



PGS HERITAGE

THE PROPOSED IRENE DALE WATER PIPELINE BETWEEN BOSJESSPRUIT COLLIERY AND A LOCAL RESERVOIR, LOCATED IN THE LEKWA LOCAL MUNICIPALITY AND THE GOVAN MBEKI LOCAL MUNICIPALITY, GERT SIBANDE DISTRICT MUNICIPALITY, MPUMALANGA PROVINCE

Heritage Impact Assessment

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Declaration of Independence

I, Cherene de Bruyn, declare that –

General declaration:

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

Disclosure of Vested Interest

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



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ACKNOWLEDGEMENT OF RECEIPT

Report Title	<i>THE PROPOSED IRENE DALE WATER PIPELINE BETWEEN BOSJESSPRUIT COLLIERY AND A LOCAL RESERVOIR, LOCATED IN THE LEKWA LOCAL MUNICIPALITY AND THE GOVAN MBEKI LOCAL MUNICIPALITY, GERT SIBANDE DISTRICT MUNICIPALITY, MPUMALANGA PROVINCE</i>		
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Reviewed			

CLIENT: Environmental Impact Management Services (Pty) Ltd

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SIGNATURE: _____

EXECUTIVE SUMMARY

PGS Heritage (Pty) Ltd (PGS) was appointed by Environmental Impact Management Services (Pty) Ltd (EIMS) to undertake a Heritage Impact Assessment (HIA) which will serve to inform the Environmental Impact Assessment Report (EIA) and Environmental Management Programme (EMPr) for the proposed Irenedale Water Pipeline Between Bosjesspruit Colliery and a Local Reservoir, located in the Lekwa Local Municipality and the Govan Mbeki Local Municipality, Gert Sibande District Municipality, Mpumalanga Province.

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.

Site Name and location

The proposed linear activity will be located on portion 9 of the Farm Voegelvallei 355 IS and portion 8, 26 and 27 of the Farm Stadensdam 333 IS. The site is located approximately 3km south-west of the town Charles Cilliers and 30km north of the town Standerton.

Heritage Sites

Intensive field surveys of the study area were undertaken on foot by comprising two field archaeologists on 23 November 2020. One heritage site was identified during the fieldwork.

Historical Structures

The site consist of a farmstead (IDPL-01) and has low heritage significance and was rated as IIIC.

Palaeontological

According to the PalaeoMap of SAHRIS the Palaeontological Sensitivity of the proposed area of the project footprint occurs in an area with insignificant (grey) palaeo-sensitivity. As such no studies are required.

IMPACT STATEMENT

Analysis of the various components of the HIA indicates a mitigated low negative impact on heritage resources and are expanded on below.

Historical Structures

An assessment of the possible impacts of the proposed project on historical heritage resources has shown that unmitigated impacts consist of medium negative impacts mostly confined to the construction phase of the project. By implementing the mitigation measures as listed in this report these impacts can be managed to low negative.

RECOMMENDATIONS

The following mitigation measures are listed as extracted from the three specialist studies concluded for this HIA is listed in Table 1.

Table 1 - Heritage management recommendations.

General project area	Implement chance find procedures in case where possible heritage finds are uncovered.
Historical structures with a low heritage sensitivity and rating of IIIC (IDPL-01)	No development within 50 meters from the site

General

It is the author's considered opinion that the overall impact on heritage resources is Low. 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.

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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 2 – 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
EIMS	nvironmental Impact Management Services (Pty) Ltd
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
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

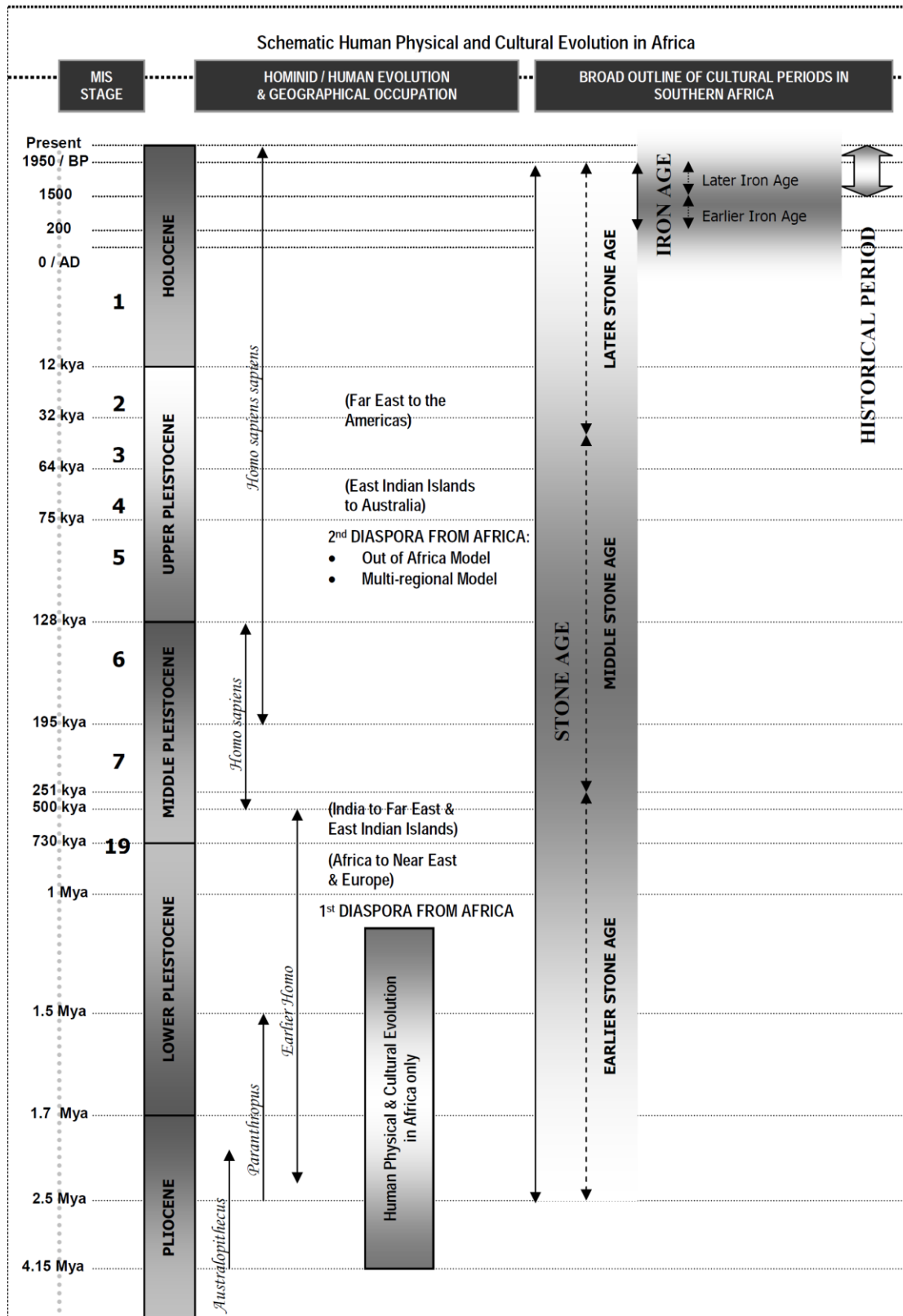


Figure 1 – Human and Cultural Timeline in Africa

1 INTRODUCTION

PGS Heritage (Pty) Ltd (PGS) was appointed by Environmental Impact Management Services (Pty) Ltd (EIMS) to undertake a Heritage Impact Assessment (HIA) which will serve to inform the Environmental Impact Assessment Report (EIA) and Environmental Management Programme (EMPr) for the proposed Irenedale Water Pipeline Between Bosjesspruit Colliery and a Local Reservoir, located in the Lekwa Local Municipality and the Govan Mbeki Local Municipality, Gert Sibande District Municipality, Mpumalanga Province.

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 90 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, is registered with the Association of Southern African Professional Archaeologists (ASAPA) as a Professional Archaeologist and is accredited as a Principal Investigator; he is further an Accredited Professional Heritage Practitioner with the Association of Professional Heritage Practitioners (APHP).

Cherene de Bruyn author of this report is registered with the ASAPA as a Professional Archaeologist and is accredited as a Principal Investigator and Field Director, she is further also a member of the International Association for Impact Assessment South Africa (IAIASA). She holds a MA in Archaeology, BSc (Hons) in Physical Anthropology and a BA (Hons) in Archaeology.

Michelle Sachse field archaeologist for this report is registered with the ASAPA as a Professional Archaeologist. She holds a MA 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.

1.4 LEGISLATIVE CONTEXT

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

1.4.1 STATUTORY FRAMEWORK: THE NATIONAL HERITAGE RESOURCES (ACT 25 OF 1999)

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

1.4.1.1 SECTION 35 – ARCHAEOLOGY, PALAEOLOGY AND METEORITES

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

1.4.1.2 SECTION 36 – BURIAL GROUNDS & GRAVES

A section 36 permit application is made to the SAHRA or the competent provincial heritage authority which protects burial grounds and graves that are older than 60 years and must conserve and generally care for burial grounds and graves protected in terms of this section, and it may make such arrangements for their conservation as it sees fit. SAHRA must also identify and record the graves of victims of conflict and any other graves which it deems to be of cultural significance and may erect memorials associated with these graves and must maintain such memorials. A permit is required under the following conditions:

Permitting requirements for burial grounds and graves older than 60 years to Heritage Western Cape (prehistoric) and historic burials to the South African Heritage Resources Agency:

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

1.4.1.3 SECTION 38 HIA AS A SPECIALIST STUDY WITHIN THE EIA IN TERMS OF SECTION 38(8)

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

Permitting requirements for demolition of built environment features:

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

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

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

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

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

1.4.2 NOTICE 648 OF THE GOVERNMENT GAZETTE 45421

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

Table 3 - Reporting requirements for GN648.

GN 648	Relevant section in report	Where not applicable in this report
2.2 (a) a desk top analysis, using satellite imagery;	section 4	
2.2 (b) a preliminary on-site inspection to identify if there are any discrepancies with the current use of land and environmental status quo versus the environmental sensitivity as identified on the national web based environmental screening tool, such as new developments, infrastructure, indigenous/pristine vegetation, etc.	section 5	-
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 5	-
2.3(b) contains a motivation and evidence (e.g. photographs) of either the verified or different use of the land and environmental sensitivity;	Section 5 provides a description of the current use and confirms the status in the screening report	

An assessment of the Environmental Screening tool provides that there are currently no known archaeological and heritage resources in the project area (**Figure 2**).

