



***The proposed Jeanette Project, Welkom, Free State Province***

**Heritage Impact Assessment**

**Issue Date:** 18 January 2016

**Revision No.:** 2

**Project No.:**

PGS Heritage (Pty) Ltd

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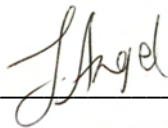
## Declaration of Independence

*PGS Heritage, an appointed Heritage Specialist for SLR Consulting (Africa) (Pty) Ltd, has compiled the report. The views stipulated in this report are purely objective and no other interests are displayed during the decision making processes discussed in the Heritage Impact Assessment Process.*

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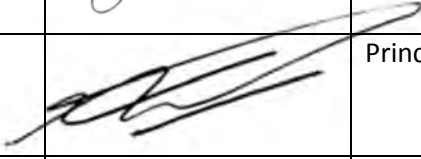
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Document Title:	Heritage Impact Assessment for the proposed Jeanette Project, Welkom, Free State Province		
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## EXECUTIVE SUMMARY

PGS Heritage was appointed by SLR Consulting (Africa) (Pty) Ltd to undertake a Heritage Impact Report (HIA) that forms part of the Environmental Impact Assessment (EIA) for the proposed Jeanette Project, Welkom, Free State Province.

The HIA and field work survey yielded 29 sites with possible heritage significance of these, 13 sites are deemed to be heritage sites and were given a low to high heritage significance rating:

- a total of 4 cemeteries (JP01, JP02, JP05 and JP10);
- 2 possible cemeteries (JP03 and JP021);
- 1 farmstead (JP031);
- Historical buildings or remains of (JP04, JP08, JP09, JP012, JP022, JP018); and
- a sacred/religious site (JP025) was identified.
- The other structure was rated as having low or no heritage significance and needing no further mitigation work.

**Table 1 Summary of Impact Area**

DIRECT IMPACT	INDIRECT IMPACT	NO IMPACT
JP012	JP01, JP02, JP03	JP05JP08
JP018, JP030	JP04, JP021, JP031	JP09, JP012

Section 5.2 lists and describes all the sites in detail.

Although numerous sites were identified within the proposed mining right area, only one historical site, namely JP022, will be disturbed as part of the proposed project. The recommendations for historical sites are provided below, however given that numerous other sites are located within the proposed mining right area, recommendations specific to those areas are also included but only need to be implemented if these sites are disturbed.

### *Cemeteries*

- Adjust the development layout (where possible) and demarcate site with at least a 50-meter buffer.

### *Historical Structures*

- Mitigation is not required. The remaining structures are in a state of collapse and have no historical value. The documentation in this report is a sufficient recording of the remaining structures.
- Most of the heritage structures mentioned are already in a state of decay and the documentation of these structures in this report is sufficient.
- The farmsteads JP029, JP031 and JP033 are occupied and should be avoided however no impact on these structures is foreseen.

#### *Sacred/ religious site*

- This heritage site is protected under Section 3 of the NHRA, will need to be avoided with a buffer of 50m.
- A consultation process with local spiritual and religious groupings will be required in the event that access to such site will be limited.

#### *Historic Mines*

No mitigation required.

#### *Palaeontology*

It is also recommended that if any fossil plant material be discovered during construction, then a professional palaeontologist be called to site to assess the importance of the fossils.

***The overall impact on identified palaeontological resources is rated as low to moderate. No further mitigation is required***

Further to these recommendations the general Heritage Management Guideline in Sections 7 needs to be incorporated in to the EMP for the project. Notice should be taken that no public participation process was undertaken as part of this heritage report. This process was undertaken by SLR Consultants as part of the Environmental Impact Assessment and the Environmental Management Plan and till date no heritage related issues have been reported to them.

The overall impact of the development on heritage resources is seen as acceptably low and impacts can be mitigated to acceptable levels. The project can go ahead and will not have a significant impact on heritage resources.

<b>NEMA Regs (2014) - Appendix 6</b>	<b>Relevant section in report</b>
Details of the specialist who prepared the report	pp iii and Section 2.1
The expertise of that person to compile a specialist report including a curriculum vitae	Appendix C
A declaration that the person is independent in a form as may be specified by the competent authority	Pp ii
An indication of the scope of, and the purpose for which, the report was prepared	Pp iv
The date and season of the site investigation and the relevance of the season to the outcome of the assessment	Section 5
A description of the methodology adopted in preparing the report or carrying out the specialised process	Section 4
The specific identified sensitivity of the site related to the activity and its associated structures and infrastructure	Section 5
An identification of any areas to be avoided, including buffers	Section 5 and Section 8
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;	p.67 Section 5.3
A description of any assumptions made and any uncertainties or gaps in knowledge;	Section 1.3
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
Any mitigation measures for inclusion in the EMPr	Section 5, 6 and 7
Any conditions for inclusion in the environmental authorisation	Section 8
Any monitoring requirements for inclusion in the EMPr or environmental authorisation	Section 7 and 8
A reasoned opinion as to whether the proposed activity or portions thereof should be authorised and	Section 8
If the opinion is that the proposed activity 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	
A description of any consultation process that was undertaken during the course of carrying out the study	none

**CLIENT NAME** SLR Consulting (Africa) (Pty) Ltd

**prepared by:** PGS Heritage

The Proposed Jeanette Project, Welkom, Free State Province  
Revision No. 1  
18 April 2016

A summary and copies if any comments that were received during any consultation process	none
Any other information requested by the competent authority.	none

# JEANETTE PROJECT

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- A Maps of heritage sites
- B Map of track logs and waypoints
- C Curriculum Vitae of Archaeologists

## **1 INTRODUCTION**

PGS Heritage was appointed by SLR Consulting (Africa) (Pty) Ltd to undertake a Heritage Impact Assessment (HIA) that forms part of the Environmental Impact Assessment (EIA) for the proposed Jeanette Project, Welkom, Free State 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 Environmental Management Plan (EMP) to assist the Taung Gold (Free State) Proprietary Limited in managing the discovered heritage resources in a responsible manner, in order to protect, preserve, and develop them within the framework provided by the National Heritage Resources Act of 1999 (Act 25 of 1999) (NHRA).

### **1.2 Specialist Qualifications**

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

Jessica Angel, Heritage Specialist for this project, holds a Masters degree in Archaeology and is registered as a Professional Archaeologist with the Association of Southern African Professional Archaeologists (ASAPA).

Wouter Fourie, Project manager for this project, is registered as a Professional Archaeologist with the Association of Southern African Professional Archaeologists (ASAPA) and has CRM accreditation within the said organisation, as well as being accredited as a Professional Heritage Practitioner with the Association of Professional Heritage Practitioners – Western Cape (APHP).

### **1.3 Assumptions and Limitations**

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

factors account for this, including the subterranean nature of some archaeological sites and the current agricultural activities. As such, should any heritage features and/or objects not included in the present inventory be located or observed, a heritage specialist must immediately be contacted.

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 had 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. In the event that any graves or burial places are located during the development the procedures and requirements pertaining to graves and burials will apply as set out below.

#### **1.4 Legislative Context**

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

- i. National Environmental Management Act (NEMA) Act 107 of 1998
- ii. National Heritage Resources Act (NHRA) Act 25 of 1999
- iii. Minerals and Petroleum Resources Development Act (MPRDA) Act 28 of 2002

The following sections in each Act refer directly to the identification, evaluation and assessment of cultural heritage resources.

- i. National Environmental Management Act (NEMA) Act 107 of 1998
  - a. Basic Environmental Assessment (BEA) – Section (23)(2)(d)
  - b. Environmental Scoping Report (ESR) – Section (29)(1)(d)
  - c. Environmental Impacts Assessment (EIA) – Section (32)(2)(d)
  - d. Environmental Management Plan (EMP) – Section (34)(b)
- ii. National Heritage Resources Act (NHRA) Act 25 of 1999
  - a. Protection of Heritage resources – Sections 34 to 36; and
  - b. Heritage Resources Management – Section 38
- iii. Minerals and Petroleum Resources Development Act (MPRDA) Act 28 of 2002
  - a. Section 39(3)

The NHRA stipulates that cultural heritage resources may not be disturbed without authorization from the relevant heritage authority. Section 34(1) of the NHRA states that, “no person may alter or demolish any structure or part of a structure which is older than 60 years without a permit issued by the relevant provincial heritage resources authority...” The NHRA is utilized as the basis for the identification, evaluation and management of heritage resources and in the case of CRM those resources specifically impacted on by development as stipulated in Section 38 of NHRA, and those developments administered through NEMA, and MPRDA legislation. In the latter cases the feedback from the relevant heritage resources authority is required by the State and Provincial Departments managing these Acts before any authorizations are granted for development. The last few years have seen a significant change towards the inclusion of heritage assessments as a major component of Environmental Impacts Processes required by NEMA and MPRDA. This change requires us to evaluate the Section of these Acts relevant to heritage (Fourie, 2008).

The NEMA 23(2)(b) states that an integrated environmental management plan should, “...identify, predict and evaluate the actual and potential impact on the environment, socio-economic conditions and cultural heritage”.

A study of subsections (23)(2)(d), (29)(1)(d), (32)(2)(d) and (34)(b) and their requirements reveals the compulsory inclusion of the identification of cultural resources, the evaluation of the impacts of the proposed activity on these resources, the identification of alternatives and the management procedures for such cultural resources for each of the documents noted in the Environmental Regulations. A further important aspect to be taken account of in the Regulations under NEMA is the Specialist Report requirements laid down in Section 33 of the regulations (Fourie, 2008).

## 1.5 Terminology and Abbreviations

Abbreviations	Description
<b>AIA</b>	<b>Archaeological Impact Assessment</b>
<b>ASAPA</b>	<b>Association of South African Professional Archaeologists</b>
<b>Au</b>	<b>Gold</b>
<b>CRM</b>	<b>Cultural Resource Management</b>
<b>CS</b>	<b>Concept Study</b>
<b>DEA</b>	<b>Department of Environmental Affairs</b>

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Abbreviations	Description
DWS	Department of Water and Sanitation
EIA practitioner	Environmental Impact Assessment Practitioner
EIA	Environmental Impact Assessment
ESA	Earlier Stone Age
GPS	Global Positioning System
HIA	Heritage Impact Assessment
I&AP	Interested & Affected Party
LSA	Later Stone Age
LIA	Late Iron Age
LoM	Life of Mine
MSA	Middle Stone Age
MIA	Middle Iron Age
NEMA	National Environmental Management Act
NHRA	National Heritage Resources Act
PFS	Pre-Feasibility Study
PGS	PGS Heritage (Pty)Ltd
PHRA	Provincial Heritage Resources Agency
PSSA	Palaeontological Society of South Africa
ROD	Record of Decision
SADC	Southern African Development Community
SAHRA	South African Heritage Resources Agency

### *Archaeological resources*

This includes:

- material remains resulting from human activity which are in a state of disuse and are in or on land and which are older than 100 years including artefacts, human and hominid remains and artificial features and structures;
- rock art, being any form of painting, engraving or other graphic representation on a fixed rock surface or loose rock or stone, which was executed by human agency and which is older than 100 years, including any area within 10m of such representation;
- wrecks, being any vessel or aircraft, or any part thereof, which was wrecked in South Africa, whether on land, in the internal waters, the territorial waters or in the maritime

culture zone of the republic as defined in the Maritimes Zones Act, and any cargo, debris or artefacts found or associated therewith, which is older than 60 years or which SAHRA considers to be worthy of conservation;

- features, structures and artefacts associated with military history, which is 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

#### *Earlier Stone Age*

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

#### *Fossil*

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

#### *Heritage*

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

#### *Heritage resources*

This means any place or object of cultural significance

#### *Holocene*

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

#### *Later Stone Age*

The archaeology of the last 20 000 years associated with fully modern people.

#### *Late Iron Age (Early Farming Communities)*

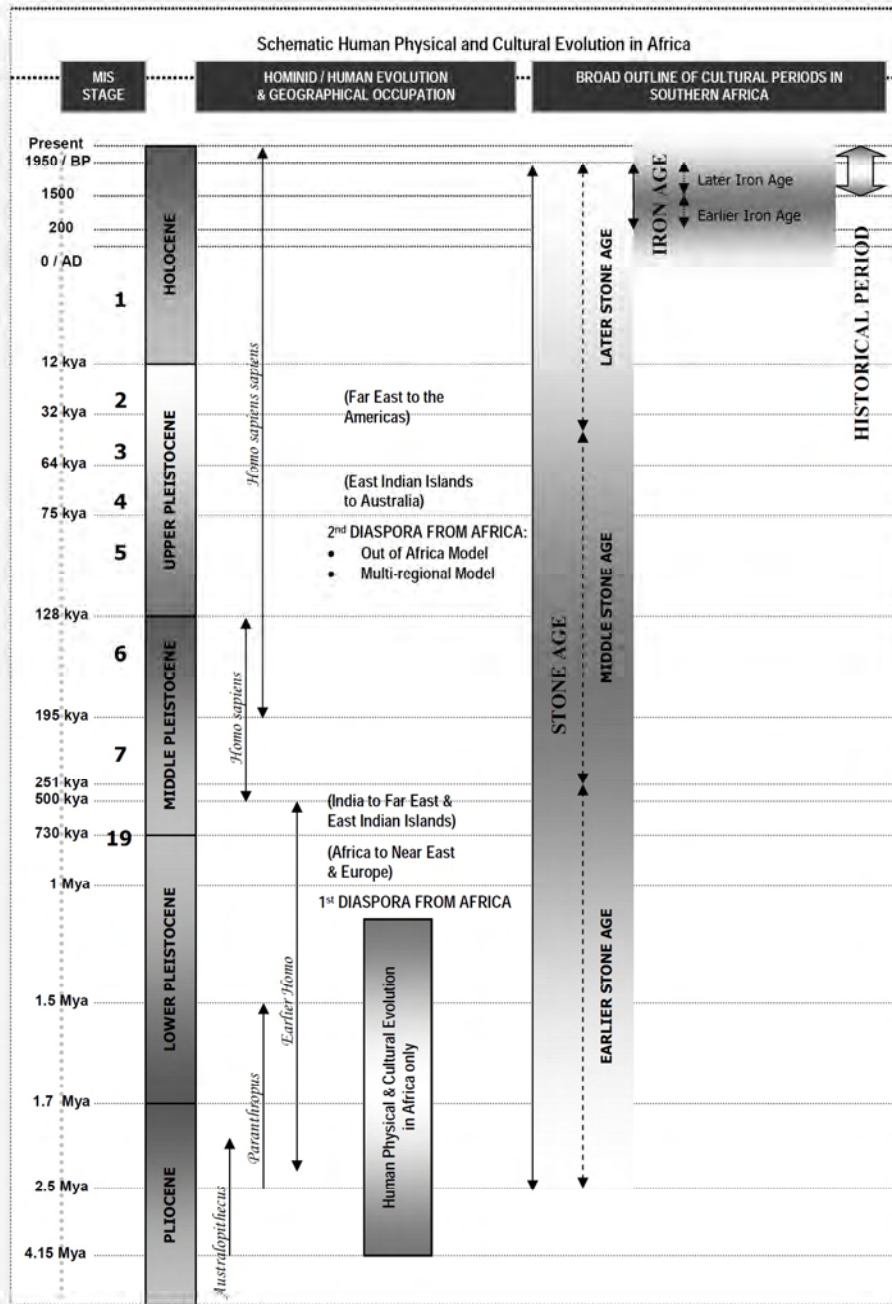
The archaeology of the last 1000 years up to the 1800s, associated with iron-working and farming activities such as herding and agriculture.

#### *Middle Stone Age*

The archaeology of the Stone Age between 20-300 000 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.



