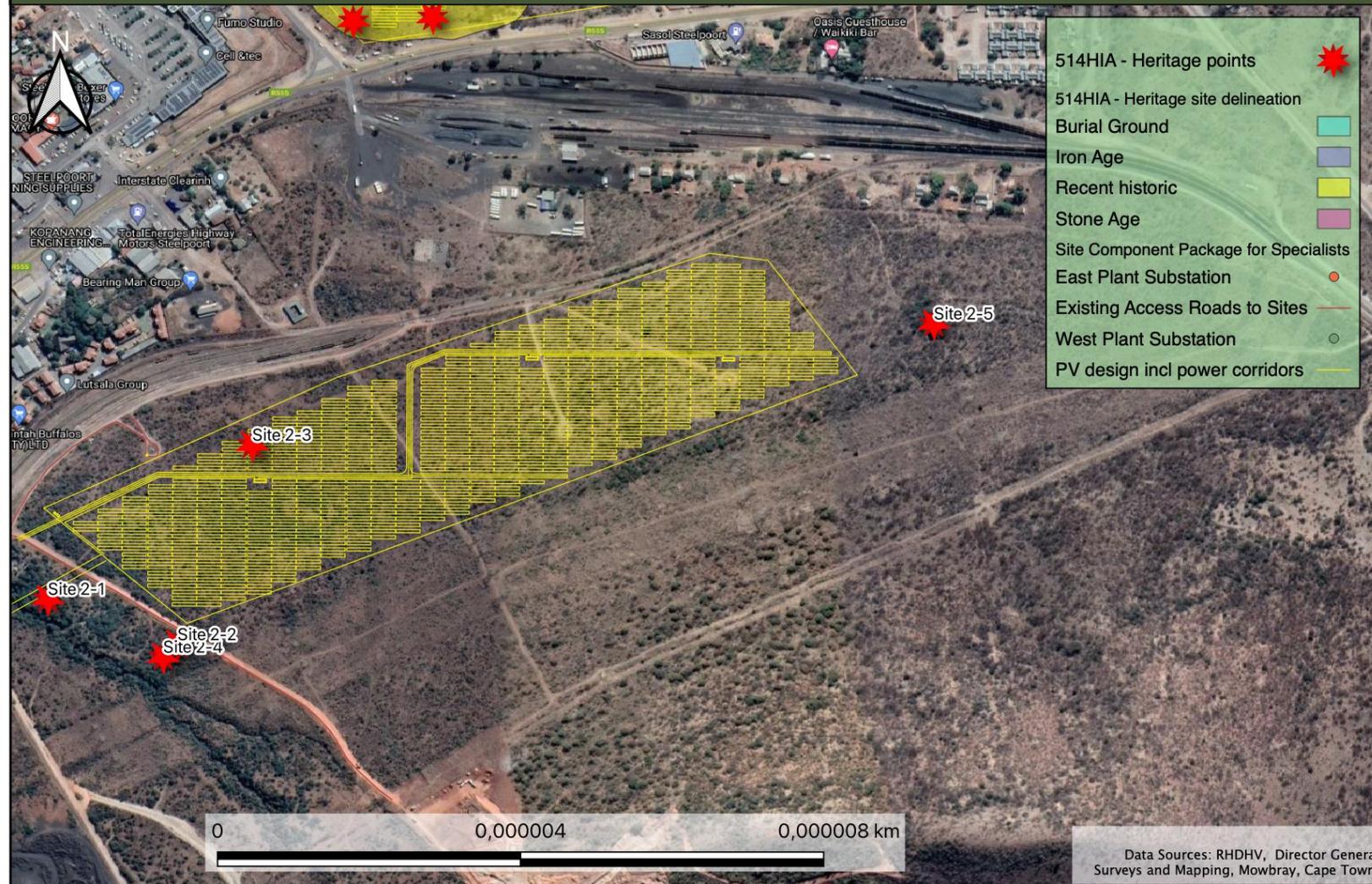


Figure 57 – Locality of the heritage resource in relation alternative site 2

Samancor Chrome PV project
Heritage Resources – Site 3

PGS Heritage (Pty) Ltd
 Heritage Management
 Unit



Figure 58 – Locality of the heritage resource in relation alternative site 3

Samancor Chrome PV project
Heritage Resources – Site 4

PGS Heritage (Pty) Ltd
 Heritage Management
 Unit



Figure 59 – Locality of the heritage resource in relation alternative site 4

**Samancor Chrome PV project
Heritage Resources – Site 5**

PGS Heritage (Pty) Ltd
Heritage Management
Unit



Figure 60 – Locality of the heritage resource in relation alternative site 5

8.8 Impact Assessment Table

Table 21 - Impact Assessment Table (pre-mitigation)