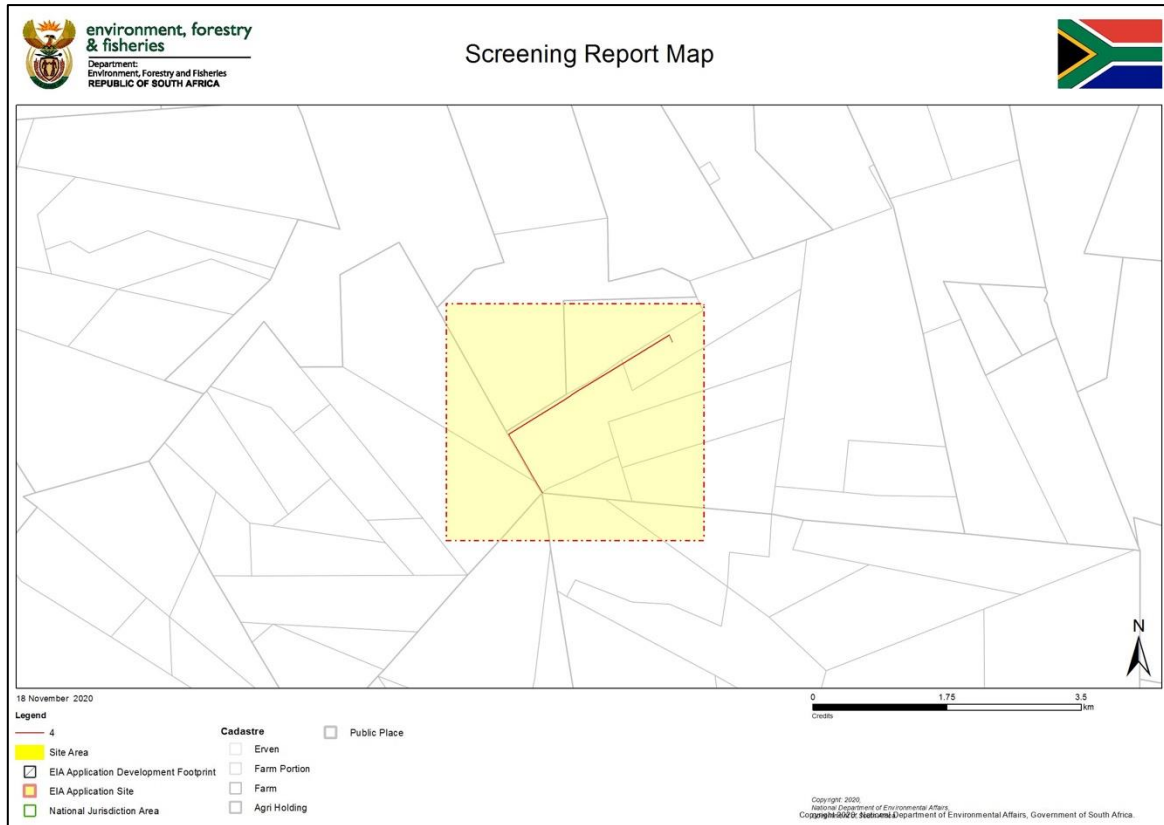


Figure 2: Environmental screening tool - archaeological and heritage sensitivity.

1.4.3 NEMA – APPENDIX 6 REQUIREMENTS

The HIA report has been compiled considering the National Environmental Management Act (Act No. 107 of 1998) (NEMA) and Environmental Impact Assessment (EIA) Regulations, 2014 (as amended) 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 4 - Reporting requirements as per NEMA, as amended, Appendix 6 for specialist reports

Requirements of Appendix 6 – GN R326 EIA Regulations of 7 April 2017	Relevant section in report	Comment where not applicable.
1.(1) (a) (i) Details of the specialist who prepared the report	Page 2 of Report – Contact details and company	-
(ii) The expertise of that person to compile a specialist report including a curriculum vita	Section 1.2 – refer to Appendix A	-
(b) A declaration that the person is independent in a form as may be specified by the competent authority	Page ii of the report	-
(c) An indication of the scope of, and the purpose for which, the report was prepared	Section 1.1	-
(cA) An indication of the quality and age of base data used for the specialist report	Section 3	-

Requirements of Appendix 6 – GN R326 EIA Regulations of 7 April 2017	Relevant section in report	Comment where not applicable.
(cB) a description of existing impacts on the site, cumulative impacts of the proposed development and levels of acceptable change;	Section 6	-
(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	-
(f) details of an assessment of the specific identified sensitivity of the site related to the proposed activity or activities and its associated structures and infrastructure, inclusive of a site plan identifying site alternatives;	Section 6 and 7	-
(g) An identification of any areas to be avoided, including buffers	Section 6 and 7	-
(h) A map superimposing the activity including the associated structures and infrastructure on the environmental sensitivities of the site including areas to be avoided, including buffers;	Section 7	
(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 6 and 7	
(k) Any mitigation measures for inclusion in the EMPr	Section 8	
(l) Any conditions for inclusion in the environmental authorisation		Non required
(m) Any monitoring requirements for inclusion in the EMPr or environmental authorisation	Section 8	
(n)(i) A reasoned opinion as to whether the proposed activity, activities or portions thereof should be authorised and	Section 9	
(n)(iA) A reasoned opinion regarding the acceptability of the proposed activity or activities; and		
(n)(ii) If the opinion is that the proposed activity, activities or portions thereof should be authorised, any avoidance, management and mitigation measures that should be included in the EMPr, and where applicable, the closure plan	Section 8	-
(o) A description of any consultation process that was undertaken during the course of carrying out the study		Not applicable. A public consultation process was handled as part of the BA and EMPr 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 HWC guidelines on HIAs, PIAs and AIAs	

2 SITE LOCATION AND DESCRIPTION

2.1 LOCALITY AND SITE DESCRIPTION (PROVIDED BY GSW)

The proposed linear activity is to be located approximately 3km south-west of the town Charles Cilliers and 30km north of the town Standerton, Mpumalanga Province (**Figure 3**).

Study Area central Coordinate	26.699317° 29.176884°
Location	The study area is located in the Lekwa Local Municipality and the Govan Mbeki Local Municipality, Gert Sibande District Municipality, of the Mpumalanga Province.
Property	Portion 9 of the Farm Vegelvallei 355 IS and Portion 8, 26 and 27 of the Farm Van Stadensdam 333 IS

Locality Map



Figure 3 - Locality map showing the proposed linear development

2.2 PROJECT DESCRIPTION (PROVIDED BY EIMS)

The applicant wishes to construct a water pipeline between Bosjesspruit Colliery and a local reservoir. The proposed pipeline is estimated to be approximately 3km in length and runs adjacent to existing servitudes. It is anticipated that numerous wetlands will be traversed.

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.

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 15 September 2020, 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. An 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) based on SAHRA guidelines, were used for the purpose of this report (**Table 5** and **Table 6**).

Table 5 - Rating system for archaeological resources

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

¹ According to Notice 648 of the Government Gazette 45421

Grading	Description of Resource	Examples of Possible Management Strategies	Heritage Significance
IIIA	Such a resource must be an excellent example of its kind or must be sufficiently rare. Current examples: Varschedrift; Peers Cave; Brobartia Road Midden at Bettys Bay	Resource must be retained. Specific mitigation and scientific investigation can be permitted in certain circumstances with sufficient motivation.	High Significance
IIIB	Such a resource might have similar significances to those of a Grade III A resource, but to a lesser degree.	Resource must be retained where possible where not possible it must be fully investigated and/or mitigated.	Medium Significance
IIIC	Such a resource is of contributing significance.	Resource must be satisfactorily studied before impact. If the recording already done (such as in an HIA or permit application) is not sufficient, further recording or even mitigation may be required.	Low Significance
NCW	A resource that, after appropriate investigation, has been determined to not have enough heritage significance to be retained as part of the National Estate.	No further actions under the NHRA are required. This must be motivated by the applicant or the consultant and approved by the authority.	No research potential or other cultural significance

Table 6 - Rating system for built environment resources

Grading	Description of Resource	Examples of Possible Management Strategies	Heritage Significance
I	Heritage resources with qualities so exceptional that they are of special national significance. Current examples: Robben Island	May be declared as a National Heritage Site managed by SAHRA.	Highest Significance
II	Heritage resources with special qualities which make them significant in the context of a province or region, but do not fulfil the criteria for Grade I status. Current examples: St George's Cathedral, Community House	May be declared as a Provincial Heritage Site managed by HWC.	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

Grading	Description of Resource	Examples of Possible Management Strategies	Heritage Significance
IIIC	Such a resource is of contributing significance to the environs. These are heritage resources which are significant in the context of a streetscape or direct neighbourhood.	This grading is applied to buildings and/or sites whose significance is contextual, i.e. in large part due to its contribution to the character or significance of the environs. These buildings and sites should, as a consequence, only be regulated if the significance of the environs is sufficient to warrant protective measures, regardless of whether the site falls within a Conservation or Heritage Area. Internal alterations should not necessarily be regulated.	Low Significance
NCW	A resource that, after appropriate investigation, has been determined to not have enough heritage significance to be retained as part of the National Estate.	No further actions under the NHRA are required. This must be motivated by the applicant and approved by the authority. Section 34 can even be lifted by HWC for structures in this category if they are older than 60 years.	No research potential or other cultural significance

4 CURRENT STATUS QUO

4.1 SITE DESCRIPTION

4.1.1 GENERAL SITE

The proposed linear activity will be located on portion 9 of the Farm Voegelvallei 355 IS and portion 8, 26 and 27 of the Farm Stadensdam 333 IS, located in the Lekwa Local Municipality and the Govan Mbeki Local Municipality, Gert Sibande District Municipality, Mpumalanga Province.

The study area is situated on an extremely flat and disturbing environment. The area is mostly categorised by grassy vegetation that covers the entire landscape. The properties have been predominantly used as part of agriculture and animal grazing.

According to Mucina & Rutherford (2006: 297) the vegetation of the region can be classified as Soweto Highveld Grassland. The vegetation type is characterised by *“Gently to moderately undulating landscape on the Highveld plateau supporting short to medium-high, dense, tufted grassland dominated almost entirely by Themeda triandra and accompanied by a variety of other grasses such as Elionurus muticus, Eragrostis racemosa, Heteropogon contortus and Tristachya leucothrix. In places not disturbed, only scattered small wetlands, narrow stream alluvia, pans and occasional ridges or rocky outcrops interrupt the continuous grassland cover.”*

In terms of Geology, the area is characterised by *“shale, sandstone or mudstone of the Madzaringwe Formation (Karoo Supergroup) or the intrusive Karoo Suite dolerites which feature prominently in the area. In the south, the Volksrust Formation (Karoo Supergroup) is found and in the west, the rocks of the older Transvaal, Ventersdorp and Witwatersrand Supergroups are most significant”* (Mucina & Rutherford (2006:297; sanbi.org)

Visibility on-site was high due to the disturbed nature of the site as well as the flat topography of the landscape. Large portions of the study areas show signs of continued use as grazing and existing agricultural fields. A section of the proposed pipeline transversed through several small wetlands. Several powerlines, as well as existing pipeline infrastructure, were identified throughout the site.



Figure 4 - General view of the study area



Figure 5 – Agricultural fields located to the south of the pipeline



Figure 6 - Sections of the pipeline transverse through wetlands



Figure 7 - Eskom Powerlines located on the western section of the pipeline.



Figure 8 – Existing Pipeline/drain infrastructure identified throughout the site.

5 HISTORICAL OVERVIEW OF THE STUDY AREA

5.1 ARCHAEOLOGICAL BACKGROUND TO THE STUDY AREA AND SURROUNDINGS

The archival research focused on available information sources (published literature and historical maps) that were used to compile a background history of the study area and surrounds. This data then informed the possible heritage resources to be expected during the initial field surveying.