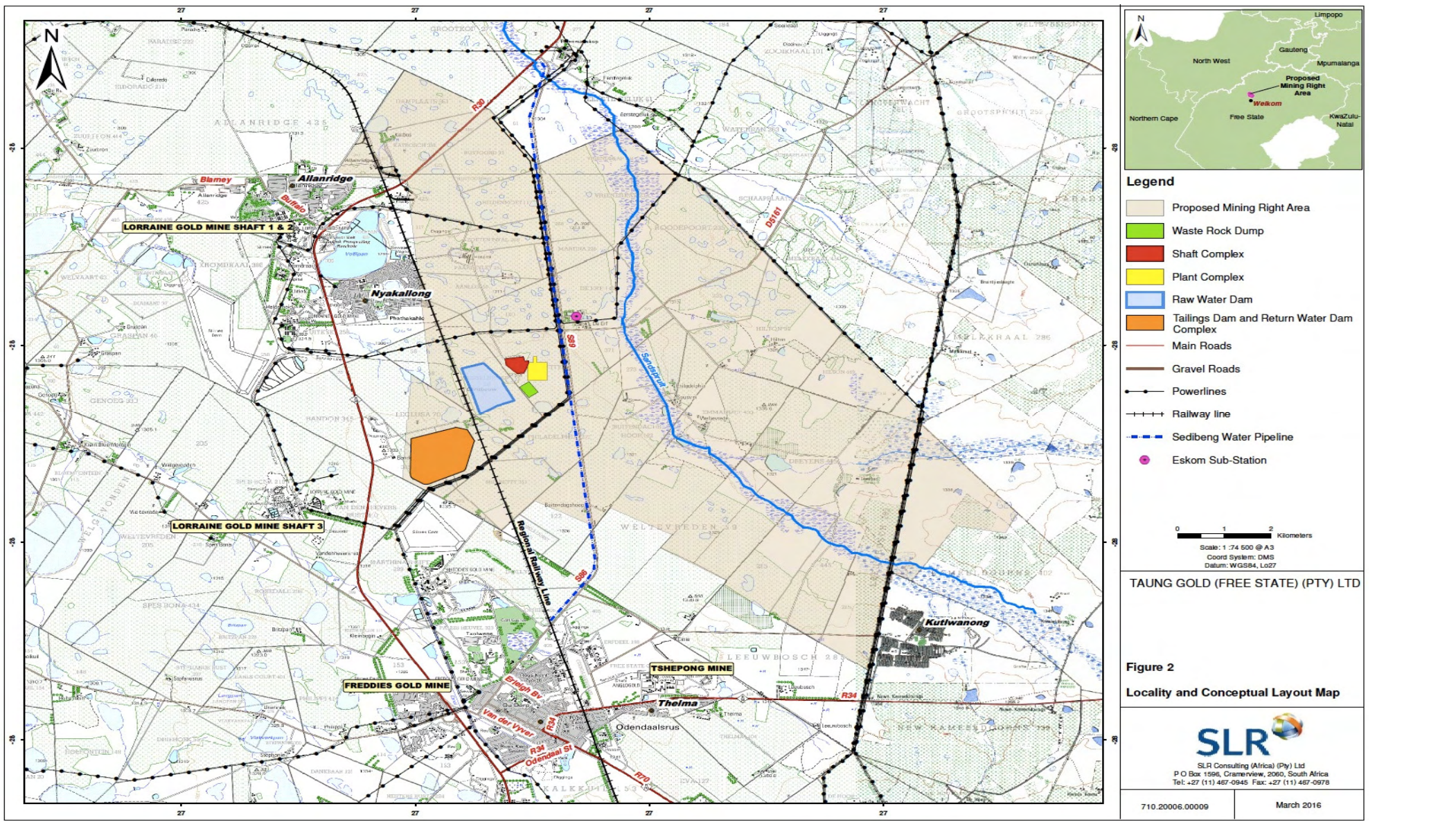
**Figure 1: Human and Cultural Timeline in Africa (Morris, 2013)**

## **2 TECHNICAL DETAILS OF THE PROJECT**

### **2.1 Project Location**

The Jeanette Gold Project is situated approximately 20 km northwest of the town of Welkom in the Free State Province of South Africa and occupies an area of 5,700.8 ha in the northern Free State Goldfields. The Project is centred on longitude 26041' E and latitude 27047' S. The Project Area is accessible via an un-tarred secondary road, which intersects the R30 national road between the towns of Odendaalsrus and Bothaville, located west of the Project Area (Scholtz et al, 2014).

The area has well-developed infrastructure which includes a rail link, the R30 national road and Eskom power lines (part of a major grid), which are situated to the immediate east (central to the Project Area). The western boundary of the Project Area is shared with the defunct Lorraine Mine, while the southern boundary is shared with Tshepong Mine, where exploitation of the Basal Reef occurs. The conventional stopping method has been tailored at this mine to successfully undercut and support the shale in the hanging wall. Figure 1 depicts the Jeanette Mine location relative to other projects and mines (Scholtz et al, 2014).



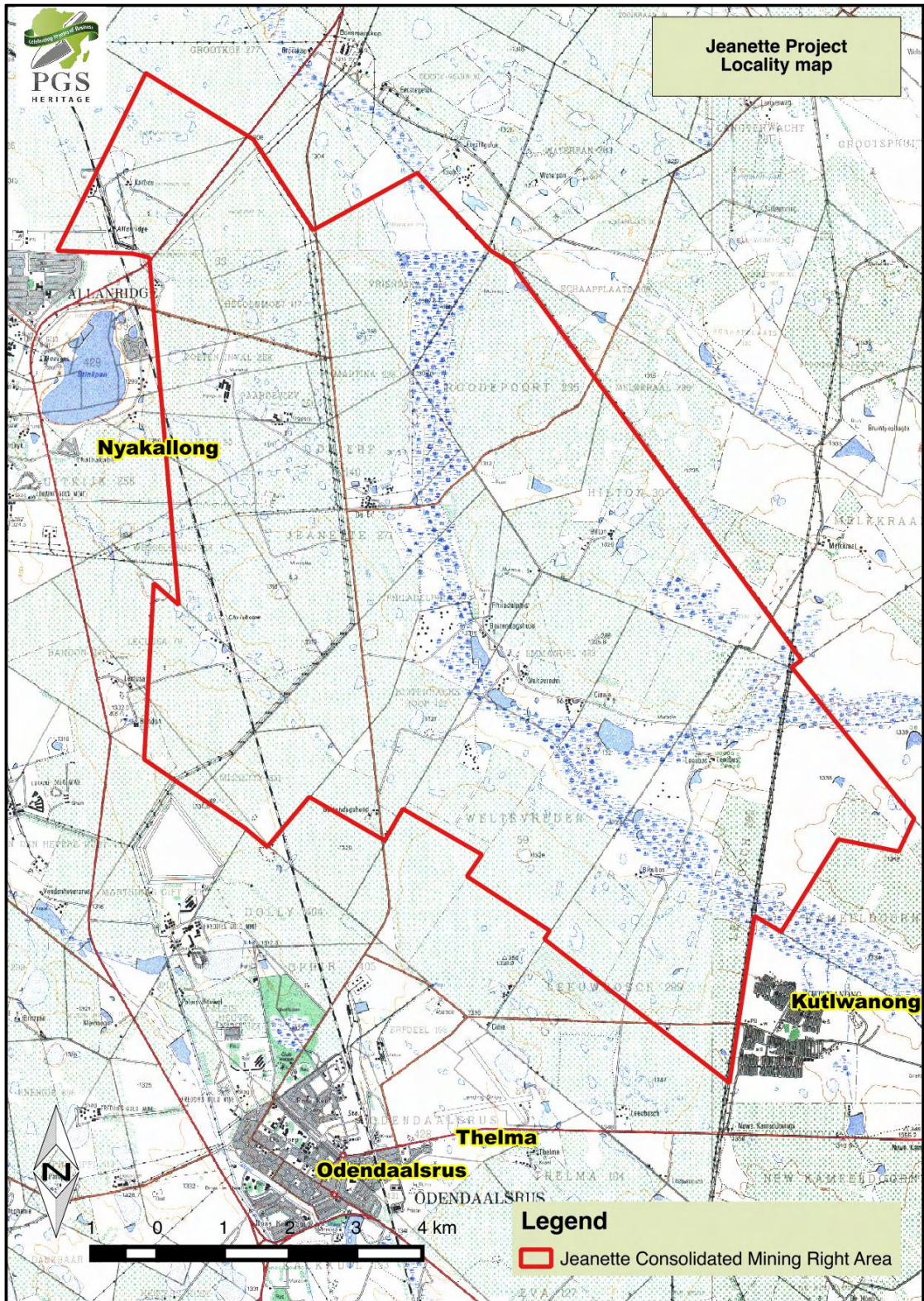
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**Figure 3: Locality map**

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### 3 ASSESSMENT METHODOLOGY

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

PGS Heritage (PGS) compiled this Heritage Impact Assessment (HIA) report for the proposed Jeanette Project. The applicable maps, tables and figures, are included as stipulated in the NHRA (no 25 of 1999), the National Environmental Management Act (NEMA) (no 107 of 1998) and the South African Heritage Resources (SAHRA) guidelines for Archaeological Impact Assessments (2007). The HIA process consisted of three steps:

- Step I – Literature Review: The background information to the field survey leans on information gathered for the larger study area.
- Step II – Physical Survey: A physical survey was conducted on foot and by vehicle through the proposed mining area by qualified archaeologists (July 2015), 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, as well as the assessment of resources in terms of the heritage impact assessment criteria and report writing, as well as mapping and constructive recommendations

The significance of heritage sites was based on four main criteria:

- **site integrity** (i.e. primary vs. secondary context),
- **amount of deposit, range of features** (e.g., stonewalling, stone tools and enclosures),
  - Density of scatter (dispersed scatter)
    - Low - <10/50m<sup>2</sup>
    - Medium - 10-50/50m<sup>2</sup>
    - High - >50/50m<sup>2</sup>
- **uniqueness** and
- **potential** to answer present research questions.

Management actions and recommended mitigation, which will result in a reduction in the impact on the sites, will be expressed as follows:

A - No further action necessary;



- B - Mapping of the site and controlled sampling required;
- C - No-go or relocate pylon position
- D - Preserve site, or extensive data collection and mapping of the site; and
- E - Preserve site

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

### 3.1 Site Significance

Site significance classification standards prescribed by the South African Heritage Resources Agency (2006) and approved by the Association for Southern African Professional Archaeologists (ASAPA) for the Southern African Development Community (SADC) region, were used for the purpose of this report.

**Table 2: Site significance classification standards as prescribed by SAHRA**

FIELD RATING	GRADE	SIGNIFICANCE	RECOMMENDED MITIGATION
<b>National Significance (NS)</b>	Grade 1	-	<b>Conservation; National Site nomination</b>
<b>Provincial Significance (PS)</b>	Grade 2	-	<b>Conservation; Provincial Site nomination</b>
<b>Local Significance (LS)</b>	Grade 3A	High Significance	<b>Conservation; Mitigation not advised</b>
<b>Local Significance (LS)</b>	Grade 3B	High Significance	<b>Mitigation (Part of site should be retained)</b>
<b>Generally Protected A (GP.A)</b>	Grade 4A	High / Medium Significance	<b>Mitigation before destruction</b>
<b>Generally Protected B (GP.B)</b>	Grade 4B	Medium Significance	<b>Recording before destruction</b>
<b>Generally Protected C (GP.C)</b>	Grade 4C	<b>Low Significance</b>	<b>Destruction</b>

### 3.2 Methodology for Impact Assessment

The impacts will be ranked according to the methodology described below. Where possible, mitigation measures will be provided to manage impacts. In order 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, as discussed below.

### 3.2.1 Nature of the impact

Each impact should be described in terms of the features and qualities of the impact. A detailed description of the impact will allow for contextualisation of the assessment.

### 3.2.2 Extent of the impact

Extent intends to assess the footprint of the impact. The larger the footprint, the higher the impact rating will be. The table below provides the descriptors and criteria for assessment.

**Table 3: Criteria for the assessment of the extent of the impact**

Extent Descriptor	Definition	Rating
<b>Site</b>	Impact footprint remains within the boundary of the site.	1
<b>Local</b>	Impact footprint extends beyond the boundary of the site to the adjacent surrounding areas.	2
<b>Regional</b>	Impact footprint includes the greater surrounds and may include an entire municipal or provincial jurisdiction.	3
<b>National</b>	The scale of the impact is applicable to the Republic of South Africa.	4
<b>Global</b>	The impact has global implications	5

### 3.2.3 Duration of the impact

The duration of the impact is the period of time that the impact will manifest on the receiving environment. Importantly, the concept of reversibility is reflected in the duration rating. The longer the impact endures, the less likely it is to be reversible. See Table 4 for the criteria for rating duration of impacts.

**Table 4: Criteria for the rating of the duration of an impact**

Duration Descriptor	Definition	Rating
<b>Construction / Decommissioning phase only</b>	The impact endures for only as long as the construction or the decommissioning period of the project activity. This implies that the impact is fully reversible.	1
<b>Short term</b>	The impact continues to manifest for a period of between 3 and 5 years beyond construction or decommissioning. The impact is still reversible.	2
<b>Medium term</b>	The impact continues between 6 and 15 years beyond the construction or decommissioning phase. The impact is still reversible with relevant and applicable mitigation and management actions.	3
<b>Long term</b>	The impact continues for a period in excess of 15 years beyond construction or decommissioning. The impact is only reversible with considerable effort in implementation of rigorous mitigation actions.	4
<b>Permanent</b>	The impact will continue indefinitely and is not reversible.	5

### 3.2.4 Potential intensity of the impact

The concept of the potential intensity of an impact is the acknowledgement at the outset of the project of the potential significance of the impact on the receiving environment. For example, SO<sub>2</sub> emissions have the potential to result in significant adverse human health effects, and this potential intensity must be accommodated within the significance rating. The importance of the potential intensity must be emphasised within the rating methodology to indicate that, for an adverse impact to human health, even a limited extent and duration will still yield a significant impact.

Within potential intensity, the concept of irreplaceable loss is taken into account. Irreplaceable loss may relate to losses of entire faunal or floral species at an extent greater than regional, or the permanent loss of significant environmental resources. Potential intensity provides a measure for comparing significance across different specialist assessments. This is possible by aligning specialist ratings with the potential intensity rating provided here. This allows for better integration of specialist studies into the environmental impact assessment. See Table 5 and Table 6 below.

**Table 5: Criteria for impact of potential intensity of a negative impact**

Potential Intensity Descriptor	Definition of negative impact	Rating
<b>High</b>	Significant impact to human health linked to mortality/loss of a species/endemic habitat.	16
<b>Moderate-High</b>	Significant impact to faunal or floral populations/loss of livelihoods/individual economic loss.	8
<b>Moderate</b>	Reduction in environmental quality/loss of habitat/loss of heritage/loss of welfare amenity	4
<b>Moderate-Low</b>	Nuisance impact	2
<b>Low</b>	Negative change with no associated consequences.	1

**Table 6: Criteria for the impact rating of potential intensity of a positive impact**

Potential Intensity Descriptor	Definition of positive impact	Rating
<b>Moderate-High</b>	Net improvement in human welfare	8
<b>Moderate</b>	Improved environmental quality/improved individual livelihoods.	4
<b>Moderate-Low</b>	Economic development	2
<b>Low</b>	Positive change with no other consequences.	1

It must be noted that there is no HIGH rating for positive impacts under potential intensity, as it must be understood that no positive spinoff of an activity can possibly raise a similar significance rating to a negative impact that affects human health or causes the irreplaceable loss of a species.