IMPACT	IMPACT DIRECTION	SIGNIFICANCE	SPATIAL SCALE	TEMPORAL SCALE	PROBABILITY	RATING
Impact on burial ground and graves	Negative	VERY HIGH	Isolated Sites / proposed site	Permanent	Very Likely	
		5	1	5	4	2,93
Impact on archaeological sites	Negative	VERY HIGH	Study Area	Permanent	It's going to happen / has occurred	
		5	2	5	5	4,00
Palaeontological resources	Negative	VERY LOW	Isolated Sites / proposed site	Permanent	Unlikely	
		1	1	5	2	0,93

Table 22 - Impact Assessment Table (post-mitigation)

IMPACT	IMPACT DIRECTION	SIGNIFICANCE	SPATIAL SCALE	TEMPORAL SCALE	PROBABILITY	RATING
Impact on burial ground and graves	Negative	LOW	Isolated Sites / proposed site	Permanent	Practically impossible	
		2	1	5	1	0,53
Impact on archaeological sites	Negative	MODERATE	Isolated Sites / proposed site	Permanent	Unlikely	
		3	1	5	2	1,20
Palaeontological resources	Negative	LOW	Isolated Sites / proposed site	Short-term	Unlikely	
		2	1	2	2	0,67

8.9 Management recommendations and guidelines

8.9.1 Construction phase

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

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

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

8.9.2 Chance find 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.
- 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.

8.9.3 Possible finds during construction and operation (mining activities)

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:

- High density concentrations of stone artefact
- unmarked graves

8.10 Timeframes

It must be kept in mind that mitigation and monitoring of heritage resources discovered during construction activity will require permitting for collection or excavation of heritage resources and lead times must be worked into the construction time frames. **Table 23** gives guidelines for lead times on permitting.

Table 23 - Lead times for permitting and mobilisation

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

8.11 Heritage Management Plan for EMPr implementation

Table 24 - Heritage Management Plan for EMPr implementation

Area and site no.	Mitigation measures	Phase	Timeframe	The responsible party for implementation	Monitoring Party (frequency)	Target	Performance indicators (monitoring tool)
General project area	Implement a chance to find procedures in case where possible heritage finds are uncovered.	Construction and operation	During construction and operation	Applicant ECO Heritage Specialist	ECO (monthly / as or when required)	Ensure compliance with relevant legislation and recommendations from SAHRA under Section 34-36 and 38 of NHRA	ECO Monthly Checklist/Report
Burial grounds and graves	These sites should be demarcated with a 30-meter buffer as a no-go area. It is recommended that consultation with regards to Site 5-8 is done with the local authorities before construction commence to determine the site's social significance.	Construction through to Operational	During Construction and Operation	Applicant Environmental Control Officer (ECO) Heritage specialist	Monthly	Ensure compliance with relevant legislation and recommendations from SAHRA under Section 36 and 38 of NHRA	ECO Monthly Checklist/Report
Identified archaeological sites	If any of the identified archaeological sites on Alternatives 3,4 and 5 are to be impacted a Phase 2 archaeological mitigation process must be implemented. This will include, surface collections, test excavations and analysis of recovered material. A permit issued under s35 of the NHRA will be required to conduct such work. On completion of the mitigation work the developer can apply for a destruction permit with the backing of the mitigation report	Pre-construction	Pre-construction	Applicant Archaeologist	None	Ensure compliance with relevant legislation and recommendations from SAHRA under Section 35 of NHRA	Final report to be used by the developer to apply for a destruction permit under s35 of the NHRA
Palaeontological finds	If fossil remains are discovered during any phase of construction, either on the surface or exposed by fresh excavations the Chance Find Protocol must be implemented by the ECO in charge of these developments.	Construction	Construction	Applicant ECO Palaeontologist	Monthly	Ensure compliance with relevant legislation and recommendations from SAHRA under Section 35 of NHRA	Final report to be used by the developer to apply for a destruction permit under s35 of the NHRA

9 CONCLUSIONS

The HIA has shown that the study area and surrounding area has some heritage resources situated within the proposed development boundaries. Through data analysis and a site investigation, the following issues were identified from a heritage perspective.