Table 7- Summary of archival data found on the area in general

DATE	DESCRIPTION
2.5 million to 250 000 years ago	The Earlier Stone Age (ESA) is the first and oldest phase identified in South Africa's archaeological history and comprises two technological phases. The earliest of these technological phases is known as Oldowan and is associated with crude flakes and hammerstones which date to approximately 2 million years ago. The second technological phase in the Earlier Stone Age of Southern Africa is known as the Acheulian and comprises more refined and better-made stone artefacts such as the cleaver and bifacial handaxe. The Acheulian phase dates back to approximately 1.5 million years ago. The site of Maleoskop on the farm Rietkloof in Groblersdal is one of only a few places in Mpumalanga where ESA artefacts have been found to date. Erosion gullies along the Rietspruit revealed concentrations of ESA stone tools. These stone tools consisted of choppers (Oldowan), hand axes, and cleavers (Acheulean). (Esterhuysen and Smith, 2007)
250 000 to 40 000 years ago	The Middle Stone Age is the second oldest phase identified in South Africa's archaeological history. This phase is associated with flakes, points and blades manufactured by means of the so-called prepared-core technique. Evidence for this period has been excavated from Bushman Rock Shelter, a well-known site situated on the farm Klipfonteinhoek in the Ohrigstad District (Esterhuysen and Smith, 2007).
40 000 years ago to the historic past	The Later Stone Age is the third phase identified in South Africa's Stone Age history. This phase in human history is associated with an abundance of very small stone artefacts or microliths. Archaeologists have investigated some of the old shelters in the present-day areas of Witbank, Ermelo, Barberton, Nelspruit, White River, Lydenburg, and Ohrigstad. (Delius and Hay, 2009). An LSA site containing stone tools and rock art have been found near Badplaas (Korsman and Plug 1994; Antonites, 2020). Evidence of the LSA occupation have also been found at Welgelefen Shelter, close to Ermelo on the banks of the Vaal river and at Iron Pig shelter in the Doornkop Nature Reserve north of Carolina (Schoonraad and Beaumont 1971; Bader et al., 2020; Antonites, 2020).
AD 200 – AD 900	The earliest phase in the Iron Age history of Southern African is known as the Early Iron Age (EIA).
AD 900 – AD 1300	The second phase in the Iron Age history of Southern Africa is known as the Middle Iron Age (MIA) . Evidence from Welgelegen Shelter on the banks of the Vaal River near Ermelo, suggests early farming and hunter-gatherer communities coexisted. Layers dating to AD 1200 provide evidence that the farmers with metal tools occupied the shelter, while what appears to be a dependent hunter-gatherer group, making typical SA tools, and using pottery but no iron tools, occupied the less desirable overhang area. (Esterhuysen and Smith, 2007)
AD 1300 – AD 1850	The third and final phase in the Iron Age history of Southern Africa is known as the Late Iron Age (LIA). Bergh (1999) identifies two main Late Iron Age groups within the wider vicinity of the Ermelo area, namely the Phuthing and the Khumalo Ndebele (Matabele). Furthermore, Lombard (1980) states that corbelled stone huts (which are also associated with the Late Iron Age) are found on the farms Tafelkop 270 and Middelpaat

	<p>271. These farms are located some 14 kilometres north-west of the present study area. According to Huffmann (2007) corbelled stone huts appear to be associated with the so-called Type V Iron Age sites. These Type V settlements date from the period 1700 to 1850.</p> <p>Lombard (1980) also mentions a Late Iron Age group he refers to as the Nhlapo people and indicates that when the first white people came to stay in the Ermelo district they already found the Nhlapo people in the vicinity of Maviristad. Myburgh (1956) refers to the followers of George Nhlapo who resided on the farm Witbank in the Ermelo District. It is presently not exactly certain whether this farm is the farm Witbank located directly south of the farm Van Oudtshoorn Stroom.</p> <p>An LIA site with Type V stonewalling was identified at the confluence of the Vaal and Klip rivers outside Standerton at Robertsdrift (Derricourt & Evers, 1973). The site was discovered through a series of aerial photographs of the area. Ceramics with comb stamping motifs were identified during excavations (Derricourt & Evers, 1973). Huffman (2007) classified the ceramics as belonging to the Makgareng facies, dating to AD 1700 to AD 1820. Another site with Type V stonewalling was found at Wildebeestfontein in the Bethal district (Taylor, 1979). This site consisted of middens and circular depressions indicating possible dwellings (Taylor, 1979). Pieces of iron age ceramics, most likely belonging to the Makgareng facies were also found.</p>
1821	<p>In this year the Matabele of Mzilikazi moved out of present-day KwaZulu Natal and encountered the Phuthing along the upper reaches of the Vaal and Olifants Rivers. This area was located northwest of present-day Ermelo, roughly between this town and Hendrina. After the Phuthing was attacked and defeated by the Matabele, they were forced to flee in a southern direction over the Vaal River. In turn, the Matabele moved to the banks of the Vaal River where they established themselves between 1823 and 1827 (Bergh, 1999).</p>
1899 – 1902	<p>Since the arrival of the white settlers - c. AD 1840 in this part of the country. The southern Mpumalanga region of Amersfoort and Volksrust played a major part in the first few months of the South African War (1899-1902), with specific reference to the movement of British troops from the then Natal Colony through the areas of Newcastle, Charlestown and Volksrust. This area playing a major role as the spring board for the movement of General Buller into the then Zuid Afrikaanse Republic (ZAR) in the winter of 1900.</p> <p>Evidence for battles or skirmishes within or in the direct vicinity of the study area during the South African War could be found, on the farms Oshoek (4 December 1901), Trigaardsfontein (10 December 1901), Witbank (11 January 1902) and Nelspan (26 January 1902) (Bergh, 1999; Antonites, 2020; Van Vollenhoven, 2013).</p> <p>Van der Westhuizen (2000) refers to the fact that the hill known as Bührmannstafelkop was used by the British as a military hospital during the war. The hill is located approximately 90 km northeast of the study area.</p>

5.2 HISTORICAL BACKGROUND OF STANDERTON AND CHARL CILLIERS

5.2.1 STANDERTON

The town of Standerton was laid out on the farm Grootverlangen (Erasmus, 2014). The farm belonged to Adriaan Henrik Stander. The District of Standerton was proclaimed in December 1878, while the town of Standerton was formally established in January 1879 (Bergh, 1999). During Transvaal's first war of independence (1880-1881) a British garrison was besieged in the town (Erasmus, 2014).

At Standerton there was both a concentration camp for white and for black people (Bergh 1999; Van Vollenhoven, 2013). The concentration camp was probably established in 1900 (BCCD, 2020). In February 1901 the camp was handed over to civil administration with Mr van Musschernbroek who was put in charge of the camp (BCCD, 2020). There are no records of individuals arriving or departing from the camp (BCCD, 2020). Conditions in the camp were poor, as there was not enough food, blankets or sleeping space, causing many of the Boer and black prisoners to become sick with dysentery (BCCD, 2020).



Figure 9 - Standerton Concentration Camp (Boervolkerfenisbewaring, 2020)

5.2.2 CHARL CILLIERS

Charl Cilliers was first known as Van Tondershoek. A new Dutch Reformed parish was established in 1971 (Erasmus, 2014). The name of the town was changed to Charl Cilliers in honour of the Voortrekker leader (Erasmus, 2014).

5.3 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 (1964 and 1984) were assessed to observe the development of the area, as well as the location of possible historical structures and burial grounds. The maps were also used to assess the possible age of structures located, to determine whether they could be considered as heritage sites. Map overlays were created showing the possible heritage sites identified within the areas of concern, as can be seen below.

The relevant topographical maps include:

- Map of the Transvaal and Orange Free State. Heidelberg. Heliozincographed at the Ordnance Survey Office, Southampton in 1899.
- First Edition Imperial Map of South Africa, compiled for the Field Intelligence Department Cape town, April 1900.
- Topographic Sheet Bethal No 27. Heliozincographed at the Government Printing Works, drawn by the Surveyor-Generals Office in 1917.
- First Edition Topographic map 2629CA Charl Cilliers, surveyed in 1964 and drawn in 1965 by the Trigonometrical Survey Office. Printed by the Government Printer in 1965.
- Second Edition Topographic map 2629CA Secunda, published by the Chief Director of Surveys and Mapping in 1987.

It can be seen that all the map sheets consulted depict the entire project area surrounded by several huts, as well as old agricultural fields.

Furthermore, from the Chief Surveyor-General database (<http://csg.dla.gov.za/>) the following farms were surveyed:

- The farm Vogelvallei was surveyed in April 1891 by land surveyor W. Duncan.
- The farm Vogelvallei 355 IS was surveyed in March 1978 – June 1979 by the land surveyor Z.A. du Toit.
- The farm Van Stadendam 333 IS was surveyed in September 1972.

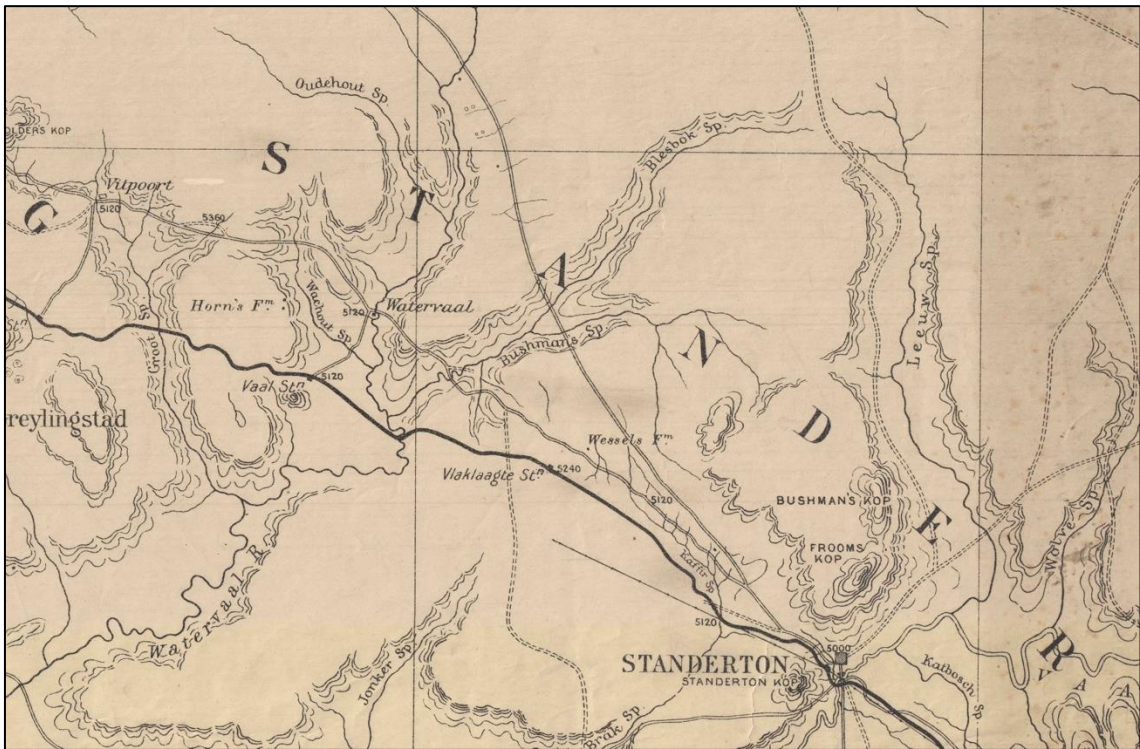
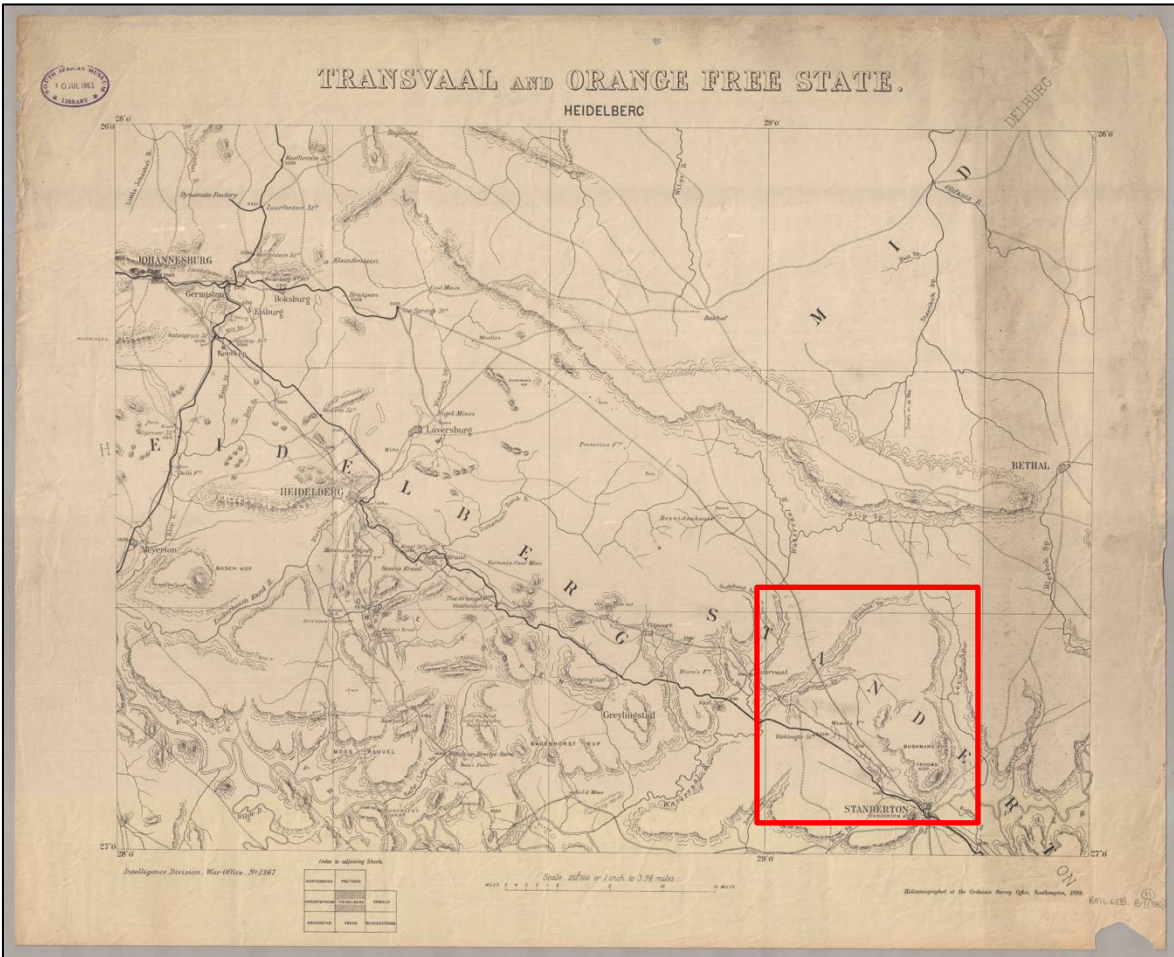