### 3.2.5 Likelihood of the impact

***This is the likelihood of the impact potential intensity manifesting. This is not the likelihood of the activity occurring. If an impact is unlikely to manifest then the likelihood rating will reduce the overall significance.***

Table 7 provides the rating methodology for likelihood.

**Table 7: Criteria for the rating of the likelihood of the impact occurring**

Likelihood Descriptor	Definition	Rating
<b>Improbable</b>	The possibility of the impact occurring is negligible and only under exceptional circumstances.	0.1
<b>Unlikely</b>	The possibility of the impact occurring is low with a less than 10% chance of occurring. The impact has not occurred before.	0.2
<b>Probable</b>	The impact has a 10% to 40% chance of occurring. Only likely to happen once in every 3 years or more.	0.5
<b>Highly Probable</b>	It is most likely that the impact will occur and there is a 41% to 75% chance of occurrence.	0.75
<b>Definite</b>	More than a 75% chance of occurrence. The impact will occur regularly.	1

The rating for likelihood is provided in fractions in order to provide an indication of percentage probability, although it is noted that mathematical connotation cannot be implied to numbers utilised for ratings.

### 3.2.6 Cumulative Impacts

Cumulative impact are reflected in the potential intensity of the rating system. In order to assess any impact on the environment, cumulative impacts must be considered in order to determine an accurate significance. Impacts cannot be assessed in isolation. An integrated approach requires that cumulative impacts be included in the assessment of individual impacts.

The nature of the impact should be described in such a way as to detail the potential cumulative impact of the activity.

### 3.2.7 Significance Assessment

The significance assessment assigns numbers to rate impacts in order to provide a more quantitative description of impacts for purposes of decision-making. Significance is an expression of the risk of damage to the environment, should the proposed activity be authorised.

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, which takes cognisance of extent, duration, potential intensity and likelihood.

$$\text{Impact Significance} = (\text{extent} + \text{duration} + \text{potential intensity}) \times \text{likelihood}$$

Table 8 provides the resulting significance rating of the impact as defined by the equation as above.

**Table 8: Significance rating formulas**

Score	Rating	Implications for Decision-making
< 3	Low	Project can be authorised with low risk of environmental degradation
3 - 9	Moderate	Project can be authorised but with conditions and routine inspections. Mitigation measures must be implemented.
10 - 20	High	Project can be authorised but with strict conditions and high levels of compliance and enforcement. Monitoring and mitigation are essential.
21 - 26	Fatally Flawed	Project cannot be authorised

## 4 CURRENT STATUS QUO

### 4.1 Background history

The aim of the archival background research is to identify possible heritage resources that could be encountered during the fieldwork. The archival research focused on available information sources, which 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 field surveying.

#### 4.1.1 Historic Overview of Study Area and Surrounding Landscape

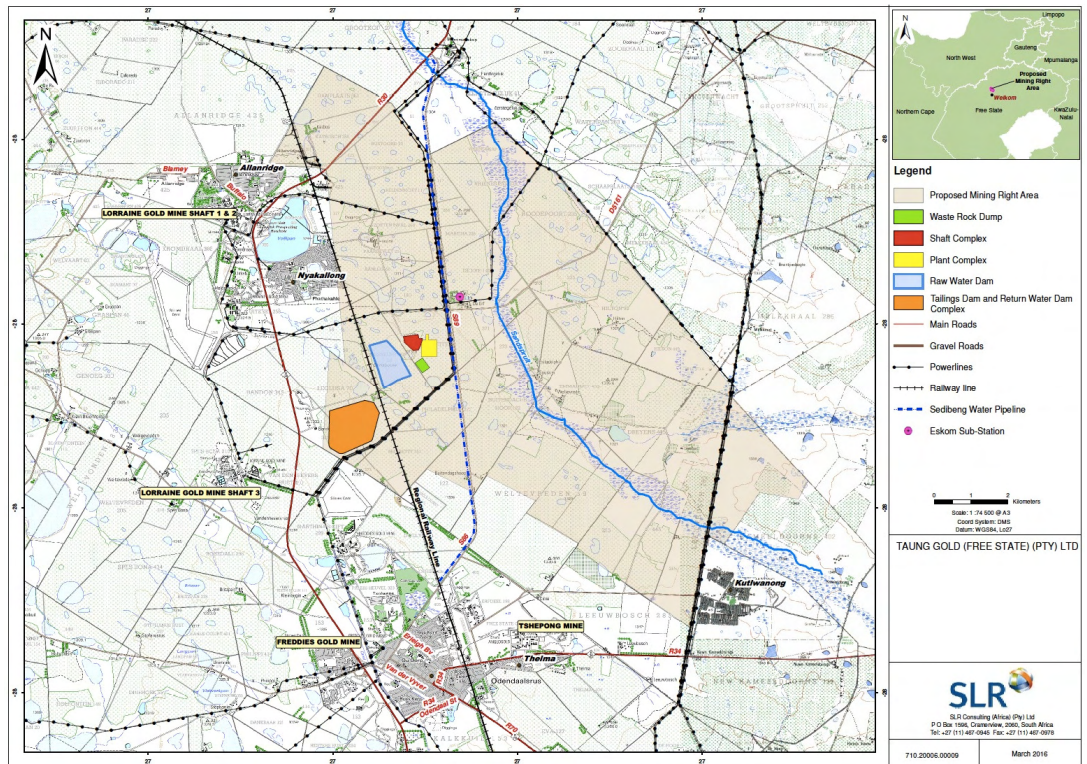
DATE	DESCRIPTION
2.5 million to 250 000 years ago	The Earlier Stone Age (ESA) is the first and oldest phase identified in South Africa's archaeological history and comprises two technological phases. The earliest of these is known as Oldowan and is associated with more robust flaked tools. It dates to approximately <2 million years ago. The second technological phase is the Acheulean and comprises more refined stone artefacts such as the cleaver and bifacial hand axe. The Acheulean dates back to approximately 1.5 million years ago. No Early Stone age sites are recorded in the vicinity of the study area.
>250 000 to 40 000 years ago	The Middle Stone Age (MSA) is associated with flakes, points and blades manufactured by means of the prepared core technique. This phase is furthermore associated with modern humans and complex cognition (Wadley, 2013). Klasies River Mouth on the Cape coast, west of Port Elizabeth is rich in Middle Stone Age deposits and is the first instance where shellfish were preserved to give an idea of the food sources used during that time (Van Schalkwyk, 2008; <a href="http://www.britannica.com">http://www.britannica.com</a> ). Middle Stone Age artefacts usually can be found around pans and have great conservation value (Parsons, 2003).
40 000 years ago	The Later Stone Age (LSA) is the third archaeological phase identified and is associated with an abundance of very small stone tools known as microliths. This period lasted up until contact with Iron Age inhabitants or European colonists and is associated with <i>Homo Sapiens Sapiens</i> .
Iron Age First Millennium AD to 1400	The Iron Age people constructed stone-walling throughout Southern Africa, with different patterns in different areas based the central cattle pattern. These people relied on agriculture and therefore settled near rivers and where conditions were favourable for farming. They also substituted their activities to include some hunting, gathering and collecting shellfish, if they resided close to the coast (Van Schalkwyk, 2008). The study area is situated outside the western boundary of Iron Age settlement distribution in the Free State. However to the north,

DATE	DESCRIPTION
	ceramics from the Thabeng Facies of the Moloko Branch representing the Urewe tradition were found and to the east, Makgwareng ceramics from the Blackburn Branch of the same tradition have been recorded (Van der Walt, 2013).
Jeanette 1837	<p>The study area is located in the northern part of the Free State Province and forms part of the Highveld Zone. The main agricultural produce of the study area falls under some of the main wheat and maize producing districts in South Africa (Bulpin, 1982).</p> <p>The earliest inhabitants of the area were the San and Khoekhoe, they were hunter-gatherers and travelled in the area for many years. With the movement of Bantu-speaking farmers into the area the San and Khoekhoe were incorporated into their tribes or alternatively, they moved further west until they were completely expelled from the area (Coplan, 2008). In 1941 the area was a part of the Boer republic of Winburg, which resulted from the mass migration of white people from the Cape Colony, also known as the Great Trek, which started in 1837. The black tribe that was prominent in this area during this period was the Tlokwa (Bulpin, 1982).</p> <div data-bbox="424 1008 1493 1503" data-label="Image"> </div> <p><b>Figure 4: The Great Trek: Boer settlers with their ox wagons (PE Library)</b></p>
Anglo Boer War 1899 - 1902	The discovery of diamonds and gold between the years 1867 to 1886 in the Northern provinces had significant consequences for South Africa. The British wanted to expand their territories into the Boer Republics, which led to the Anglo-Boer War between 1899 and 1902. The northern Free State was the area where Boer General Christiaan De Wet conducted his operations during the war. He was one of the first to adapt the Guerrilla warfare technique consisting of small groups spread out to inflict surprise attacks on the British. The British in




DATE	DESCRIPTION
	<p>turn adapted a scorched earth policy in which they burned down the Boer crops and houses and imprisoned their women and children in concentration camps, a peace treaty was therefore imminent and ended the war in 1902 (Du Preez, 1977).</p> <div data-bbox="440 524 1476 1077" data-label="Image"> </div> <p><b>Figure 5: Free State Concentration camp (<a href="http://angloboer.com/images/gallery/camp3.htm">http://angloboer.com/images/gallery/camp3.htm</a>)</b></p> <p>After the war many farming families were left destitute accompanied by severe droughts and locust plagues. This led to white <i>bywoners</i> settling on other rich farmers land in exchange for doing odd jobs on the farm and having a piece of land to grow crops and pay a minimal rent fee. These <i>bywoners</i> were not seen as labourers as the farmers still made use of Black labourers. However, with the advent of commercial farming, the <i>bywoners</i> were evicted from the land and replaced by Black labourers; because it was less expensive and they could be used for hard labour. With the 1913 Natives Land Act this practice was forbidden in that no more than five black families may live on white farms (Bulpin, 1982).</p>
<p>Jeanette Taung Gold</p>	<p>Jeanette is located in the Welkom Goldfield and includes several farms over which Taung Gold holds a prospecting right. These gold deposits are believed to be of the same geological age as those of the Witwatersrand and could be an extension of the reef (Pauw, 1954). Development of the mine started in 1951 by the Anglo American Corporation under the leading man Ernest Oppenheimer (<a href="http://www.taunggold.com/gold-sa/jeanette-gold-mine-history">http://www.taunggold.com/gold-sa/jeanette-gold-mine-history</a>). The Union Government established the Natural Resources Development Council to coordinate and</p>

DATE	DESCRIPTION
	<p>enforce the development of these industrial areas around Welkom in relatively small towns not one large city as was the case in the Witwatersrand area. Therefore Allanridge, in the north served Jeanette and Loraine mines; Odendaalsrus served two Freddie's mines; Welkom served six mines and Virginia served the remaining two mines of the Welkom Goldfield (Pauw, 1954). The boundary for the Taung Gold Jeanette Project is the same as in the original lease from the Jeannette Gold Mines Limited, which has been closed since 1955 due to the unfavourable market conditions technical difficulties with Khaki Shale (a thick band of sedimentation above the gold reef) and the prospect of better mining opportunities in and around the Welkom Goldfield area. (<a href="http://wikimapia.org/#lang=en&amp;lat=-27.783809&amp;lon=26.971436&amp;z=11&amp;m=b&amp;show=/20452064/Jeanette-Gold-Project">http://wikimapia.org/#lang=en&amp;lat=-27.783809&amp;lon=26.971436&amp;z=11&amp;m=b&amp;show=/20452064/Jeanette-Gold-Project</a>).</p> <p>The property of Jeanette was acquired by Taung Gold in 2008 and purchased from Harmony Gold in March 2010 with new and improved mining technology as well as the current gold market it seemed feasible for Taung Gold to invest, up until then global events prohibited the extent of mining on the property (<a href="http://www.taunggold.com/our-business/projects/jeanette">http://www.taunggold.com/our-business/projects/jeanette</a>).</p>




**Figure 6: Lease boundary for Taung Gold's Jeanette Project**

DATE	DESCRIPTION
	<p>The original drill cores extracted from Jeanette by Anglo American were meticulously preserved and still available for re-evaluation by Taung Gold. Two shafts were also sunk in 1951; a main shaft down to 1,290m below the surface and a ventilation shaft of 1,547m. The drilling revealed gold grades similar than those on the neighbouring mines on the Basal Reef, the orebody of the Free State mines. Even though the Khaki Shale covering the reef prohibited mining, periodic drilling still continued into the 1970s but the true potential of the Jeanette mine was not fully realised until now (<a href="http://www.taunggold.com/gold-sa/jeanette-gold-mine-history">http://www.taunggold.com/gold-sa/jeanette-gold-mine-history</a>). (<a href="http://www.taunggold.com/our-business/projects/jeanette">http://www.taunggold.com/our-business/projects/jeanette</a>)</p>
<p>Odendaalsrus 1899</p>	<p>Odendaalsrus is located 17km from Allanridge and to the west of the Jeanette area. A Voortrekker, H.W. Huyser was the first to establish a farm in this area in the 1830s, which he called Kalkkuil (“lime pool”), the farm was sold to J.J. Odendaal in 1878 (Erasmus, 2014). The farm on which the town was originally established belonged to the Odendaal family, therefore where the name originated. The town was established in 1899 when the Dutch Reformed Church chose Kalkkuil for its new parish and it was proclaimed a municipal in 1912, the town only had about 40 houses, 3 shops and a hotel (Mayhew, 1982).</p> <div data-bbox="403 1115 1489 1731" data-label="Image"> </div> <p><b>Figure 7: An aerial photo of Odendaalsrus in 1946, the church is the main building, which can be noticed, indicating isolation (Jacobsson, 1882).</b></p>

DATE	DESCRIPTION
	<p>Odendaalsrus was at first a poor and isolated town with the railway line being the connection to outside areas as well a few ox wagons which got stuck in the soft sand of the road. There was also a continuing water shortage (Erasmus 2014). The discovery of gold in 1946 on the farm Geduld changed the structure and dynamics of the area placing it in the centre of the Free State gold fields (Nienaber &amp; Le Roux, 1982). The railway line was extended to Allanridge through Welkom and Odendaalsrus. Today mining is focussed on Harmony Gold’s Tshepong and Phakisa mines and has a variety of facilities such as a motor racing circuit and gliding club (Erasmus, 2014; Mayhew, 1982).</p>
<p>Welkom 1947</p>	<p>Welkom was created in 1947 and since developed into a miniature city lying in a triangle of mining claims of the Orange Free state gold fields, one of these being the St. Helena Gold mining company which produced the first gold from the Free State (Mayhew, 1982).</p>  <p><b>Figure 8: Welkom in the 1950s (Oberholser et al 1954).</b></p> <p>Welkom was established on the farm Welkom (hence the name) and is located 11km south of Odendaalsrus, the town was designed by William Backhouse as a garden city (more than a million trees were planted) with a commercial centre built around a square, no stops streets and traffic lights featured in the plan (Erasmus, 2014). Gold and Uranium is produced in great quantities from these mines but flooding is a problem and the saline water needs to be</p>

