

# PGS HERITAGE

## PROPOSED NOOITGEDACHT TAILINGS STORAGE FACILITY PROJECT IN HARMONY'S FREE STATE OPERATIONS, NEAR WELKOM, FREE STATE PROVINCE.

### Heritage Impact Assessment

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691HIA-001	Nooitgedacht TSF	1.0	01/09/2023	Page ii

### REVISION HISTORY

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001	14 April 2023	First draft

Document	Project	Revision	Date	Page Number
691HIA-001	Nooitgedacht TSF	1.0	01/09/2023	Page iii

### Declaration of Independence

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

### Disclosure of Vested Interest

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

**HERITAGE CONSULTANT:**

PGS Heritage (Pty) Ltd

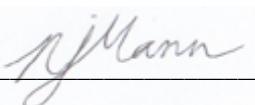
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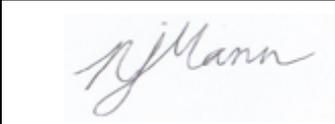
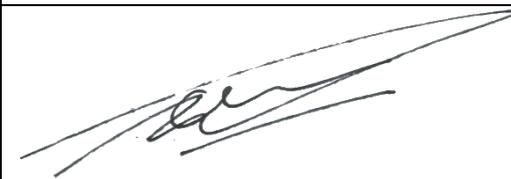
**SIGNATURE:**




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Document	Project	Revision	Date	Page Number
691HIA-001	Nooitgedacht TSF	1.0	01/09/2023	Page iv

**ACKNOWLEDGEMENT OF RECEIPT**

<b>Report Title</b>	<i><b>PROPOSED NOOITGEDACHT TAILINGS STORAGE FACILITY PROJECT IN HARMONY'S FREE STATE OPERATIONS, NEAR WELKOM, FREE STATE PROVINCE.</b></i>		
<b>Control</b>	<b>Name</b>	<b>Signature</b>	<b>Designation</b>
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<b>Reviewed</b>			Client

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

**CONTACT PERSON:**

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**SIGNATURE:** \_\_\_\_\_

Document	Project	Revision	Date	Page Number
691HIA-001	Nooitgedacht TSF	1.0	01/09/2023	Page v

The Heritage Impact Assessment Report has been compiled considering the National Environmental Management Act (Act No. 107 of 1998) (NEMA): Appendix 6 of the Environmental Impact Assessment (EIA) Regulations of 2014 (as amended, 2017) requirements for specialist reports as indicated in the table below.

Requirements of Appendix 6 – GN R326 EIA Regulations of 7 April 2017	Relevant section in report
1.(1) (a) (i) Details of the specialist who prepared the report	Page iii of Report – Contact details and company
(ii) The expertise of that person to compile a specialist report including a curriculum vita	Section 1.2 – refer to Appendix A
(b) A declaration that the person is independent in a form as may be specified by the competent authority	Page iii of the report
(c) An indication of the scope of, and the purpose for which, the report was prepared	Section 1.1
(cA) An indication of the quality and age of base data used for the specialist report	Section 3
(cB) a description of existing impacts on the site, cumulative impacts of the proposed development and levels of acceptable change;	Section 4, 5
(d) The duration, date and season of the site investigation and the relevance of the season to the outcome of the assessment	Section 3, 4
(e) a description of the methodology adopted in preparing the report or carrying out the specialised process inclusive of equipment and modelling used	Section 3
(f) details of an assessment of the specific identified sensitivity of the site related to the proposed activity or activities and its associated structures and infrastructure, inclusive of a site plan identifying site alternatives;	Section 6, 7
(g) An identification of any areas to be avoided, including buffers	Section 8
(h) A map superimposing the activity including the associated structures and infrastructure on the environmental sensitivities of the site including areas to be avoided, including buffers;	Section 6
(i) A description of any assumptions made and any uncertainties or gaps in knowledge;	Section 1.3
(j) A description of the findings and potential implications of such findings on the impact of the proposed activity, including identified alternatives, on the environment	Section 5, 6
(k) Any mitigation measures for inclusion in the EMPr	Section 8
(l) Any conditions for inclusion in the environmental authorization	Section 8
(m) Any monitoring requirements for inclusion in the EMPr or environmental authorization	Section 8
(n)(i) A reasoned opinion as to whether the proposed activity, activities or portions thereof should be authorised and	Section 9
(n)(iA) A reasoned opinion regarding the acceptability of the proposed activity or activities; and	
(n)(ii) If the opinion is that the proposed activity, activities or portions thereof should be authorised, any avoidance, management and mitigation measures that should be included in the EMPr, and where applicable, the closure plan	Section 9
(o) A description of any consultation process that was undertaken during the course of carrying out the study	
(p) A summary and copies if any comments that were received during any consultation process	Not applicable.
(q) Any other information requested by the competent authority.	Not applicable.
(2) Where a government notice by the Minister provides for any protocol or minimum information requirement to be applied to a specialist report, the requirements as indicated in such notice will apply.	No protocols or minimum standards for HIAs or PIAs

## EXECUTIVE SUMMARY

Document	Project	Revision	Date	Page Number
691HIA-001	Nooitgedacht TSF	1.0	01/09/2023	Page vi

PGS Heritage (Pty) Ltd (PGS) was appointed by Environmental Impact Management Services Consulting (Pty) Ltd (EIMS), on behalf of Harmony Gold Mining Company Limited (Harmony), to undertake a Heritage Impact Assessment (HIA), which forms part of the environmental process for the proposed Nooitgedacht Tailings Storage Facility (TSF) Project in Harmony's Free State Operations, located within the Matjhabeng Local Municipality, Lejweleputswa District Municipality, near Welkom, Free State Province.

This HIA aims to evaluate the possible impacts on heritage resources present within the proposed development footprint of the TSF Project for Harmony. Immediate and direct impacts on archaeological and palaeontological resources were addressed through the HIA.

### **Site Location and Description**

The proposed development is located within the Matjhabeng Local Municipality, Lejweleputswa District Municipality, near Welkom, Free State Province.

Harmony currently deposit tailings onto the Free State South (FSS) 2 Tailings Storage Facility (TSF), St. Helena 4 TSF, St. Helena 123 TSF, Dam 23 TSF, Brand D TSF and Target 1&2 TSF. The current planned Life of Mine (LOM) of the Free State Operations exceed the available deposition capacity of these TSFs, and Harmony is undertaking a feasibility assessment to construct the new Nooitgedacht TSF.

### **Fieldwork**

The fieldwork component of the study was aimed at identifying tangible remains of archaeological, historical and heritage significance. Heritage resources are unique and non-renewable; any impact on such resources must be seen as significant.

The fieldwork was conducted by one archaeologist (Nikki Mann) and one field assistant (Xander Fourie) from PGS between 23 and 24 March 2023. The fieldwork conducted to evaluate the possible impact of the proposed development, has revealed the presence of one (1) heritage resource. See **Figure 39** and the individual site description as contained in **Section 6**.

#### *Historical Structure*

The remains of a historical homestead (**NGD-01**) were identified within the study area. The site was rated as having **high to medium heritage significance**.

### **Palaeontology**

According to the Palaeosensitivity Map available on the South African Heritage Resources Information System database (SAHRIS), the Palaeontological Sensitivity of the proposed development area is rated as high (orange) (**Figure 36**). A desktop study is required and based on the outcome of the desktop study, a field assessment is likely (Almond and Pether 2008, SAHRIS website).

### **Impact Assessment**

Document	Project	Revision	Date	Page Number
691HIA-001	Nooitgedacht TSF	1.0	01/09/2023	Page vii

The possible pre-construction impacts calculated on the tangible cultural heritage resources is overall **MODERATE NEGATIVE** rating but with the implementation of the recommended buffers and management guidelines will be reduced to a **LOW NEGATIVE** impact.

### Mitigation measures

The calculated impact as summarised in **Section 7** of this report confirms that the impact of the proposed development will be reduced with the mitigation measures. This finding in addition to the implementation of a chance finds procedure, as part of the EMP, will mitigate possible impacts on unidentified heritage resources. The following mitigation measures are listed in **Table 1**.

Table 1 - Heritage management recommendations.

Area and site no.	Mitigation measures
<b>General project area</b>	<ul style="list-style-type: none"> <li>▪ Implement a chance to find procedures in cases where possible heritage finds are uncovered.</li> </ul>
<b>Historical Homestead with possible grave sites (NGD-01)</b>	<p><b>Homestead site mitigation</b></p> <ul style="list-style-type: none"> <li>▪ Demarcate extent of the area with a 30-meter buffer and leave in situ</li> <li>▪ If it is not possible to avoid the site, archaeological mitigation will be required.</li> </ul> <p><u>Mitigation will include:</u></p> <ul style="list-style-type: none"> <li>▪ Application for a section 35 NHRA excavation permit</li> <li>▪ Documentation of the layout of the site</li> <li>▪ Investigation through archaeological excavations to determine the extent of the site as well as retrieving cultural material to determine cultural affinity and temporal position of the site</li> <li>▪ Upon completion of the excavations and report, an application for a destruction permit can be lodged with the SAHRA by the client</li> </ul> <p><b>Human remains investigation</b></p> <ul style="list-style-type: none"> <li>▪ Mitigation measures would include applying to SAHRA for the test excavation and/or GPR permit to determine if the site contains graves.</li> <li>▪ If human remains are discovered, a grave relocation process is recommended as a mitigation and management measure. This will involve the necessary social consultation and public participation process before grave relocation permits can be applied for with the SAHRA BGG, under the NHRA and National Health Act regulations.</li> <li>▪ When graves are discovered/uncovered, the site should be demarcated with a 50-meter no-go-buffer-zone and the grave should be avoided.</li> <li>▪ If, during test excavations, it is determined that the site does not contain graves, no further mitigation will be required.</li> </ul>

Document	Project	Revision	Date	Page Number
691HIA-001	Nooitgedacht TSF	1.0	01/09/2023	Page viii

## General

It is the considered opinion of the author of this report that the overall impact of the proposed development on heritage resources will be Low. Provided that the general recommendations and mitigation measures outlined in this report are implemented, the impact would be acceptably Low or could be totally mitigated to the degree that the project could be approved from a heritage perspective. The management and mitigation measures as described in **Section 8** of this report have been developed to minimise the project impact on heritage resources.



Document	Project	Revision	Date	Page Number
691HIA-001	Nooitgedacht TSF	1.0	01/09/2023	Page ix

## TABLE OF CONTENT

<b>1</b>	<b>INTRODUCTION</b>	<b>1</b>
1.1	Scope of the Study	1
1.2	Specialist Qualifications	1
1.3	Assumptions and Limitations	1
1.4	Legislative Context	2
1.4.1	Notice 648 of the Government Gazette 45421	2
1.4.2	NEMA – Appendix 6 Requirements	4
1.4.3	The National Heritage Resources Act	4
<b>2</b>	<b>SITE LOCATION AND DESCRIPTION</b>	<b>5</b>
2.1	Locality	5
2.2	Project Background	7
2.3	Project Description	7
<b>3</b>	<b>CURRENT STATUS QUO</b>	<b>9</b>
3.1	Site Description	9
3.2	Site Vegetation	11
<b>4</b>	<b>ASSESSMENT METHODOLOGY</b>	<b>12</b>
4.1	Methodology for Assessing Heritage Site Significance	12
4.1.1	Site Significance	13
<b>5</b>	<b>HISTORICAL AND ARCHAEOLOGICAL OVERVIEW OF THE STUDY AREA</b>	<b>16</b>
5.1	Overview of the Study Area and Surrounding Landscape	16
5.2	Heritage Sensitivity as Revealed in the Historical and Archaeological Overview	35
5.3	Examination of Archival and Historical Maps	36
5.3.1	First Edition of the 2726DC Odendaalsrus Topographical Map Dated to 1952	36
5.3.2	Third Edition of the 2726DC Topographical Map Dated to 1975	38
5.4	Historical Aerial Photography of the Study Area and Surrounding Area	40
5.5	Previous Archaeological and Heritage Research from within the Study Area and Surroundings	42
5.6	Palaeontology	44
5.7	Findings of the Historical Desktop Study	46
5.7.1	Heritage Screening	46
5.7.2	Heritage Sensitivity	46
<b>6</b>	<b>FIELDWORK FINDINGS</b>	<b>47</b>
<b>7</b>	<b>IMPACT ASSESSMENT</b>	<b>54</b>
7.1	Determination of Environmental Risk	54
7.2	Impact Prioritisation	56

Document	Project	Revision	Date	Page Number
691HIA-001	Nooitgedacht TSF	1.0	01/09/2023	Page x

<b>7.3</b>	<b>Heritage Impacts</b> .....	<b>58</b>
7.3.1	Historical Structures .....	58
<b>8</b>	<b>MANAGEMENT RECOMMENDATIONS AND GUIDELINES</b> .....	<b>60</b>
8.1	Construction Phase .....	60
8.2	Chance Find Procedure .....	60
8.3	Possible Finds During Construction Phases .....	60
8.4	Timeframes .....	60
8.5	Heritage Management Plan for EMPr Implementation.....	62
<b>9</b>	<b>CONCLUSIONS</b> .....	<b>65</b>
9.1	Heritage Sites .....	65
9.2	Palaeontology .....	65
9.3	Impact Assessment .....	65
9.4	Mitigation Measures.....	66
9.5	General .....	66
<b>10</b>	<b>REFERENCES</b> .....	<b>67</b>
10.1	Published/Unpublished .....	67
10.2	Internet.....	70
10.3	Google Earth .....	71

### List of Figures

<i>Figure 1 – Human and Cultural Timeline in Africa</i> .....	<i>xvii</i>
<i>Figure 2 - Environmental screening tool's depiction of the archaeological and heritage sensitivity of the study area and surroundings.</i> .....	<i>3</i>
<i>Figure 3 - Environmental screening tool's depiction of the palaeontological sensitivity of the study area and surroundings.</i> .....	<i>4</i>
<i>Figure 4 - Locality map depicting the regional context of the study area</i> .....	<i>6</i>
<i>Figure 5 – Google Earth image of the position of the proposed Nooitgedacht TSF.</i> .....	<i>8</i>
<i>Figure 6 – View of a partial wetland and ploughed field.</i> .....	<i>10</i>
<i>Figure 7 – General view of dense grass.</i> .....	<i>10</i>
<i>Figure 8 –View of more open grassland.</i> .....	<i>10</i>
<i>Figure 9 – View of tree grove.</i> .....	<i>10</i>
<i>Figure 10 – View of informal road.</i> .....	<i>10</i>
<i>Figure 11 – View of existing TSF.</i> .....	<i>10</i>
<i>Figure 12 – View of a typical area disturbed by cattle grazing.</i> .....	<i>11</i>
<i>Figure 13 - View of water troughs and trig beacon within the study area.</i> .....	<i>11</i>
<i>Figure 14 – Photograph of the archaeological field survey as published in De Ruiter et. al. (2011).</i> .....	<i>17</i>

Document	Project	Revision	Date	Page Number
691HIA-001	Nooitgedacht TSF	1.0	01/09/2023	Page xi

<i>Figure 15 - This plan depicts the settlement layout of a typical Type Z site, and was recorded at site OXF 1 (Maggs, 1976:233).</i> .....	18
<i>Figure 16 – Artist’s impression of a bilobial dwelling at site OXF 1. These bilobial dwellings represent a characteristic element of Type Z settlements (Maggs, 1976:241).</i> .....	19
<i>Figure 17 – Corbelled stone huts associated with a Type V settlement (Huffman, 2007:39).</i> .....	20
<i>Figure 18 – Layout of a Type V Settlement (Huffman, 2007:38).</i> .....	20
<i>Figure 19 - King Mzilikazi of the Matabele. This illustration was made by Captain Cornwallis Harris in c. 1838 (<a href="http://www.sahistory.org.za">www.sahistory.org.za</a>).</i> .....	21
<i>Figure 20 – Depiction of an ox wagon crossing a river during the Great Trek (Reader’s Digest, 1994:116).</i> .....	22
<i>Figure 21 – Lord Frederick Sleigh Roberts (left) and General Louis Botha (right). These two officers commanded the opposing forces at the Battle of Zand River (Changuion, 2001:77 &amp; 117)</i> .....	25
<i>Figure 22 – Lord Roberts’s infantry crossing the Zand River at the conclusion of the Battle of Zand River. This photograph was in all likelihood taken during the afternoon of 10 May 1900, after all the significant drifts across the river had been cleared by the cavalry and other units. The crossing and surrounding landscape are monitored by an observation balloon (see top right). It is not possible to identify the exact drift where this crossing took place, although the remnants of a bridge foundation structure can be seen in the river bed (Raath, 2007:351).</i> .....	27
<i>Figure 23 - Two of the British officers at the Battle of the Zand River who were closely associated with the events within the study area, namely the occupation of the Du Preez Leger Drift on 9 May 1900 as well as the crossing of the drift on the morning of 10 May 1900. General John French (left) (Changuion, 2001:77) and Colonel Thomas William Porter (<a href="http://www.nzetc.victoria.ac.nz">www.nzetc.victoria.ac.nz</a>).</i> .....	27
<i>Figure 24 – Sir Thomas Major Cullinan was one of the founding directors of the Driekopjes Diamond Mining Company, which acquired an interest in the farm Welgegund in 1894. In the historic photograph on the left he is shown shortly after the discovery of the Cullinan diamond (which is held by F. Wells) at the Premier Diamond Mining Company, of which he was the chairman. The photograph on the right depicts Cullinan in 1929 (Helme, 1974: 75 &amp; 146).</i> .....	29
<i>Figure 25 – Archibald Megson standing in the prospecting trench on the farm Aandenk (Felstar Publications, 1968).</i> .....	30
<i>Figure 26 –The hardships experienced by General C.R. de Wet during the rebellion can be seen on these photographs. The one on the left shows De Wet shortly after the South African War (Van Schoor, 2007) with the image on the right depicting the general in the Bloemfontein prison after his capture late in 1914 (Raath &amp; Langner, 2014:119).</i> .....	31
<i>Figure 27 - The first gold prospecting borehole in the Free State was sunk on the farm Aandenk between October 1933 and February 1935. The arrows indicate the positions of Allan Roberts and his wife (Felstar Publications, 1968:11).</i> .....	32
<i>Figure 28 –The famous geologist Dr. Hans Merensky, who had his role to play in the discovery of the Free State goldfields (Machens, 2009).</i> .....	32
<i>Figure 29 –The first mine shaft ever sunk along the Free State goldfields, namely the No. 3 Incline Shaft at the St. Helena Gold Mine (Felstar Publishers, 1968:151).</i> .....	33

Document	Project	Revision	Date	Page Number
691HIA-001	Nooitgedacht TSF	1.0	01/09/2023	Page xii

<i>Figure 30 – This photograph of Welkom was taken during the 1960s, roughly ten years after its establishment (Felstar Publications, 1968:171).</i>	34
<i>Figure 31 - Section of First Edition of the 2726DC Topographical Map, shows one heritage feature (homestead: red polygon) located within the study area.</i>	37
<i>Figure 32 - Section of Third Edition of the 2726DC Topographical Map, showing several structures located within the study area.</i>	39
<i>Figure 33 - Aerial photography from 28/5/1984 showing the approximate location of the study area (orange polygon).</i>	40
<i>Figure 34 - Aerial photography from 28/7/2000 showing the approximate location of the study area (orange polygon).</i>	41
<i>Figure 35 – Google Earth Imagery from 2012 showing the location of the study area (red polygon).</i>	42
<i>Figure 36 - Extract of the 1: 250 000 SAHRIS Palaeosensitivity Map (Council of Geosciences), overlain with the location of the study area.</i>	45
<i>Figure 37 – Key to the SAHRIS palaeontological map.</i>	45
<i>Figure 38 - Map depicting the track logs (yellow lines).</i>	48
<i>Figure 39 - Satellite Image showing the finds identified during the fieldwork.</i>	49
<i>Figure 40 - General views of the historical homestead.</i>	51
<i>Figure 41 - View of masoned stone.</i>	52
<i>Figure 42 - View of stone boulders.</i>	52
<i>Figure 43 - View of scattered bricks.</i>	53
<i>Figure 44 -2726DC topographical sheet surveyed in 1952 depicts a homestead at this locality.</i>	53

## List of Tables

<i>Table 1 - Heritage management recommendations.</i>	vii
<i>Table 2 - Reporting requirements for GN648.</i>	2
<i>Table 3 - Rating system for archaeological resources.</i>	13
<i>Table 4 - Rating system for built environment resources.</i>	13
<i>Table 5 – Archaeological and Historical Overview of the Study Area and Surrounding Landscape</i>	16
<i>Table 6 - Tangible heritage site in the study area.</i>	46
<i>Table 7 - Landform type to heritage find matrix</i>	46
<i>Table 8 - Criteria for Determining Impact Consequence.</i>	54
<i>Table 9 - Probability Scoring</i>	55
<i>Table 10 - Determination of Environmental Risk.</i>	55
<i>Table 11 - Significance Classes.</i>	56
<i>Table 12 - Criteria for Determining Prioritisation</i>	56
<i>Table 13 - Determination of Prioritisation Factor.</i>	57
<i>Table 14 - Final Environmental Significance Rating</i>	57
<i>Table 15 - Impact rating for heritage resources</i>	59
<i>Table 16 - Lead times for permitting and mobilisation</i>	61

Document	Project	Revision	Date	Page Number
691HIA-001	Nooitgedacht TSF	1.0	01/09/2023	Page xiii

*Table 17 - Heritage Management Plan for EMPr implementation ..... 62*

**List of Appendices**

A        *Project team CV's*

Document	Project	Revision	Date	Page Number
691HIA-001	Nooitgedacht TSF	1.0	01/09/2023	Page xiv

## TERMINOLOGY AND ABBREVIATIONS

### Archaeological resources

This includes:

- material remains resulting from human activity which are in a state of disuse and are in or on land and which are older than 100 years including artefacts, human and hominid remains and artificial features and structures;
- rock art, being any form of painting, engraving or other graphic representation on a fixed rock surface or loose rock or stone, which was executed by human agency and which is older than 100 years, including any area within 10m of such representation;
- wrecks, being any vessel or aircraft, or any part thereof, which was wrecked in South Africa, whether on land, in the internal waters, the territorial waters or in the maritime culture zone of the republic as defined in the Maritimes Zones Act, and any cargo, debris or artefacts found or associated therewith, which is older than 60 years or which SAHRA considers to be worthy of conservation;
- features, structures and artefacts associated with military history which are older than 75 years and the site on which they are found.