Figure 10 - Map of the Transvaal and Orange Free State (1899), showing the Standerton region. Note that very few farms were established in the region (UCT Digital Collections. 2020a)

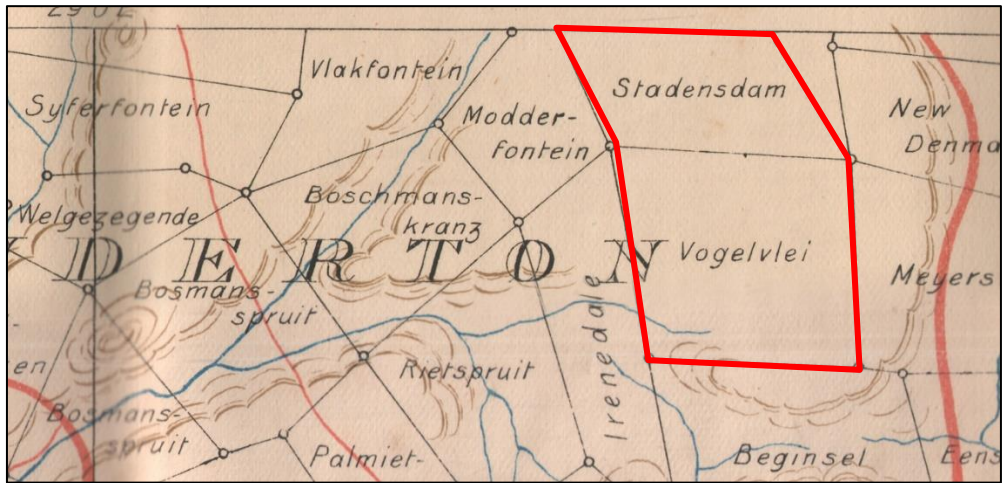


Figure 11 – View of the Farms Vogelvallei and Van Stadensdam on the First Edition Imperial Map of South Africa, April 1900 (UCT Digital Collections. 2020b).

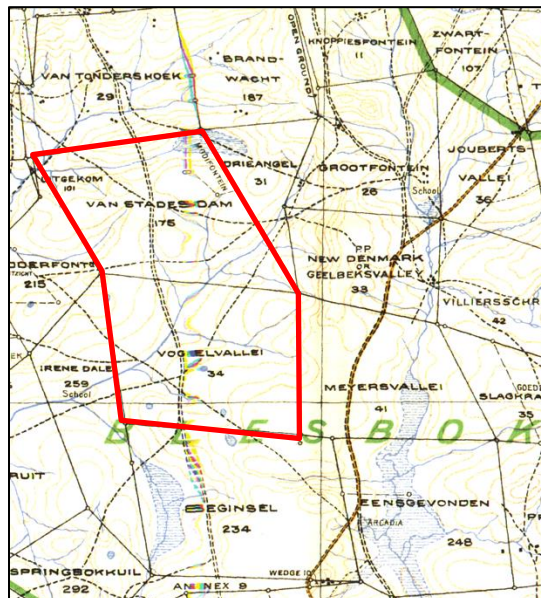
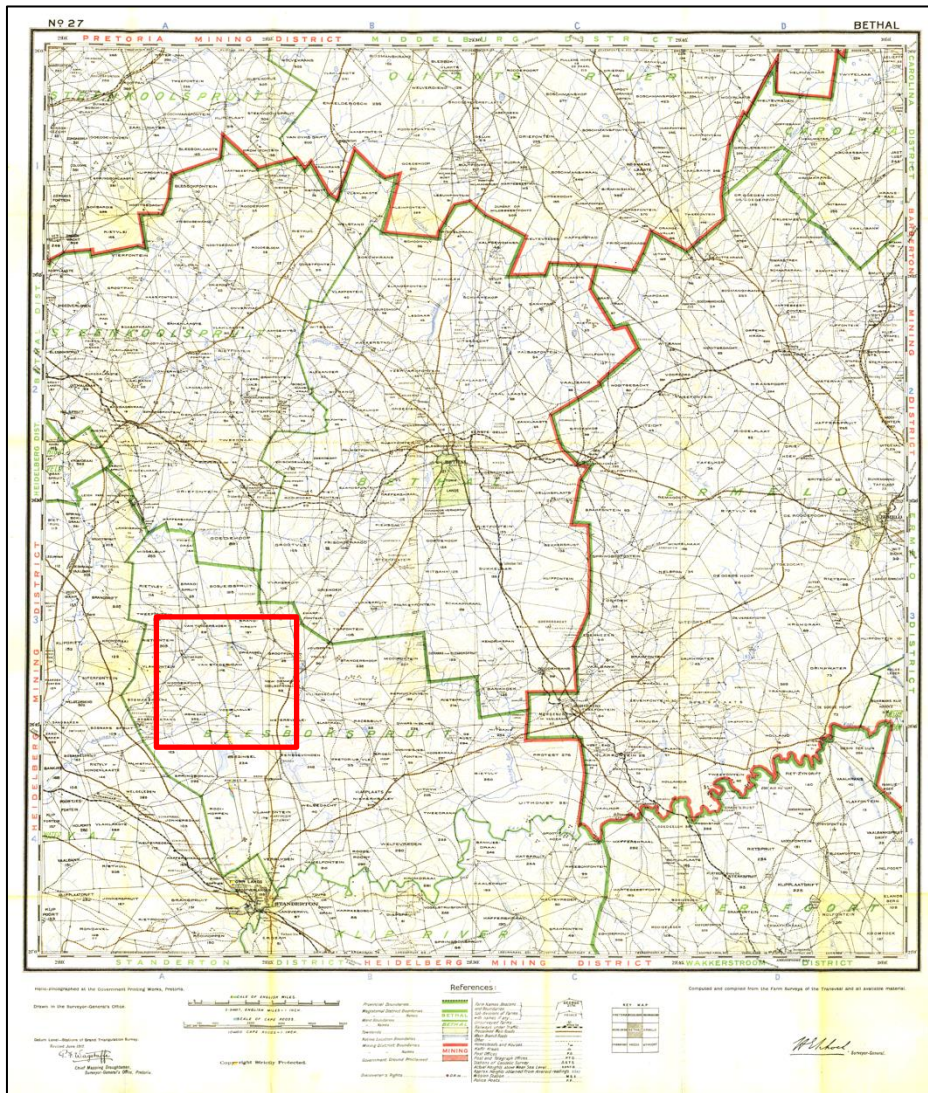


Figure 12 - View of the farms Vogelvallei and Van Stadendam on Topographic Sheet Bethal No 27

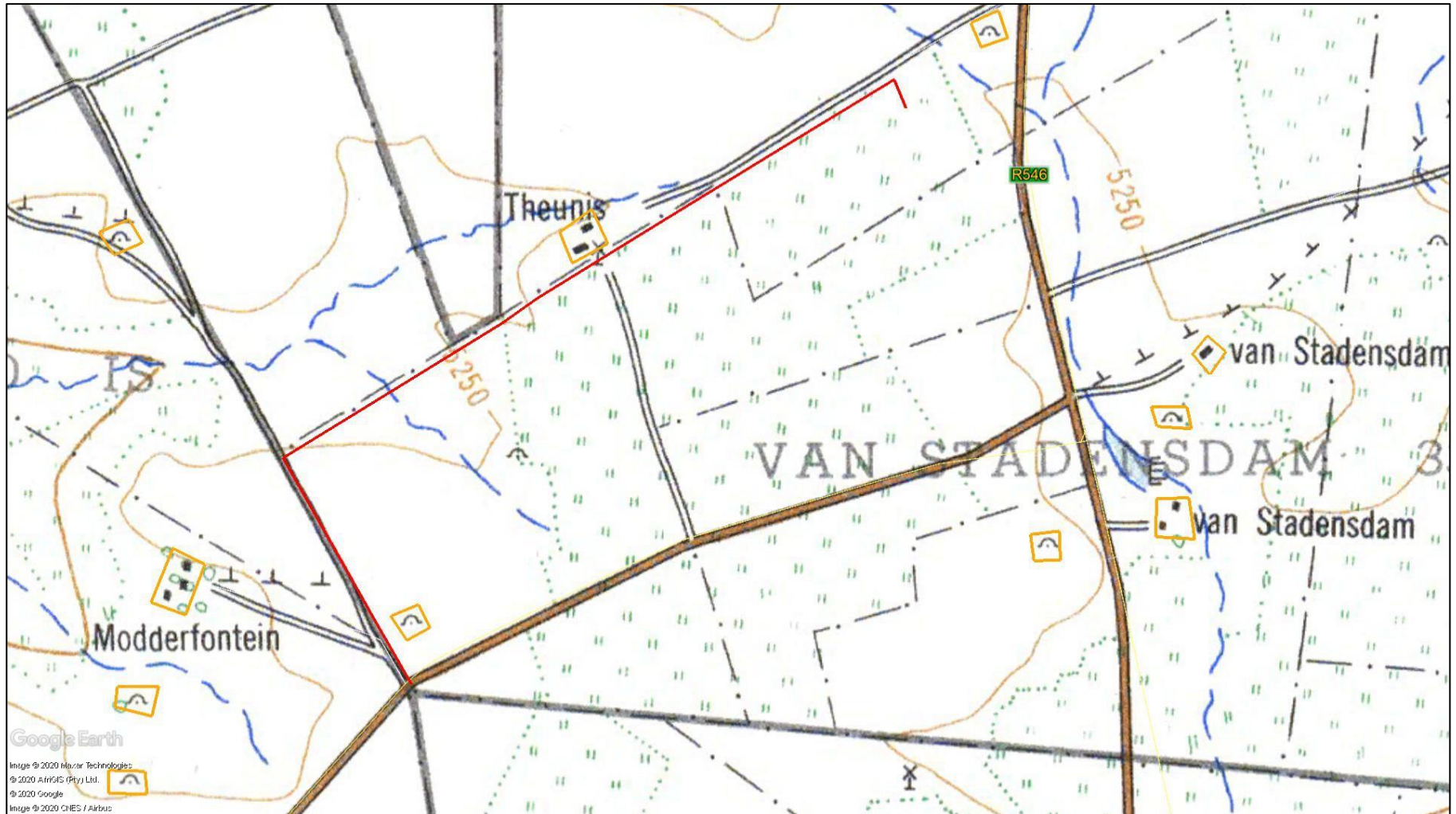


Figure 13 - First Edition Topographic map 2629CA Charl Cilliers, surveyed in 1964 showing the proposed pipeline (red polyline), with several heritage features (orange polygons) located in close proximity.