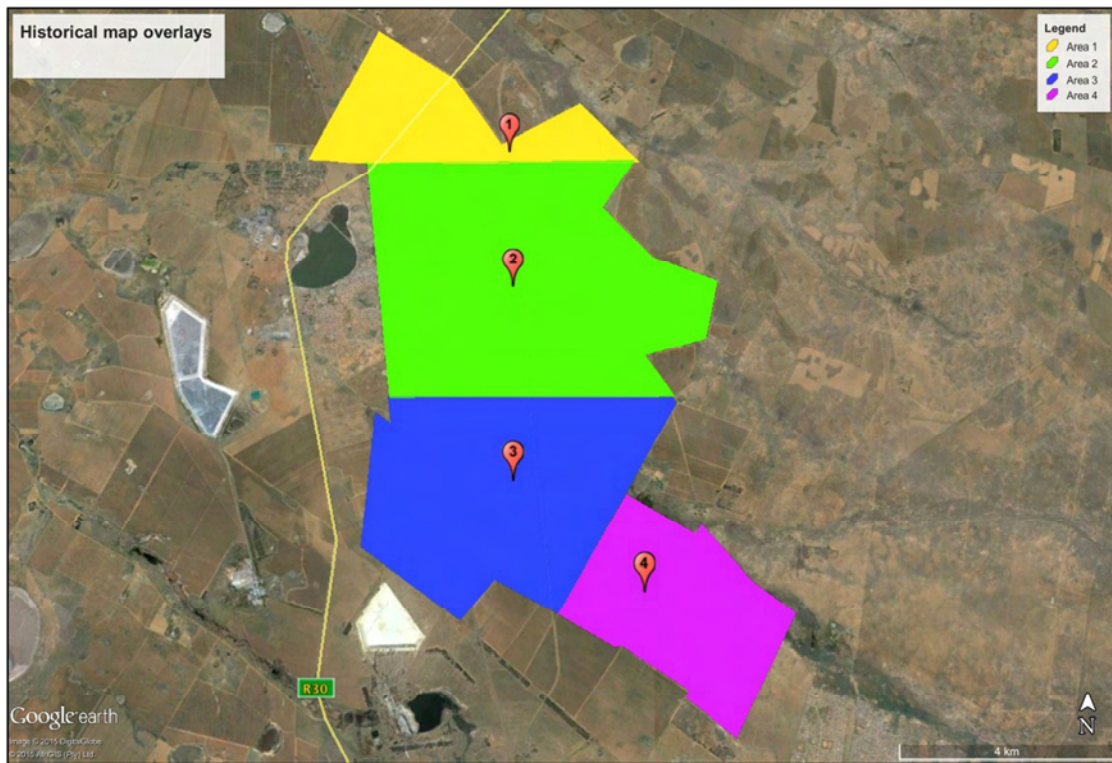
DATE	DESCRIPTION
	<p>pumped out to the surface where it collects in pans and lakes (Mayhew, 1982). The memorials in the town include the Aandenk memorial, the Joanne Pim memorial, and the Second World War memorial, monuments to the Voortrekkers, the Afrikaans language and the domestic dog. There is also a Welkom Gold Museum and an Ernest Oppenheimer Theatre in memory of the Anglo American Corporation’s founder (Erasmus, 2014).</p> <div data-bbox="493 524 1425 1126" data-label="Image"> </div> <p><b>Figure 9: The Voortrekker memorial in Welkom</b>  (<a href="http://www.nightjartravel.com/parks/welkom">http://www.nightjartravel.com/parks/welkom</a>).</p>
<p>Allanridge 1950</p>	<p>The mining town of Allanridge in the Orange Free State was discovered by geologist and prospector Allan Roberts and proclaimed in 1956. William O. Backhouse designed the town on futuristic lines, Welkom was designed on the same principles. Roberts dug a borehole on the farm Aandenk, they were only 400 feet away from discovering the Basal reef. In the 1980s the town was the centre of the Loraine Gold mines and treat 75 000 tons of gold bearing ore each month (Mayhew, 1982). Although the focus of the town is on the nearby Harmony Target Gold mine with operations at a depth of 2,350m there is also a lake that has water pumped from underground working fills that attracts thousands of flamingos in season (Erasmus, 2014).</p>

DATE	DESCRIPTION
	 <p data-bbox="391 985 1133 1019"><i>Figure 10: The first borehole drilled in 1933 by Allan Roberts</i></p>

#### 4.2 Historic Maps of the Study Area and Surrounding Landscape

Several historical topographic maps were obtained from the Chief Surveyor-General. These maps are presented below with short discussion on each.

As the study area is of significant size, it has been divided into four sections in order to present the findings in a visual manner. Figure 11 shows how the research area has been divided. Historic maps were overlaid and the findings will be discussed below.



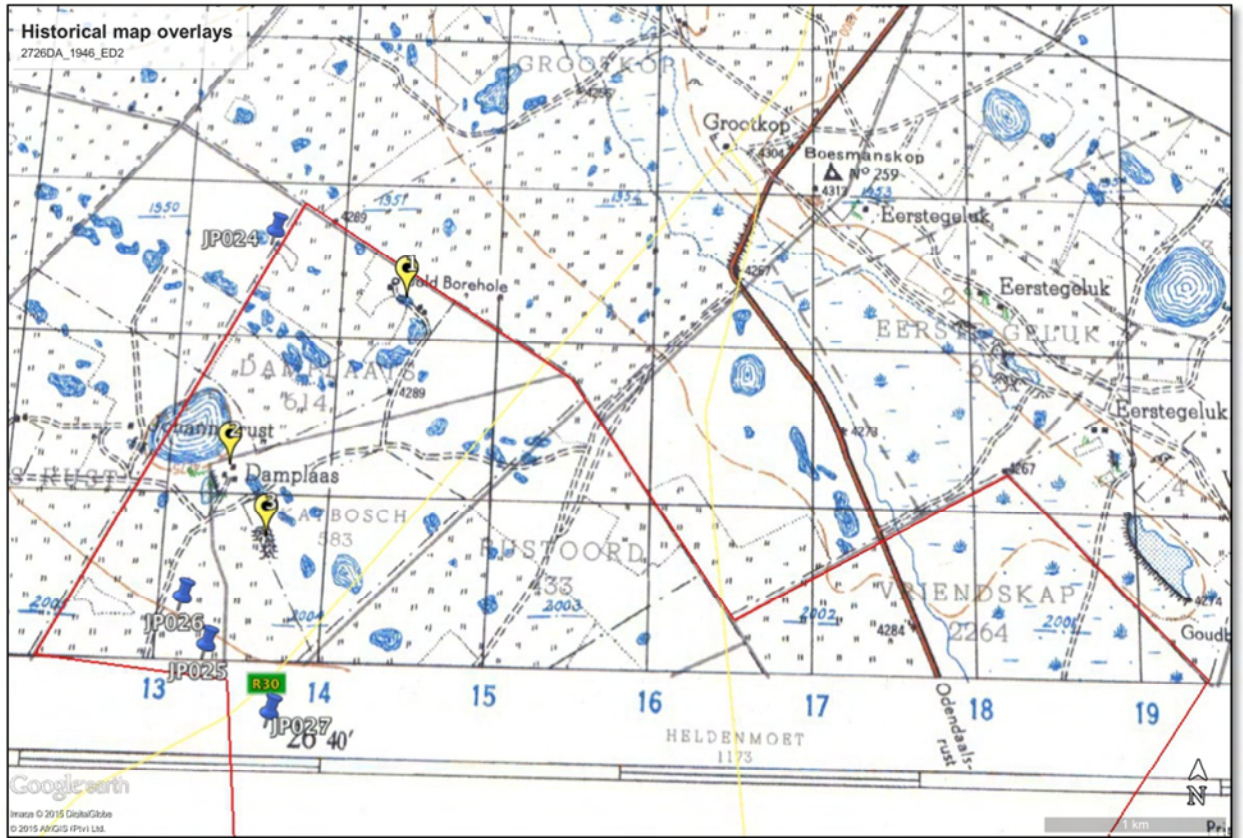
**Figure 11: Study area divided into four sections.**

#### 4.2.1 Area one: 1948 topographic map of Skoonspruit 2726DA

The map depicted in Figure 12 below shows the first segment of the study area (yellow area as seen in Figure 11) and is a South Africa 1:50 000 sheet of Skoonspruit, 2726DA, second edition. This map was surveyed in 1946 and drawn by the Trigonometrical Survey Office in 1947. Revised in 1948.

Three features can be seen here:

- Feature one and two are building representations
- Feature three represents native huts or cattle kraals. During the survey none of these features were located. The area has been ploughed extensively.



**Figure 12: 1948 Topographic map depicting part of the study area and surrounding region, the red line represents the study area.**

#### 4.2.2 Area Two: 1952 topographic map of Odendaalsrus 2726DC

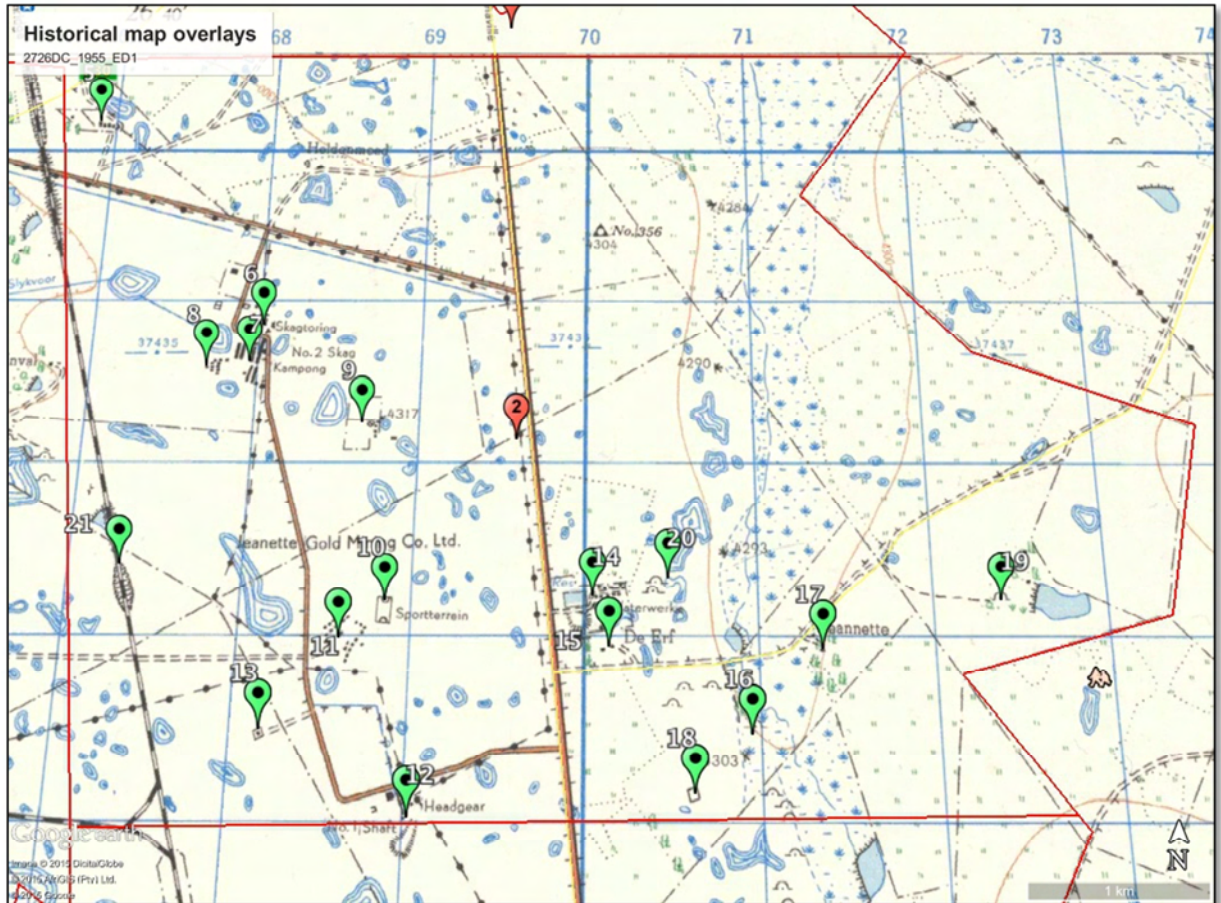
The map depicted in Figure 13 below shows the second segment of the study area (green area as seen in Figure 11) and is a South Africa 1:50 000 sheet of Odendaalsrus, 2726DC, First edition. The air photography for this map was conducted in 1952, the field survey was conducted in 1954 and drawn by the Trigonometrical Survey Office in 1955. The map was reprinted and published by the Government printer, Pretoria 1972.

Seventeen features can be observed in this section of the study area, these include:

- Feature 5, which represents buildings, the survey revealed new silos in the vicinity alongside foundation remains of older structures.
- Features 6, 7 and 8 represent a cluster of buildings, which the field survey found to be the remains of the hospital, hostel and some other related buildings.
- Feature 9 presented a large structure with associated buildings, the field survey found unused agricultural structures.
- Feature 10 represents a sports ground, the area today is completely ploughed.



- Feature 11 depicts several structures, the area is today completely ploughed.
- Feature 12 represents an unknown structure, the field survey found this to be shaft 2B.
- Feature 13 represents an unknown structure, the field survey found this to be the remains of an old dynamite magazine.
- Feature 14 represents a large structure, today this is the waterworks buildings.
- Feature 15 depicts buildings, today a farm stead with several new structures stands there.
- Feature 16 represents native huts or cattle kraals, here access was limited and confirmation could not be made.
- Feature 17 represents buildings, during the survey remains of structures were located here.
- Feature 18 represents a building, again limited access prevented confirmation
- Feature 19 and 20 represent native huts or kraals, this area was completely ploughed.
- Feature 21 represents a gorge, nothing could be found here during the survey.

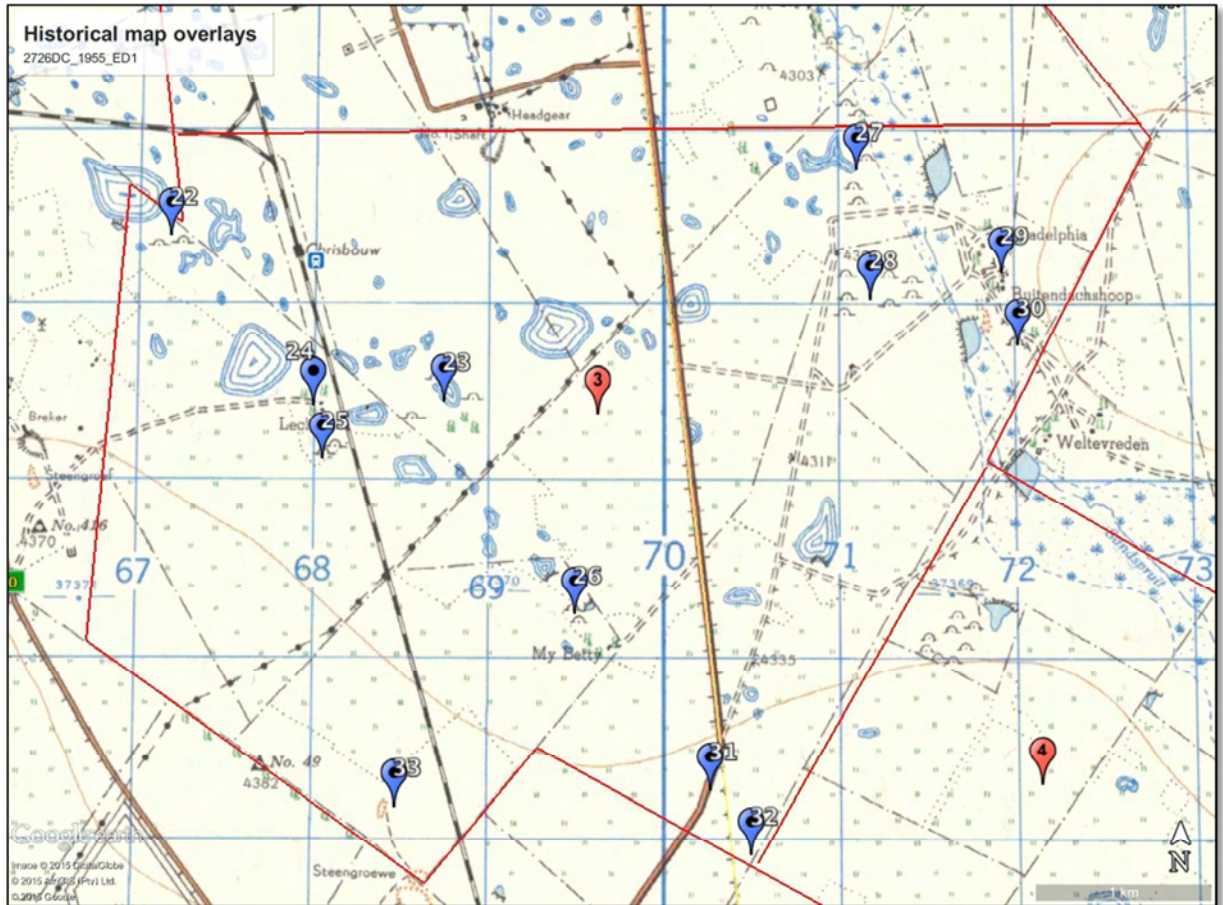


**Figure 13: 1955 Topographic map depicting part of the study area and surrounding region, the red line represents the study area.**

**4.2.3 Area Three: 1952 topographic map of Odendaalsrus 2726DC**

Figure 14 is the same as 4.3.2 and 9 features are depicted here.