### Cultural significance

This means aesthetic, architectural, historical, scientific, social, spiritual, linguistic or technological value or significance

### Development

This means any physical intervention, excavation, or action, other than those caused by natural forces, which may in the opinion of the heritage authority in any way result in a change to the nature, appearance or physical nature of a place or influence its stability and future well-being, including:

- construction, alteration, demolition, removal or change in use of a place or a structure at a place;
- carrying out any works on or over or under a place;
- subdivision or consolidation of land comprising a place, including the structures or airspace of a place;
- constructing or putting up for display signs or boards;
- any change to the natural or existing condition or topography of land; and
- any removal or destruction of trees, or removal of vegetation or topsoil

### Early Stone Age

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

### Fossil

Document	Project	Revision	Date	Page Number
691HIA-001	Nooitgedacht TSF	1.0	01/09/2023	Page xv

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

### **Heritage**

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

### **Heritage resources**

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

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

### **Holocene**

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

### **Late Stone Age**

The archaeology of the last 30 000 years associated with fully modern people.

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

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

### **Middle Stone Age**

The archaeology of the Stone Age between 30 000-300 000 years ago, associated with early modern humans.

### **Palaeontology**

Any fossilised remains or fossil trace of animals or plants which lived in the geological past, other than fossil fuels or fossiliferous rock intended for industrial use, and any site which contains such fossilised remains or trace.

Document	Project	Revision	Date	Page Number
691HIA-001	Nooitgedacht TSF	1.0	01/09/2023	Page xvi

Abbreviations	Description
AIA	Archaeological Impact Assessment
ASAPA	Association of South African Professional Archaeologists
CRM	Cultural Resource Management
DEA	Department of Environmental Affairs
EAP	Environmental Assessment Practitioner
ECO	Environmental Control Officer
EIA	Environmental Impact Assessment
EIMS	Environmental Impact Management Services (Pty) Ltd
EMPr	Environmental Management Programme
ESA	Earlier Stone Age
FSN	Free State North
FSS	Free State South
GPS	Global Positioning System
Harmony	Harmony Gold Mining Company Limited
HIA	Heritage Impact Assessment
I&AP	Interested & Affected Party
LCTs	Large Cutting Tools
LSA	Late Stone Age
LIA	Late Iron Age
LOM	Life of Mine
MPRDA	Mineral and Petroleum Resources Development Act 28 of 2002
MSA	Middle Stone Age
MIA	Middle Iron Age
MWS	Mine Waste Solutions
NEMA	National Environmental Management Act, 1998 (Act No 107 of 1998)
NHRA	National Heritage Resources Act, 1999 (Act No 25 of 1999)
PGS	PGS Heritage (Pty) Ltd
PHRA	Provincial Heritage Resources Authority
PIA	Palaeontological Impact Assessment
PSSA	Palaeontological Society of South Africa
SAHRA	South African Heritage Resources Agency
SAHRIS	South African Heritage Resources Information System
TSF	Tailings Storage Facility



Document	Project	Revision	Date	Page Number
691HIA-001	Nooitgedacht TSF	1.0	01/09/2023	Page xvii

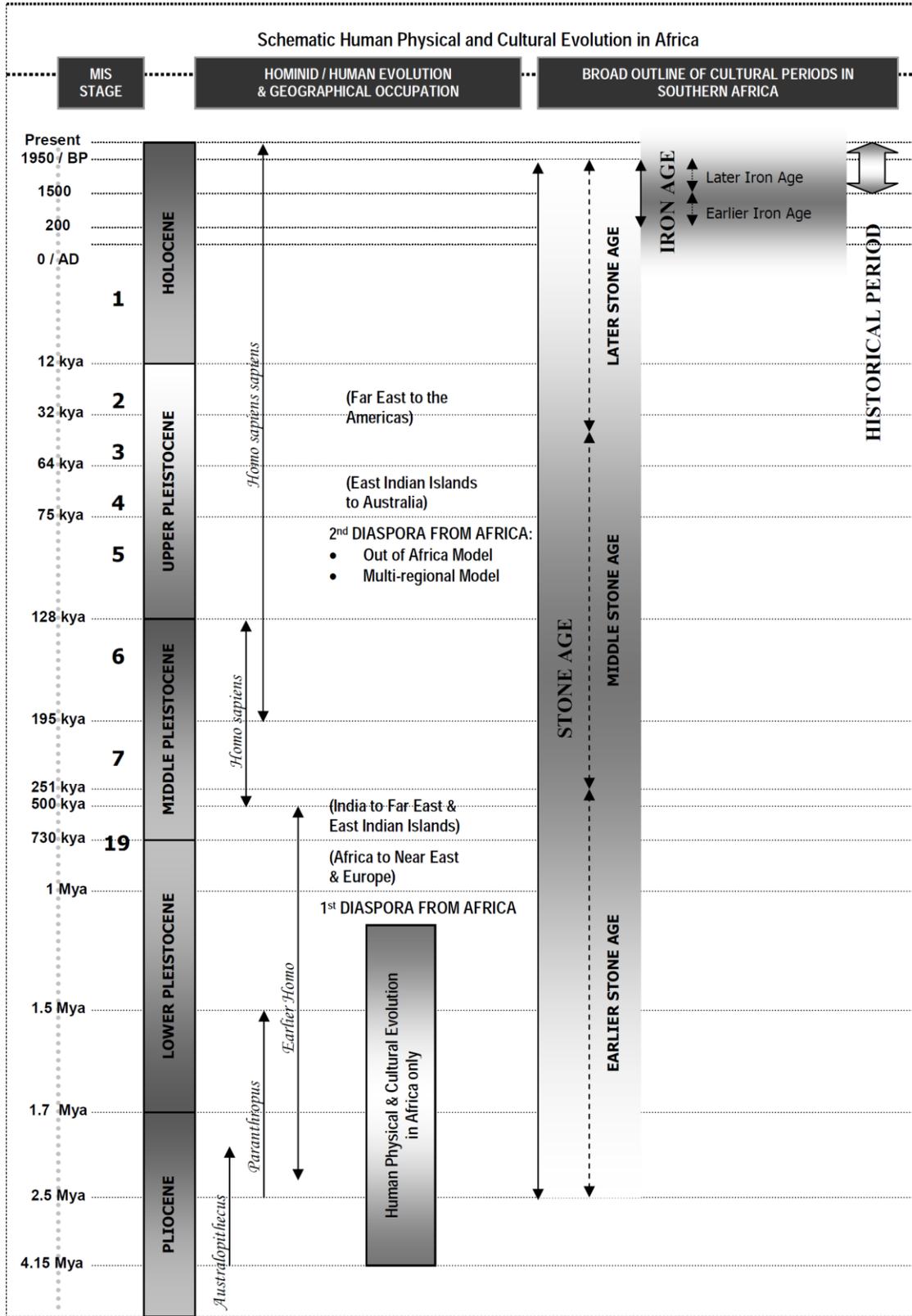


Figure 1 – Human and Cultural Timeline in Africa

Document	Project	Revision	Date	Page Number
691HIA-001	Nooitgedacht TSF	1.0	01/09/2023	Page 1

# 1 INTRODUCTION

PGS Heritage (Pty) Ltd (PGS) was appointed by Environmental Impact Management Services Consulting (Pty) Ltd (EIMS), on behalf of Harmony Gold Mining Company Limited (Harmony), to undertake a Heritage Impact Assessment (HIA), which forms part of the environmental process for the proposed Nooitgedacht Tailings Storage Facility (TSF) Project in Harmony's Free State Operations, located within the Matjhabeng Local Municipality, Lejweleputswa District Municipality, near Welkom, Free State Province.

## 1.1 Scope of the Study

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

## 1.2 Specialist Qualifications

This HIA Report was compiled by PGS Heritage (PGS).

The staff at PGS has a combined experience of nearly 90 years in the heritage consulting industry. PGS and its staff have extensive experience in managing HIA processes. PGS will only undertake heritage assessment work where they have the relevant expertise and experience to undertake that work competently.

Nikki Mann, the author of this report, is registered as a Professional Archaeologist with the Association of Southern African Professional Archaeologists (ASAPA). She has 4 years of experience in the heritage assessment field and holds a Master's degree (MSc) in Archaeology from the University of Cape Town.

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

## 1.3 Assumptions and Limitations

Not detracting in any way from the comprehensiveness of the fieldwork undertaken, it is necessary to realise that the heritage resources located during the fieldwork do not necessarily represent all the possible heritage resources present within the area. Various factors account for this, including the subterranean nature of some archaeological sites and existing vegetation cover.

Document	Project	Revision	Date	Page Number
691HIA-001	Nooitgedacht TSF	1.0	01/09/2023	Page 2

Therefore, should any heritage features and/or objects be located or observed outside the identified heritage sensitive areas during the construction activities, a heritage specialist must be contacted immediately. Such observed or located heritage features and/or objects may not be disturbed or removed in any way until such time that the heritage specialist has been able to make an assessment as to the significance of the site (or material) in question. This applies to graves and cemeteries as well. If any graves or burial places are located during the development, the procedures and requirements pertaining to graves and burials will apply as set out below.

The study area boundaries and development footprints depicted in this report were provided by the client. As a result, these were the areas assessed during the fieldwork. Should any additional development footprints located outside of these study area boundaries be required, such additional areas will have to be assessed in the field by an experienced archaeologist/heritage specialist long before construction starts.

## 1.4 Legislative Context

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

- Notice 648 of the Government Gazette 45421- general requirements for undertaking an initial site sensitivity verification where no specific assessment protocol has been identified
- National Environmental Management Act (NEMA), Act 107 of 1998 – Appendix 6
- National Heritage Resources Act (NHRA), Act 25 of 1999

### 1.4.1 Notice 648 of the Government Gazette 45421

Although minimum standards for archaeological (2007) and palaeontological (2012) assessments were published by SAHRA, GN.648 requires sensitivity verification for a site selected on the national web based environmental screening tool for which no specific assessment protocol related to any theme has been identified. The requirements for this Government Notice (GN) are listed in **Table 2** and the applicable section in this report noted.

*Table 2 - Reporting requirements for GN648*

GN 648	Relevant section in report	Where not applicable in this report
2.2 (a) a desktop analysis, using satellite imagery;	Section 5	
2.2 (b) a preliminary on-site inspection to identify if there are any discrepancies with the current use of land and environmental status quo versus the environmental sensitivity as identified on the national web-based environmental screening tool,	Section 3	-

Document	Project	Revision	Date	Page Number
691HIA-001	Nooitgedacht TSF	1.0	01/09/2023	Page 3

GN 648	Relevant section in report	Where not applicable in this report
such as new developments, infrastructure, indigenous/pristine vegetation, etc.		
2.3(a) confirms or disputes the current use of the land and environmental sensitivity as identified by the national web-based environmental screening tool;	Section 3	-
2.3(b) contains motivation and evidence (e.g., photographs) of either the verified or different use of the land and environmental sensitivity;	Section 3	-

An assessment of the Environmental Screening tool provides the following sensitivity rating for archaeological and heritage resources that fall within the proposed area as Low (**Figure 2**), while palaeontological resources are rated as High (**Figure 3**).

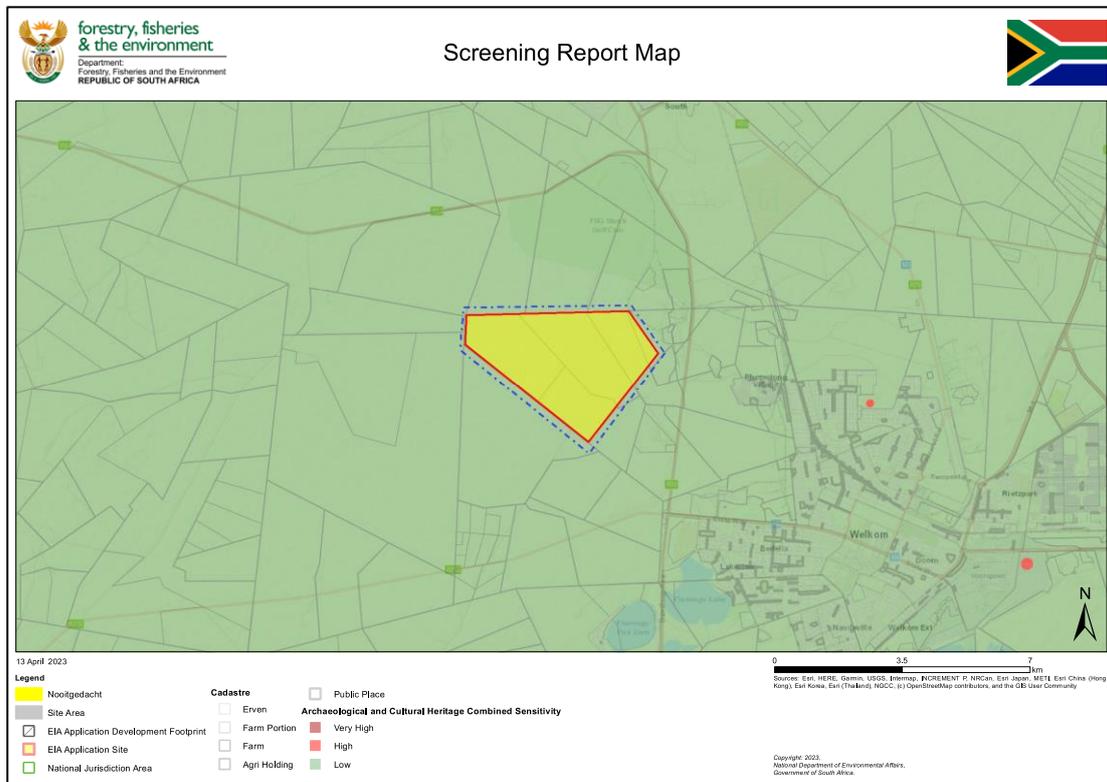


Figure 2 - Environmental screening tool's depiction of the archaeological and heritage sensitivity of the study area and surroundings.

Document	Project	Revision	Date	Page Number
691HIA-001	Nooitgedacht TSF	1.0	01/09/2023	Page 4

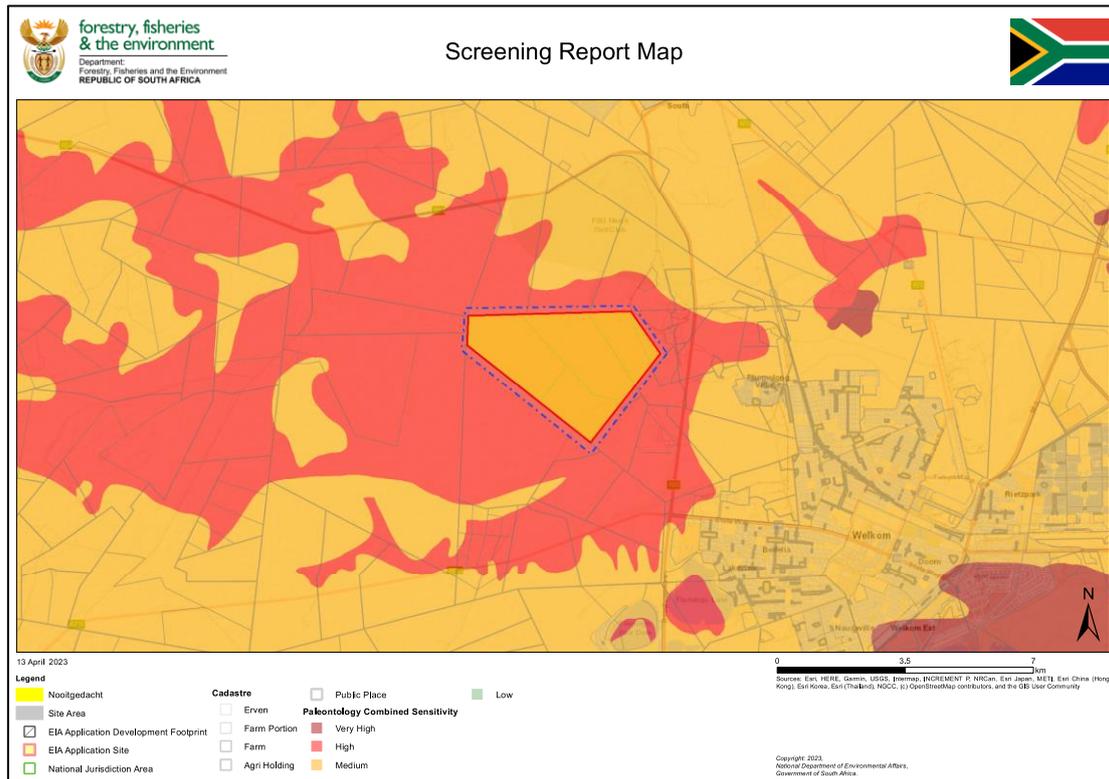


Figure 3 - Environmental screening tool's depiction of the palaeontological sensitivity of the study area and surroundings.

#### 1.4.2 NEMA – Appendix 6 Requirements

The HIA report has been compiled considering the NEMA Appendix 6 requirements for specialist reports as indicated in the table below. For ease of reference, the table below provides cross-references to the report sections where these requirements have been addressed.

#### 1.4.3 The National Heritage Resources Act

- National Heritage Resources Act (NHRA) Act 25 of 1999
  - Protection of Heritage Resources – Sections 34 to 36; and
  - Heritage Resources Management – Section 38

The NHRA is utilized as the basis for the identification, evaluation, and management of heritage resources and in the case of Cultural Resource Management (CRM) those resources specifically impacted on by development as stipulated in Section 38 of NHRA. This study falls under s38(8) and requires comment from the relevant heritage resources authority.

Document	Project	Revision	Date	Page Number
691HIA-001	Nooitgedacht TSF	1.0	01/09/2023	Page 5

## 2 SITE LOCATION AND DESCRIPTION

### 2.1 Locality

<b>Coordinates for Study Area</b>	Northernmost point: S -27.92861 E 26.67856	Easternmost point: S -27.93785 E 26.68595
	Southernmost point: S -27.95717 E 26.6687	Westernmost point: S -27.93585 E 26.63828
<b>Location</b>	The proposed development area is located within the Matjhabeng Local Municipality, Lejweleputswa District Municipality, near Welkom, Free State Province ( <b>Figure 4</b> ).	
<b>Property</b>	Portions of the farms: <ul style="list-style-type: none"> <li>▪ Jacobsdal 37</li> <li>▪ Nooitgedacht 50</li> <li>▪ Rheeders Dam 31</li> <li>▪ Goedgedacht 53</li> <li>▪ Mijannie 66</li> </ul>	
<b>Topographical Map</b>	2726DC Odendaalsrus	

The following infrastructure is encountered in the region of the areas surveyed:

- Provincial roads (R34, R30)
- Mining infrastructure (incl. existing pipelines and TSFs)
- Local roads (tar and informal)

Document	Project	Revision	Date	Page Number
691HIA-001	Nooitgedacht TSF	1.0	01/09/2023	Page 6

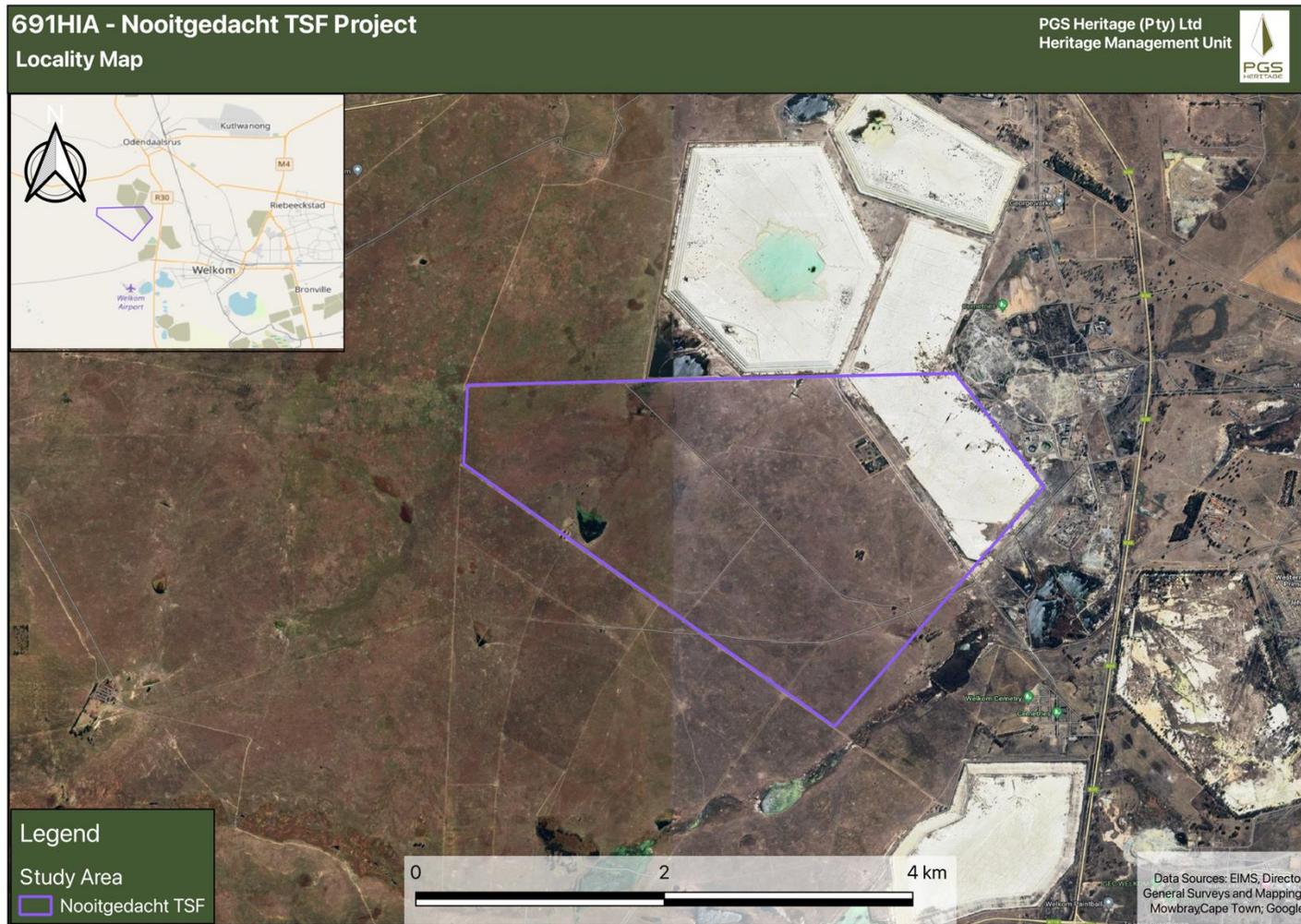


Figure 4 - Locality map depicting the regional context of the study area.