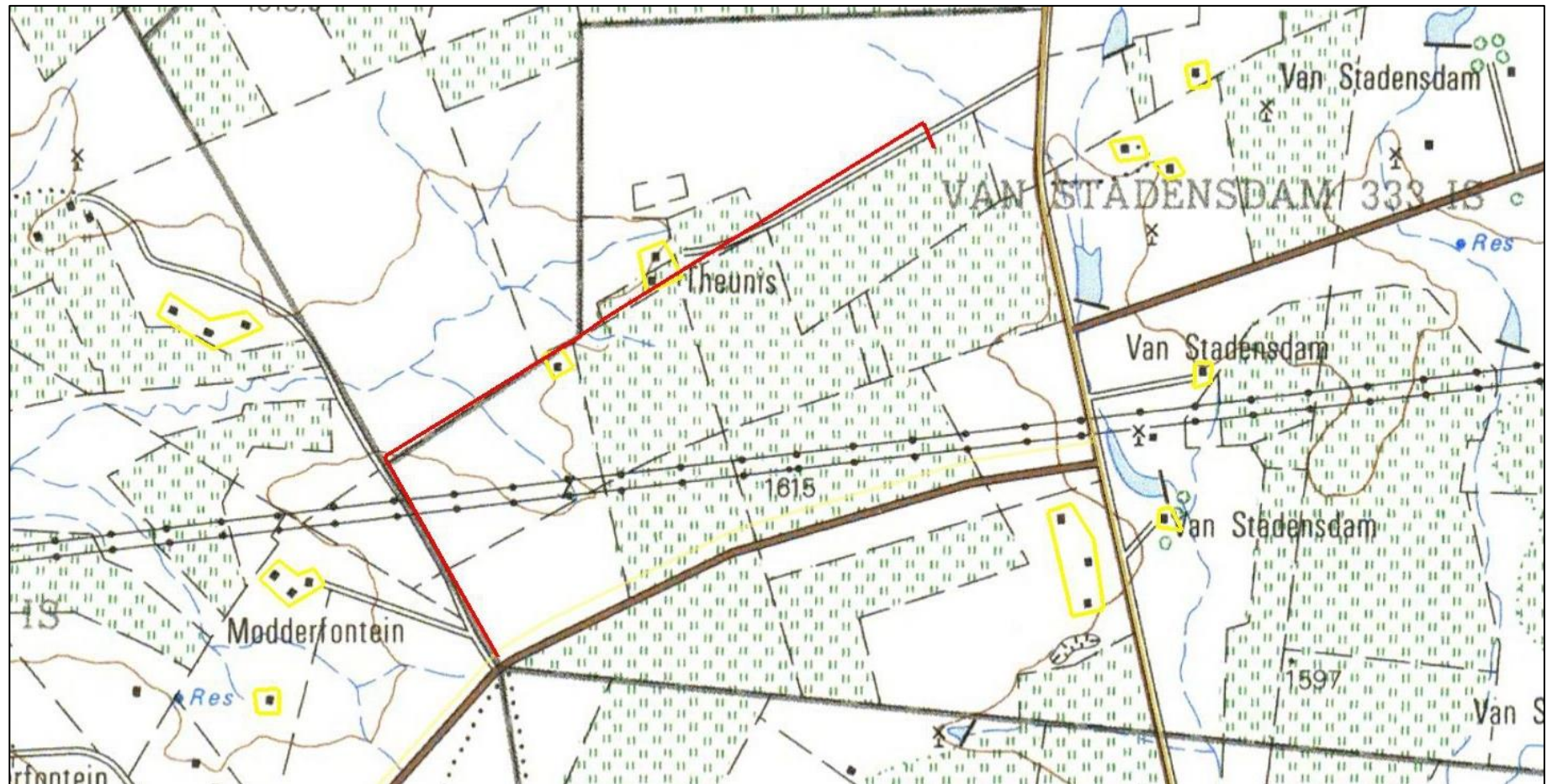


Figure 14 - Second Edition Topographic map 2629CA Secunda, published by the Chief Director of Surveys and Mapping in 1987, showing the proposed pipeline (red polyline), with several heritage features (yellow polygons) located in close proximity.

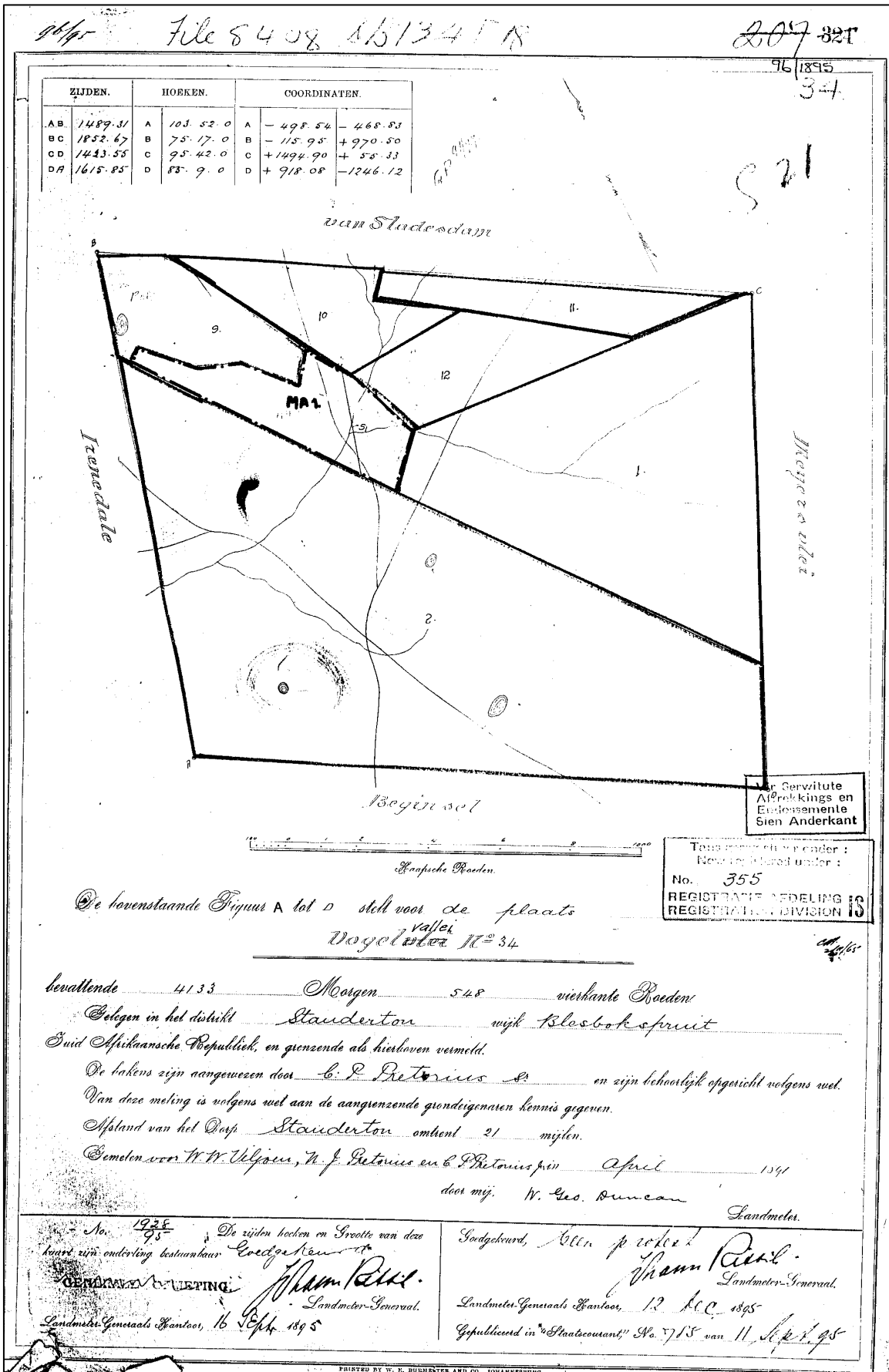


Figure 15 - Surveyor-General diagram of the farm Vogelvallei, which was surveyed in April 1891.

SERVITUDE DIAGRAM

SIDES metres	ANGLES OF DIRECTION	CO-ORDINATES	
		Y	System Lo.29°X
	Constants	+	0,00
AB	339,11	347 18 10	A - 19 603,40 + 56 651,86
BC	412,73	347 06 10	B - 19 677,94 + 56 982,68
CD	313,91	347 05 50	C - 19 770,07 + 57 385,00
DE	338,72	347 14 40	D - 19 840,17 + 57 690,98
	83 Δ Vogelvallei		E - 19 914,95 + 58 021,34
	121 Δ Stan 81		- 22 803,72 + 60 929,08
			- 16 968,94 + 56 209,94

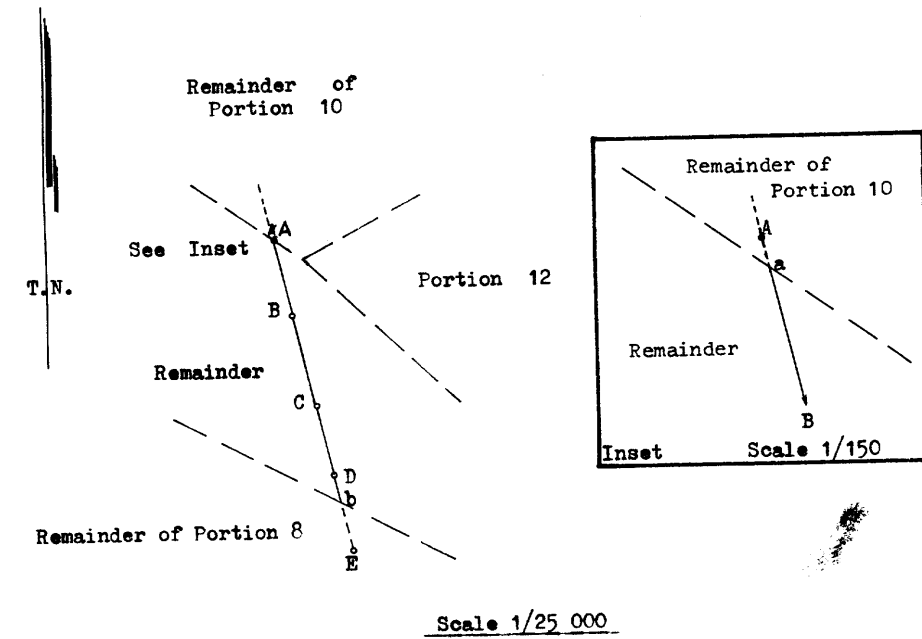
S.G. No. A
1134/80

Approved

E.A. du Toit
for Surveyor
General.