- Feature 22 and 23 depict native huts or kraals, the area is completely ploughed
- Feature 24 represents buildings; nothing was evident during the survey.
- Feature 25 and 26 depict native huts or kraals, the area is completely ploughed.
- Feature 27 represents native huts or kraals, here access was difficult and no evidence of remains could be observed.
- Feature 28 depicts native huts or kraals, the field survey showed the area to have broken down worker housing of a more recent time as well as an informal cemetery.
- Feature 29 represents buildings; a farmstead occurs here, which may be older than 60 years old as well as historical kraals (square) and remains of older buildings.
- Feature 30 depicts a native hut or cattle kraal, no evidence of this was found, however a fairly large cemetery occurs here.

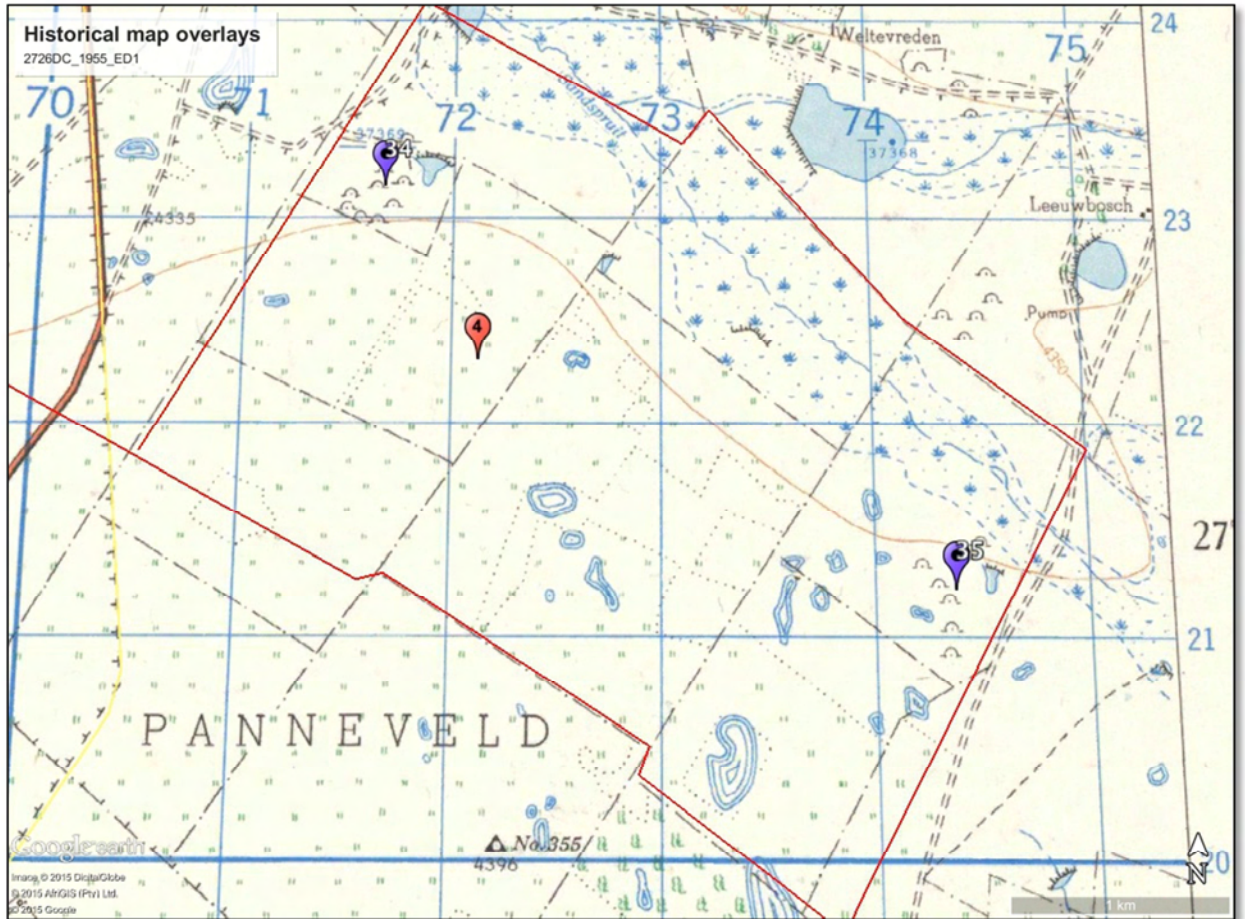


**Figure 14: 1955 Topographic map depicting part of the study area and surrounding region, the red line represents the study area.**

#### 4.2.4 Area Four: 1952 topographic map of Odendaalsrus 2726DC

Figure 15 is the same as 4.2.2 and 2 features are depicted here.

- Feature 34 depicts native huts or kraals, the area here was boggy and no evidence was found.
- Feature 35 depicts native huts or kraals, at present an informal settlement occurs here.



**Figure 15: 1955 Topographic map depicting part of the study area and surrounding region, the red line represents the study area.**

### 4.3 Aerial photos

Evaluation of aerial photography and the historical maps has indicated areas in the study area that may be sensitive from a heritage resources perspective.

The aerial photography has reference to the following as areas of possible heritage sensitivity:

#### 4.3.1 Farmsteads

Most of the farmsteads in the study area do not feature on the aerial photography. **JP029**, **JP031**, and **JP033** are not featured. However, there are other building structures that were present.

Farmstead **JP029** as well as **JP024** (Residential house) and **JP024** (Broken down structures) all occur in close proximity to each other. None of these structures occur on the 1952 aerial image. See Figure 16

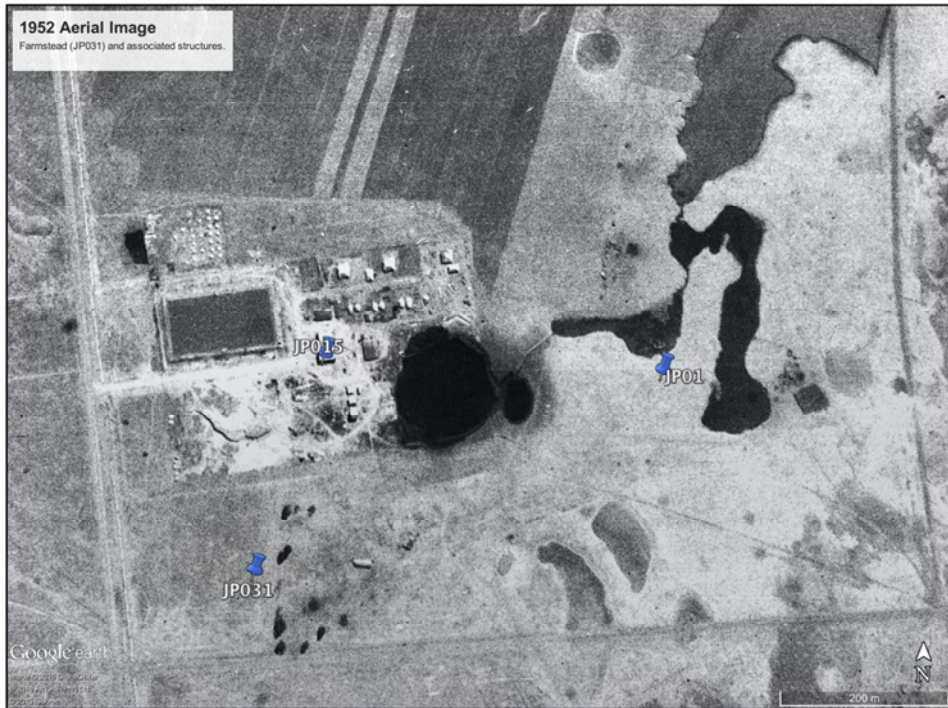


**Figure 16: 1952 Aerial Image showing that JP013, JP024 and JP029 did not occur at this time**



**Figure 17: 2015 Google Earth Image showing the positions of JP013, JP024 and JP029 at present**

Farmstead **JP031** and the waterworks **JP015** occur next to each other. The water works structure is present in 1952, however the farmhouse does not occur, see Figure 18.



**Figure 18: 1952 Aerial Image showing JP015 (waterworks) present and that the farmstead JP031 does not occur at this time.**



**Figure 19: 2015 Google Earth Image showing the presence of farmstead JP031 and the waterworks JP015 at present**

JP07 and JP08, JP09, JP012 and JP033 represent a farmstead unit. In this case the current farmhouse (JP033) does not occur on the aerial image, however JP07, JP08, JP09 and JP012 do feature (Figure 20) which confirms that these remaining structures are older than 60 years.



**Figure 20: 1952 Aerial Image showing the farmstead JP033 and the associated structures**



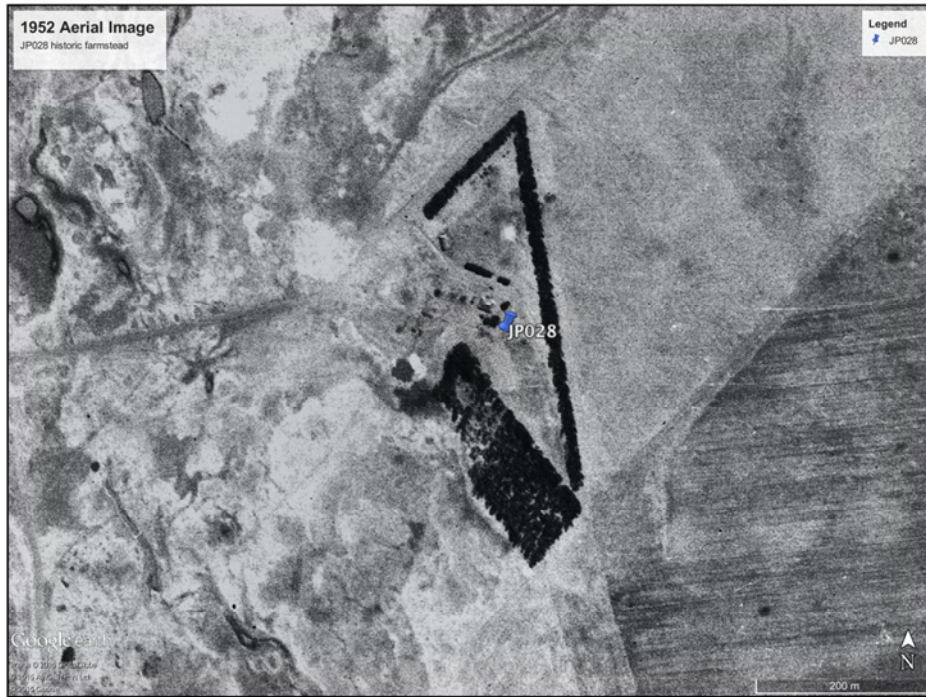


**Figure 21: 2015 Google Earth Image showing Farmstead JP031 and associated structures**

#### 4.3.2 Structures

Numerous structures and outlines of man-made structures have been identified and rated as possible sensitive heritage resources from the aerial survey. These include stone circle remains. However during the survey these were not located.

The foundation remains of a historical building (**JP028**) can clearly be seen as a functional farmstead on the 1952 aerial image. See Figure 22.



**Figure 22: 1955 Aerial Image showing the farmstead JP028 was in existence at the time the aerial image was taken**



**Figure 23: Farmstead JP028 shown on a 2015 google earth image, all that remains is the foundation**

#### 4.3.3 Mine Shafts and explosives magazine

Shaft 1# and shaft 2B# were located on the aerial images as well as during the survey. The aerial images however present an array of associated infrastructure that no longer occurs. Some of these buildings include the **JP018** the hostel and **JP019** the hospital. **JP023** is the explosives magazine, which is associated with mining activity and can also be seen on the 1952 aerial images see Figure 24, Figure 26, Figure 28.



**Figure 24: 1955 Aerial Image showing Shaft 1# and associated structures, here the hostel and the hospital can be seen.**



**Figure 25: 2015 Google Earth Image showing the current state of the structures surrounding shaft 1#**



**Figure 26: 1955 image of shaft 2B# and associated structures**



**Figure 27: 2015 Google Earth Image showing the remains of shaft 2B# and associated structures**



**Figure 28: 1955 Aerial Image showing the explosives magazine (JP023)**

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**Figure 29: 2015 Google Earth Image showing the remains of the explosives magazine (JP023)**

#### **4.4 Palaeontology**

##### *4.4.1 SAHRIS Palaeontology maps*

An analysis of the SAHRIS palaeontological sensitivity map (Figure 30) indicates that the majority of the study area is underlain by palaeontological sensitive geology. Interpreting this data according to the SAHRIS guidelines (Figure 31) indicates that a desktop study is required. There is a section on the eastern side of the study area that is orange and therefore of high importance. In this case it is recommended that a desktop study is required and based on the outcome, a field assessment is likely.



**Figure 30: Palaeontological sensitivity map for the project area (SAHRIS, 2015) overlaid on a Google Earth Image**

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.