Document	Project	Revision	Date	Page Number
691HIA-001	Nooitgedacht TSF	1.0	01/09/2023	Page 7

## 2.2 Project Background

Harmony Gold Mining Company Limited (Harmony) own and operate a number of Gold Mines and Plants in the Welkom region in the Free State. Harmony currently deposit tailings onto the Free State South (FSS) 2 Tailings Storage Facility (TSF), St. Helena 4 TSF, St. Helena 123 TSF, Dam 23 TSF, Brand D TSF and Target 1&2 TSF. The current planned Life of Mine (LOM) of the Free State Operations exceed the available deposition capacity of these TSFs and Harmony is undertaking a feasibility assessment to construct the new Nooitgedacht TSF.

## 2.3 Project Description

A reserve reclamation study which looked at the reclamation and treatment of the 774Mt of tailings contained in reserve status in TSFs in the Free State through the sequentially reprocessing of tailings through Target Plant and Harmony One Plant, as Run of Mine Ore is depleted, will require deposition space in future.

The Nooitgedacht TSF was identified as a deposition site for residue from the reclamation of tailings during Project Saints in 2007. The properties, Goedgedacht 53, Nooitgedacht 50 and Jacobsdal 37 were subsequently purchased with the intention of constructing a new Tailings Storage Facility on this site, as shown in in **Figure 5** below.

Harmony commenced with feasibility assessment for the Nooitgedacht Tailings Deposition Project that of the project is to secure future deposition capacity for Harmony Free State Operations for residue from both Run of Mine and Tailings Reclamation operations.



Document	Project	Revision	Date	Page Number
691HIA-001	Nooitgedacht TSF	1.0	01/09/2023	Page 8

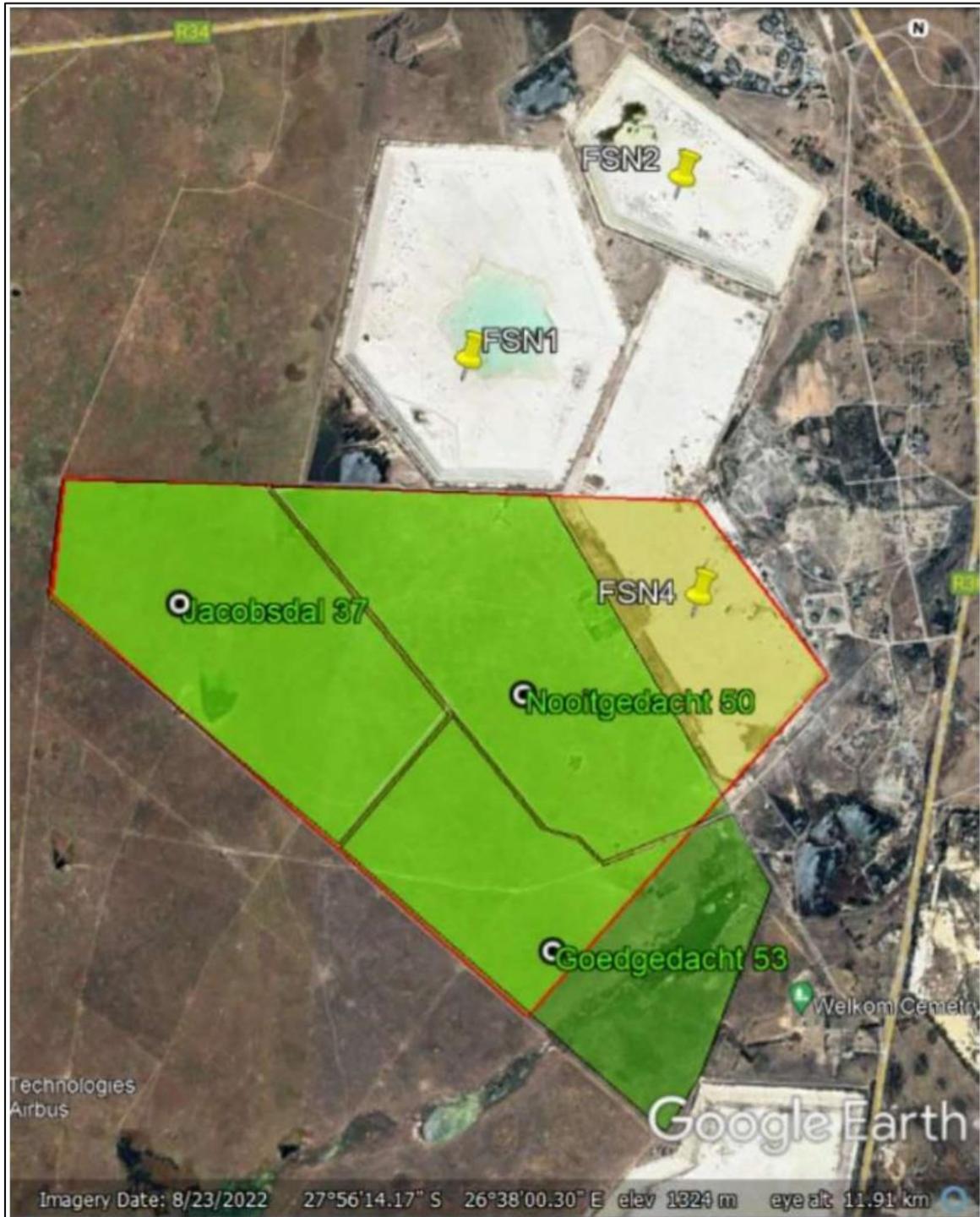


Figure 5 – Google Earth image of the position of the proposed Nooitgedacht TSF.

Document	Project	Revision	Date	Page Number
691HIA-001	Nooitgedacht TSF	1.0	01/09/2023	Page 9

### **3 CURRENT STATUS QUO**

#### **3.1 Site Description**

A site visit was conducted by one archaeologist (Nikki Mann) and one field assistant (Xander Fourie) from PGS between 23 and 24 March 2023. The proposed development area is located within the Matjhabeng Local Municipality, Lejweleputswa District Municipality, near Welkom, Free State Province.

As mentioned previously, the study area falls within a landscape that contains pipelines and existing TSFs, thus the area can be described as partly disturbed. The landscape has historically been used for informal cattle grazing. Other elements of disturbance identified within the study area include farm and provincial roads and other infrastructure associated with the existing pipelines and other mining activities. The likelihood of finding in-situ heritage resources is lessened due to this fact.

In terms of the topography, the study area comprises relatively level portions of land. In terms of the geology, the study area comprises: Volksrust Formation (Shale, siltstone, minor sandstone).

The study area is serviced by the R34, R30, provincial gravel roads and farm roads. Existing infrastructure includes mine infrastructure, electricity transmission lines, telephone lines, fences and other recent structures. Photographs of the general study area are provided below.

Document	Project	Revision	Date	Page Number
691HIA-001	Nooitgedacht TSF	1.0	01/09/2023	Page 10



*Figure 6 – View of a partial wetland and ploughed field.*



*Figure 7 – General view of dense grass.*



*Figure 8 – View of more open grassland.*



*Figure 9 – View of tree grove.*



*Figure 10 – View of informal road.*



*Figure 11 – View of existing TSF.*

Document	Project	Revision	Date	Page Number
691HIA-001	Nooitgedacht TSF	1.0	01/09/2023	Page 11



*Figure 12 – View of a typical area disturbed by cattle grazing.*



*Figure 13 - View of water troughs and trig beacon within the study area.*

### 3.2 Site Vegetation

The area is characterised by secondary grassland which is associated with areas of cultivation/grazing.

In terms of region's vegetation, the study area is characterised by one vegetation type: The Western Free State Clay Grassland (Mucina and Rutherford, 2006).

**Western Free State Clay Grassland** (Gh9) vegetation is “Restricted to flat bottom-lands which support dry, species-poor grassland with a high number of salt pans (playas) embedded. Dwarf karoo shrublands surround the playas in disturbed habitats.” (Mucina & Rutherford, 2006).

Document	Project	Revision	Date	Page Number
691HIA-001	Nooitgedacht TSF	1.0	01/09/2023	Page 12

## 4 ASSESSMENT METHODOLOGY

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

### 4.1 Methodology for Assessing Heritage Site Significance

This HIA report was compiled by PGS for the proposed TSF project. The applicable maps, tables and figures are included, as stipulated in the NHRA (no 25 of 1999) and the National Environmental Management Act (NEMA) (No. 107 of 1998). The HIA process consists of three steps:

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

Step II – Physical Survey: A physical survey was conducted by a combination of vehicle and pedestrian access through the proposed project area by one qualified heritage specialist and one field assistant (23-24 March 2023), aimed at locating and documenting sites falling within and adjacent to the proposed development footprint.

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

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

- Site integrity (i.e., primary vs. secondary context),
- Amount of deposit, range of features (e.g., stonewalling, stone tools and enclosures),
- Density of scatter (dispersed scatter)
  - Low - <10/50m<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 development activity 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:

Document	Project	Revision	Date	Page Number
691HIA-001	Nooitgedacht TSF	1.0	01/09/2023	Page 13

#### 4.1.1 Site Significance

Site significance classification standards use is based on the heritage classification of s3 in the NHRA and developed for implementation keeping in mind the grading system approved by SAHRA for archaeological impact assessments. The update classification and rating system as developed by Heritage Western Cape (2021) is implemented in this report

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

*Table 3 - Rating system for archaeological resources*

Grading	Description of Resource	Examples of Possible Management Strategies	Heritage Significance
I	Heritage resources with qualities so exceptional that they are of special national significance. Current examples: Langebaanweg (West Coast Fossil Park), Cradle of Humankind	May be declared as a National Heritage Site managed by SAHRA. Specific mitigation and scientific investigation can be permitted in certain circumstances with sufficient motivation.	Highest Significance
II	Heritage resources with special qualities which make them significant, but do not fulfil the criteria for Grade I status. Current examples: Blombos, Paternoster Midden.	May be declared as a Provincial Heritage Site managed by Provincial Heritage Authority. Specific mitigation and scientific investigation can be permitted in certain circumstances with sufficient motivation.	Exceptionally High Significance
III	Heritage resources that contribute to the environmental quality or cultural significance of a larger area and fulfils one of the criteria set out in section 3(3) of the Act but that does not fulfil the criteria for Grade II status. Grade III sites may be formally protected by placement on the Heritage Register.		
IIIA	Such a resource must be an excellent example of its kind or must be sufficiently rare. Current examples: Varschedrift; Peers Cave; Brobartia Road Midden at Bettys Bay	Resource must be retained. Specific mitigation and scientific investigation can be permitted in certain circumstances with sufficient motivation.	High Significance
IIIB	Such a resource might have similar significances to those of a Grade III A resource, but to a lesser degree.	Resource must be retained where possible where not possible it must be fully investigated and/or mitigated.	Medium Significance
IIIC	Such a resource is of contributing significance.	Resource must be satisfactorily studied before impact. If the recording already done (such as in an HIA or permit application) is not sufficient, further recording or even mitigation may be required.	Low Significance
NCW	A resource that, after appropriate investigation, has been determined to not have enough heritage significance to be retained as part of the National Estate.	No further actions under the NHRA are required. This must be motivated by the applicant or the consultant and approved by the authority.	No research potential or other cultural significance

*Table 4 - Rating system for built environment resources*

Document	Project	Revision	Date	Page Number
691HIA-001	Nooitgedacht TSF	1.0	01/09/2023	Page 14

Grading	Description of Resource	Examples of Possible Management Strategies	Heritage Significance
I	Heritage resources with qualities so exceptional that they are of special national significance. Current examples: Robben Island	May be declared as a National Heritage Site managed by SAHRA.	Highest Significance
II	Heritage resources with special qualities which make them significant in the context of a province or region, but do not fulfil the criteria for Grade I status. Current examples: St George's Cathedral, Community House	May be declared as a Provincial Heritage Site managed by Provincial Heritage Authority.	Exceptionally High Significance
II	Such a resource contributes to the environmental quality or cultural significance of a larger area and fulfils one of the criteria set out in section 3(3) of the Act but that does not fulfil the criteria for Grade II status. Grade III sites may be formally protected by placement on the Heritage Register.		
IIIA	Such a resource must be an excellent example of its kind or must be sufficiently rare. These are heritage resources which are significant in the context of an area.	This grading is applied to buildings and sites that have sufficient intrinsic significance to be regarded as local heritage resources; and are significant enough to warrant that any alteration, both internal and external, is regulated. Such buildings and sites may be representative, being excellent examples of their kind, or may be rare. In either case, they should receive maximum protection at local level.	High Significance
IIIB	Such a resource might have similar significances to those of a Grade III A resource, but to a lesser degree. These are heritage resources which are significant in the context of a townscape, neighbourhood, settlement or community.	Like Grade IIIA buildings and sites, such buildings and sites may be representative, being excellent examples of their kind, or may be rare, but less so than Grade IIIA examples. They would receive less stringent protection than Grade IIIA buildings and sites at local level.	Medium Significance
IIIC	Such a resource is of contributing significance to the environs These are heritage resources which are significant in the context of a streetscape or direct neighbourhood.	This grading is applied to buildings and/or sites whose significance is contextual, i.e., in large part due to its contribution to the character or significance of the environs. These buildings and sites should, as a consequence, only be regulated if the significance of the environs is sufficient to warrant protective measures, regardless of whether the site falls within a Conservation or Heritage Area. Internal alterations should not necessarily be regulated.	Low Significance

<b>Document</b>	<b>Project</b>	<b>Revision</b>	<b>Date</b>	<b>Page Number</b>
691HIA-001	Nooitgedacht TSF	1.0	01/09/2023	Page 15

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



Document	Project	Revision	Date	Page Number
691HIA-001	Nooitgedacht TSF	1.0	01/09/2023	Page 16

## 5 HISTORICAL AND ARCHAEOLOGICAL OVERVIEW OF THE STUDY AREA

### 5.1 Overview of the Study Area and Surrounding Landscape

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

The Free State has a rich archaeological and historical history going back millions of years and includes significant aspects such as Later Stone Age rock art, Battlefields and Iron Age stonewalled enclosures. The general surroundings of the study area became a melting pot of contact and conflict as it represents one of many frontiers where San hunter-gatherers, Nguni and Sotho-Tswana agro-pastoralists, Dutch Voortrekkers and British Colonists all came together. The ravages of war also swept across these plains, and in particular the South African War (1899-1902) as well as the Boer Rebellion (1914-1915).

It must be noted that such an overview, which is based on available literature and archival research, would necessarily reflect a bias toward a traditional white history of the region as this would have been the focus of publications and archival documents during the last 150 years.

*Table 5 – Archaeological and Historical Overview of the Study Area and Surrounding Landscape*

DATE	DESCRIPTION
<b>The Study Area during the Stone Age</b>	
Very little is known about the Stone Age archaeology of the study area and its immediate surroundings. In the wider surroundings, probably the most significant Stone Age is at Florisbad, located roughly 78 km south-west of the present study area. Closer to the study area, a number of Middle and Later Stone Age material in associated with mammal fossil remains have been identified in erosion gullies along the Sand, Doring and Vet Rivers between Virginia and Theunissen (De Ruiter <i>et. al.</i> 2011). See also Rossouw (n.d.).	
2.5 million to 250 000 years ago	The Earlier Stone Age (ESA) is the first and oldest phase identified in South Africa's archaeological history and comprises two technological phases. The earliest of these is known as Oldowan and is associated with crude flakes and hammer stones. It dates to approximately 2 million years ago. The second technological phase is the Acheulian and comprises more refined and better made stone artefacts such as the cleaver and bifacial hand axe. The Acheulian dates back to approximately 1.5 million years ago. No information regarding ESA sites from the study area and surroundings was found.
>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). During research fieldwork by the National Museum in Bloemfontein, ten sites were recorded where Middle Stone Age and/or Later Stone Age lithics were identified in association with mammal fossil remains from erosion gullies along the Sand, Vet and Doring Rivers (De Ruiter <i>et. al.</i> 2011).

Document	Project	Revision	Date	Page Number
691HIA-001	Nooitgedacht TSF	1.0	01/09/2023	Page 17

DATE	DESCRIPTION
	
	<p><i>Figure 14 – Photograph of the archaeological field survey as published in De Ruiter et. al. (2011).</i></p>
40 000 years ago, to c. 1800s	<p>The Later Stone Age (LSA) is the third archaeological phase identified and is characterised by an abundance of very small stone tools known as microliths as well many rock art sites across the country. This period is associated with hunter-gatherers (San) as well as early pastoralists (Khoekhoe) and lasted up until - and in many cases a considerable number of years after – the arrival of Iron Age and European communities.</p> <p>Apart from the occurrence of Later Stone Age lithics along the Sand, Vet and Doring Rivers (see above), no other Later Stone Age sites are known from the surroundings of the study area. Similarly, no known rock art sites are known from the study area or its wider surroundings.</p>
<b>The Study Area during the Iron Age</b>	
	<p>The arrival of early farming communities during the first millennium, heralded in the start of the Iron Age for South Africa. The Iron Age is that period in South Africa’s archaeological history associated with pre-colonial farming communities associated with agricultural and pastoralist farming activities, metal working, cultural customs such as lobola as well as the tangible representation of the significance of cattle imprinted on their settlement layouts (known as the Central Cattle Pattern) (Huffman, 2007).</p> <p>According to the distribution map for Iron Age settlements on the Southern Highveld as published in Maggs (1976), the study area is located to the west of the known distribution of such Late Iron Age sites. It is therefore unlikely for any Late Iron Age sites to be located within the study area or its immediate surroundings. This surmise is largely supported by the distribution maps as published by Huffman (2007), albeit these latter distribution maps (which are based on known archaeological information) indicate that the study area is located very close to the periphery of two Iron Age facies. For the sake of completeness, these two Iron Age facies, known as Thabeng and Makgwareng, will be presented here.</p>
AD 1700 – AD 1840	<p>The Thabeng facies of the Moloko Branch of the Urewe Tradition is one of the facies identified within the region. The decoration on the ceramics associated with this facies is characterised by incised triangles, coloured chevrons and arcades. The Tlhaping at Dithakong, Rolong at Platberg and the Kubung from the Free State form a Southwestern Sotho-Tswana cluster that is associated with this Thabeng facies pottery and Type Z settlement layouts (Huffman, 2007).</p>

Document	Project	Revision	Date	Page Number
691HIA-001	Nooitgedacht TSF	1.0	01/09/2023	Page 18

DATE	DESCRIPTION
	<p>The Type Z settlements are one of the Late Iron Age stonewalled settlement types identified by Tim Maggs during his extensive archaeological research project on the Iron Age of the southern Highveld, which includes the present study area (Maggs, 1976). These sites are characterised by large primary enclosures enclosed by a 'discontinuous ring' of characteristic bilobial dwellings. Each of these bilobial dwellings comprises a hut at its front with a semi-circular courtyard at the back. With the area in front of the hut enclosed by a low stone wall and the courtyard at the back similarly enclosed by a smaller enclosure, the layout plan of these huts comprises two lobes, one larger than the other. The huts are defined by a ring of upright stones and are usually paved with flat stones. Unlike Type V settlements (see below), corbelled hut are rarely associated with these Type Z settlements, and appear to be the result of contact with the Type V settlements located to the east.</p> <p>One of the more prominent ones is OXF1, located a short distance north-west of the town of Ventersburg. This site was excavated by Tim Maggs during the 1970s as part of his overall research project alluded to above (Maggs, 1976).</p> <p>In his conclusions on the history of his entire study area, Maggs (1976:317) states that "...the conclusion seems inescapable that the Kubung were the builders of Type Z. This conclusion could be put forward on the typological evidence alone, for the Kubung are the only known off-shoot of the Rolong to have settled in our area, and the Type Z industry was clearly the work of a group related to the Rolong."</p>