27-8-1980

ABCDE.....Concrete pillar ±1m high with centre peg.



The figure- line aBCDb represents the centre line of a pipeline servitude 7 metres wide over Remainder of the farm

VOGELVALLEI No. 355 - IS.

Province of Transvaal
Surveyed in March 1978 - June 1979

by me *E.A. du Toit*
Land Surveyor.
E.A. du Toit.

This diagram is annexed to

No. *K. 2554/1981.5*
d.d.
i.f.o.

The original diagram is

No. ~~A-943/20~~ 96/95

DB 134/18

~~Transfer T9148/1924~~

Grant 1734/1873
DB 134/18

File

S.R. No. 758/79

Comp. IS-5C

Registrar of Deeds

PONDERS B4910 12/74 1 000 FORMS 2057 25519 010

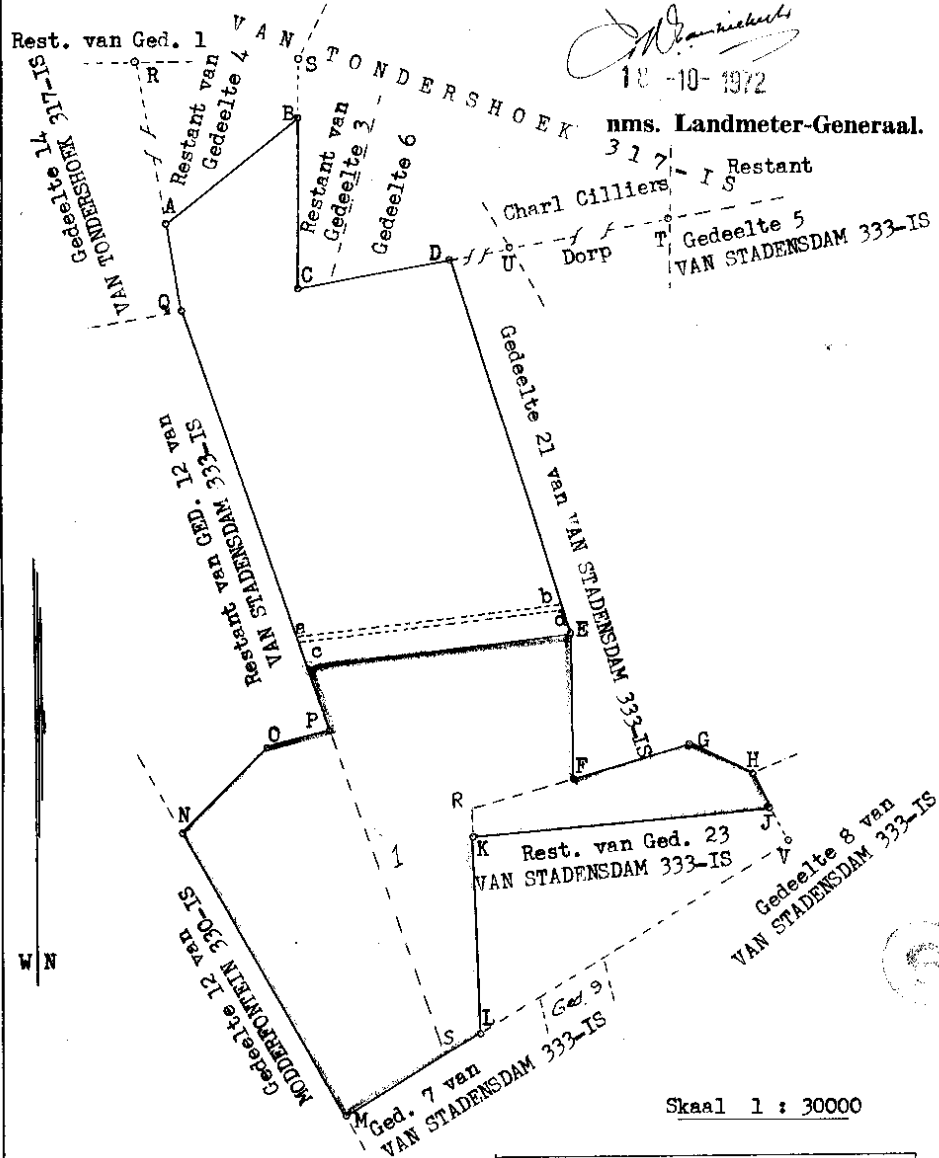
YW 146
L267/5B

Figure 16 - Surveyor-General diagram of the farm Vogelvallei 355 IS, which was surveyed in March 1978 - June 1979.

Goedgekeur

M. van Niekerk
18-10-1972

nms. Landmeter-Generaal.



Bakenbeskrywings:

- A B C Q T : Ysterpale en klipstapels.
 D : Geplante klip 0,20 x 0,20 x 0,95m. R : 25mm ysterpyp en klipstapel
 E : Geplante klip 0,13 x 0,20 x 0,95m. (nie belyn nie).
 F : Geplante klip 0,15 x 0,23 x 0,95m. U : 25mm ronde ysterpen onder klippe
 L G : Geplante klip 0,15 x 0,15 x 0,95m. by interseksie van drade.
 H : 16 mm Ysterpen aan noord-westekant van houtdraadpaal met 2 V.M.e
 op 4,7m langs grense.
 S J K : 12mm x 0,45m Ysterpenne en klipstapels.
 M : Ysterpaal 0,13m oos van 15mm ysterpen, albei in klipstapel.
 N O P : Ysterpale in klipstapels.
 V : 15mm x 40mm ysterpen oos van houtpaal; 2 v.m.e op 4,7m langs grense.

Saamgestel in September 1972 deur my *M. van Niekerk* Landmeter

HIERDIE KAART BESTAAN UIT 2 VELLE
VEL NO. 2

Figure 17 - Surveyor-Genera; diagram of the farm Van Stadendam 333 IS was surveyed in September 1972.

5.4 PREVIOUS ARCHAEOLOGICAL AND HERITAGE STUDIES IN AND AROUND THE STUDY AREA

A scan of the SAHRIS database has revealed the following studies conducted in and around the study area of this report. These studies are summarised below in ascending date order:

- VAN SCHALKWYK, J. A. 2002. A survey of cultural resources for the proposed new Tutuka-Alpha Power Transmission Line, Standerton District, Mpumalanga Province. **No sites, objects or structures were found.**
- KÜSEL, U. 2006. Cultural heritage resources impact assessment of Portion 10 of the farm Jonkersdam 391 Is Standerton Mpumalanga. **No cultural heritage resources were identified.**
- VAN SCHALKWYK, J. A. 2007. Heritage impact assessment for the Standerton Extension 8 Project, Standerton, Mpumalanga. **Several sites related to Second World War buildings and airfield were identified.**
- BIRKHOLTZ, P. 2008. Phase 1 heritage impact assessment for the proposed Lothter Siding for Golfview Mining (Pty) Ltd on the farm Leliefontein 136 It Portion 6 in the vicinity of Ermelo Mpumalanga Province, South Africa. **No heritage sites were located inside the proposed development area.**
- FOURIE, W. 2008a. Archaeological Impact Assessment Proposed mining development for Xstrata Group - Spitzkop Mine, Breyten – Ermelo Region, Mpumalanga Province. **During the survey, three cemeteries consisting of approximately 77 graves where identified.**
- FOURIE, W. 2008b. Archaeological Impact Assessment for the Camden Power Station Rail expansion project on portions of the farm Mooiplaats 290 IT and the farm Camden Power Station 329 IT, District Ermelo, Mpumalanga. **During the survey, one site of low heritage significance was identified.**
- FOURIE, W. 2009a. Heritage Impact Assessment for the Spitzkop Colliery, District Ermelo, Mpumalanga. **During the survey seventy-five site of heritage, significance was identified, including forty-four cemeteries, and twenty-five farmsteads.**
- FOURIE, W. 2009b. Archaeological Impact Assessment for the Benicon – Bankfontein Coal Mine project on a portion of the remaining extent of portion 7 of the farm Bankfontein125 IS, District Ermelo, Mpumalanga. **During the survey, eight sites were found, including historical house, historic homesteads, graves, and structures associated with pre-colonial farming communities.**

- GAIGHER, S. 2009. Heritage Impact Assessment for the Proposed Standerton Residential Golf Estate, Standerton, Mpumalanga Province. **Three sites were identified, including several irregular stone terrace walls, a demolished homestead and two well-marked graves.**
- VAN DER WALT, J. 2009. Archaeological Impact Assessment for the proposed Coal Mine on the Farm Leeufontein 48 Is, District Ermelo, Mpumalanga Province. **No heritage significant sites were identified during the survey.**
- BRIKHOLTZ, P. 2010. Phase 1 Heritage Impact Assessment for the proposed establishment of the Van Ouds Colliery on Portions 20, 23, 32 And 51 of the Farm Van Oudshoornstroom 261-It, in the vicinity of Ermelo, Mpumalanga Province. **No sites were located within the study area.**
- GAIGHER, S. 2009. Heritage impact assessment for the proposed extension of the existing General Waste Disposal Site at Tutuka Power Station, Standerton, Mpumalanga. **In terms of tangible historic and archaeological structures; none were identified within the proposed study area.**
- KITTO, J. 2013. Expansion of mining activities on Portion 25 Of The Farm Witbank No 262 It, Ferreira's Extension of Penumbra Mine, Near Ermelo, Gert Sibande District Municipality, Mpumalanga Province. **The fieldwork identified four cultural-heritage sites, including three grave/cemetery sites and two historic structures.**
- VAN VOLLENHOVEN, A. 2013. A report on a cultural heritage impact assessment for the development of a De-Stoning Plant at the New Denmark Colliery, close to Standerton, Mpumalanga Province. **During the survey, three sites of cultural heritage significance were located, including two historical farmyards and a gravesite.**
- FOURIE, W. 2016. Heritage impact assessment for the upgrading of rural access road D281 between Volksrust and Daggakraal (17 Km) in the Gert Sibande District of Mpumalanga Province. **During the fieldwork, seven burial grounds were identified.**
- PELSER, A. 2019. Phase 1 HIA report for the proposed Standerton x10 mixed used development on Portions 2, 4, 7 & 85 of the Farm Grootverlangen 409is In Standerton, Mpumalanga. **No sites, features or material of cultural heritage were identified.**
- VAN DER WALT, J. 2016. Archaeological Impact Assessment for the proposed Phosphoric Acid Plant, Standerton, Mpumalanga. **No archaeological features or artefacts recorded within the study area.**
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Mpumalanga Province. **Three sites were identified including a homestead and two burial grounds.**

- VAN VOLLENHOVEN, A. 2016. A report on a cultural heritage impact assessment for the proposed Setlabosha Project, close to Standerton, Mpumalanga Province. **Three graveyards were found during the survey.**
- SMEYATSKY, I. 2019. Proposed Kalabasfontein Mine Extension Project, Near Bethal, Govan Mbeki District Municipality, Mpumalanga. **During the field assessment, a total of 10 heritage sites were located. These include four burial grounds and six historical sites.**
- ANTONITES, X. 2020. Heritage Impact assessment report for the proposed stone mining and crushers on Portion 15 Of Rietspruit 437 IS. **A single burial ground was identified.**

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 (**Figure 17**).