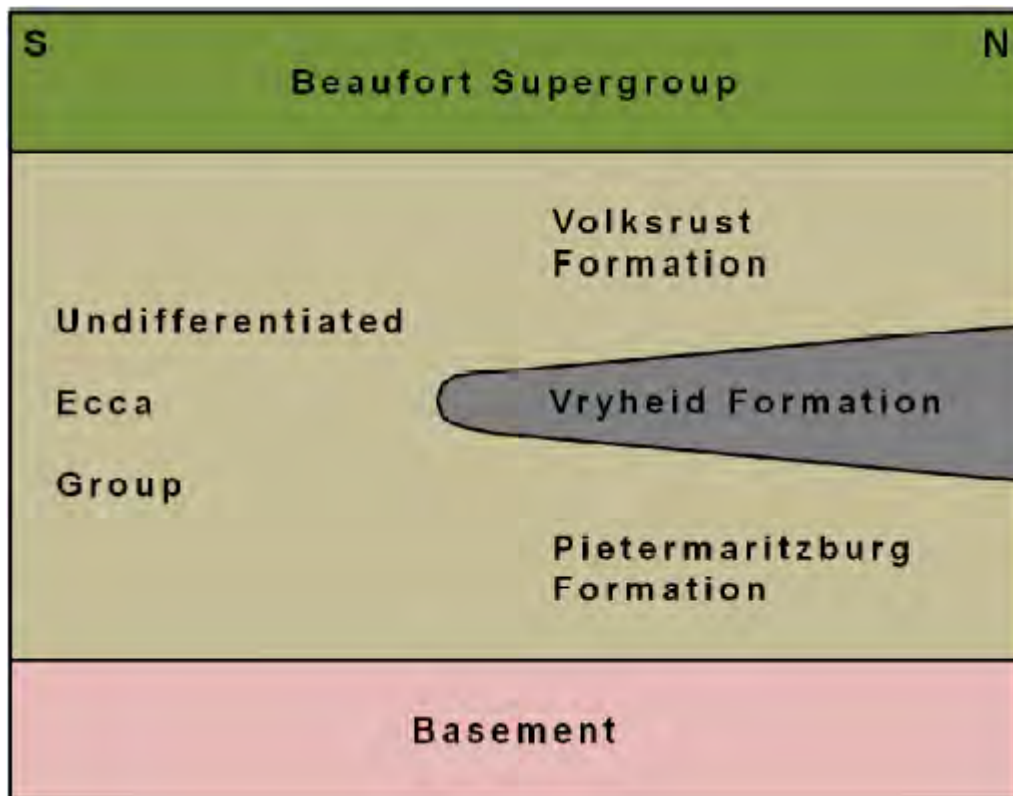
**Figure 31: Legend for the above map from SAHRIS.**

#### 4.4.2 Palaeontology background

Currently there are no fossil record for the Permian Ecca group known as the Volksrust rock Formation in the vicinity in which the Jeannette study area is located but it is possible it contains coal deposits (50 and 360m below the surface) from the Free State Coal Field which stretch from the Vaal River and Theunissen, these are however of poor quality (Snyman, 1998). Fossil Vertebrates do not occur in association with coal deposits. The Volksrust Formation is a part of the Main Karoo Basin of South Africa and it differs in age where it transitions between the overlying Beaufort Group and the underlying Vryheid Formation (Millstead unpublished). The thickness of this unit leads to an open muddy suspension and



usually consists of grey to black silty shale with thin siltstone or Sandstone lenses (Johnson et al; 2006). The plant fossils which can be identified comes from six genera which includes *glossopterids*, *cordaitaleans* and other seed fern groupings; they can be found in the shales and mudstones in between the coal seams (Bamford, 2003; Cadle et al, 1993).



**Figure 32: Schematic representation of the Karoo Basin indicating the position of the Volksrust Formation (Millstead unpublished).**

The Plio-Pleistocene record is unique in the fact that the alluvial deposits comes from the Vaal, Sand and Vet rivers; the banks of these rivers show moderately fossiliferous overbank sediments (Rossouw unpublished). The other stratigraphy unit that covers the area is *Canozoic* Regolith, this cover of which the thickness is unknown seems to have been ploughed away by the maize fields in the area so any fossils that it may have contained have been destroyed, but this in turn could have protected the Volksrust Formation and the fossils it may contain (Millstead unpublished). The *Canozoic* Regolith sites are mostly identified in alluvial terraces and dongas and may contain large mammal bones, dentition, horn cores, micro mammal bones and freshwater mollusc (Millstead unpublished).

The Basal Reef for the Jeanette mine project includes mineral resources of Black Chert and Overlapping Facies also a shale layer known as Khaki Shale (thickness of 70cm to more than 270cm) covers this Basal Reef (Scholtz et al, 2014). The structure of this layer is of a mineralogical clay make-up known as pyrophyllite and in the case of the Jeanette project this structure does not provide geotechnical support during mining activities, this is the main reason why the Jeanette project was not feasible during the 1950s for the Anglo American Corporation (Scholtz et al, 2014). The problem of the Khaki Shale will be overcome when during the first stage as it will be throw-blasted into worked-out areas and used as backfill.

A desktop report prepared by Dr B. P, Millstead for a proposed 75MW solar energy facility near Odendaalsrus proposed that the general impact on Palaeontology in the area in this case would be low. However, as little is known about the fossil record of this area, Millstead states that it would be beneficial to conduct an examination during site excavations for this particular project but this is not essential. Millstead states however that the impact in this case would be low as the project will not penetrate to the depth of the Volksrust Formation, which is potentially fossiliferous. No further recommendations are made in this report.

Professor Marion Bamford also conducted a desktop study in Odendaalsrus for the proposed Photovoltaic Solar facilities for Harmony Gold Mining Company. In this case Professor Bamford concludes that as this particular project will mainly affect the surface geology, there will be little to no impact on palaeontology. As with the above-mentioned assessment, it is also recommended that if any fossil plant material be discovered during construction, then a professional palaeontologist be called to site to assess the importance of the fossils.

## **5 POSSIBLE HERITAGE FINDS**

### **5.1 Field work findings**

A site visit and HIA survey of the Jeanette Project was conducted in July 2015. Track logs and points of significance were recorded with a handheld Garmin GPS, see **Appendix B**.

The site is predominantly covered in agricultural fields with areas of seasonal wetlands occurring along the eastern side of the study area. And patches of natural grassland spread out sporadically within the area.



**Figure 33: View of general landscapes in the study area. It can be noted that most of the area is extensively altered for agricultural activity**

## 5.2 Heritage Sites

The HIA and field work survey yielded 29 sites with possible heritage significance of these, 13 sites the following are deemed to be heritage sites and were given a medium to high heritage significance rating:

- a total of 4 cemeteries (JP01, JP02, JP05 and JP10);
- 2 possible cemeteries (JP03 and JP021);
- 1 farmstead (JP031);
- Historical buildings or remains of (JP04, JP08, JP09, JP012, JP018); and

- a sacred/religious site (JP025) was identified.


The other structure was rated as having low or no heritage significance and needing no further mitigation work.

Refer to **Appendix A** for the positions of the heritage sites within the study area.

### 5.2.1 Cemeteries

During the fieldwork 6 cemeteries, 4 formal and two possible were identified.

**Table 9: Cemeteries**

Site No	Type	Co ordinates	Description	Heritage Significance	Photo
JP01	Cemetery	-27.782553°, 26.699998°	Heritage site  A cemetery was identified at this location. This is the cemetery used by the farm workers. The cemetery is fenced and contains 20-30 graves. There are two rows of graves facing an east west orientation.	Grade 3A	

**Figure 34: Workers cemetery on a farmstead (within lease area)**

**JP02** Cemetery -27.780175°, Heritage site. Grade 3A  
26.721982°

A single grave was identified at this location. It has a formal dressings and headstone. The inscription reads "*Sarah Sophia Staal - 5 December 1876 – 28 October 1933*". This grave is in an east west orientation.



**Figure 35: Single grave of Sarah Sophia Staal, 5 December 1876 – 28 October 1933 (within lease area)**

**JP03** Possible -27.780173°, Heritage site. Grade 3A  
Cemetery 26.721675°

At this location a possible cemetery was identified. It is not evident how many graves are present; the number could be as many as 10 graves. The appears to be only one row of graves in an east west orientation



**Figure 36: Possible graves (within lease area)**

**JP05** Cemetery -27.804786°, Heritage site Grade 3A  
26.716171°

At this location a large cemetery is located. A fence divides the graves with approximately 22 on the one side and 78 on the other. Most of the graves have formal headstones. There are approximately 6 rows of graves, all in an east west orientation. The earliest date that could be distinguished is 1962.



***Figure 37: Large cemetery, approximately 100 graves (outside lease area, within mining right area)***



**JP010** Cemetery -27.799483°, Heritage site **Grade 3A**  
26.705105°

At this location is a cemetery most probably associated with farm workers; it is located next to ruined staff housing. The amount of graves present could be between 15-25. Not all the graves are marked. There are approximately three rows of graves, in an east west orientation.



***Figure 38: Cemetery of workers, located next to staff housing (outside lease area, within mining right area)***

**JP021** Possible -27.782185°, Heritage site Grade 3A  
Cemetery 26.676043°

At this location are two possible graves marked with rocks. The alignment and placement of the stone indicate the possibility that the structures could be graves.




**Figure 39: Possible two graves (within lease area)**

**Mitigation:**

- Adjust the development layout and demarcate site with at least a 50-meter buffer in regard to any development of the project.

5.2.2 Historical Structures

**Table 10: Historical structures**

Site No	Type	Co ordinates	Description	Heritage Significance	Photo
JP04	Remaining foundation of a historic structure	-27.779673°, -27.779673°	Heritage site  At this location are the remains of a historic structure. This structure occurs near <b>Feature 19</b> on the historic map, which depicted a native hut or cattle kraal. This structure occurs in close proximity to <b>JP03</b> (cemetery).	Grade 4B	

**Figure 40: Remaining foundation (within lease area)**

**JP07** Remains of a historic building -27.779673°, 26.714341° Heritage site Grade 4C

At this location are the remains of a historic building. The windows have been bricked up and the rest of the structure barely remains. This structure occurs near **Feature 29**, which represents buildings. This could suggest the remains are older than 60 years. This structure forms part of the farmstead **JP033**



**Figure 41: Dilapidated remains of a historic building (outside lease area, within mining right area)**

**JP012** Historic -27.798275°, Heritage site Grade 4B  
building with 26.714405°  
stone walls

At this location a historic building occurs which has been partly constructed with the use of stone walling. This structure occurs near **Feature 29**, which represents buildings, this could suggest the remains are older than 60 years. This structure forms part of the farmstead **JP033**



**Figure 42: Remains of a historic structure built partly with stone walling (outside lease area, within mining rights area)**

**JP08** Historical -27.798873°, Heritage site Grade 4B  
kraal 26.713681°

At this location a historical kraal occurs which is rectangular in shape. This structure occurs near **Feature 29**, which represents buildings, this could suggest the remains are older than 60 years. This structure forms part of the farmstead **JP033**.



**Figure 43: Historical kraal (outside lease area, within mining rights area)**

**JP09** Historical -27.800204°, Heritage site Grade 4B  
kraal 26.713793°

At this location a historical kraal occurs which is rectangular in shape. This structure occurs near **Feature 29**, which represents buildings; this could suggest the remains are older than 60 years. This structure forms part of the farmstead **JP033**



**Figure 44: Historical kraal (outside lease area, within mining rights area)**

**JP033** Possible -27.799864°, Not a heritage site Grade 4C  
Historic 26.714935°  
Farmstead

A farmstead was identified at this location. The farmstead was constructed with bricks and cement and had a pitched corrugated iron roof.



**Figure 45: Farmstead (outside lease area, within mining rights area)**



**JP011** Old staff housing. -27.801112°, 26.705501° Not a heritage site Grade 4C

Old staff housing which occurs near the cemetery at **JP010** and near **Feature 28**. The buildings are dilapidated and more than likely younger than 60 years. In close proximity to **JP010** (cemetery)



*Figure 46: Old staff housing (outside lease area, within mining rights area)*

**JP013** Remains of a residential house  
-27.826697°, 26.701395°  
Grade 4C

An house occurs at this location. This house does not feature on the 1955 topographic map and is therefore not older than 60 years.



***Figure 47: Remains of a residential house (outside lease area, within mining rights area)***

**JP014** Historic building -27.768846°, 26.672946° Heritage site Grade 4C

At this location are the remains of a historic building. This building coincides with **Feature 8** on the 1955 topographic map which suggests that it is older than 60 years.



*Figure 48: Remains of historic building in association with the hospital and the hostel (inside shaft 1# area)*

**JP015** Water works -27.782380°, Heritage site Grade 4C  
26.695882°

Government structure, water works . This feature is represented on the 1955 topographic map and is therefore older than 60 years



**Figure 49: Water works structures (within lease area)**

**JP018** Historic -27.770310°, Heritage site Grade 4B  
hostel 26.674753°

At this location an historical hostel occurs. These buildings occur on the topographic map (**Feature 7**) and are therefore older than 60 years. The buildings are dilapidating and are currently being resided by squatters.



**Figure 50: Historical hostel (inside Shaft 1# area)**

**JP019** Remains of hospital -27.767346°, 26.674992° Heritage site (Destroyed) Grade 4C

At this location the remains of a hospital occur. The structure has been completely broken down. All that remains are piles of rubble. The 1955 topographic map depicts this building (**Feature 6**).



**Figure 51: Rubble remains of a hospital (inside Shaft 1# area)**

**JP020** Agricultural structures -27.773519°, 26.682344° Not a heritage site Grade 4C

This location presents several agricultural broiler houses that are no longer in use. The structures occur near **Feature 9** on the 1955 topographic map, however is probably not the feature that is depicted.



**Figure 52: Unused agricultural buildings (within lease area)**

**J023** Explosives storage magazine -27.788735°, 26.676733° Heritage site Grade 4C

At this location the remains of a explosives storage magazine occur. This structure also coincides with **Feature 12** on the 1955 topographic map.



*Figure 53: Entrance to the remaining structure of the explosives storage magazine (within lease area)*



**JP024** Remains of structures -27.829418°, 26.699479° Not a heritage site Grade 4C

At this location are remains of buildings. These structures do not occur on the 1955 topographic map and are not older than 60 years.



***Figure 54: Remains of structures (outside lease area, within mining right area)***

**JP026** Remains of Allanridge railway station

-27.747348°,  
26.657958°

Grade 4C

At this location are the remains of Allanridge railway station. This structure is not depicted on the 1955 topographic map and is not older than 60 years. The building is dilapidated.



**Figure 55: Remains of the Allanridge railway station (outside lease area, within mining right area)**

**JP027** Remains of historic buildings -27.748533°, 26.656498° Not a heritage site Located in close vicinity to the railway station are several dilapidated structures. These structures are not depicted on the 1955 map and not older than 60 years Grade 4C



**Figure 56: Buildings in close vicinity to the Allanridge railway station (outside lease area, within mining rights area)**

**JP028** Foundation remains of historical building -27.784485°, 26.709222° Heritage site Grade 4C

At this location is the foundation remains of an historical building. This structure can be observed on the 1955 topographic map as well as on the 1952 aerial images (Figure 22) and is therefore older than 60 years. There are a few remains of possible other structures in the same vicinity.



**Figure 57: Foundation remains of a historical building (within lease area)**

**JP029** Farmstead -27.826765°, Not a heritage site Grade 4B  
26.698321°

At this location is an operational farmstead. This structure is not historical.



***Figure 58: Current farmstead (outside lease area, inside mining rights area)***

**JP031** Farmstead -27.785624°, Not a heritage site 3A  
26.694108°

At this location is a farmstead that is currently fully operational. The 1955 topographic map depicts structures at this location (Feature 15) however these buildings are modern and probably not more than 60 years old.



**Figure 59: Current farmstead (within lease area)**

*Mitigation:*

Most of the heritage structures mentioned are already in a state of decay and the documentation of these structures in this report is sufficient.

The farmsteads **JP029**, **JP031** and **JP033** are occupied and should be avoided however no impact on these structures is foreseen.


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5.2.3 Sacred/ religious site

**Table 11: Sacred/religious sites**

Site No	Type	Co ordinates	Description	Heritage Significance	Photo
JP025	Religious site	-27.749670°, 26.659506°	A circle of stones occur at this location that clearly has religious purposes of the local African Church Denomination. The site showed little evidence of current occupation	Grade 4C	

**Figure 60: Religious site (outside lease area, within mining rights area)**

*Mitigation:*

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- This heritage site is protected under Section 3 of the NHRA, will need to be avoided with a buffer of 50m.
- A consultation process with local spiritual and religious groupings will be required in the event that access to such site will be limited.