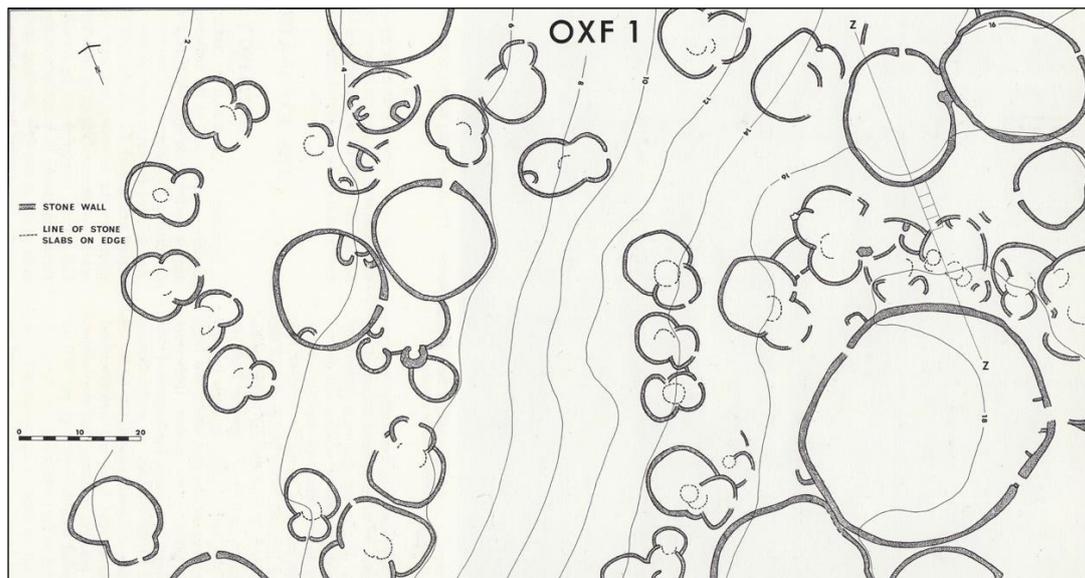
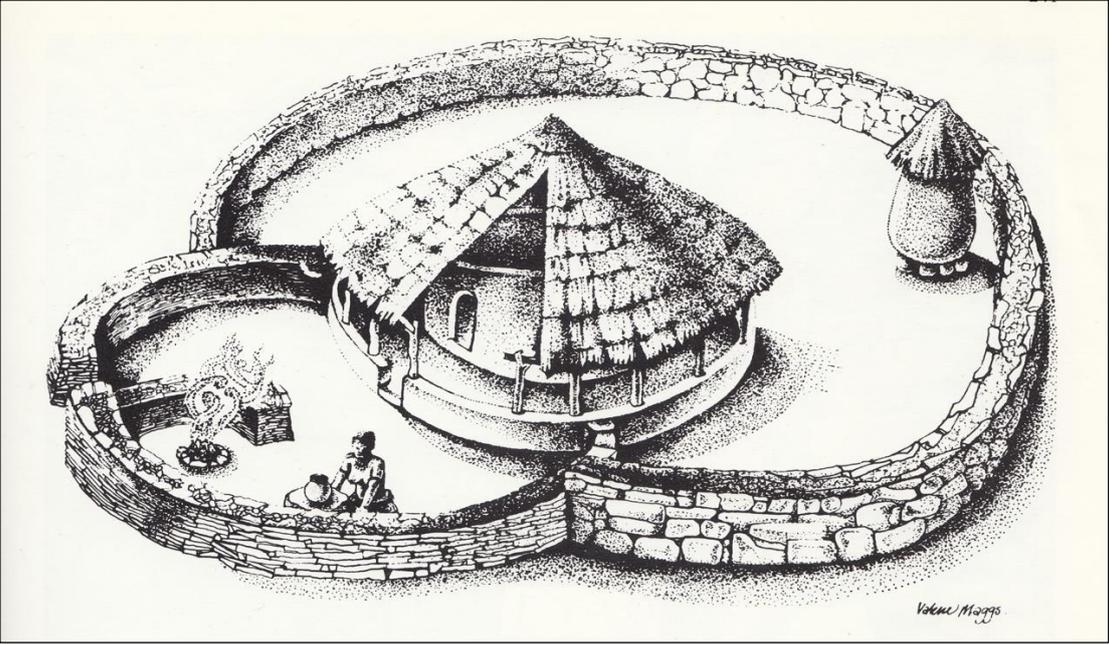


Figure 15 - This plan depicts the settlement layout of a typical Type Z site, and was recorded at site OXF 1 (Maggs, 1976:233).

Document	Project	Revision	Date	Page Number
691HIA-001	Nooitgedacht TSF	1.0	01/09/2023	Page 19

DATE	DESCRIPTION
	 <p data-bbox="252 922 1326 981"><i>Figure 16 – Artist's impression of a bilobial dwelling at site OXF 1. These bilobial dwellings represent a characteristic element of Type Z settlements (Maggs, 1976:241).</i></p>
<p data-bbox="204 1368 331 1429">AD 1700 – AD 1820</p>	<p data-bbox="357 1016 1374 1137">The Makgwareng facies of the Blackburn Branch of the Urewe Ceramic Tradition represents the next known Iron Age period within the surroundings of the study area. The decoration on the ceramics from this facies is characterised by finely stamped triangles, rim notching and appliqué (Huffman, 2007).</p> <p data-bbox="357 1140 1374 1503">This facies developed from Ntsuanatsatsi south of the Vaal River and can be associated with the Type V stone walling settlement type (Huffman, 2007), the name of which is derived from Vegkop (Maggs, 1976). Van Riet Lowe (1927) was one of the first to record these structures. Dreyer (1990) also conducted excavations on Type V Late Iron Age stonewalled settlements located a short distance south-west of Winburg. The Type V settlements comprise a core of cattle enclosures surrounded by beehive huts. Corbelled stone huts are associated with this walling type, and can be seen as characteristic. They are low stone huts located at the edge of the cattle enclosures and were where the boys herding the cattle often lived (Huffman 2007). As suggested by Huffman (2007), the corbelled huts were in fact beehive huts made of stone rather than grass and reeds. Furthermore, the presence of beehive huts at these sites necessarily indicates a Nguni association or origin with these settlements.</p> <p data-bbox="357 1505 1374 1783">Based in information presently available, the best known site of this type found within the surroundings of the study area, comprises a so-called “Early Sotho Settlement, Waterval, Sandrivierhoogte” that was originally declared a National Monument and which is now registered as a Provincial Heritage Site. The site is located 37 km south-east of the present study area. The site was proclaimed a national monument by virtue of a notice in the Government Gazette on 17 December 1982. In the declaration, the site is described as a ‘Leghoya Village’ comprising corbelled huts and stonewalls. The site has since been declared a Provincial Heritage Site in terms of the National Heritage Resources Act (<a href="http://www.sahra.org.za">www.sahra.org.za</a>).</p>

Document	Project	Revision	Date	Page Number
691HIA-001	Nooitgedacht TSF	1.0	01/09/2023	Page 20

DATE	DESCRIPTION
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Figure 17 – Corbelled stone huts associated with a Type V settlement (Huffman, 2007:39).

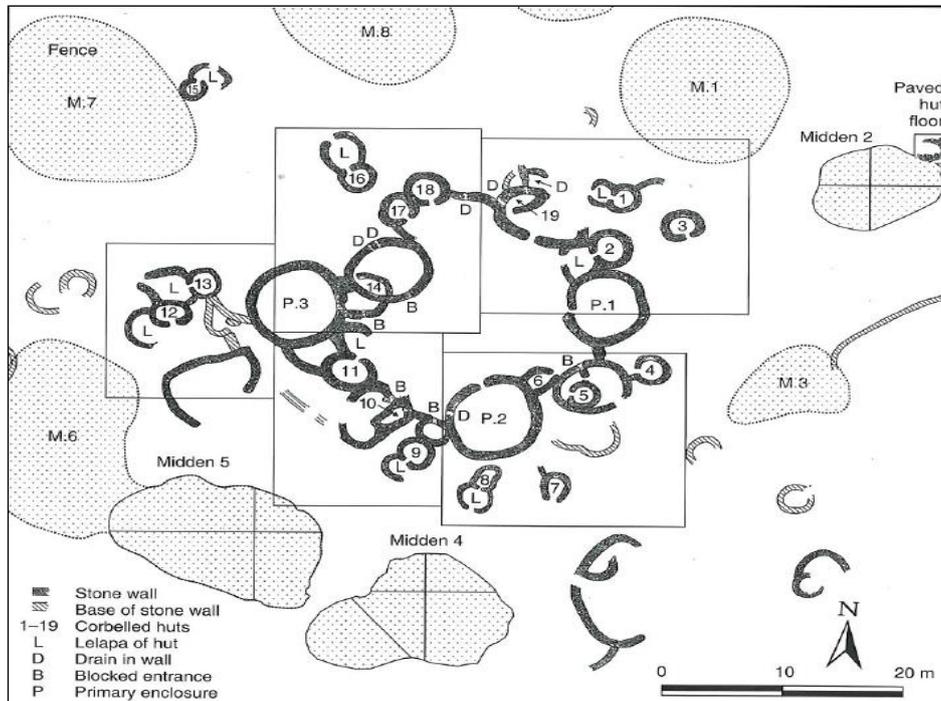


Figure 18 – Layout of a Type V Settlement (Huffman, 2007:38).

1820s

Across the Southern Highveld, this period was characterised by warfare and unrest. Known as the Mfecane, these years of upheaval originated primarily in the migration of three Nguni groups from present day Kwazulu-Natal into the present day Free State as a result of the conquests of the Zulu under King Shaka. The three Nguni groups were the Hlubi of Mpangazitha, the Ngwane of Matiwane and the Khumalo Ndebele (Matabele) of Mzilikazi.

In c. 1821, the Hlubi migrated across the Drakensberg Mountains in a westerly direction (Maggs, 1976) and attacked the Tlokwa of MaNthatisi along the banks of the Wilge River. This river has its source near Harrismith and flows into the Vaal River where the Vaal Dam is located today. While it is not exactly certain where MaNthatisi's settlements would have been located (in all likelihood further south), the Tlokwa fled westward as a result of the Hlubi attack and in turn attacked other groups in its path.

Document	Project	Revision	Date	Page Number
691HIA-001	Nooitgedacht TSF	1.0	01/09/2023	Page 21

DATE	DESCRIPTION
	<p>This started a period of unrest and warfare, which rippled across the Highveld on both sides of the Vaal River (Legassick, 2010) (Lye and Murray, 1980). The Ngwane followed closely on the Hlubi and further augmented the unrest and warfare along the southern Highveld (Legassick, 2010). Although the effects of the migrations of the Hlubi and Ngwane would certainly have had a profound impact on the northern Free State, this was also the case in terms of the Khumalo Ndebele who would have played a significant role in the surroundings of the study area during this time.</p> <p>The Khumalo Ndebele (also known as the Matabele) were also forced to leave Kwazulu-Natal and between 1823 and 1827 settled along the central Vaal River (Bergh, 1999). Mzilikazi attacked a number of Sotho-Tswana groups and settlements and incorporated them into his kingdom. As a result, his activities would have had a definite impact on the northern Free State at the time.</p>

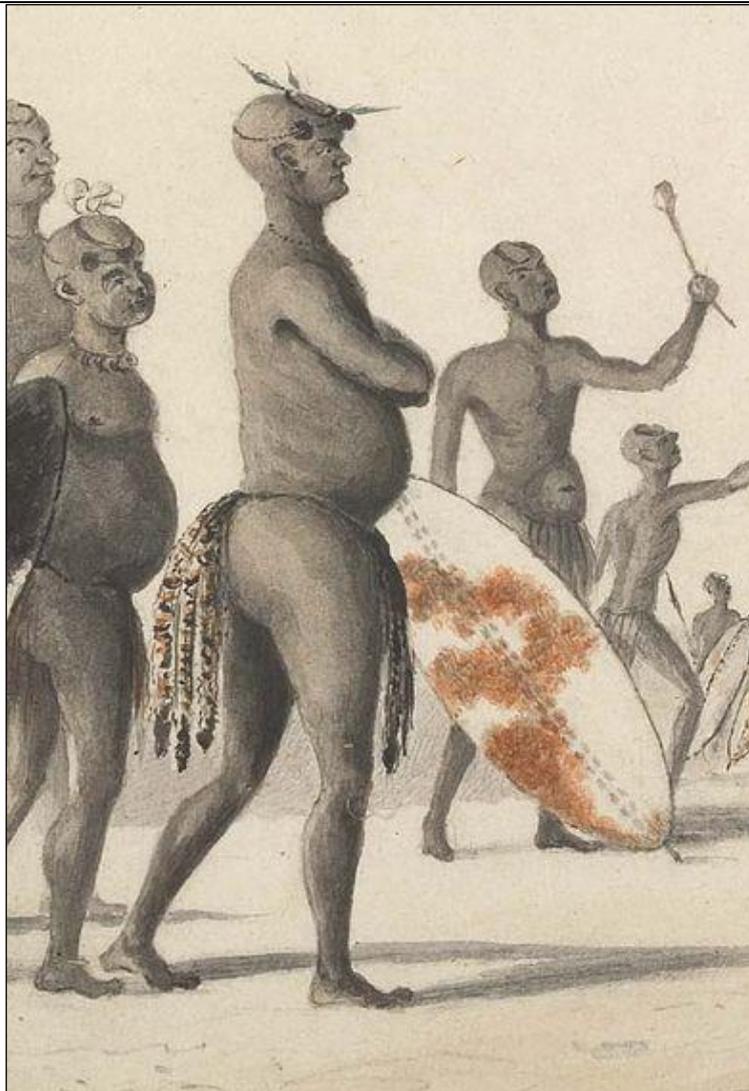


Figure 19 - King Mzilikazi of the Matabele. This illustration was made by Captain Cornwallis Harris in c. 1838 ([www.sahistory.org.za](http://www.sahistory.org.za)).

### The Early Colonial Period

The early Colonial Period within the study area and surroundings was characterised by the arrival of newcomers to the Transoraniga. The first arrivals were the Griqua followed by white Trekboers, who for the most part practiced a nomadic pastoralist way of life and were small in number. During

Document	Project	Revision	Date	Page Number
691HIA-001	Nooitgedacht TSF	1.0	01/09/2023	Page 22

DATE	DESCRIPTION
	the 1830s a mass migration of roughly 2 540 Afrikaner families (comprising approximately 12 000 individuals) from the frontier zone of the Cape Colony to the interior of Southern Africa took place. The people who took part in this Great Trek were later to be known as Voortrekkers (Visagie, 2011).
1804	The Griqua were of European and Khoikhoi descent, and although they had been present on the Orange River for some time, they only established themselves permanently north of the river in 1804 when they settled near present-day Danielskuil (Reader's Digest, 1994).
Early 1800s	During the early 1800s, frequent droughts forced white farmers from the Cape Colony to move with their livestock across the Orange River to look for better grazing. Initially, these Trekboers first obtained permission from the Cape authorities before departing across the frontier, however with time, increasing numbers of Trekboers moved across this river into the Transorangia (as it became known) without any prior permission (Schoeman, 1980).
Early 1836	The first Voortrekker party of some 70 wagons crossed over the Orange River during early 1836. More groups followed and in terms of the surroundings of the study area, established themselves along the Vet River (Schoeman, 1980). Meintjies (1973) mentions that a Voortrekker party under Hendrik Potgieter arrived along the Vet River during this time. The grazing around the Vet River was not enough for all the livestock and animals of the Voortrekkers, so they split into smaller groups with one group establishing itself in May 1836 at Blaauwdrift, on the Zand River.
1837 - 1843	In 1841 the town of Winburg was established on the banks of the Vet river. After the annexation of Natal by the British in 1843 and the subsequent dissolution of the Voortrekker Republic of Natalia, Winburg became the capital of the Voortrekkers in what is today known as the Free State (Erasmus, 2004). Winburg is located 55 km south-south-east of the study area. On 10 October 1968, an extensive Voortrekker Monument was opened near Winburg ( <a href="http://www.artefacts.co.za">www.artefacts.co.za</a> ).
	 <p><i>Figure 20 – Depiction of an ox wagon crossing a river during the Great Trek (Reader's Digest, 1994:116).</i></p>
<b>The Mid to Late Nineteenth Century</b>	
3 February 1848	The Orange River Sovereignty was proclaimed over the Transorangia by Great Britain and had its capital at the newly established town of Bloemfontein ( <a href="http://www.wikipedia.org">www.wikipedia.org</a> ). The sovereignty came about after one-sided agreements that favoured the British Government had been reached between Great Britain on the one hand and King Moshesh of the Basotho and Adam Kok III of the Griqua on the other. Those Voortrekkers present in the Transorangia were completely by-passed by these agreements, which led to serious dismay and disappointment amongst them. In terms of the surroundings of the study area, the response of the Voortrekkers was to force

Document	Project	Revision	Date	Page Number
691HIA-001	Nooitgedacht TSF	1.0	01/09/2023	Page 23

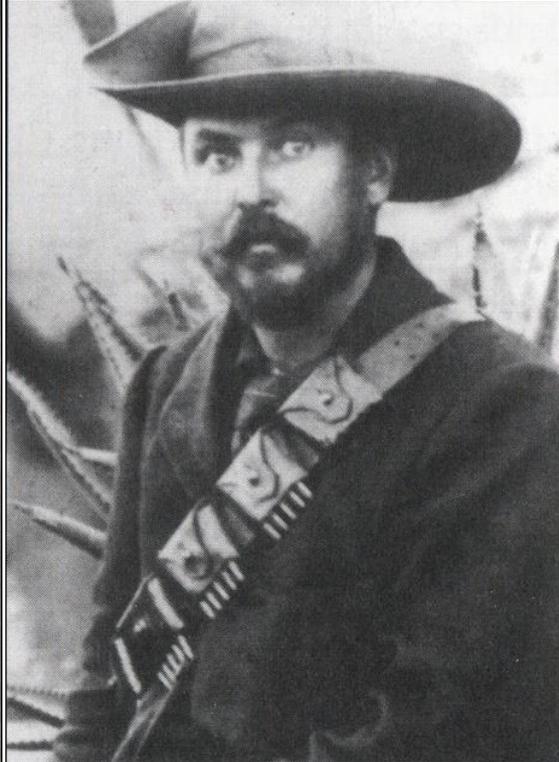
DATE	DESCRIPTION
	the British magistrate at Winburg, one Thomas Biddulph, out of town and proclaim the Republic of Winburg (Reader's Digest, 1994).
16 January 1852	<p>On 16 January 1852 the Sand River Convention was signed between the British Government and the Transvaal Boers. The British Government was represented by British Assistant Commissioners W.S. Hogge and C.M. Owen, whereas the Transvaal Boers were under the leadership of the Voortrekker hero of Blood/Ncome River, General Andries Pretorius.</p> <p>This convention formally recognised the existence and independence of the Boer Republic north of the Vaal River by the British Government. As a result, this agreement allowed for the creation of a Boer Republic, namely the <i>Zuid-Afrikaansche Republiek</i> (South African Republic) (Oberholster, 1972). The <i>Zuid-Afrikaansche Republiek</i> remained in existence until the end of the South African War in 1902.</p> <p>The site where the signing of the convention took place, was declared a monument and for many years was marked by a stone cairn and plaque (Oberholster, 1972). The present condition of the monument is not known.</p> <p>The site is located near the bridge where the N1 highway passes over the Sand River.</p>
23 February 1854	<p>The Orange River Convention was signed by representatives of Great Britain and the Boers, and resulted in the proclamation of the Boer Republic of the Orange Free State. The convention was signed at Bloemfontein (<a href="http://www.wikipedia.org">www.wikipedia.org</a>).</p> <p>As with the proclamation of the Sovereignty, the Orange River Convention was again one-sided and did not obtain the blessing or inputs of all the major role-players in the Free State. While the Voortrekkers were excluded in 1848, the signing of the Orange River Convention in 1854 did the same to the Basotho and Griqua.</p> <p>For the next 48 years, the study area fell within the boundaries of the Boer Republic of the Orange Free State.</p> <p>Incidentally, the Orange River Convention is sometimes referred to as the Bloemfontein Convention.</p>
1872	<p>The town of Ventersburg was laid out on the farm Kromfontein in 1872. Kromfontein had originally belonged to one of the early Voortrekker leaders, namely Field-Cornet P.A. Venter. After his death in 1857, his son B.G. Venter allowed church services to be held in his father's homestead. The second Gereformeerde (Dopper) church north of the Orange River was also established at Kromfontein in 1859.</p> <p>The use of the farm for church services led to the establishment of a town. The new town was named after Field-Cornet P.A. Venter, and formal proclamation for Ventersburg took place in 1876 (Erasmus, 2004).</p>
1890	<p>Erasmus (2004) states that two American engineers were responsible for the original survey of sections of the proposed railway line between Bloemfontein and Johannesburg. On the farm Merriespruit they chiselled the name 'Virginia' on a boulder, presumably in honour of the American State of Virginia. When the railway line was built a few years later, the nearby railway siding was named Virginia and some years later, in 1954, the town of Virginia was also established.</p> <p>The exact position of the chiselled boulder, if it still exists today, is not presently known.</p>
Early 1890s	<p>The railway line between Bloemfontein and Johannesburg was built during the early 1890s, and eventually reached Johannesburg during September 1891 and Pretoria in January 1892 (Schoeman, 1980). In terms of the study area, this railway line passed to its east and in this area was built from Smaldeel (present day Theunissen) to Theron, Welgelegen and Virginia.</p>
9 November 1892 – 1899	<p>The Driekopjes Diamond Mining Company was registered. One of the founding directors of the company was the man who would become synonymous with South African diamond mining and diamonds, Sir Thomas Major Cullinan.</p> <p>The "Driekopjes" in the name of the company referred to a farm of that name north-west of Kroonstad, where diamond mining was taking place. In June 1894 the</p>