5.5.1 HERITAGE SENSITIVITY

The sensitivity maps were produced by overlying:

- Satellite Imagery;
- Current Topographical Maps; and
- First edition Topographical Maps dating to 1964.

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 8**.

Table 8 -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 9**.

Table 9 - 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



Figure 18 - Heritage sensitivity map indicating possible sensitive areas around and within the proposed pipeline project area.

6 FIELDWORK AND FINDINGS

A controlled surface survey was conducted on foot and by a vehicle by an archaeologist from PGS. The fieldwork was conducted on 23 November 2020. During the fieldwork, hand-held GPS devices were used to record tracklogs. These recorded track logs show the routes followed by the fieldwork team on site. The tracklogs (in yellow) for the survey are indicated in **Figure 19**.

One heritage site was identified during the survey.



Figure 19 - Locality of the heritage resource– Identified heritage sites throughout the project area.

Table 10 - Sites identified during the heritage survey.



Site number	Lat	Lon	Description	Heritage Significance	Heritage Rating
IDPL-01	26.698421°	29.176900°	<p>A Farmsteads was identified, located to the north of the proposed pipeline. The site consists of the main farmhouse (contemporary architecture), as well as an old shed, a kraal, and what appears to be the original farm house.</p> <p>Structures were identified on the First Edition Topographic map 2629CA Charl Cilliers, dating to 1964 near the location of IDPL-01. These structures, most likely the original farmhouse and shed are older than 60 years and of heritage significance. The site is provisionally rated as IIIC with low heritage significance.</p> <p>It is recommended that: The development does not fall within 50m of IDPL-01</p>	Low	IIIC
					
					
			<p>Figure 20 - View of the contemporary farmhouse identified at IDPL-01.</p>		
			<p>Figure 21 - View of the old shed, with a green corrugated iron roof.</p>		



Figure 22 - View of what is likely the original farmhouse.



Figure 23 - Kraal located approximately 130m west of the main farm buildings.

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 survey, one heritage site was identified. The site consist of a farmstead (IDPL-01) and has low heritage significance and was rated as IIIC.

7 PALAEOONTOLOGY

The proposed development footprint is underlain by Jurassic dolerite. According to the PalaeoMap of South African Heritage Resources Information System the Palaeontological Sensitivity of the Jurassic dolerite is zero/indignificant and thus unfossiliferous. It is therefore considered that the proposed Irenedale Water Pipeline Project is deemed appropriate and feasible and will not lead to detrimental impacts on the palaeontological resources of the area. Thus, the construction of the development may be authorised as the whole extent of the development footprint is not considered sensitive in terms of palaeontological resources (**Figure 2514**).

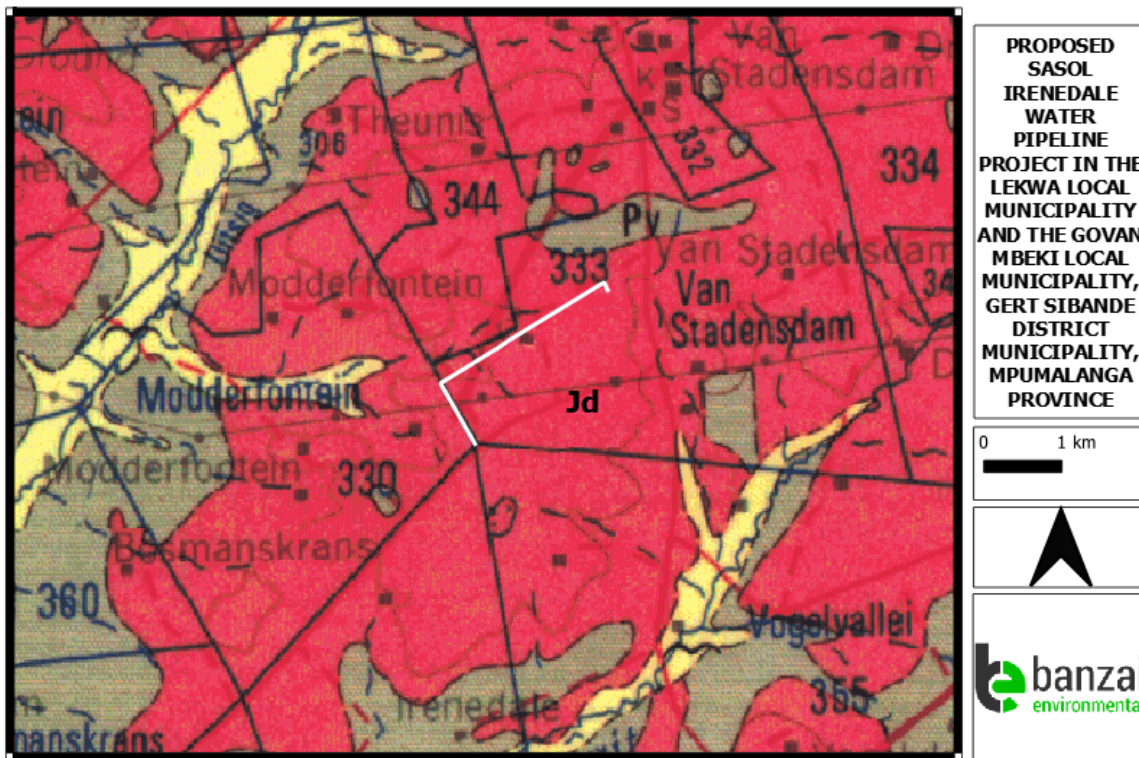


Figure 24 - Extract of the 2528 Pretoria Geological Map (Council of Geoscience) indicating the surface geology of the proposed development.

Legend: Jd; red - Jurassic Dolerite-Igneous rocks; Pv-brown- Vryheid Formation (Ecca Group; Karoo Supergroup

According to the SAHRIS Palaeo Sensitivity map (**Figure 25**) there is a zero/insignificant chance of finding fossils in this area (proposed development is indicated in red).



Figure 25 - Extract of the 1 in 250 000 SAHRIS PalaeoMap map (Council of Geosciences).
Approximate location of the proposed development is indicated by the red polyline.

Table 11 - SAHRIS palaeosensitivity ratings table.

Colour	Sensitivity	Required Action
RED	VERY HIGH	Field assessment and protocol for finds is required
ORANGE/YELLOW	HIGH	Desktop study is required and based on the outcome of the desktop study, a field assessment is likely
GREEN	MODERATE	Desktop study is required
BLUE	LOW	No palaeontological studies are required however a protocol for finds is required
GREY	INSIGNIFICANT/ZERO	No palaeontological studies are required
WHITE/CLEAR	UNKNOWN	These areas will require a minimum of a desktop study. As more information comes to light, sahra will continue to populate the map.

8 IMPACT ASSESSMENT

The impact significance rating methodology, as provided by GSW, is guided by the requirements of the NEMA EIA Regulations 2014 (as amended). The broad approach to the significance rating methodology is to determine the environmental risk (ER) by considering the consequence (C) of each impact (comprising Nature, Extent, Duration, Magnitude, and Reversibility) and relate this to the probability/ likelihood (P) of the impact occurring. This determines the environmental risk. In addition, other factors, including cumulative impacts and potential for irreplaceable loss of resources, are used to determine a prioritisation factor (PF) which is applied to the ER to determine the overall significance (S). The impact assessment will be applied to all identified alternatives. Where possible, mitigation measures will be recommended for the impacts identified.

8.1 DETERMINATION OF ENVIRONMENTAL RISK

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

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

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

4

Each individual aspect in the determination of the consequence is represented by a rating scale as defined in **Table 12** below.

Table 12 - Criteria for Determining Impact Consequence

Aspect	Score	Definition
Nature	- 1	Likely to result in a negative/ detrimental impact
	+1	Likely to result in a positive/ beneficial impact
Extent	1	Activity (i.e. limited to the area applicable to the specific activity)
	2	Site (i.e. within the development property boundary),
	3	Local (i.e. the area within 5 km of the site),
	4	Regional (i.e. extends between 5 and 50 km from the site)
	5	Provincial / National (i.e. extends beyond 50 km from the site)
Duration	1	Immediate (<1 year)
	2	Short term (1-5 years),
	3	Medium term (6-15 years),
	4	Long term (the impact will cease after the operational life span of the project),
	5	Permanent (no mitigation measure of natural process will reduce the impact after construction).
Magnitude/ Intensity	1	Minor (where the impact affects the environment in such a way that natural, cultural and social functions and processes are not affected),

Aspect	Score	Definition
	2	Low (where the impact affects the environment in such a way that natural, cultural and social functions and processes are slightly affected),
	3	Moderate (where the affected environment is altered but natural, cultural and social functions and processes continue albeit in a modified way),
	4	High (where natural, cultural or social functions or processes are altered to the extent that it will temporarily cease), or
	5	Very high / don't know (where natural, cultural or social functions or processes are altered to the extent that it will permanently cease).
Reversibility	1	Impact is reversible without any time and cost.
	2	Impact is reversible without incurring significant time and cost.
	3	Impact is reversible only by incurring significant time and cost.
	4	Impact is reversible only by incurring prohibitively high time and cost.
	5	Irreversible Impact

Once the C has been determined, the ER is determined in accordance with the standard risk assessment relationship by multiplying the C and the P. Probability is rated/ scored as per Error! Reference source not found.9.

Table 13 - Probability Scoring

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

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

$$ER = C \times P$$

Table 14 - Determination of Environmental Risk

Consequence	5	5	10	15	20	25
	4	4	8	12	16	20
	3	3	6	9	12	15
	2	2	4	6	8	10
	1	1	2	3	4	5
	0	1	2	3	4	5
	Probability					

The outcome of the environmental risk assessment will result in a range of scores, ranging from 1 through to 25. These ER scores are then grouped into respective classes as described in **Table 15**.

Table 15 - Significance Classes

Environmental Risk Score	
Value	Description
< 9	Low (i.e. where this impact is unlikely to be a significant environmental risk).
≥9 - <17	Medium (i.e. where the impact could have a significant environmental risk),
≥17	High (i.e. where the impact will have a significant environmental risk).

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

8.2 IMPACT PRIORITISATION

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

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

To ensure that these factors are considered, an impact prioritisation factor (PF) will be applied to each impact ER (post-mitigation). This prioritisation factor does not aim to detract from the risk ratings but rather to focus the attention of the decision-making authority on the higher priority/significance issues and impacts. The PF will be applied to the ER score based on the assumption that relevant suggested management/mitigation impacts are implemented.

Table 16 - Criteria for Determining Prioritisation

Cumulative Impact (CI)	Low (1)	Considering the potential incremental, interactive, sequential, and synergistic cumulative impacts, it is unlikely that the impact will result in spatial and temporal cumulative change.
	Medium (2)	Considering the potential incremental, interactive, sequential, and synergistic cumulative impacts, it is probable that the impact will result in spatial and temporal cumulative change.
	High (3)	Considering the potential incremental, interactive, sequential, and synergistic cumulative impacts, it is highly probable/ definite that the impact will result in spatial and temporal cumulative change.
	Low (1)	Where the impact is unlikely to result in irreplaceable loss of resources.

Irreplaceable Loss of Resources (LR)	Medium (2)	Where the impact may result in the irreplaceable loss (cannot be replaced or substituted) of resources but the value (services and/or functions) of these resources is limited.
	High (3)	Where the impact may result in the irreplaceable loss of resources of high value (services and/or functions).

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

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

The result is a priority score which ranges from 3 to 9 and a consequent PF ranging from 1 to 2 (Refer to **Table 17**).