5.2.4 Historic Mines

**Table 12: Historical mines**

Site No	Type	Co ordinates	Description	Heritage Significance	Photo
JP022	Historic mine shaft	-27.792232°, 26.685096°	The historic mine Shaft 2B is at this location with associated buildings. This structure is depicted on the 1955 topographic map ( <b>Feature 12</b> ).	Grade 4C	

**Figure 61: Historic mine shaft 2B (direct impact)**

**JP030** Historic mine shaft -27.766822°, 26.675844° Grade 4C  
The historic mine Shaft #1 is located here. Most the associated infrastructure has been demolished. The structure is depicted on the 1955 topographic map (Feature 6)



**Figure 62: Historic mine shaft number 1.**

*Mitigation:*

As none of the associated infrastructure remains intact, no further mitigation is required

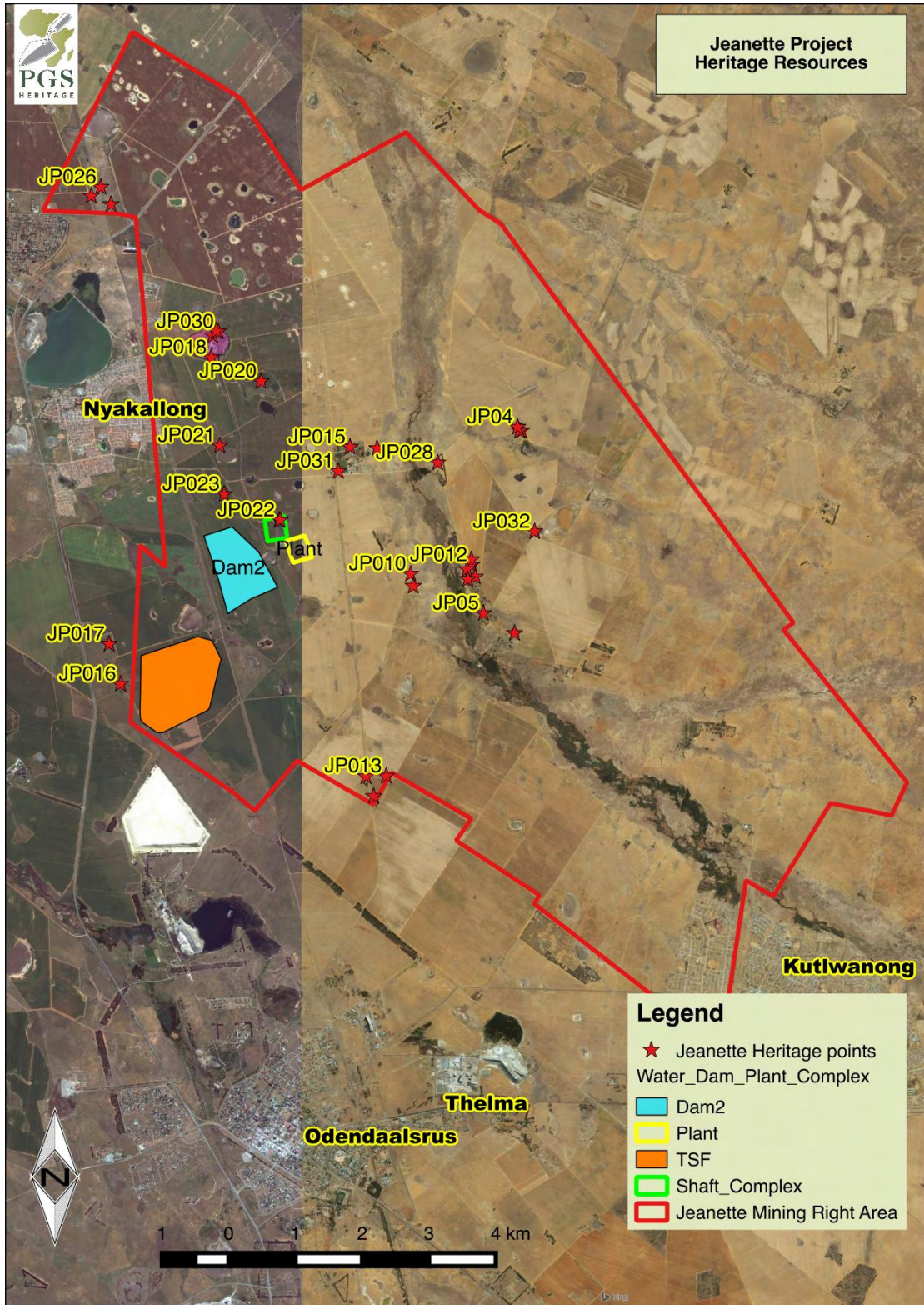
### 5.3 Summary of field work findings

The HIA and field work survey yielded 29 sites with possible heritage significance of these, 13 sites are deemed to be heritage sites and were given a medium to high heritage significance rating:

- a total of 4 cemeteries (JP01, JP02, JP05 and JP10);
- 2 possible cemeteries (JP03 and JP021);
- 1 farmstead (JP031);
- Historical buildings or remains of (JP04, JP08, JP09, JP012, JP018); and
- a sacred/religious site (JP025) was identified.
- The other structure was rated as having low or no heritage significance and needing no further mitigation work.

**Table 13 Summary of Impact Area**

DIRECT IMPACT	INDIRECT IMPACT	NO IMPACT
JP012	JP01, JP02, JP03	JP05JP08
JP018, JP030	JP04, JP021, JP031	JP09, JP012



**Figure 63: Project infrastructure in relation to the identified heritage points**

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## 6 IMPACT ASSESSMENT

### 6.1 Impact Matrix

**Table 14: Rating Matrix for impacts in the Pre-Construction phase**

Activity	Nature of Impact	Impact type	Extent	Duration	Potential Intensity	Likelihood	Rating	Mitigation	Interpretation
Impact on cemeteries	<u>Indirect Impact:</u>	Existing	1	1	1	0,1	0 - LOW	<ul style="list-style-type: none"> <li>Demarcate site with at least a 50-meter buffer</li> <li>In the event that the sites cannot be excluded from the development footprint a grave relocation process as described in Section 5 of this reports needs to be implemented.</li> </ul>	The possibility of impacting the identified cemeteries without mitigation is low
	Current impact on cemeteries	Cumulative	1	1	1	0,1	0 - LOW		No further mitigation required
		Residual	1	1	1	0,1	0 - LOW		No further mitigation required

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Activity	Nature of Impact	Impact type	Extent	Duration	Potential Intensity	Likelihood	Rating	Mitigation	Interpretation
Impact on farmsteads	<u>Indirect Impact:</u>	Existing	1	1	1	0,1	0 - LOW	No impact is envisaged	The possibility of impacting the identified farmsteads without mitigation is low.
	Current impact on historic farmstead	Cumulative	1	1	1	0,1	0 - LOW		No further mitigation
		Residual	1	1	1	0,1	0 - LOW		No further mitigation

Activity	Nature of Impact	Impact type	Extent	Duration	Potential Intensity	Likelihood	Rating	Mitigation	Interpretation
Impact on historic mine infrastructure	<u>Direct Impact:</u>	Existing	1	1	1	0,1	0 - LOW	No impact is envisaged	The possibility of impacting the identified historical mine shafts without mitigation is low
	Current impact on historic mine infrastructure	Cumulative	1	1	1	0,1	0 - LOW		No further mitigation required
		Residual	1	1	1	0,1	0 - LOW		No further mitigation required

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Impact of sacred site	Indirect Impact:	Existing	1	1	1	0,5	2 - LOW	No impact is envisaged	The possibility of impacting the identified sacred site without mitigation is low
	Current impact on sacred sites	Cumulative	1	1	1	0,2	1 - LOW		No further mitigation required
		Residual	1	1	1	0,2	1 - LOW		No further mitigation required

**Table 15: Rating Matrix for impacts on Construction phase**

Activity	Nature of Impact	Impact type	Extent	Duration	Potential Intensity	Likelihood	Rating	Mitigation	Interpretation
Impact on cemeteries	<u>Indirect Impact:</u>	Existing	1	1	1	0,2	1 - LOW	<ul style="list-style-type: none"> <li>• Demarcate site with at least a 50-meter buffer</li> <li>• In the event that the sites cannot be excluded from the development footprint a grave relocation process as described in Section 5 of this reports needs to be implemented.</li> </ul>	The possibility of impacting the identified cemeteries without mitigation is low
	----- Current impact on cemeteries	Cumulative	1	1	1	0,2	1 - LOW		No further mitigation required
			Residual	1	1	1	0,1	0 - LOW	No further mitigation required



Activity	Nature of Impact	Impact type	Extent	Duration	Potential Intensity	Likelihood	Rating	Mitigation	Interpretation
Impact on farmsteads	<u>Indirect Impact:</u>	Existing	1	1	1	0,2	1 - LOW	No impact is envisaged	The possibility of impacting the identified farmsteads without mitigation is low.
	Current impact on historic farmstead	Cumulative	1	1	1	0,5	2 - LOW		No further mitigation required
		Residual	1	1	1	0,1	0 - LOW		No further mitigation required
Impact on historic mine infrastructure	<u>Direct Impact:</u>	Existing	1	1	1	0,2	1 - LOW	No impact is envisaged	The possibility of impacting the identified mine shafts without mitigation is low
	Current impact on historic mine infrastructure	Cumulative	1	1	1	1	3 - MOD		No further mitigation required
		Residual	1	1	1	1	3 - MOD		No further mitigation required

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Activity	Nature of Impact	Impact type	Extent	Duration	Potential Intensity	Likelihood	Rating	Mitigation	Interpretation
Impact of sacred site	Indirect Impact:	Existing	1	1	1	0,2	1 - LOW	No impact is envisaged	The possibility of impacting the identified sacred site without mitigation is low
	Current impact on sacred sites	Cumulative	1	1	1	0,2	1 - LOW		No further mitigation required
		Residual	1	1	1	0,2	1 - LOW		No further mitigation required

**Table 16: Rating Matrix for impacts on Operational phase**

Activity	Nature of Impact	Impact type	Extent	Duration	Potential Intensity	Likelihood	Rating	Mitigation	Interpretation
Impact on cemeteries	<u>Indirect Impact:</u>	Existing	1	1	1	0,2	1 - LOW	<ul style="list-style-type: none"> <li>• Demarcate site with at least a 50-meter buffer</li> <li>• In the event that the sites cannot be excluded from the development footprint a grave relocation process as described in Section 5 of this reports needs to be implemented.</li> </ul>	The possibility of impacting the identified cemeteries without mitigation is low
	Current impact on cemeteries	Cumulative	1	1	1	0,2	1 - LOW		No further mitigation required
		Residual	1	1	1	0,1	0 - LOW		No further mitigation required
Impact on farmsteads	<u>Indirect Impact:</u>	Existing	1	1	1	0,2	1 - LOW	No impact is envisaged	The possibility of impacting the

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Activity	Nature of Impact	Impact type	Extent	Duration	Potential Intensity	Likelihood	Rating	Mitigation	Interpretation
									identified farmsteads without mitigation is low.
	Current impact on historic farmstead	Cumulative	1	1	1	0,5	2 - LOW		No further mitigation required
		Residual	1	1	1	0,1	0 - LOW		No further mitigation required
Impact on historic mine infrastructure	<u>Direct Impact:</u>	Existing	1	5	8	0,2	3 - MOD	As the project intends to use shaft 2B# the impact in this case is moderate.	The possibility of impacting the identified historic mine shafts without mitigation is high
	Current impact on historic mine infrastructure	Cumulative	1	5	8	0,2	3 - MOD		The possibility of impacting the identified historic mine shafts without mitigation is high
		Residual	1	5	8	0,2	3 - MOD		The possibility of impacting the

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Activity	Nature of Impact	Impact type	Extent	Duration	Potential Intensity	Likelihood	Rating	Mitigation	Interpretation
									identified historic mine shafts without mitigation is high
Impact of sacred site	Indirect Impact:	Existing	1	3	1	0,2	1 - LOW	No impact is envisaged	The possibility of impacting the identified sacred site without mitigation is low
	Current impact on sacred sites	Cumulative	1	3	1	0,2	1 - LOW		No further mitigation required
		Residual	1	3	1	0,2	1 - LOW		No further mitigation required

## 6.2 Confidence in Impact Assessment

It is necessary to realise that the heritage resources located during the fieldwork do not necessarily represent all the possible heritage resources present within the area. Various factors account for this, including the subterranean nature of some heritage sites.

The impact assessment conducted for heritage sites assumes the possibility of finding heritage resources during the project life and has been conducted as such.

## 6.3 Cumulative Impacts

The impact matrix above presents the cumulative impacts on the heritage sites identified. The impact is low for cemeteries, structures and sacred sites. As the existing shafts will be used for the project, there is a moderate to low impact on the historic mining infrastructure. No mitigation is required due to the low heritage rating of the sites.

## 7 GENERAL MITIGATION MEASURES

### 7.1 Management Guidelines

1. The National Heritage Resources Act (Act 25 of 1999) states that, any person who intends to undertake a development categorised as-
  - (a) the construction of a road, wall, transmission 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 50m in length;
  - (c) any development or other activity which will change the character of a site-
    - (i) exceeding 5 000 m<sup>2</sup> 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 m<sup>2</sup> in extent; or
  - (e) any other category of development provided for in regulations by SAHRA or a provincial heritage resources authority, must at the very earliest stages of initiating such a development, notify the responsible heritage resources authority and furnish it with details regarding the location, nature and extent of the proposed development.

**In the event that an area previously not included in an archaeological or cultural resources survey is to be disturbed, the South African Heritage Resources Agency (SAHRA) needs to be contacted. An enquiry must be lodged with them into the necessity for a Heritage Impact Assessment.**

2. In the event that a further heritage assessment is required it is advisable to utilise a qualified heritage practitioner preferably registered with the Cultural Resources Management Section (CRM) of the Association of Southern African Professional Archaeologists (ASAPA).

This survey and evaluation must include:

- (a) The identification and mapping of all heritage resources in the area affected;
- (b) An assessment of the significance of such resources in terms of the heritage assessment criteria set out in section 6 (2) or prescribed under section 7 of the National Cultural Resources Act;
- (c) An assessment of the impact of the development on such heritage resources;
- (d) An evaluation of the impact of the development on heritage resources relative to the sustainable social and economic benefits to be derived from the development;
- (e) The results of consultation with communities affected by the proposed development and other interested parties regarding the impact of the development on heritage resources;
- (f) If heritage resources will be adversely affected by the proposed development, the consideration of alternatives; and
- (g) Plans for mitigation of any adverse effects during and after the completion of the proposed development.

3. It is advisable that an information section on cultural resources be included in the SHEQ training given to contractors involved in surface earthmoving activities. These sections must include basic information on:

- a. Heritage;
- b. Graves;
- c. Archaeological finds; and
- d. Historical Structures.

This module must be tailor made to include all possible finds that could be expected in that area of construction.

4. In the event that a possible find is discovered during construction, all activities must be halted in the area of the discovery and a qualified archaeologist contacted.

5. The archaeologist needs to evaluate the finds on site and make recommendations towards possible mitigation measures.
6. If mitigation is necessary, an application for a rescue permit must be lodged with SAHRA.
7. After mitigation an application must be lodged with SAHRA for a destruction permit. This application must be supported by the mitigation report generated during the rescue excavation. Only after the permit is issued may such a site be destroyed.
8. If during the initial survey sites of cultural significance is discovered, it will be necessary to develop a management plan for the preservation, documentation or destruction of such a site. Such a program must include an archaeological monitoring programme, timeframe and agreed upon schedule of actions between the company and the archaeologist.
9. In the event that human remains are uncovered or previously unknown graves are discovered a qualified archaeologist needs to be contacted and an evaluation of the finds made.
10. If the remains are to be exhumed and relocated, the relocation procedures as accepted by SAHRA need to be followed. This includes an extensive social consultation process.