9.1 Heritage Sites

During the field work several heritage features and resources were identified and logged. A total of 57 points of interest were logged that resulted in the delineation and identification of 24 separate heritage sites. These consist of **five burial grounds** (Site 1-1, 1-7, 2-1, 2-2 and 2-3 this is indicated as a stone feature that could possibly be a grave) with a **High heritage significance and a heritage grading of IIIA**. The **nine historic recent structures**. These are 1-2, 1-3, 1-4, 1-5, 1-6, 2-4, 2-5, 5-5 and 5-7, vary in significance from **medium to low and a grading of IIIB**. The archaeological finds consisting of 9 archaeological sites (Site 3-1, 3-2, Site 4-1, 4-2, and Sites 5-1, 5-2, 5-3, 5-4 and 5-6) has in most cases a rating of **Medium significance and a grading varying between IIIC and IIIA at the highest**. Site 5-8 represents a possible memorial now in disuse it was rated as having a Low heritage significance but with a possible local significance.

9.1.1 Burial Grounds and graves

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

9.1.2 Archaeological sites

The identified archaeological sites have a low to high heritage significance. Sites alternatives 2, 3 and 5 will have the least impact on identified archaeological sites, although mitigation work will be required for sites 3 and 5 as identified in the management guidelines of this report. The archaeological site identified on site 4 will require extensive mitigation work to mitigate the impact before any development.

If any of the identified archaeological site are to be disturbed a Phase 2 archaeological mitigation process must be implemented. This will include, surface collections, test excavations and analysis of recovered material. A permit issued under s35 of the NHRA will be required to conduct such work.

On completion of the mitigation work the developer can apply for a destruction permit with the backing of the mitigation report.

9.1.3 Palaeontological Impacts

The SAHRIS Palaeo sensitivity Map rates the palaeontological sensitivity of the geology as low and will only require the inclusion of a chance finds procedure in the EMPr.

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

Preceding any collection of fossil material, the specialist would need to apply for a collection permit from SAHRA. Fossil material must be curated in an accredited collection (museum or university collection), while all fieldwork and reports should meet the minimum standards for palaeontological impact studies suggested by SAHRA.

9.2 Preferred alternatives

From a heritage perspective the first management principle is conservation in situ. The locality of burial grounds and graves on alternatives Site 1 and Site 2 will require the adjustment of designs for these alternatives, but do not exclude the whole area.

The position and significance of the archaeological sites at site alternatives 3, 4 and 5 will required the implementation of mitigation as described in section 7, however these mitigation measures will be costly for site alternative 4 due to the extent and significance of the archaeological site.

9.3 General

It is the author's considered opinion that overall impact on heritage resources can be mitigated to Low with the implementation of mitigation measures. Provided that the recommended mitigation measures are implemented, the impact would be acceptably Low or could be totally mitigated to the degree that the project could be approved from a heritage perspective. The management and mitigation measures as described in Section 7 of this report have been developed to minimise the project impact on heritage resources.

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10.3 Historic Topographic Maps

All the historic and early topographic 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.

10.4 Internet

www.sanbi.org

10.5 Contemporary Cartographic Data

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

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Professional Heritage Specialist and Professional Archaeologist and Director PGS Heritage

Summary of Experience

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

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

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

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

Key Qualifications

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

BA - Archaeology, Geography and Anthropology - 1996

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

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

CRM Accreditation (ASAPA) -

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

Key Work Experience

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

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

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

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1998-2000 - Environmental Coordinator – Randfontein Estates Limited. Randfontein, Gauteng

1997-1998 - Environmental Officer – Department of Minerals and Energy. Johannesburg, Gauteng

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