Document	Project	Revision	Date	Page Number
691HIA-001	Nooitgedacht TSF	1.0	01/09/2023	Page 24

DATE	DESCRIPTION
	<p>Driekopjes Diamond Mining Company also acquired an interest in the farm Welgegund from the Van Rensburg Diamond Mining Syndicate. The farm Welgegund is presently known as the farm Driekoppies 422. No information could be found on this syndicate. However, the fact that the Driekopjes Company acquired an interest from the Van Rensburg syndicate, suggests that diamond prospecting and possibly mining activities had taken place within the study area before this transfer took place.</p> <p>A large number of diamonds were subsequently recovered from Welgegund. However all mining activities came to a halt with the South African War (1899 – 1902) (Helme, 1974).</p>
Mid 1890s	<p>During the mid 1890s two men arrived on the farm Aandenk to undertake prospecting work. Alexander Edward King Donaldson was a prospector and his associate Herbert Hinds an engineer. They excavated an 18-meter-deep shaft and took samples from their excavations for further testing and analysis. On their return journey to England, both men died when their ship, the Drummond Castle, wrecked at Ushant off France, and with it the samples they had brought from the Free State (<a href="http://www.sahra.org.za">www.sahra.org.za</a>) (Felstar Publishers, 1968).</p> <p>The activities of these two men laid the foundation for the discovery and development of the Free State Goldfields. The farm Aandenk is located immediately south of Allanridge today.</p>
1899	<p>The town of Odendaalsrust was officially established in 1899 when the Dutch Reformed Church chose the farm Kalkkuil for its new parish. The town was proclaimed a municipality in 1912. At the time, it only had about 40 houses, three shops and a hotel (Mayhew, 1982).</p>
<b>The South African War (1899 – 1902)</b>	
<p>The South African War was fought between the Boer Republics of the Transvaal and Free State on the one side and Great Britain on the other, but is referred to as the South African War as the victims and participants of the war were not excluded to Britain or Boer alone.</p> <p>As will be discussed in more detail below, the march of Lord Roberts from Bloemfontein to Pretoria in May and June 1900 was especially significant in terms of the study area. In particular, the so-called Battle of Zand River (7 – 10 May 1900) was fought very close to the study area, with at least the movement of troops during the battle taking place across the study area.</p>	
13 March 1900 – 6 May 1900	<p>Bloemfontein, the capital of the Boer Republic of the Orange Free, was occupied by the British Army under Lord Roberts on 13 March 1900. The Boer Republic of the Orange Free State was renamed the Orange River Colony.</p> <p>With the Republican forces of the Transvaal and Free State retreating northwards from Bloemfontein, Lord Roberts's eyes drifted further north, where the greatest prize of the war lay waiting, Pretoria. Lord Roberts and his staff strongly believed that once the capital of the <i>Zuid-Afrikaansche Republiek</i> fell, the war would be over.</p> <p>However, the success of the British Army required all focus on the immediate front, as the land between Bloemfontein and Pretoria was bisected by a myriad of rivers, dongas and hills, all strategically significant obstacles from where the Boer forces could implement a solid defence. The Boer forces standing between Lord Roberts and Transvaal capital were estimated by British Intelligence to comprise two main groups namely a force of between 5 000 to 6 000 burghers with 18 guns under General Louis Botha and a similarly large force in the surroundings of Kroonstad (Maurice &amp; Grant, 1906).</p> <p>After departing from Bloemfontein, Lord Roberts's force was involved in a couple of successful actions on their way to Pretoria, including Brandfort (3 May 1900) and Vet River (4 - 6 May 1900). With the successful conclusion of the battle of Vet River, Lord Roberts and almost his entire army crossed over the river successfully, and by the evening of 6 May 1900 bivouacked at the small railway siding known as Smaldeel. The</p>

Document	Project	Revision	Date	Page Number
691HIA-001	Nooitgedacht TSF	1.0	01/09/2023	Page 25

DATE	DESCRIPTION
	<p>town of Theunissen is located here today and is roughly 39 km south of the present study area (Maurice &amp; Grant, 1906).  A short distance to the north lay the next, and far more daunting, obstacle on Lord Roberts's march to Pretoria, the Zand (or Sand) River. It was here, at this river, that General Louis Botha, the commanders-in chief of the Transvaal republican forces, was determined to halt Lord Roberts's march on Pretoria.</p>
	<div style="display: flex; justify-content: space-around;">   </div> <p><i>Figure 21 – Lord Frederick Sleigh Roberts (left) and General Louis Botha (right). These two officers commanded the opposing forces at the Battle of Zand River (Changuion, 2001:77 &amp; 117)</i></p>
7 – 10 May 1900	<p>On 7 May 1900 a reconnaissance of the Zand River by General Edward Hutton indicated that the northern bank of the river was held by a force of roughly 6 000 Boers supported by two heavy and eight light pieces of artillery. These estimates provided by General Hutton allowed Lord Roberts to draw up a battle plan (Maurice &amp; Grant, 1906).  On the 9<sup>th</sup> of May 1900, Lord Roberts moved his army forward and established his headquarters at the Welgelegen Station. The movement of the British Army under Lord Roberts at Smaldeel to a position a short distance east, suggests that the main component of Lord Roberts's force followed the railway line.  Lord Roberts's battle plan focussed on securing significant drifts that provides safe crossing of his infantry over the Zand River, and especially so Junction Drift, Merriespruit, Du Preez Leger Drift (where the bridge on the road between Theunissen and Welkom crosses the river) and De Klerks Kraal Drift. For the purposes of this discussion, the events associated with the latter two of these drifts will be discussed in more detail below.  On the morning of 9 May 1900, Lieutenant-Colonel Thomas William Porter with the 1s Cavalry Brigade departed from Smaldeel to reconnoitre the two drifts at Du Preez Leger and De Klerks Kraal. They were assisted in this task by Major-General J.B.B. Dickson with the 4<sup>th</sup></p>

Document	Project	Revision	Date	Page Number
691HIA-001	Nooitgedacht TSF	1.0	01/09/2023	Page 26

DATE	DESCRIPTION
	<p>Cavalry Brigade. Meanwhile, at 11 am, Major-General John French with his advance guard reached Kalkoenkrans, a section of which farm is located within the present study area. At Kalkoenkrans, French received word from the reconnaissance units on the river that the Du Preez Leger Drift was not held by the enemy. Seizing the opportunity to outflank the Boer positions, French immediately ordered a squadron of the Scots Greys forward to take possession of the drift, and ordered the remainder of the 1<sup>st</sup> Cavalry Brigade to follow and assist in this task. The 4<sup>th</sup> Cavalry Brigade was left at Kalkoenkrans in support. By 15h30 that afternoon the Du Preez Leger Drift was occupied by the British force, with the De Klerks Kraal Drift was taken shortly thereafter. Incidentally, the other significant drifts on the river had also been taken with similar ease.</p> <p>On the morning of 10 May 1900, Lord Roberts's army advanced on the river. On its left flank (and the side closest to the study area) General French with the 1<sup>st</sup> Cavalry Brigade, the 4<sup>th</sup> Cavalry Brigade as well as Hutton's Mounted Infantry, crossed over the Du Preez Leger Drift from where they moved in a north-eastern direction.</p> <p>On the left centre of the front, the 3<sup>rd</sup> Cavalry Brigade and Henry's Mounted Infantry crossed over the drift at the railway line in proximity to present-day Virginia. The northern bank was occupied by 8 am that same morning.</p> <p>The crossing of the drifts further to the east was achieved with more difficulty, but the northern banks were also occupied a mere half an hour after the crossing over the Merriespruit Drift near the railway line.</p> <p>This meant that Lord Roberts's front comprising cavalry and mounted infantry units had successfully crossed over the Zand River early on the morning of 10 May 1900, without meeting any significant resistance. However, the fortunes of war were about to change for Lord Roberts.</p> <p>A patrol sent out by General French ran into a large Boer force of between 2 000 and 3 000 burghers moving down onto the centre of Lord Roberts's front at the Virginia Station. French ordered an attack by one squadron each from the 6<sup>th</sup> Inniskilling Dragoons, Scots Greys and Australian Horse and two troops from the 6<sup>th</sup> Dragoon Guards (Carabiniers). Their attack was focussed on the centre of the advancing Boer force on a ridge located on the farm Vredes Verdrag. Suffice to say that the battle raged for some time and the outcome was not at all clear until 14h00 that afternoon when the Boers abandoned the field of battle, allowing the British to occupy the ridge and proceed forward (Maurice &amp; Grant, 1906).</p> <p>Further battles and actions took place to the east, near Junction Drift. However, by the afternoon of 10 May 1900, all the drifts had been successfully cleared and occupied to allow for the crossing of the Zand River by Lord Roberts's infantry (Maurice &amp; Grant, 1906).</p>

Document	Project	Revision	Date	Page Number
691HIA-001	Nooitgedacht TSF	1.0	01/09/2023	Page 27

DATE	DESCRIPTION
------	-------------



*Figure 22 – Lord Roberts’s infantry crossing the Zand River at the conclusion of the Battle of Zand River. This photograph was in all likelihood taken during the afternoon of 10 May 1900, after all the significant drifts across the river had been cleared by the cavalry and other units. The crossing and surrounding landscape are monitored by an observation balloon (see top right). It is not possible to identify the exact drift where this crossing took place, although the remnants of a bridge foundation structure can be seen in the river bed (Raath, 2007:351).*



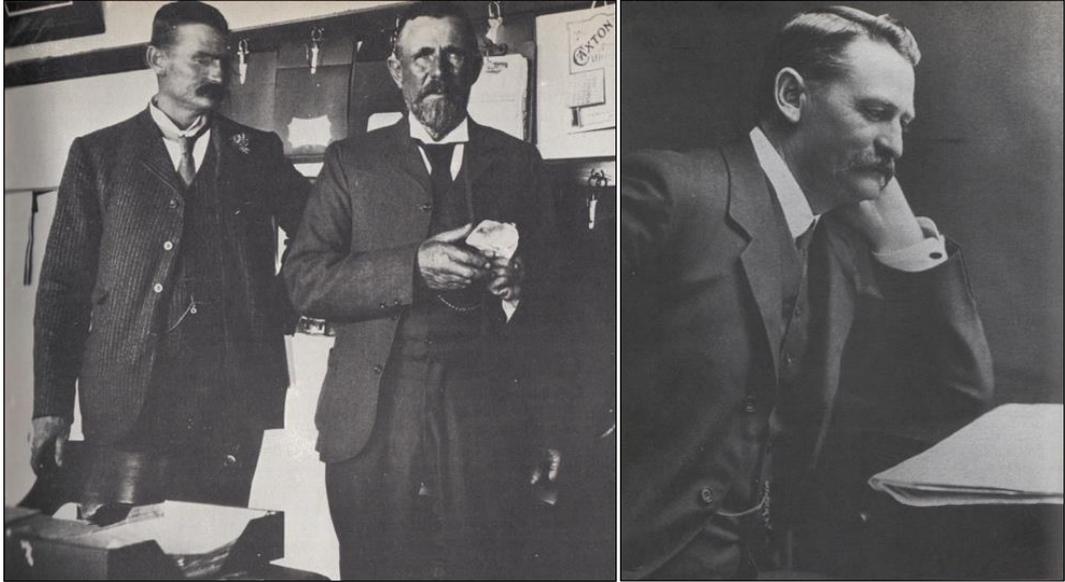
*Figure 23 - Two of the British officers at the Battle of the Zand River who were closely associated with the events within the study area, namely the occupation of the Du Preez Leger Drift on 9 May 1900 as well as the crossing of the drift on the morning of 10 May 1900. General John French (left) (Changuion, 2001:77) and Colonel Thomas William Porter (www.nzetc.victoria.ac.nz).*

After the fall of Pretoria on 5 June 1900 and the subsequent battles of Diamond Hill (11-12 June 1900) and Bergendal (21-27 August 1900), the Boer generals decided that the only way to proceed with the war would

Document	Project	Revision	Date	Page Number
691HIA-001	Nooitgedacht TSF	1.0	01/09/2023	Page 28

DATE	DESCRIPTION
	<p>be the implementation of a completely different strategy, a strategy based on mobility by using smaller commandos to attack and harass the British on all fronts in what was to become known as guerrilla warfare. This style of warfare had significant successes, and extended the war for nearly another two years. However, these successes also came with significant losses as the war increasingly dragged the civilian population of the Boer Republics into the carnage of war.</p> <p>No skirmishes or battles associated with the guerrilla war are known from within the study area or its immediate surroundings. This said, the study area and surroundings, as with almost the entire South Africa, experienced the effects of guerrilla warfare.</p> <p>In retaliation to the new form of warfare, the British High Command devised a strategy of building extensive blockhouse lines across the country as a way of hindering the mobility of the Boer commandoes. By December 1900, points along the railway line north of Bloemfontein had been fortified with hastily constructed trenches shaded by roofs and defended by razor wire. The closest of these defensive works was at Virginia. Shortly thereafter, a number of key positions along the railway line north of Bloemfontein were significantly strengthened with the construction of multi-storey blockhouses. At Virginia, for example, a double storey stone blockhouse as well as one corrugated iron blockhouse were built (Hattingh &amp; Wessels, 1997).</p> <p>Lord Kitchener, in particular, also implemented a strategy that was to become known as scorched earth whereby the Boer farms were burnt to the ground and the civilian population (both white and black) remaining on these farms forced into concentration camps.</p> <p>While no concentration camps existed within the study area, a surprising large number of such camps were located in the surroundings of the study area. Black concentration camps were located at Smaldeel, Virginia, Welgelegen and Winburg (Warwick, 1983) (<a href="http://www.angloboerwar.com">www.angloboerwar.com</a>).</p> <p>Untold hardship ensued in these concentration camps, and many women and children died as a result of exposure, inadequate nutrition and poor medical facilities. These camps resulted in the deaths of 27 926 white and 14 154 black people (<a href="http://www.sahistory.org.za">www.sahistory.org.za</a>).</p>
<b>The Early Twentieth Century (1902 – 1913)</b>	
<p>October 1902 – November 1904</p>	<p>In October 1902, some months after the end of the South African War, the name of the Driekopjes Diamond Mining Company was changed to the New Driekopjes Diamond Mining Company, which still had Thomas Major Cullinan as one of its directors.</p> <p>Although work at the Driekopjes Mine north-west of Kroonstad resumed on a small scale during 1903 (in all likelihood work at Welgegund also continued), all work at the mine was permanently halted by November 1904. This was due to disappointing yields and as a result the company was liquidated shortly thereafter (Helme, 1974).</p>

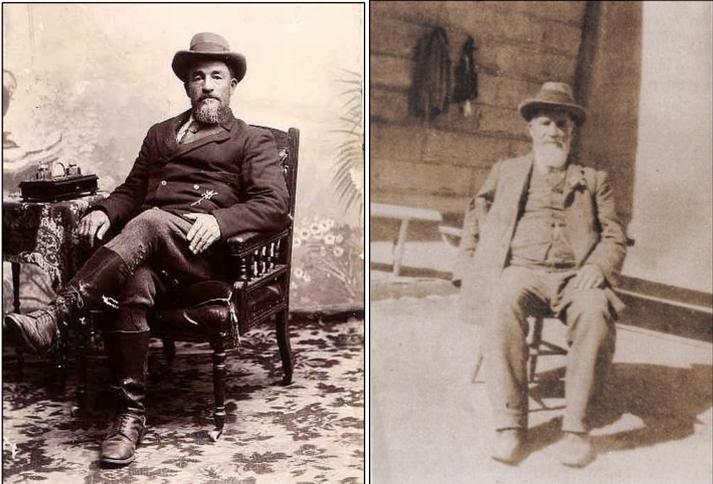
Document	Project	Revision	Date	Page Number
691HIA-001	Nooitgedacht TSF	1.0	01/09/2023	Page 29

DATE	DESCRIPTION
	<p><i>Figure 24 – Sir Thomas Major Cullinan was one of the founding directors of the Driekopjes Diamond Mining Company, which acquired an interest in the farm Welgegund in 1894. In the historic photograph on the left he is shown shortly after the discovery of the Cullinan diamond (which is held by F. Wells) at the Premier Diamond Mining Company, of which he was the chairman. The photograph on the right depicts Cullinan in 1929 (Helme, 1974: 75 &amp; 146).</i></p>
<p>1904</p>	<p>After the South African War, renewed efforts were made to carry out gold prospecting work in the area.</p> <p>In 1904, a prospector named Archibald Megson arrived on the farm Aandenk, and the farmer showed him the trench where Alexander Edward King Donaldson and Herbert Hinds had looked for gold. It had been more than a decade since these two pioneers had prospected the same farm.</p> <p>Megson opened up the old trench and continued with the excavations. At a depth of 30 meters, he found indications of gold and took a number of samples.</p> <p>Megson returned to Johannesburg with his samples and attempted to gain the interest of various mining houses and investors on the rand. However, with the rapid development and expansion of the Witwatersrand gold mining industry attracting all of the attention, no one seemed interested in possible gold discoveries so far away from Johannesburg (<a href="http://www.sahra.org.za">www.sahra.org.za</a>).</p>
	

Document	Project	Revision	Date	Page Number
691HIA-001	Nooitgedacht TSF	1.0	01/09/2023	Page 30

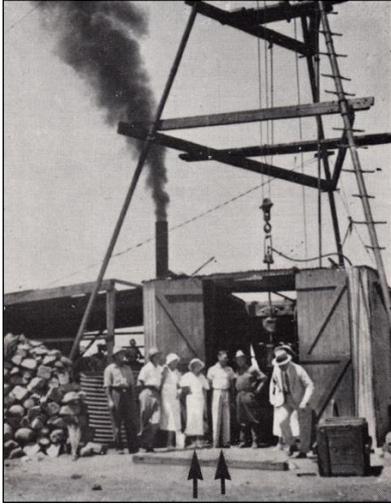
DATE	DESCRIPTION
<i>Figure 25 – Archibald Megson standing in the prospecting trench on the farm Aandenk (Felstar Publications, 1968).</i>	
August 1907	In August 1907, the town of Theunissen was proclaimed. This proclamation followed on a petition by farmers living in proximity to Smaldeel Siding. The town was named in honour of Commandant Helgaardt Theunissen, who led the petition and had also been the leader of the local commando during the South African War. The town of Theunissen became a municipality in 1912 (Erasmus, 2004).
1910	At the time, the Driekoppies Diamond Mine at Welgegund comprised 50 claims (Johnson, 1910). Although no detailed information on these syndicates and companies could be obtained, it would appear that by this time the farm was prospected and mined by at least the Magnus Diamond Syndicate Limited as well as the Triumph Diamond Mining Company Limited. Based on this information, it would appear that the Magnus and Triumph entities in all likelihood took over at Welgegund after the liquidation of the New Driekopjes Mining Company in 1904.
25 November 1911	The Drie Koppie Diamond Mine Limited was formed on 25 November 1911 by W.G. Griffiths to acquire from the Magnus Diamond Syndicate Limited and the Triumph Diamond Mining Company Limited the farm Welgegund in the Winburg District (The Mining Manual and Mining Year Book, 1914). The later history of the diamond mine and mining activities at Welgegund could not be revealed by way of the desktop study. However, based on the remains of the mine property observed during the field, it would appear that a diamond mine was operated here into the relatively recent past.
<b>The Boer Rebellion (1914 – 1918)</b>	
At the end of the South African War (1899 – 1902), the Transvaal and Orange Free State republics lost their independence to the British Empire. In 1910, the Union of South Africa was established consisting of the Cape Colony, Natal, the Transvaal Colony and the Orange River Colony. General Louis Botha was appointed the Union's first prime minister and believed that South Africa's future would be best served as part of the British Commonwealth. In 1914, the South African government under General Louis Botha decided to assist Great Britain in its war with Germany. A number of Boer leaders were not happy about this turn of events, and when General Koos de la Rey was killed at a roadblock in Johannesburg, emotions reached a boiling point and rebellion broke out across the former Boer republics. This rebellion saw more than 11 000 Boer men under the leadership of some of the former Boer War generals such as De Wet, Maritz, Kemp and Beyers rebelling against the South African government and its armed forces under the leadership of former Boer War generals Louis Botha and Jan Smuts.	
16 November 1914	In terms of the study area, the most notable event relating to the Boer Rebellion was the battle that occurred between the commando of General De Wet and the Government forces under the command of Colonel Enslin at the Virginia railway station on 16 November 1914. This battle followed on the defeat of De Wet's rebels at Mushroom Valley, south-east of Winburg, at the hands of General Louis Botha. De Wet and 2 000 rebels managed to escape from Mushroom Valley and followed the railway line north-eastwards towards the Virginia Station on the Zand River. De Wet wanted to cross over the railway line, and as a result, a fight ensued with Colonel Enslin's forces stationed at Virginia Station. General De Wet suffered a number of casualties and 50 of his men were also taken prisoner. After the battle, De Wet and his men followed the Zand River in a western direction and crossed over the river into the Transvaal Colony in proximity to Hoopstad (Union of South Africa, 1916).