Table 17 - Determination of Prioritisation Factor

Priority	Ranking	Prioritisation Factor
2	Low	1
3	Medium	1.125
4	Medium	1.25
5	Medium	1.375
6	High	1.5

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

Table 18 - Final Environmental Significance Rating

Environmental Significance Rating	
Value	Description
≤ -20	High negative (i.e. where the impact must have an influence on the decision process to develop in the area).
> -20 ≤ -10	Medium negative (i.e. where the impact could influence the decision to develop in the area).
> -10	Low negative (i.e. where this impact would not have a direct influence on the decision to develop in the area).
0	No impact
<10	Low positive (i.e. where this impact would not have a direct influence on the decision to develop in the area).

$\geq 10 < 20$	Medium positive (i.e. where the impact could influence the decision to develop in the area).
≥ 20	High positive (i.e. where the impact must have an influence on the decision process to develop in the area).

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

8.3 HERITAGE IMPACTS

During the survey, one heritage site was identified. The site consist of a farmstead (IDPL-01) and has low heritage significance and was rated as IIIC.

The following section evaluates and rates the impact of the proposed development on the identified heritage resources based on the proposed layout as provided by the client.

1.1.1 Historical Structures

IDPL-01 has low heritage significance and were rated at IIIC. The impact significance before mitigation on the identified archaeological sites will be MODERATE negative before mitigation. *Only the study site will be affected by the proposed development.* The possibility of the impact occurring is **very likely**. The expected duration of the impact is assessed as potentially permanent. Implementation of the recommended mitigation measures will modify this impact rating to an acceptable LOW negative.

Table 19 - Impact rating for heritage resources

IMPACT DESCRIPTION				Pre-Mitigation							Post Mitigation								Priority Factor Criteria			
Identifier	Impact	Alternative	Phase	Nature	Extent	Duration	Magnitude	Reversibility	Probability	Pre-mitigation on ER	Nature	Extent	Duration	Magnitude	Reversibility	Probability	Post-mitigation on ER	Confidence	Cumulative Impact	Irreplaceable loss	Priority Factor	Final score
10.1.1	Impact on heritage resources		Construction	-1	2	4	3	5	3	-10,5	-1	1	5	1	2	1	-2,25	High	1	1	1,00	-2,25
10.1.2	Impact on palaeontology		Construction	-1	1	5	2	5	1	-3,25	-1	1	5	1	1	1	-2	High	1	1	1,00	-2

8.4 MANAGEMENT RECOMMENDATIONS AND GUIDELINES

8.4.1 CONSTRUCTION PHASE

The project will encompass the removal of vegetation and the digging of trenches for the establishment of the irrigation pivots.

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.

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.

8.4.2 CHANCE FIND PROCEDURE

- An appropriately qualified heritage practitioner/archaeologist must be identified to be called upon in the event that any possible heritage resources or artefacts are identified.
- Should an archaeological site or cultural material be discovered during construction (or operation), the area should be demarcated, and construction activities halted.
- The qualified heritage practitioner/archaeologist will then need to come out to the site and evaluate the 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.

8.4.3 POSSIBLE FINDS DURING CONSTRUCTION

The study area occurs within a greater historical and the 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 a stone artefact
- unmarked graves

8.5 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 20** gives guidelines for lead times on permitting.

Table 20 - 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

8.6 HERITAGE MANAGEMENT PLAN FOR EMPR IMPLEMENTATION

Table 21 - 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 chance 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
Historical structures with a low heritage sensitivity and rating of IIC (IDPL-01)	No development within 50 meters from the site	Implement chance 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

9 CONCLUSIONS

PGS was appointed by EIMS to undertake an HIA which will serve to inform the EIA and EMPr for the proposed Irenedale Water Pipeline Between Bosjesspruit Colliery And A Local Reservoir, located in the Lekwa Local Municipality and the Govan Mbeki Local Municipality, Gert Sibande District Municipality, Mpumalanga Province.

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.

9.1 HERITAGE SITES

Intensive field surveys of the study area were undertaken on foot by comprising two field archaeologist on 23 November 2020. One heritage site was identified during the fieldwork.

Historical Structures

The site consist of a farmstead (IDPL-01) and has low heritage significance and was rated as IIIC.

Palaeontological

According to the PalaeoMap of SAHRIS the Palaeontological Sensitivity of the proposed area of the project footprint occurs (Figure 2514) in an area with insignificant (grey) palaeo-sensitivity. As such no studies are required.

9.2 IMPACT ASSESSMENT

Analysis of the various components of the HIA indicates a mitigated medium to low negative impact on heritage resources and are expanded on below.

Historical Structures

An assessment of the possible impacts of the proposed project on historical heritage resources has shown that unmitigated impacts consist of medium negative impacts mostly confined to the construction phase of the project. By implementing the mitigation measures as listed in this report these impacts can be managed to low negative.

9.3 RECOMMENDATIONS

The following mitigation measures are listed as extracted from the three specialist studies concluded for this HIA is listed in Table 22.

Table 22 - Heritage management recommendations.

General project area	Implement chance find procedures in case where possible heritage finds are uncovered.
Historical structures with a low heritage sensitivity and rating of IIIC (IDPL-01)	No development within 50 meters from the site

9.4 GENERAL

It is the author's considered opinion that the overall impact on heritage resources is Low. 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.

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Historic Topographic Maps

All the historic 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.

Contemporary Cartographic Data

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

WOUTER FOURIE

Professional Heritage Specialist and Professional Archaeologist and Director PGS Heritage

Summary of Experience

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

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

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

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

Key Qualifications

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

BA - Archaeology, Geography and Anthropology - 1996

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

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

CRM Accreditation (ASAPA) -

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

Key Work Experience

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

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

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

2000-2004 - CEO– Matakoma Consultants

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

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

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

CHERENE DE BRUYN

Professional Heritage Specialist and Professional Archaeologist

Name: Cherene de Bruyn
Profession: Archaeologist
Date of Birth: 1991-03-01
Parent Firm: PGS Heritage (Pty) Ltd
Position in Firm: Archaeologist
Years with Firm: 10 Months
Years' experience: 2
Nationality: South African
HDI Status: White Female

EDUCATION:

Name of University or Institution : University of Pretoria
Degree obtained: : BA
Major subjects : Archaeology and Anthropology
Year : 2010-2012

Name of University or Institution : University of Pretoria
Degree obtained : BA (Hons)
Major subjects : Archaeology
Year : 2013

Name of University or Institution : University of Pretoria
Degree obtained : BSc (Hons)
Major subjects : Physical Anthropology
Year : 2015

Name of University or Institution : University College London
Degree obtained : MA
Major subjects : Archaeology
Year : 2016/2017

Professional Qualifications:

- Association of Southern African Professional Archaeologists - Professional Member (#432)
- International Association for Impact Assessment South Africa - Member (#6082)
- Association of Southern African Professional Archaeologists - CRM Accreditation
 - Principal Investigator: Grave relocation
 - Field Director: Colonial period archaeology, Iron Age archaeology

- Field Supervisor: Rock art, Stone Age archaeology
- Laboratory Specialist: Human Skeletal Remains
- KZN Amafa and Research Institute - Accredited Professional Heritage Practitioner

Languages:

Afrikaans & English

KEY QUALIFICATIONS

Heritage Impact Assessment Management, Historical and Archival Research, Archaeology, Physical Anthropology, Grave Relocations, Fieldwork and Project Management including *inter alia*

Summary of Experience

Involvement in various grave relocation projects and grave “rescue” excavations in the various provinces of South Africa

Involvement with various Heritage Impact Assessments, within South Africa

- Heritage Impact Assessments for various projects

HERITAGE ASSESSMENT PROJECTS

Below a selected list of Heritage Impact Assessments (HIA) Projects involvement:

- Heritage Impact Assessment for the upgrade of road d4407 between Hluvukani and Timbavati, road d4409 at Welverdiend and road d4416/2 between Welverdiend and road P194/1 in the Bohlabela region of the Mpumalanga Province.
- Heritage Impact Assessment for the proposed Piggery on Portion 46 of the farm Brakkefontien 416, within the Nelson Mandela Bay Municipality, Eastern Cape.
- Heritage Impact Assessment for proposed development On Erf 30, Letamo Town, Farm Honingklip 178 Iq, Mogale Local Municipality, Gauteng Province.
- Heritage Impact Assessment for the proposed Prospecting Right Application on the Farm Reserve No 4 15823 And 7638/1, near St Lucia, within the jurisdiction of the Mfolozi Local Municipality in the King Cetshwayo District Municipality, KwaZulu-Natal Province.
- Heritage Impact Assessment for the proposed mining rights on the Farm Waterkloof 95 located between Griekwastad and Groblershoop in the Pixley Ka Seme District Municipality within the Northern Cape Province.
- Heritage Impact Assessment for the proposed East Coast Gas 400 Kv Power Lines, located in Richards Bay, within the Umhlathuze Local Municipality in the King Cetshwayo District Municipality in the Kwazulu-Natal Province.
- Heritage Impact Assessment for the mining right application for the Farm Woodlands 407, situated in the Free State Province.
- Heritage Impact Assessment for the refurbishments of Lyttelton Primary School, Lyttelton Manor, Centurion, Gauteng Province.

- Heritage Impact Assessment for the amendment of an existing prospecting right and environmental authorization for Bothaville NE Ext A, situated in the Free State Province.
- Heritage Impact Assessment and Integrated Cultural Resources Management Study for The Proposed Mfolozi-Mbewu 765kv Transmission Line, Zululand And King Cetshwayo District Municipality, KwaZulu-Natal.
- Heritage Impact Assessment for the proposed for the Construction of the Bulk Water Supply Pipeline and Feeder Pipes in Dunnottar, Gauteng Province.
- Heritage Impact Assessment the prospecting right and environmental authorisation application for Kroonstad South situated in the Free State Province.
- Archaeological impact assessment for a mining permit application for portion 19 of the farm Syferfontein 303 IP within the city of Matlosana Local Municipality in the North West Province.

GRAVE RELOCATION PROJECTS

Below, a selection of grave relocation projects involvement:

- Report on the relocation of graves. Relocation of four stillborn graves from the Farm Wonderfontein 428 Js, Belfast, Mpumalanga Province.
- Report on the relocation of graves. Relocation of approximately 6 graves from Kwaqubuka Tribal Area, Mtubatuba Local Municipality, Kwa-Zulu Natal Province. Grave exhumation and relocation of 19 graves on erf 3 of Holding 87 North Riding Agricultural Holdings, City of Johannesburg, Gauteng Province.
- Report on the exhumation and reburial report of 16 graves from Doornkop, to Voortrekker Cemetery in Middelburg, Mpumalanga Province
- Report on rescue excavations and skeletal analyses of two archaeological graves inadvertently uncovered in Boitekong, North-West Province.
- Rescue excavation of an unmarked graveyard at Diamond Park, Greenpoint, Kimberley, Northern Cape Province.
- Report on Follow-up site visit excavation and physical anthropological analyses of archaeological human remains transferred from SAPA Victim Identification Centre to Department of Anatomy. Mamelodi East Phase 2 House 566.
- Excavation of human remains from Marulaneng village, Bakenberg Limpopo Province.
- Follow up site visit on human remains found at Bothlokwa (Ramatjowe & Mphakahne), Limpopo Province.
- Follow up site visit on human remains found in Waterpoort, Soutpansberg, Limpopo Province.

EMPLOYMENT SUMMARY:

Positions Held

- 2020 – to date: Archaeologist - PGS Heritage (Pty) Ltd
- 2019: Manager of the NGT ESHS Heritage Department – NGT Holdings (Pty) Ltd

- 2018 – 2019: Archaeologist and Heritage Consultant – NGT Holdings (Pty) Ltd
- 2015-2016: Archaeological Contractor - BA3G, University of Pretoria
- 2014 – 2015: DST-NRF Archaeological Intern, Forensic Anthropological Research Centre