**Table 17: Roles and responsibilities of archaeological and heritage management**

ROLE	RESPONSIBILITY	IMPLEMENTATION
A responsible specialist needs to be allocated and should sit in at all relevant meetings, especially when changes in design are discussed, and liaise with SAHRA.	Taung Gold	Archaeologist and a competent archaeology supportive team
If chance finds and/or graves or burial grounds are identified during construction or operational phases, a specialist must be contacted in due course for evaluation.	Taung Gold	Archaeologist and a competent archaeology supportive team
Comply with defined national and local cultural heritage regulations on management plans for identified sites.	Taung Gold	Environmental Consultancy and the Archaeologist
Consult the managers, local communities	Taung Gold	Environmental



ROLE	RESPONSIBILITY	IMPLEMENTATION
and other key stakeholders on mitigation of archaeological sites.		Consultancy and the Archaeologist
Implement additional programs, as appropriate, to promote the safeguarding of our cultural heritage. (i.e. integrate the archaeological components into employee induction course).	Taung Gold	Environmental Consultancy and the Archaeologist,
If required, conservation or relocation of burial grounds and/or graves according to the applicable regulations and legislation.	Taung Gold	Archaeologist, and/or competent authority for relocation services
Ensure that recommendations made in the Heritage Report are adhered to.	Taung Gold	Taung Gold
Provision of services and activities related to the management and monitoring of significant archaeological sites.	Taung Gold	Environmental Consultancy and the Archaeologist
After the specialist/archaeologist has been appointed, comprehensive feedback reports should be submitted to relevant authorities during each phase of development.	Taung Gold and Archaeologist	Archaeologist

## 7.2 All phases of the project

### 7.2.1 Archaeology

The project will encompass a range of activities during the operational period, including ground clearance, establishment of construction camps area and small-scale infrastructure development associated with the project.

It is possible that cultural material will be exposed during operations and may be recoverable, but this is the high-cost front of the operation, and so any delays should be minimised. Development surrounding infrastructure and construction of facilities results in significant disturbance, but construction trenches 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

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phase of the project and these must be catered for. Temporary infrastructure is often changed or added to the subsequent history of the project. 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.

In addition, the archaeologist to Taung Gold and SAHRA to ensure effective monitoring can submit feedback reports. This archaeological monitoring and feedback strategy should be incorporated into the Environmental Management Plan (EMP) of the project. Should an archaeological site or cultural material be discovered during construction (or operation), such as burials or grave sites, the project needs to be able to call on a qualified expert to make a decision on what is required and if it is necessary to carry out emergency recovery. SAHRA would need to be informed and may give advice on procedure. The developers therefore should have some sort of contingency plan so that operations could move elsewhere temporarily while the material and data are recovered. The project thus needs to have an archaeologist available to do such work. This provision can be made in an archaeological monitoring programme.

#### 7.2.2 Graves

In the case where a grave is identified during operation the following measures must be taken.

- Mitigation of graves will require a fence around the cemetery with a buffer of at least 50 meters.
- If graves are accidentally discovered during operation, activities must cease in the area and a qualified archaeologist be contacted to evaluate the find. To remove the remains a rescue permit must be applied for with SAHRA and the local South African Police Services must be notified of the find.

The grave relocation process must include:

- i. A detailed social consultation process, that will trace the next-of-kin and obtain their consent for the relocation of the graves, that will be at least 60 days in length;
- ii. Site notices indicating the intent of the relocation
- iii. Newspaper Notice indicating the intent of the relocation
- iv. A permit from the local authority;
- v. A permit from the Provincial Department of health;

- vi. A permit from the South African Heritage Resources Agency if the graves are older than 60 years or unidentified and thus presumed older than 60 years;
- vii. An exhumation process that keeps the dignity of the remains intact;
- viii. An exhumation process that will safeguard the legal implications towards the developing company;
- ix. The whole process must be done by a reputable company that are well versed in relocations;
- x. The process must be conducted in such a manner as to safeguard the legal rights of the families as well as that of the developing company.

## 8 CONCLUSIONS AND RECOMMENDATIONS

The HIA and field work survey yielded 29 sites with possible heritage significance of these, 13 sites are deemed to be heritage sites and were given a low to high heritage significance rating:

- a total of 4 cemeteries (JP01, JP02, JP05 and JP10);
- 2 possible cemeteries (JP03 and JP021);
- 1 farmstead (JP031);
- Historical buildings or remains of (JP04, JP08, JP09, JP012, JP022 and JP018); and
- a sacred/religious site (JP025) was identified.

The other structure was rated as having low or no heritage significance and needing no further mitigation work.

**Table 18 Summary of Impact Area**

DIRECT IMPACT	INDIRECT IMPACT	NO IMPACT
JP012	JP01, JP02, JP03	JP05JP08
JP018 JP030	JP04, JP021, JP031	JP09, JP012

Section 5.2 lists and describes all the sites in detail.

Although numerous sites were identified within the proposed mining right area, only one historical site, namely JP022, will be disturbed as part of the proposed project. The recommendations for historical sites are provided below, however given that numerous other sites are located within the proposed mining right area, recommendations specific to those areas are also included but only need to be implemented if these sites are disturbed.

### *Cemeteries*

- Adjust the development layout and demarcate site with at least a 50-meter buffer.

### *Historical Structures*

- Mitigation is not required. The remaining structures are in a state of collapse and have no historical value. The documentation in this report is a sufficient recording of the remaining structures.
- Most of the heritage structures mentioned are already in a state of decay and the documentation of these structures in this report is sufficient.
- The farmsteads JP029, JP031 and JP033 are occupied and should be avoided however no impact on these structures is foreseen.

### *Sacred/ religious site*

- This heritage site is protected under Section 3 of the NHRA, will need to be avoided with a buffer of 50m.
- A consultation process with local spiritual and religious groupings will be required in the event that access to such site will be limited.

### *Historic Mines*

No mitigation required.

### *Palaeontology*

It is also recommended that if any fossil plant material be discovered during construction, then a professional palaeontologist be called to site to assess the importance of the fossils.

***The overall impact on identified palaeontological resources is rated as low to moderate. No further mitigation is required***

Further to these recommendations the general Heritage Management Guideline in Sections 7 needs to be incorporated in to the EMP for the project to inform the conditions of the environmental authorisation.

The overall impact of the development on heritage resources is seen as acceptably low and no further mitigation is required.

Further to these recommendations, the general Heritage Management Guidelines in Section 7, need to be incorporated into the EMP for the project.

The overall impact of the development on heritage resources is seen as acceptably low and impacts can be mitigated to acceptable levels. The project can go ahead and will not have a significant impact on heritage resources.

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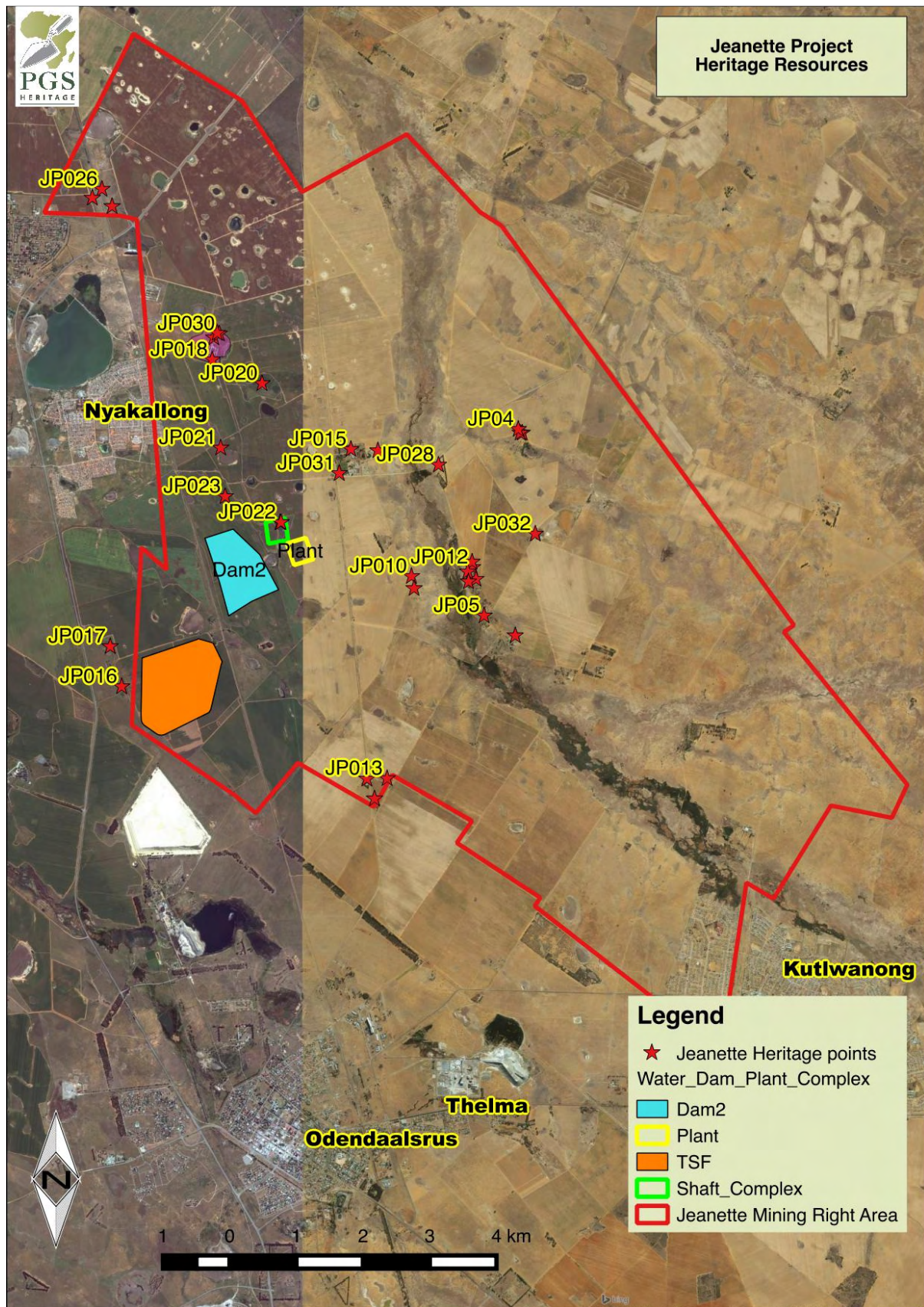
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Appendix A



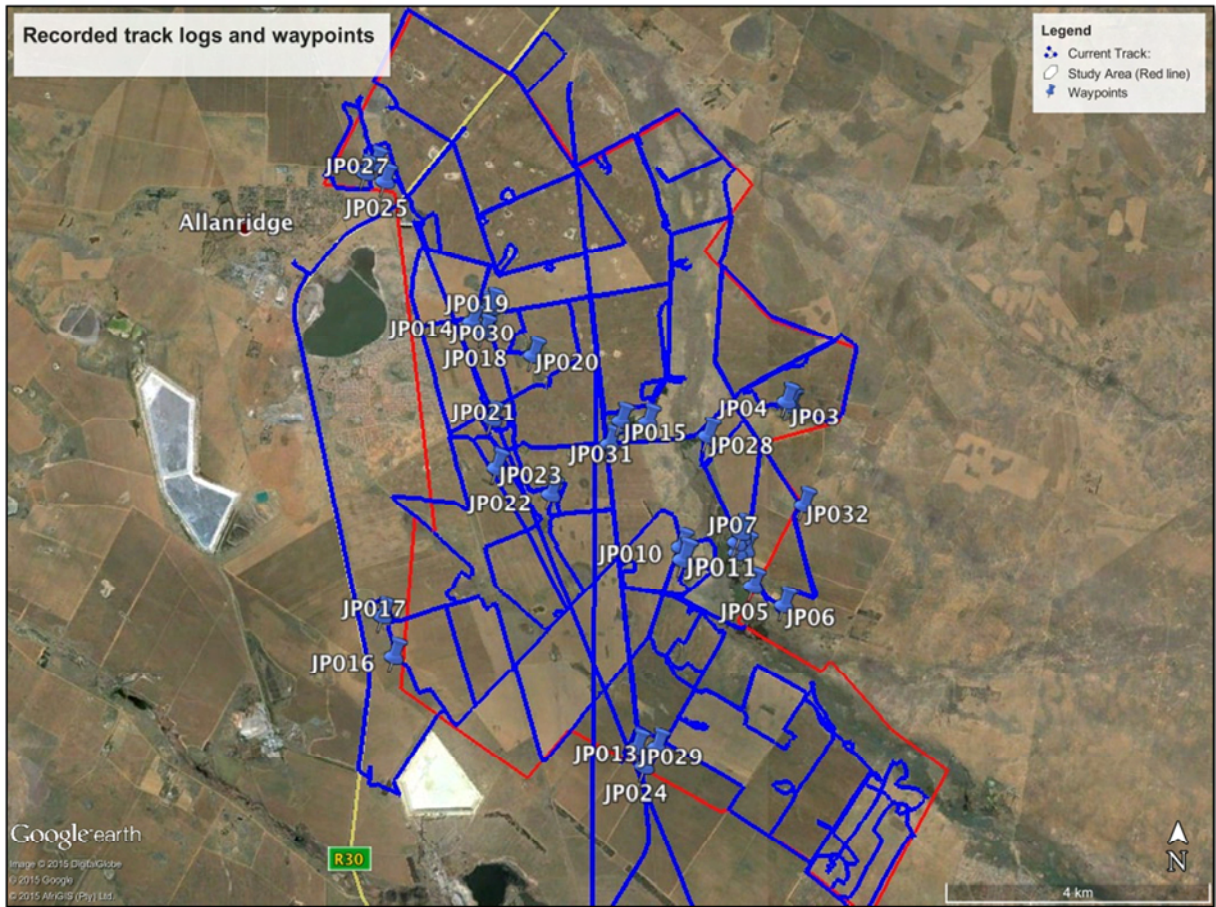
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**APPENDIX B**



## APPENDIX C

### JESSICA ANGEL Professional Archaeologist

#### Personal Details

- **Name:** Jessica
- **Surname:** Angel
- **Identity Number:** 8312250052082
- **Date of Birth:** 25-12-1983
- **Citizenship:** South African
- **Gender:** Female
- **Marital Status:** Single
- **Languages Spoken:** English and Afrikaans

#### Education History

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

#### Employment History

##### Part time employment as a student:

- **2011:** Research Assistant: GIS work for Prof Karim Sadr. Duties include: Google Earth survey work and digitising.

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- **2012-2013:** Basic internship at PGS. Duties include gaining familiarity with gathering relevant background data, field surveys, exhumations and report writing.
- **2013:** Heritage work at NGT. Background research, report writing and ground surveys.
- **2015** – Archaeologist – PGS Heritage

**Experience in the field of archaeology:**

September 2012: First Phase Heritage Assessment. Belfast. Marko Hutten and Jennifer Kitto

August 2012: First Phase Heritage Assessment. Delareyville. Wouter Fourie. Stone Age survey

August 2012: Heritage Assessment. MP. Chris van Vuuren and Jennifer Kitto. Ndebele initiation site.

February 2013: Map survey. PTA East. Polka Birkholtz. Mapping Iron Age site.

February 2013: Grave Exhumation. Chlorkop. Marko Hutten

March 2013: First Phase Heritage Assessment. MP. Jennifer Kitto.

July 2013: Grave Exhumation. Mafikeng. Prof Maryna Steyn and Coen Nienaber.

November 2013: First Phase Heritage Assessment. Port Nolloth. Luke Verbant, Ursula Verbant.

January 2015 – June 2015: 10 Heritage Impact assessments and background research for PGS Heritage

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## 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

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### **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 and the Democratic Republic of the Congo