Document	Project	Revision	Date	Page Number
691HIA-001	Nooitgedacht TSF	1.0	01/09/2023	Page 31

DATE	DESCRIPTION
	 <p><i>Figure 26 –The hardships experienced by General C.R. de Wet during the rebellion can be seen on these photographs. The one on the left shows De Wet shortly after the South African War (Van Schoor, 2007) with the image on the right depicting the general in the Bloemfontein prison after his capture late in 1914 (Raath &amp; Langner, 2014:119).</i></p>
<b>The Remainder of the Twentieth Century (1915 – Present Day)</b>	
1929 - 1933	<p>Nearly 25 years after finding the first indications of gold on the farm Aandenk, Archibald Megson finally managed to raise the interests of possible investors in Johannesburg. In 1929, during a chance encounter with Joseph Freedman, Megson found a more welcoming response. Freedman introduced the prospector to Johannesburg attorney, Emmanuel Jacobson, and his friend Allan Roberts, a dental technician. Despite being interested in what the prospector had to say, it took almost four years before Jacobson, Roberts and Megson travelled to the Free State (Shorten, 1970).</p> <p>Allan Roberts, who was an amateur prospector, was able to trace a conglomerate outcrop all along the farm Aandenk, and incorrectly identified it as part of the Upper Witwatersrand series. The two friends returned to Johannesburg and formed a syndicate comprising themselves, F.L. Marx, Dr. E.B. Woolf, Samuel Potter and Joseph Freedman. Freedman represented the interests of the old prospector Archibald Megson in the syndicate (Shorten, 1970).</p> <p>The syndicate acquired prospecting options on 31 farms in the area and the company Wit. Extensions Limited was established by the syndicate. On 23 October 1933, drilling commenced at a point roughly 80 m from Megson's trench on the same farm Aandenk. However, by February 1935 the drilling work had to be halted due to a lack of funds without any evidence for gold-bearing reefs identified. Many years later, it was estimated that if the two friends had only managed to deepen the hole by another 400 feet, they would have become very rich men and the discoverers of the Free State goldfields. Sadly, this was not to be their fate. Allan Roberts died in such poverty in 1939 and his friends had to pay for his funeral whereas Emmanuel Jacobson had to sell all his assets to survive (Shorten, 1970). Today, the town of Allanridge (named after Allan Roberts) and a monument to the west of the road between Welkom and Bothaville are all that is left of the dreams and expectations of these two mining pioneers.</p>



Document	Project	Revision	Date	Page Number
691HIA-001	Nooitgedacht TSF	1.0	01/09/2023	Page 32

DATE	DESCRIPTION
	 <p><i>Figure 27 - The first gold prospecting borehole in the Free State was sunk on the farm Aandenk between October 1933 and February 1935. The arrows indicate the positions of Allan Roberts and his wife (Felstar Publications, 1968:11).</i></p>
1935	<p>After the failure of Wit. Extensions Limited, an agreement was reached with the Anglo-French Exploration Company to continue prospecting work at Aandenk. However, instead of continuing deeper on the same borehole, the Anglo-French Exploration Company decided to rather deflect the borehole and no results were achieved. It was later estimated that if either one of these companies had deepened the borehole by only another 400 feet, payable gold would have been discovered (Shorten, 1970).</p> <p>The agreement between Wit. Extensions Limited and Anglo-French Exploration Company came to an end and the famous geologist Dr. Hans Merensky acquired an interest in Wit. Extensions Limited. He subsequently carried out extensive prospecting work including the drilling of further boreholes. However, even these more extensive attempts by Merensky to find the Free State goldfields also failed (Shorten, 1970). Machens (2009) indicates that when news broke that the famous discoverer of inter alia South Africa's platinum reserves owned options in a company working on the Free State goldfields, the interest from investors and mining companies to this part of the Free State was further awakened.</p>
	 <p><i>Figure 28 – The famous geologist Dr. Hans Merensky, who had his role to play in the discovery of the Free State goldfields (Machens, 2009).</i></p>
1 February 1937 – April 1939	<p>After failing to discover any payable gold, Merensky sold his shares in Wit. Extensions to the Anglo American Corporation, who on 1 February 1937 established the West Rand Investment Trust. The trust also carried</p>

Document	Project	Revision	Date	Page Number
691HIA-001	Nooitgedacht TSF	1.0	01/09/2023	Page 33

DATE	DESCRIPTION
	out an extensive drilling operation. The activities and interest of the Anglo American Corporation in this part of the Free State attracted the interest of other mining houses and investment companies, and prospecting options were taken out on a large number of farms from this area (Shorten, 1970).
	Despite all this interest, the first payable gold in the Free state was only identified in March 1939 during drilling operations by the African and European Investment Company on the farm Uitsig at a depth of 2 701 feet (Felstar Publishers, 1968). One month later, during April 1939, another discovery of payable gold was made on the farm St. Helena at a depth of 1 143 feet (Shorten, 1970). The discoveries of payable gold at Uitsig and St. Helena created significant excitement amongst mining companies and investors, and increasing numbers of prospecting options and eventually mines were acquired and developed. The Free State gold rush had begun.
1941	The first gold mining lease in the Free State was granted by the government of the Union of South Africa for the farm St. Helena in 1941, and the St. Helena Gold Mining Company was established to mine and develop the property (Felstar Publishers, 1968). A number of other gold mining companies were also established in a relatively short spate of time, including the Welkom Gold Mining Company, President Steyn Gold Mining Company and the President Brand Gold Mining Company.
	
<p><i>Figure 29 – The first mine shaft ever sunk along the Free State goldfields, namely the No. 3 Incline Shaft at the St. Helena Gold Mine (Felstar Publishers, 1968:151).</i></p>	
16 April 1946	The borehole of the Blinkpoort Gold Syndicate Limited on the boundary of the farms Geduld and Friedenheim, reached payable gold in 1946. On 16 April 1946 it was announced that the gold-bearing material retrieved at a depth of 3 922 feet from this borehole assayed at an impressive 1 252 dwts per ton which was unique in the history of gold prospecting and mining in South Africa, with averages usually in the region of 250 dwts per ton. This discovery led to further interest in the Free State goldfields (Felstar Publishers, 1968).
11 July 1946 – 15 April 1947	On 11 July 1946 an application was made by the land company of Sir Ernest Oppenheimer’s Anglo American Corporation, namely the South African Township and Mining and Finance Corporation, for the establishment of a new town called Welkom. After some legal and procedural processes and debate between the township applicants and its opponents (including the Odendaalsrus Town Council), the application for the establishment of the town of Welkom was approved on 15 April 1947 (Felstar Publishers, 1968).

Document	Project	Revision	Date	Page Number
691HIA-001	Nooitgedacht TSF	1.0	01/09/2023	Page 34

DATE	DESCRIPTION
	William Backhouse designed the town as a garden city with a commercial centre built around a town square and traffic circles rather than stop streets or traffic lights. More than a million trees were also planted (Erasmus 2014).
	 <p><i>Figure 30 – This photograph of Welkom was taken during the 1960s, roughly ten years after its establishment (Felstar Publications, 1968:171).</i></p>
1953	After gold was discovered in the area, Odendaalsrus became a prominent town in the Free State. A railway line was built from Allanridge to Odendaalsrus in 1953 and served the two Freddie's mines (Nienaber et al. 1982).
1954	Three of the six mines surrounding Welkom had reached production stage by 1954. These were the Welkom, Western Holdings and St. Helena Mines. During the same year, the town of Virginia was laid out on the banks of the Zand River. As indicated elsewhere, the name of this town was derived from the nearby railway station, which in turn was named this after two American engineers working on the line in 1890 had carved the name "Virginia" on a boulder from a nearby hill (Erasmus 2014).
1981 - 1987	Beisa Shaft (now the Beatrix West Section) was commissioned in 1981 to exploit uranium. The sinking of Beatrix 1 and 2 Shafts (now the Beatrix South Section) were also started at the time ( <a href="http://www.sibanyegold.co.za">www.sibanyegold.co.za</a> ). In 1984, the Beisa Uranium Mine was closed due to the low price of uranium at the time. In 1985 the Beatrix 1 and 2 Shafts were commissioned and exploration work commenced in proximity to the Beisa Mine on the farm Kalkoenkrans ( <a href="http://www.sibanyegold.co.za">www.sibanyegold.co.za</a> ). The sinking of two sub-vertical shafts and a ventilation shaft commenced at the Beisa Mine in 1987. During the same year this mine was renamed the Oryx Mine ( <a href="http://www.sibanyegold.co.za">www.sibanyegold.co.za</a> ).

Document	Project	Revision	Date	Page Number
691HIA-001	Nooitgedacht TSF	1.0	01/09/2023	Page 35

## 5.2 Heritage Sensitivity as Revealed in the Historical and Archaeological Overview

It is clear that the historical and archaeological overview revealed various aspects relating to the surroundings of the study area. While this assists with reconstructing the historical landscape, it does however provide some indication of the relatively limited historical significance of the study area as a whole. The following historical events and sites can be directly associated with the study area:

- During archaeological research undertaken by the National Museum in Bloemfontein, a total of 10 Middle Stone Age and Later Stone Age sites were identified in association with mammal fossil bones in drainage gullies along the Vet, Doring and Sand Rivers. It is important to note that this research was not focussed on identifying Stone Age sites without the associated presence of mammal fossil bones.
- The historical and archaeological review has revealed that the study area is located outside of the known distribution of Late Iron Age stonewalled settlements as published by Maggs (1976). This observation is largely supported by the distribution maps of known Iron Age sites as published by Huffman (2007). This said, it is always still possible for Iron Age sites to be located within the study area, and especially sites associated with the Thabeng and Makgwareng facies.
- In May 1836, a Voortrekker party under the leadership of Hendrik Potgieter arrived in the wider surroundings of the study area. Due to limited grazing the party decided to splinter into smaller groups. One of these groups established themselves at the present-day farm Blaauwdrift (Meintjies, 1976).
- Diamond prospecting and mining activities had been undertaken on the farm Welgegund since at least the early 1890s. These early activities appear to have been undertaken by the Van Rensburg Diamond Mining Syndicate. In June 1894 an interest in the farm Welgegund was acquired by the Driekopjes Diamond Mining Company, a founding director of which was the famous diamond magnate Sir Thomas Major Cullinan. While mining activities were undertaken in earnest during the remainder of the decade, the outbreak of the South African War in 1899 brought all work to a halt. After the war, mining activities continued at Welgegund. With time other mining companies also acquired claims on the farm, including the Magnus Diamond Mining Company, Triumph Diamond Mining Company, Welgegund Diamond Mining Company as well as the Drie Koppies Diamond Mining Company. This latter company appears to have still existed by 1931.
- The South African War (1899-1902) had a significant impact across the country, and also within the study area. During the Battle of Zand River (7 – 10 May 1900), the most significant drifts across the river were earmarked for attention by Lord Robers in his attack, including the Du Preez Leger Drift as well as De Klerks Kraal Drift.
- During the Boer Rebellion (1914 -1915) a battle took place between the commando of General De Wet and government forces under Colonel Enslin at the Virginia railway station on 16 November 1914. It is important to note that after the battle De Wet and his commando followed the Zand River in a westerly direction towards Hoopstad.

Document	Project	Revision	Date	Page Number
691HIA-001	Nooitgedacht TSF	1.0	01/09/2023	Page 36

- In March and April 1939 and 16 April 1946 significant discoveries of payable gold were made during prospecting drilling operations on the farms Uitsig, St. Helena and Geduld. These discoveries led to the rapid development of the Free State goldfields which significantly changed the entire landscape, including the present study area.

### 5.3 Examination of Archival and Historical Maps

The examination of historical data and cartographic resources represents a critical tool for locating and identifying heritage resources and in determining the historical and cultural context of the study area. Relevant topographic maps and satellite imagery were studied to identify structures, possible burial grounds or archaeological sites present in the footprint area.

Historical topographic maps (1:50 000) for various years (1952, 1954, 1975, 1997, 2009) were available for utilisation in the background study. These maps were assessed to observe the development of the area, as well as the location of possible historical structures and burial grounds. The study area was overlain on the map sheets to identify structures or graves situated within or immediately adjacent to the study area that could possibly be older than 60 years and thus protected under Section 34 and 36 of the NHRA.

#### 5.3.1 First Edition of the 2726DC Odendaalsrus Topographical Map Dated to 1952

The 2726DC Odendaalsrus map sheet was based on aerial photography carried out in 1952, was surveyed in 1954 and drawn in 1955 by the Trigonometrical Survey Office.

**This map sheet shows one homestead located within the study area.**

Document	Project	Revision	Date	Page Number
691HIA-001	Nooitgedacht TSF	1.0	01/09/2023	Page 37

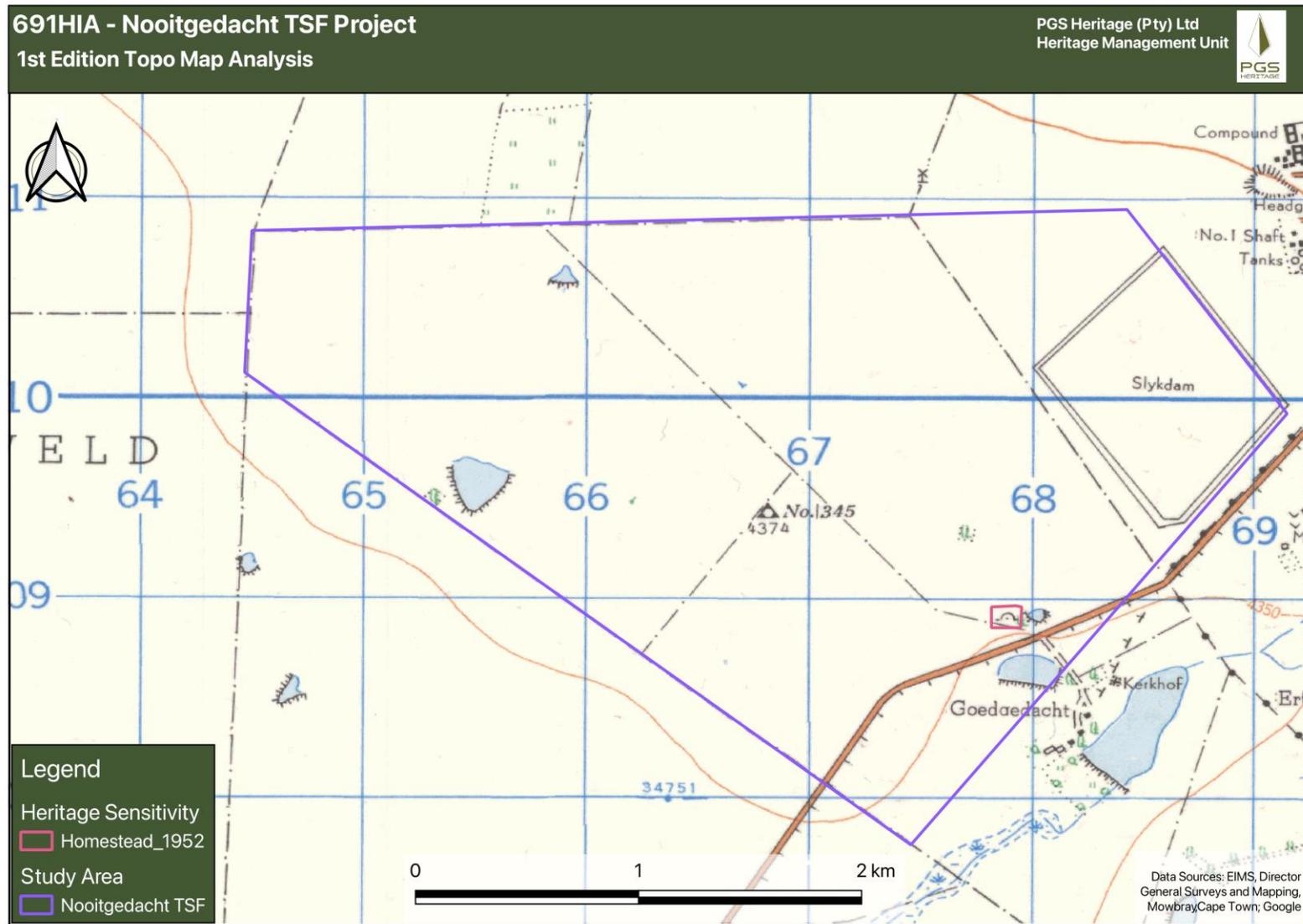


Figure 31 - Section of First Edition of the 2726DC Topographical Map, shows one heritage feature (homestead: red polygon) located within the study area.

Document	Project	Revision	Date	Page Number
691HIA-001	Nooitgedacht TSF	1.0	01/09/2023	Page 38

### 5.3.2 Third Edition of the 2726DC Topographical Map Dated to 1975

The 2726DC Odendaalsrus map sheet was remapped in 1975 by the Director – General of Surveys.

**This map sheet shows several structures located within the study area.** If these sites still exist today, they would be at least 48 years old.

Document	Project	Revision	Date	Page Number
691HIA-001	Nooitgedacht TSF	1.0	01/09/2023	Page 39

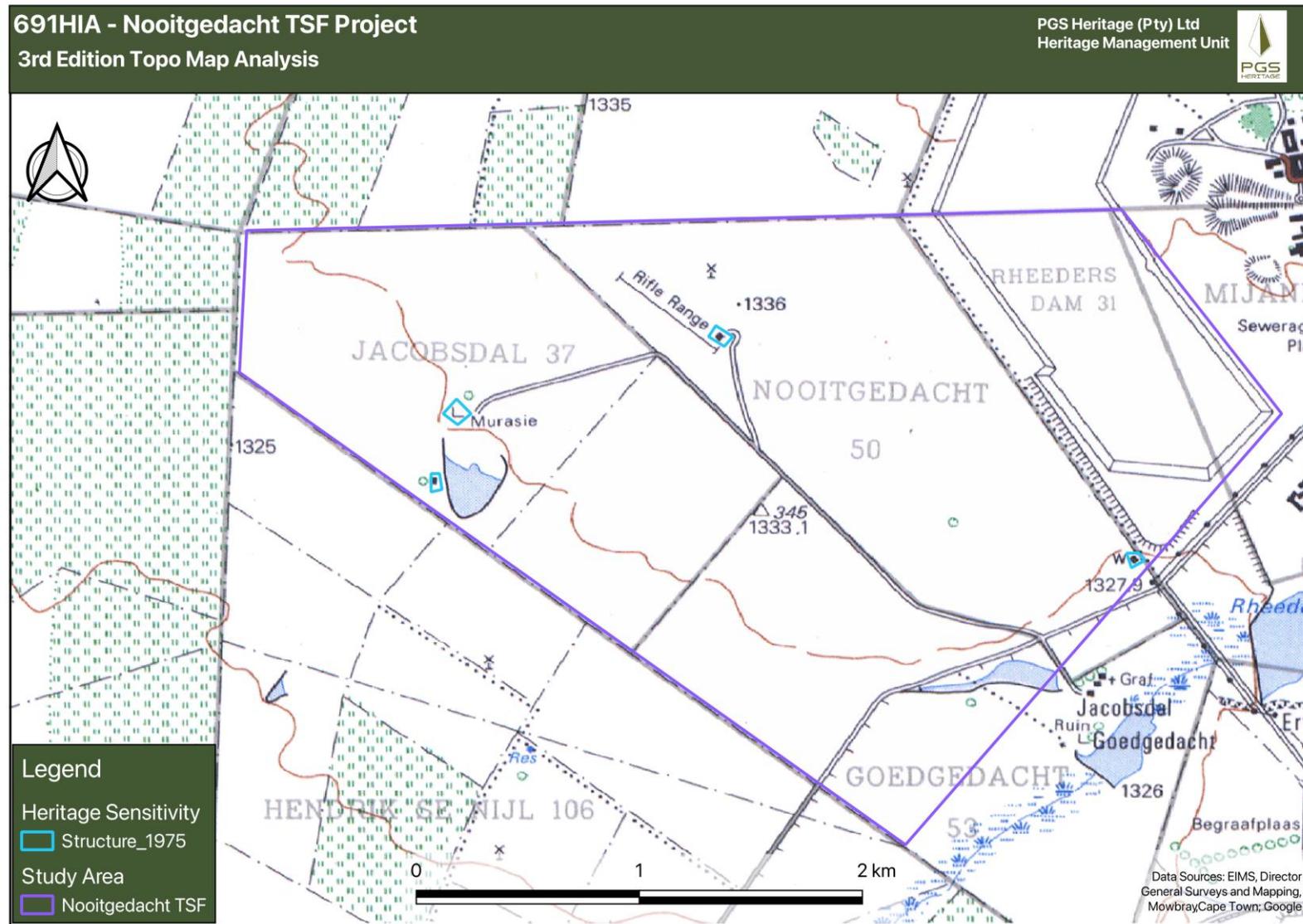


Figure 32 - Section of Third Edition of the 2726DC Topographical Map, showing several structures located within the study area.



Document	Project	Revision	Date	Page Number
691HIA-001	Nooitgedacht TSF	1.0	01/09/2023	Page 40

#### 5.4 Historical Aerial Photography of the Study Area and Surrounding Area

In addition to the historical topographic maps, there were also several historical aerial photographs (1968, 1984, 2014) available for utilisation in the background study. These photographs were assessed to observe the development of the area, as well as the location of possible historical structures. The study area was overlain on the aerial photographs to assess the level of land disturbance through time (**Figure 33 - Figure 35**). **The analysis of the historical and current aerial photography confirms that the study area has been disturbed by agriculture and mining related activities.**



*Figure 33 - Aerial photography from 28/5/1984 showing the approximate location of the study area (orange polygon)<sup>1</sup>.*

<sup>1</sup> NGI, Aerial Photographs, Source:  
[http://cdngportal.co.za/photocentres/30K\\_PAN/498\\_203\\_Welkom/498\\_203\\_004\\_02626.jpg](http://cdngportal.co.za/photocentres/30K_PAN/498_203_Welkom/498_203_004_02626.jpg)

Document	Project	Revision	Date	Page Number
691HIA-001	Nooitgedacht TSF	1.0	01/09/2023	Page 41



*Figure 34 - Aerial photography from 28/7/2000 showing the approximate location of the study area (orange polygon)<sup>2</sup>.*

<sup>2</sup> NGI, Aerial Photographs, Source: [http://cdngiportal.co.za/photocentres/30K\\_PAN/1030\\_Welkom/1030\\_005\\_00439.jpg](http://cdngiportal.co.za/photocentres/30K_PAN/1030_Welkom/1030_005_00439.jpg)

Document	Project	Revision	Date	Page Number
691HIA-001	Nooitgedacht TSF	1.0	01/09/2023	Page 42



Figure 35 – Google Earth Imagery from 2012 showing the location of the study area (red polygon).

## 5.5 Previous Archaeological and Heritage Research from within the Study Area and Surroundings

A search of the South African Heritage Resources Information System (SAHRIS) database revealed that several previous archaeological and heritage impact assessments had been undertaken within the surroundings of the study area. In each case, the results of each study are shown in bold. These previous studies are listed below in ascending chronological order:

- Dreyer, C. 2004a. First Phase Heritage/Archaeological Assessment of the Proposed Powerline Route at Phakisa Mine, Welkom, Free State. **No archaeological, cultural, or historical material was identified during the survey.**
- Dreyer, C. 2004b. Archaeological and Historical Investigation of the Graves at the Proposed Housing Developments near Thabong, Welkom, Free State. **One grave and several other stones protruding from the ground suggested that it was an old graveyard.**

Document	Project	Revision	Date	Page Number
691HIA-001	Nooitgedacht TSF	1.0	01/09/2023	Page 43

- Dreyer, C. 2005. Archaeological and Historical Investigation of the Proposed New Filling Station at Virginia, Free State. **No archaeological, cultural, or historical material was identified during the survey.**
- Dreyer, C. 2007. First Phase Archaeological and Cultural Heritage Assessment of the Proposed New MTN Cell Phone Mast at Pumlani Cemetery, Thabong, Welkom, Free State. **No archaeological, cultural or historical material was identified during the survey.**
- Coetzee, F. 2008. Cultural Heritage Survey of the Proposed Phakisa Housing Development, Welkom, Free State. **No Stone Age or Iron Age settlements, structures, features, or artefacts were recorded during the survey. One site that consisted of a mine shaft and various associated buildings and structures that probably older than 60 years were identified. No impact on the site was envisaged.**
- Dreyer, C. 2008. First Phase Archaeological and Heritage Investigation of the proposed Oppenheimer Park Golf Estate, Welkom, Free State. **No archaeological, cultural, or historical material was identified during the survey due to the surface disturbance.**
- Dreyer, C. 2011. First Phase Archaeological and Heritage Investigation of the proposed Chicken Egg Production Developments at Mooidoorns 319, Welkom, Free State. **No archaeological, cultural, or historical material was identified during the survey due to the surface disturbance (ploughed fields).**
- Van Ryneveld, K. 2013. Phase 1 Archaeological Impact Assessment for the Lebone Solar Farm, Onvewag RE/728 and Vaalkranz 2/220, Welkom, Free State, South Africa. Prepared for Enviroworks. **The report identified five sites: colonial period farming infrastructure, farmstead, cultural landscape, structure remains and railway bridge.**
- van Schalkwyk, J. 2014. Cultural Heritage Impact Assessment Report for the Proposed SANRAL Thabong Interchange Development, Welkom Region, Free State Province. **No archaeological, cultural, or historical material was identified during the survey.**
- Birkholtz, P.D. 2017a. Heritage Impact Assessment for the Proposed Tetra4 Cluster 1 Gas Production Project. Prepared for EIMS. **The identified sites comprise the following: cemeteries, Stone Age sites, historic structures believed to be older than 100 years, historic structures believed to be older than 60 years, historical buildings of low**

Document	Project	Revision	Date	Page Number
691HIA-001	Nooitgedacht TSF	1.0	01/09/2023	Page 44

**significance, historic to recent sites with possible stillborn baby graves, possible grave sites and a site comprising a single lower grinder.**

- Birkholtz, P.D. 2017b. Heritage Audit Report for the Beatrix Mining Areas of Sibanye Gold, Between Welkom and Theunissen, Lejweleputswa District, Orange Free State Province. Prepared for Sibanye Gold (Pty Ltd). **A total of 66 heritage sites were identified within the total study area. These identified heritage sites comprise 9 graves or burial grounds, 30 historical structures believed to be older than 60 years, of which 11 are believed to be older than 100 years, and 12 archaeological (Stone Age) sites. Sites where possible unmarked (infant) graves could occur were also identified (15). These sites include the remains of black homesteads. In terms of black African tradition, stillborn babies were often buried in unmarked graves underneath or adjacent to the homesteads of their parents.**
  
- Fourie, W. 2021. Heritage Impact Assessment for The Proposed Harmony FSS6 Reclamation Pipeline, Welkom, Free State Province. **No archaeological, cultural, or historical material was identified during the survey.**
  
- Kruger, N. 2021a. Archaeological Impact Assessment (AIA) On Portions Of The Farms Bloemhoek 509, Welgelegen 382, Mooi Uitzig 352, Florida 633, Le Roux 717 And Detente 744 For The Proposed Virginia Solar Park Power Lines Ba Project, Lejweleputswa District Municipality, Free State Province. **The study noted the remains of a later Historical Period settlement (possibly a farmworkers compound of houses). The site was poorly preserved and of medium to low significance.**
  
- Kruger, N. 2021b. Archaeological Impact Assessment (AIA) On Portions Of The Farm Blomskraal 216 For The Proposed Virginia 1, 2 & 3 Solar Parks Eia Project, Lejweleputswa District Municipality, Free State Province. **The study noted the remains of a large Iron Age occupation, several Historical Period settlements, and farmsteads, and three burial sites.**

## 5.6 Palaeontology

According to the Palaeosensitivity Map available on the South African Heritage Resources Information System database (SAHRIS), the Palaeontological Sensitivity of the proposed development area is rated as high (orange) (**Figure 36**). A desktop study is required and based on the outcome of the desktop study, a field assessment is likely (Almond and Pether 2008, SAHRIS website).

Document	Project	Revision	Date	Page Number
691HIA-001	Nooitgedacht TSF	1.0	01/09/2023	Page 45

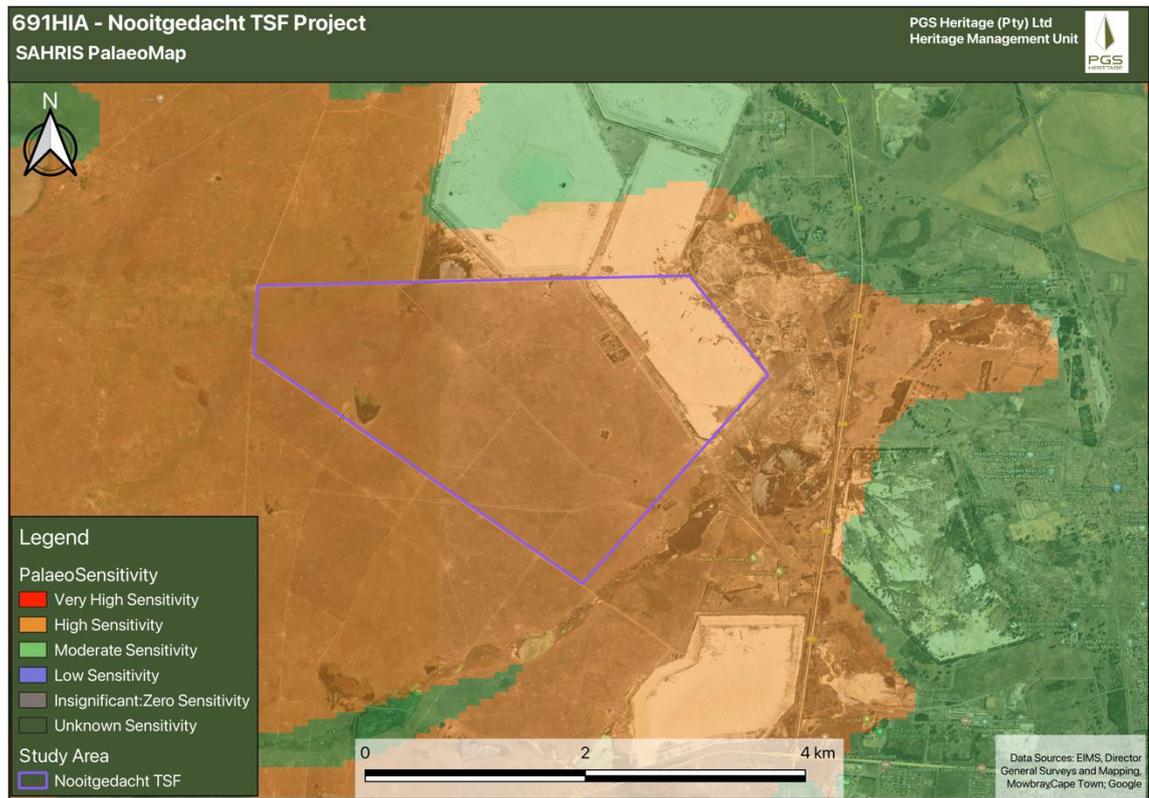


Figure 36 - Extract of the 1: 250 000 SAHRIS Palaeosensitivity Map (Council of Geosciences), overlain with the location of the study area.

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 37 – Key to the SAHRIS palaeontological map.

Document	Project	Revision	Date	Page Number
691HIA-001	Nooitgedacht TSF	1.0	01/09/2023	Page 46

## 5.7 Findings of the Historical Desktop Study

### 5.7.1 Heritage Screening

A heritage screening report was compiled by the Department of Environmental Affairs National Web-based Environmental Screening Tool as required by Regulation 16(1)(v) of the Environmental Impact Assessment Regulations 2014, as amended. According to the heritage screening report, the project area has a Low Heritage Sensitivity (**Figure 2**). The field work that was conducted in the study area demonstrates that there were no archaeological or historical sites of heritage significance that warrant conservation. Therefore, in the case of this study area, the DFFE screening tool sensitivity map is supported based on the findings of this fieldwork.

### 5.7.2 Heritage Sensitivity

Analysis of maps and satellite imagery enabled the identification of possible heritage sensitive areas. By superimposition and analysis, it was possible to rate these structures according to age and thus their level of protection under NHRA. **Table 6** lists the possible tangible heritage sites identified in the vicinity of the study area and the relevant legislative protection.

*Table 6 - Tangible heritage site in the study area.*

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

Additionally, evaluation of satellite imagery has indicated the following areas that may be sensitive from a heritage perspective. The analysis of the studies conducted in the area assisted in the development of the following landform type to heritage find matrix (**Table 7**).

*Table 7 - Landform type to heritage find matrix*

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

Document	Project	Revision	Date	Page Number
691HIA-001	Nooitgedacht TSF	1.0	01/09/2023	Page 47

## 6 FIELDWORK FINDINGS<sup>3</sup>

The fieldwork component of the study was aimed at identifying tangible remains of archaeological, historical and heritage significance. The fieldwork was conducted by an archaeologist (Nikki Mann) and field assistant (Xander Fourie) from PGS on 23 March 2023. At times, the archaeological visibility of the area was not ideal for surveying due to dense grass cover.

Heritage resources are unique and non-renewable and as such any impact on such resources must be seen as significant. The locations of finds were recorded using a GPS device and photographs were taken of the identified finds and general landscape of the proposed development area. The recorded track logs show the routes followed by the fieldwork team on site (yellow tracks, **Figure 38**).

The fieldwork conducted to evaluate the possible impact of the proposed development, has revealed the presence of one (1) heritage resource (See **Figure 39**).

The remains of a historical homestead (**NGD-01**) were identified within the study area.

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<sup>3</sup> Site in this context refers to a place where a heritage resource is located and not a proclaimed heritage site as contemplated under s27 of the NHRA.



Document	Project	Revision	Date	Page Number
691HIA-001	Nooitgedacht TSF	1.0	01/09/2023	Page 48

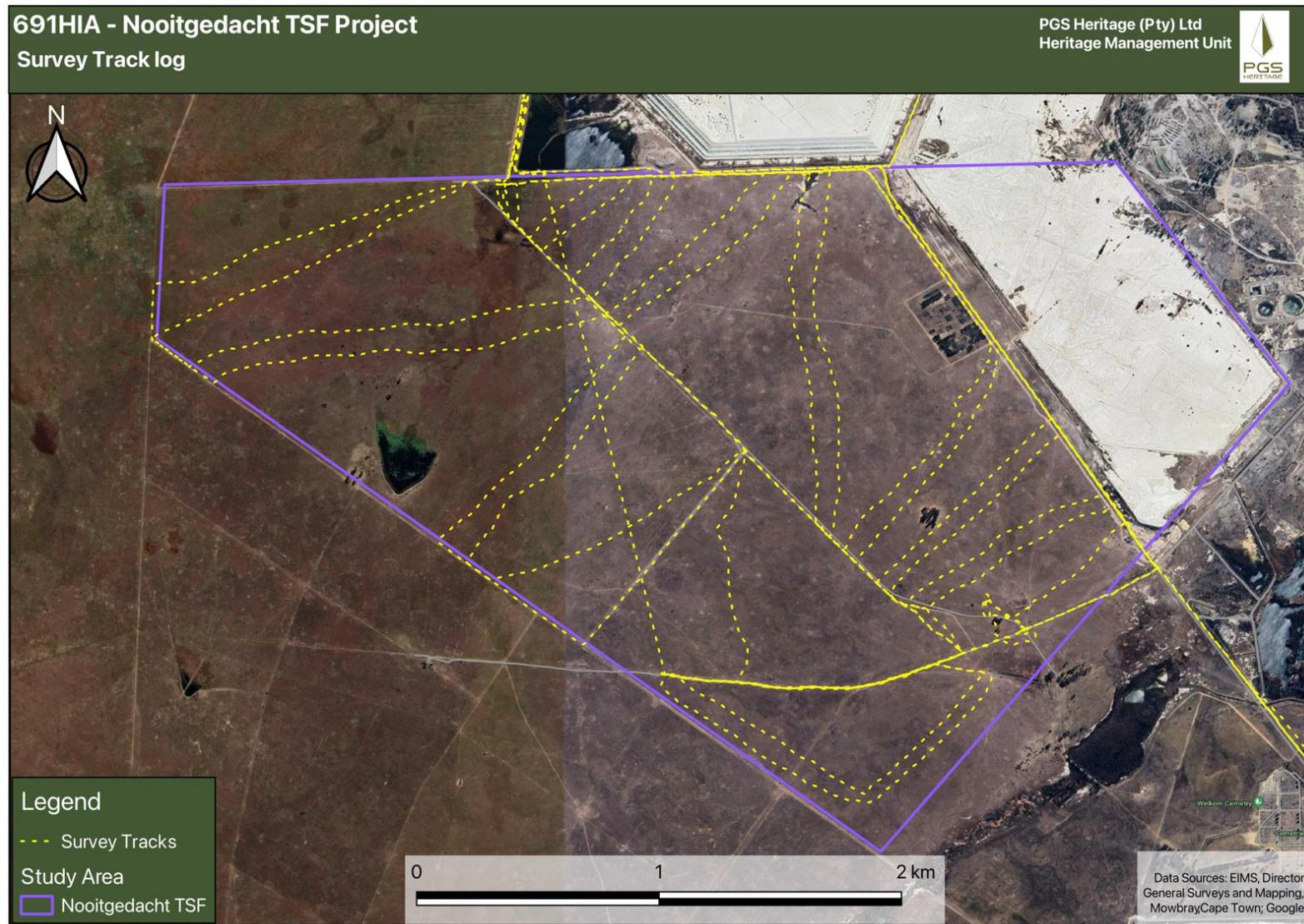


Figure 38 - Map depicting the track logs (yellow lines).

Document	Project	Revision	Date	Page Number
691HIA-001	Nooitgedacht TSF	1.0	01/09/2023	Page 49

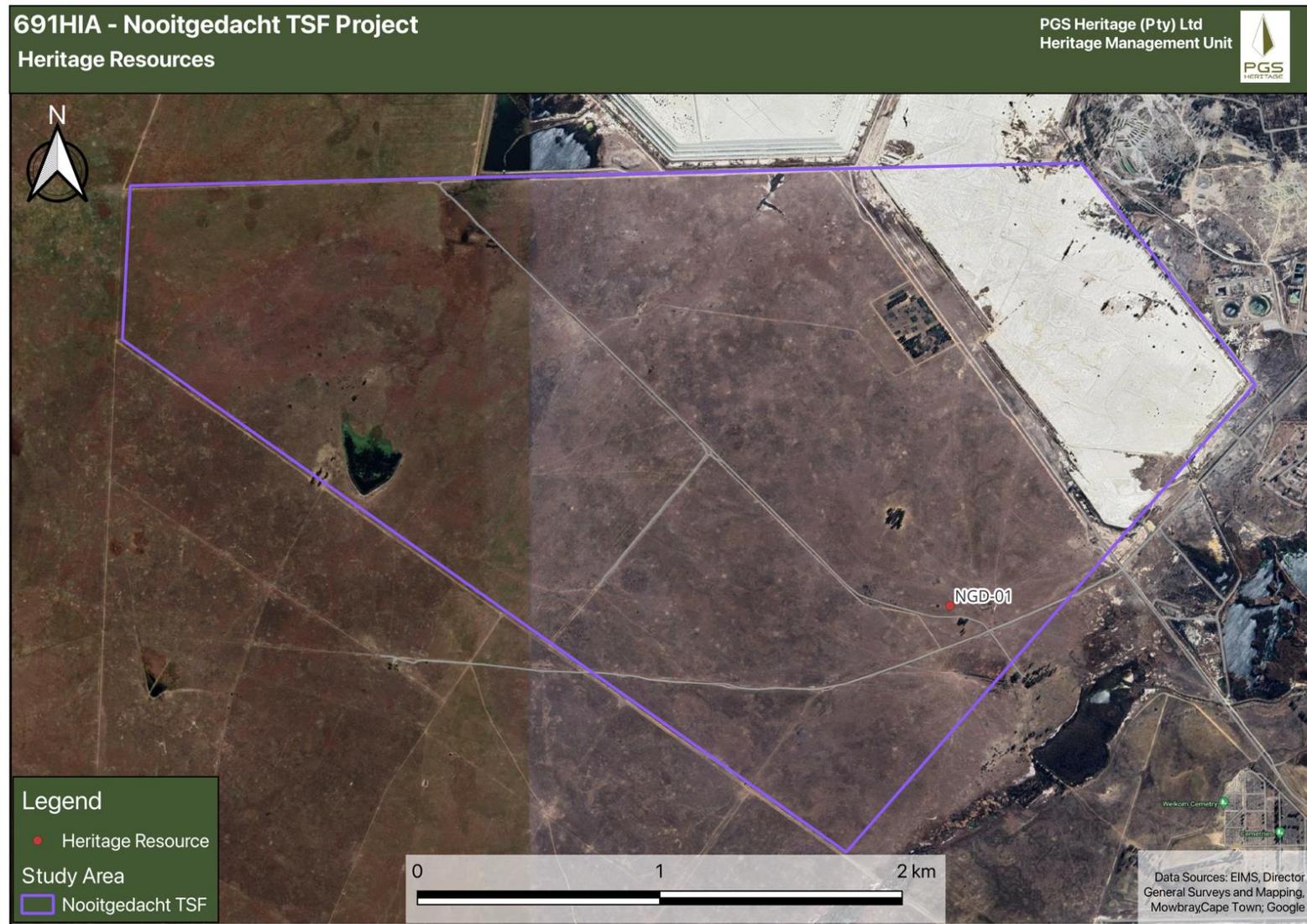


Figure 39 - Satellite Image showing the finds identified during the fieldwork.

Document	Project	Revision	Date	Page Number
691HIA-001	Nooitgedacht TSF	1.0	01/09/2023	Page 50

Site number	Lat	Lon	Description	Heritage Significance	Heritage Rating
NGD-01	-27.947143	26.67318	<p><b>General Landscape Characteristics</b> Flat lying area, Grassy vegetation</p> <p><b>Site Conditions</b> Overgrown/ limited visibility, Disturbed, Demolished/Destroyed</p> <p><b>Time Period</b> Historical</p> <p><b>Site Type</b> Historical Homestead</p> <p><b>Site Extent</b> 20m x 40m</p> <p><b>Notes</b> Remains of homestead on raised earth. Extremely overgrown, no walling and only scatter of bricks, masoned stone and stone boulders. Majority of the stone walling had been robbed of its stone, which meant that the layout pattern was somewhat obscured. No other material cultural observed.</p> <p>The structure was depicted at this locality on the 2726DC topographical sheet dating to 1952. The site is therefore older than 60 years.</p> <p>The possibility does exist for unmarked stillborn graves to be located at this site. Until such time that the presence of graves at the site has been tested, the stone concentrations must be viewed as containing graves.</p>	Medium to High	Grade 3 - A (IIIA), Grade 3 - B (IIIB)

Document	Project	Revision	Date	Page Number
691HIA-001	Nooitgedacht TSF	1.0	01/09/2023	Page 51

Site number	Lat	Lon	Description	Heritage Significance	Heritage Rating
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*Figure 40 - General views of the historical homestead.*

Document	Project	Revision	Date	Page Number
691HIA-001	Nooitgedacht TSF	1.0	01/09/2023	Page 52

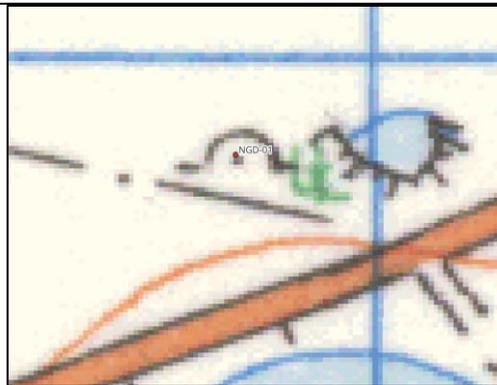
Site number	Lat	Lon	Description	Heritage Significance	Heritage Rating
					
					
			<p><i>Figure 41 - View of masoned stone.</i></p>		
			<p><i>Figure 42 - View of stone boulders.</i></p>		

Document	Project	Revision	Date	Page Number
691HIA-001	Nooitgedacht TSF	1.0	01/09/2023	Page 53

Site number	Lat	Lon	Description	Heritage Significance	Heritage Rating
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*Figure 43 - View of scattered bricks.*



*Figure 44 -2726DC topographical sheet surveyed in 1952 depicts a homestead at this locality.*

Document	Project	Revision	Date	Page Number
691HIA-001	Nooitgedacht TSF	1.0	01/09/2023	Page 54

## 7 IMPACT ASSESSMENT

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

### 7.1 Determination of Environmental Risk

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

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

$$C = (E+D+M+R) \times N$$

4

Each individual aspect in the determination of the consequence is represented by a rating scale as defined in **Table 8** below.

*Table 8 - Criteria for Determining Impact Consequence*

Aspect	Score	Definition
Nature	- 1	Likely to result in a negative/ detrimental impact
	+1	Likely to result in a positive/ beneficial impact
Extent	1	Activity (i.e. limited to the area applicable to the specific activity)
	2	Site (i.e. within the development property boundary),
	3	Local (i.e. the area within 5 km of the site),
	4	Regional (i.e. extends between 5 and 50 km from the site)
	5	Provincial / National (i.e. extends beyond 50 km from the site)
Duration	1	Immediate (<1 year)
	2	Short term (1-5 years),
	3	Medium term (6-15 years),
	4	Long term (the impact will cease after the operational life span of the project),

Document	Project	Revision	Date	Page Number
691HIA-001	Nooitgedacht TSF	1.0	01/09/2023	Page 55

Aspect	Score	Definition
	5	Permanent (no mitigation measure of natural process will reduce the impact after construction).
<b>Magnitude/ Intensity</b>	1	Minor (where the impact affects the environment in such a way that natural, cultural and social functions and processes are not affected),
	2	Low (where the impact affects the environment in such a way that natural, cultural and social functions and processes are slightly affected),
	3	Moderate (where the affected environment is altered but natural, cultural and social functions and processes continue albeit in a modified way),
	4	High (where natural, cultural or social functions or processes are altered to the extent that it will temporarily cease), or
	5	Very high / don't know (where natural, cultural or social functions or processes are altered to the extent that it will permanently cease).
<b>Reversibility</b>	1	Impact is reversible without any time and cost.
	2	Impact is reversible without incurring significant time and cost.
	3	Impact is reversible only by incurring significant time and cost.
	4	Impact is reversible only by incurring prohibitively high time and cost.
	5	Irreversible Impact

Once the C has been determined, the ER is determined in accordance with the standard risk assessment relationship by multiplying the C and the P. Probability is rated/ scored as per Table 9.

*Table 9 - Probability Scoring*

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

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

$$ER = C \times P$$

*Table 10 - Determination of Environmental Risk*

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

The outcome of the environmental risk assessment will result in a range of scores, ranging from 1 through to 25. These ER scores are then grouped into respective classes as described in **Table 11**.



Document	Project	Revision	Date	Page Number
691HIA-001	Nooitgedacht TSF	1.0	01/09/2023	Page 56

*Table 11 - Significance Classes*

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

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

## 7.2 Impact Prioritisation

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

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

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

*Table 12 - Criteria for Determining Prioritisation*

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

Document	Project	Revision	Date	Page Number
691HIA-001	Nooitgedacht TSF	1.0	01/09/2023	Page 57

	High (3)	Where the impact may result in the irreplaceable loss of resources of high value (services and/or functions).
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The value for the final impact priority is represented as a single consolidated priority, determined as the sum of each individual criteria represented in Table 13. The impact priority is therefore determined as follows:

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

The result is a priority score which ranges from 3 to 9 and a consequent PF ranging from 1 to 2 (Refer to **Table 13**).

*Table 13 - Determination of Prioritisation Factor*

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

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

*Table 14 - Final Environmental Significance Rating*

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

Document	Project	Revision	Date	Page Number
691HIA-001	Nooitgedacht TSF	1.0	01/09/2023	Page 58

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

## 7.3 Heritage Impacts

During the survey, one heritage site was identified. The site consists of the remains of a historical homestead (**NGD-01**) and has a medium to high heritage significance (rated: IIIA – IIIB).

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

### 7.3.1 Historical Structures

**NGD-01** has a medium to high heritage significance (rated: IIIA – IIIB). The impact significance before mitigation on the identified archaeological sites will be MODERATE negative before mitigation. Only the study site will be affected by the proposed development. The possibility of the impact occurring is very likely. The expected duration of the impact is assessed as potentially permanent. Implementation of the recommended mitigation measures will modify this impact rating to an acceptable LOW negative.

Document	Project	Revision	Date	Page Number
691HIA-001	Nooitgedacht TSF	1.0	01/09/2023	Page 59

Table 15 - Impact rating for heritage resources

IMPACT DESCRIPTION		Pre-Mitigation							Post Mitigation								Priority Factor Criteria			
Identifier	Impact	Nature	Extent	Duration	Magnitude	Reversibilit	Probability	Pre-mitigation ER	Nature	Extent	Duration	Magnitude	Reversibilit	Probability	Post-mitigation ER	Confid ence	Cumulative Impact	Irreplaceabl e loss	Priority Factor	Final score
10.1.1	Impact on heritage resources	-1	2	4	3	5	3	-10.5	-1	1	5	1	2	1	-2.25	High	1	1	1.00	-2.5

Document	Project	Revision	Date	Page Number
691HIA-001	Nooitgedacht TSF	1.0	01/09/2023	Page 60

## **8 MANAGEMENT RECOMMENDATIONS AND GUIDELINES**

### **8.1 Construction Phase**

The project will encompass a range of activities during the Construction Phase, including vegetation clearance and disturbance to the soil surface.

It is always possible that cultural material may be exposed during construction and may be recoverable, keeping in mind delays can be costly during construction and as such must be minimised. Development surrounding mining and construction results in significant disturbance; however, any excavation work offers a window into the past, and it thus may be possible to rescue some of the data and materials.

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

### **8.2 Chance Find Procedure**

- An appropriately qualified heritage practitioner / archaeologist must be identified to be called upon if any possible heritage resources or artefacts are identified.
- Should an archaeological site or cultural material be discovered during construction (or operation), the area should be demarcated, and construction activities halted.
- The qualified heritage practitioner / archaeologist will then need to come out to the site and evaluate the extent and importance of the heritage resources and make the necessary recommendations for mitigating the find and the impact on the heritage resource.
- The contractor therefore should have some sort of contingency plan so that operations could move elsewhere temporarily while the materials and data are recovered.
- Construction can commence as soon as the site has been cleared and signed off by the heritage practitioner / archaeologist.

### **8.3 Possible Finds During Construction Phases**

The study area occurs within a greater historical and archaeological context as identified during the desktop and fieldwork phase. Soil clearance may uncover the following:

- Unmarked graves.

### **8.4 Timeframes**

It must be kept in mind that mitigation and monitoring of heritage resources discovered during construction activity will require permitting for collection or excavation of heritage resources and lead

Document	Project	Revision	Date	Page Number
691HIA-001	Nooitgedacht TSF	1.0	01/09/2023	Page 61

times must be worked into the construction time frames. The table below gives guidelines for lead times on permitting.

*Table 16 - Lead times for permitting and mobilisation*

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

Document	Project	Revision	Date	Page Number
691HIA-001	Nooitgedacht TSF	1.0	01/09/2023	Page 62

## 8.5 Heritage Management Plan for EMPr Implementation

Table 17 - Heritage Management Plan for EMPr implementation

Area and site no.	Mitigation measures	Phase	Timeframe	The responsible party for implementation	Monitoring Party (frequency)	Target	Performance indicators (monitoring tool)
<b>General project area</b>	<ul style="list-style-type: none"> <li>Implement a chance find procedures in case where possible heritage finds are uncovered.</li> </ul>	Construction	During construction	Applicant ECO Heritage Specialist	ECO (monthly / as or when required)	Ensure compliance with relevant legislation and recommendations from SAHRA under Section 34-36 and 38 of NHRA	ECO Monthly Checklist/Report
	<p><b>Homestead site mitigation</b></p> <ul style="list-style-type: none"> <li>Demarcate extent of the area with a 30-meter buffer and leave in situ</li> <li>If it is not possible to avoid the site, archaeological mitigation will be required.</li> </ul> <p><u>Mitigation will include:</u></p> <ul style="list-style-type: none"> <li>Application for a section 35 NHRA excavation permit</li> <li>Documentation of the layout of the site</li> <li>Investigation through archaeological excavations to determine the extent of the site as well as retrieving cultural material to determine</li> </ul>	Pre-Construction	During pre-construction	Applicant ECO Heritage Specialist	ECO (monthly / as or when required)	Ensure compliance with relevant legislation and recommendations from SAHRA under Section 34-36 and 38 of NHRA	ECO Monthly Checklist/Report

Document	Project	Revision	Date	Page Number
691HIA-001	Nooitgedacht TSF	1.0	01/09/2023	Page 63

Area and site no.	Mitigation measures	Phase	Timeframe	The responsible party for implementation	Monitoring Party (frequency)	Target	Performance indicators (monitoring tool)
	<p>cultural affinity and temporal position of the site</p> <ul style="list-style-type: none"> <li>Upon completion of the excavations and report, an application for a destruction permit can be lodged with the SAHRA by the client</li> </ul> <p><b>Human remains investigation</b></p> <ul style="list-style-type: none"> <li>Mitigation measures would include applying to SAHRA for the test excavation and/or GPR permit to determine if the site contains graves.</li> <li>If human remains are discovered, a grave relocation process is recommended as a mitigation and management measure. This will involve the necessary social consultation and public participation process before grave relocation permits can be applied for with the SAHRA BGG, under the NHRA and National Health Act regulations.</li> </ul>						



Document	Project	Revision	Date	Page Number
691HIA-001	Nooitgedacht TSF	1.0	01/09/2023	Page 64

Area and site no.	Mitigation measures	Phase	Timeframe	The responsible party for implementation	Monitoring Party (frequency)	Target	Performance indicators (monitoring tool)
	<ul style="list-style-type: none"> <li>When graves are discovered/uncovered, the site should be demarcated with a 50-meter no-go-buffer-zone and the grave should be avoided.</li> <li>If, during test excavations, it is determined that the site does not contain graves, no further mitigation will be required.</li> </ul>						

Document	Project	Revision	Date	Page Number
691HIA-001	Nooitgedacht TSF	1.0	01/09/2023	Page 65

## 9 CONCLUSIONS

PGS was appointed by EIMS, on behalf of Harmony, to undertake a HIA, which forms part of the environmental process for the proposed Nooitgedacht TSF Project in Harmony's Free State Operations, located within the Matjhabeng Local Municipality, Lejweleputswa District Municipality, near Welkom, Free State Province.

This HIA aims to evaluate the possible impacts on heritage resources present within the proposed development footprint. The HIA has shown that the study area has no heritage resources situated within the proposed development boundaries.

### 9.1 Heritage Sites

The fieldwork component of the study was aimed at identifying tangible remains of archaeological, historical and heritage significance. Heritage resources are unique and non-renewable and as such any impact on such resources must be seen as significant.

The fieldwork was conducted by one archaeologist (Nikki Mann) and one field assistant (Xander Fourie) from PGS between 23 and 24 March 2023. The fieldwork conducted to evaluate the possible impact of the proposed development, has revealed the presence of one (1) heritage resource. See **Figure 39** and the individual site description as contained in **Section 6**.

#### *Historical Structure*

The remains of a historical homestead (**NGD-01**) were identified within the study area. The site was rated as having **high to medium heritage significance**.

### 9.2 Palaeontology

According to the Palaeosensitivity Map available on the South African Heritage Resources Information System database (SAHRIS), the Palaeontological Sensitivity of the proposed development area is rated as high (orange) (**Figure 36**). A desktop study is required and based on the outcome of the desktop study, a field assessment is likely (Almond and Pether 2008, SAHRIS website).

### 9.3 Impact Assessment

Document	Project	Revision	Date	Page Number
691HIA-001	Nooitgedacht TSF	1.0	01/09/2023	Page 66

The possible pre-construction impacts calculated on the tangible cultural heritage resources is overall **MODERATE NEGATIVE** rating but with the implementation of the recommended buffers and management guidelines will be reduced to a **LOW NEGATIVE** impact.

## 9.4 Mitigation Measures

The calculated impact as summarised in **Section 7** of this report confirms that the impact of the proposed development will be reduced with the mitigation measures (see **Section 8**). This finding in addition to the implementation of a chance finds procedure, as part of the EMP, will mitigate possible impacts on unidentified heritage resources.

## 9.5 General

It is the considered opinion of the author of this report that the overall impact of the proposed development on heritage resources will be Low. Provided that the general recommendations and mitigation measures outlined in this report are implemented, the impact would be acceptably Low or could be totally mitigated to the degree that the project could be approved from a heritage perspective. The management and mitigation measures as described in **Section 8** of this report have been developed to minimise the project impact on heritage resources.

Document	Project	Revision	Date	Page Number
691HIA-001	Nooitgedacht TSF	1.0	01/09/2023	Page 67

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691HIA-001	Nooitgedacht TSF	1.0	01/09/2023	Page 68

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Document	Project	Revision	Date	Page Number
691HIA-001	Nooitgedacht TSF	1.0	01/09/2023	Page 69

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Document	Project	Revision	Date	Page Number
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<b>Document</b>	<b>Project</b>	<b>Revision</b>	<b>Date</b>	<b>Page Number</b>
691HIA-001	Nooitgedacht TSF	1.0	01/09/2023	Page 71

### 10.3 **Google Earth**

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



Document	Project	Revision	Date	Page Number
691HIA-001	Nooitgedacht TSF	1.0	01/09/2023	Page 72

**APPENDIX A**  
**PGS TEAM CVS**

**PROFESSIONAL CURRICULUM VITAE FOR NIKKI MANN**  
**Professional Archaeologist for PGS Heritage**

**Name:** Nikki Mann  
**Profession:** Archaeologist  
**Date of birth:** 1992-10-13  
**Parent Firm:** PGS Heritage (Pty) Ltd  
**Position at Firm:** Archaeologist  
**Years with firm:** 2  
**Years of experience:** 7  
**Nationality:** South African  
**HDI Status:** White

**EDUCATION:**

**Name of University or Institution** : University of Cape Town  
**Degree obtained** : BSc  
**Major subjects** : Archaeology, Environmental and  
Geographical Sciences  
**Year** : 2013

**Name of University or Institution** : University of Cape Town  
**Degree obtained** : BSc [Hons]  
**Major subjects** : Archaeology  
**Year** : 2014

**Name of University or Institution** : University of Cape Town  
**Certificate obtained** : MSc – Archaeology (phytolith analysis)  
**Year** : 2017

**Professional Qualifications:**

Professional Archaeologist - Association of Southern African Professional Archaeologists -  
Professional Member – No 472

**Languages:**

English  
French

Document	Project	Revision	Date	Page Number
691HIA-001	Nooitgedacht TSF	1.0	01/09/2023	Page 73

## KEY QUALIFICATIONS

- 3 years of work in the heritage consulting field;
- 7 years working experience in archaeological excavations;
- Proven experience in report writing and report deliverables;

## HERITAGE IMPACT ASSESSMENTS

### *South African*

2021- Current – Archaeologist – PGS Heritage (Pty) Ltd

HMPs for the Khangela and Umsinde WEFs and associated grid infrastructure, near Murraysburg, Western Cape. Nala Environmental. **Position:** Heritage Specialist.

Proposed new 132kV grid connection for the authorised Emoyeni WEF, near Murraysburg, Western Cape. Nala Environmental. **Position:** Heritage Specialist.

Proposed Apollo PV Plant, near Atlantis, Western Cape – Desktop study. TerraManzi. **Position:** Heritage Specialist.

Proposed Eskom Witkop-Pietersburg 132kV Powerline, Limpopo. Polokwane. Acer. **Position:** Heritage Specialist.

Proposed deviations to Eskom Nhlavuko-Tshebela 132kV Powerlines, Limpopo. Polokwane. Acer. **Position:** Heritage Specialist.

Proposed Tetra4 Cluster 2 gas production project, near Welkom. EIMS. **Position:** Heritage Specialist.

Kathu Tyre Management Plant HIA. Kathu. EXM. **Position:** Heritage Specialist.

Kathu Borrow Pit Screening. Kathu. EXM. **Position:** Heritage Specialist.

Kolomela Mine Expansion. Postmasburg. EXM. **Position:** Heritage Specialist.

Kudumane HIA update. Hotazel. SRK. **Position:** Heritage Specialist.

Victoria West Pipeline project. Victoria West. iXEng. **Position:** Heritage Specialist.

10MW Chelsea Solar PV. Gqeberha, Eastern Cape. SLR. **Position:** Heritage Specialist.

Koup 1 and Koup 2 WEF. Beaufort West, Western Cape. SiVEST. **Position:** Heritage Specialist.

Victoria West Pipelines. Victoria West, Northern Cape. iXEng. – **Position:** Heritage Specialist.

East Orchards Poultry Farm Project. Delmas, Mpumalanga. EcoSphere. – **Position:** Heritage Specialist.

Gunstfontein WEF and OHL. Sutherland, Northern Cape. Savannah– **Position:** Heritage Specialist.

Overhead power line for Oya PV Facility. Sutherland, Northern Cape. SiVEST– **Position:** Heritage Specialist.

Infrastructure for Kudusberg WEF. Sutherland, Northern Cape. SiVEST– **Position:** Heritage Specialist.

Proposed SKA fibre optic cable, between Beaufort West and Carnarvon, Northern and Western Cape. **Position:** Heritage Specialist.

Document	Project	Revision	Date	Page Number
691HIA-001	Nooitgedacht TSF	1.0	01/09/2023	Page 74

Proposed SANSA Space Operations. Matjiesfontein, Western Cape. **Position:** Heritage Specialist

Pienaarspoort WEF 1 and 2. North-west of Matjiesfontein, Western Cape. Savannah- **Position:** Heritage Specialist.

Swellendam WEF. Swellendam, Western Cape. – **Position:** Heritage Specialist.

Matjiesfontein Road Extension Project. Matjiesfontein, Western Cape. **Position:** Heritage Specialist.

## MITIGATION WORK

2020 – Coega Zone 10, Coega IDZ, Eastern Cape Province. Colonial Period Phase 2 Mitigation Archaeological Excavation. **Archaeologist.**

2019 – 2020 - **Lesotho Highland Development Authority – Polihali Dam Project - Heritage Management Plan development and Implementation.** Mokhotlong, Kingdom of Lesotho. **Archaeologist.**

2018- Proposed development of boreholes and associated pipelines for the Langebaan Aquifer within the Hopefield Private Nature Reserve, Hopefield, Western Cape. **Archaeologist.**

## POSITIONS HELD

**2021 – current:** Archaeologist - PGS (Pty) Ltd

**2019 – 2020:** Archaeologist - PGS (Pty) Ltd Lesotho

**2018 – 2020:** Contract Archaeologist – CTS Heritage

## REFERENCES

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nic.wiltshire@ctsheritage.com

Document	Project	Revision	Date	Page Number
691HIA-001	Nooitgedacht TSF	1.0	01/09/2023	Page 75

## **WOUTER FOURIE**

### **Professional Heritage Specialist and Professional Archaeologist and Director PGS Heritage**

#### **Summary of Experience**

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

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

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

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

#### **Key Qualifications**

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

BA - Archaeology, Geography and Anthropology - 1996

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

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

CRM Accreditation (ASAPA) -

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

#### **Key Work Experience**

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

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

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

<b>Document</b>	<b>Project</b>	<b>Revision</b>	<b>Date</b>	<b>Page Number</b>
691HIA-001	Nooitgedacht TSF	1.0	01/09/2023	Page 76

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, Mauritius, Malawi, Zambia, Mozambique, and the Democratic Republic of the Congo