



**PHASE 1 HERITAGE IMPACT
ASSESSMENT OF THE PROPOSED
GELUKSDAL TAILINGS STORAGE
FACILITY AND PIPELINE**

GOLD ONE INTERNATIONAL LIMITED

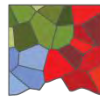
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Report Title: Phase 1 Heritage Impact Assessment of the Proposed Geluksdal Tailings Storage Facility and Pipeline Infrastructure

Project Number: RAN1386

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EXECUTIVE SUMMARY

A Phase 1 Heritage Impact Assessment (HIA) was undertaken for Gold One International Limited (Gold One) as part of the Environmental and Social Impact Assessment (Environmental Impact Assessment and Environmental Management Plan (EIA/EMP)) processes completed for the development of the Geluksdal Tailings Storage Facility and Pipeline Project. Gold One wishes to re-mine existing tailings facilities and create a new Tailings Storage Facility (TSF) for the residual tailings from the re-mining process. This report presents the results for the heritage assessment of the proposed project.

A total of eight cultural resources were identified, recorded and assessed. All other built structures and burial grounds and graves that were recorded in previous impact assessments and during the survey were either younger than 60 years or located outside of the project area and were therefore not assessed.

The following table briefly describes the identified cultural resource, its significance and impact rating.

SITE ID	DESCRIPTION	SAHRA GRADING	SIGNIFICANCE ASSESSMENT	IMPACT ASSESSMENT
GY01	Two graves on Raatskraal 524 IQ (Pistorius)	Grade 3B	4	18
GY02	Approximately 25 graves on Geluksdal 396 IQ (Pistorius)	Grade 3B	4	18
GY03	Approximately 3 graves on Cardolville 364 IQ (Pistorius)	Grade 3B	4	123
GY04	Approximately 15 graves on Geluksdal 396 IQ (Pistorius)	Grade 3B	4	18
RAN1386/DW004	30 graves located 350 m away from proposed line.	Grade 3B	3	27

SITE ID	DESCRIPTION	SAHRA GRADING	SIGNIFICANCE ASSESSMENT	IMPACT ASSESSMENT
RAN1386/DW007	Built environment - Farm house and associated infrastructure	Grade 4A	3	27
RAN1386/DW017	Built environment - Farm house and associated infrastructure	Grade 4A	3	27
RAN1386/DW025	Built environment - Farm house and associated infrastructure	Grade 4A	3	27

Potential impacts and recommended mitigation on the identified cultural resources:

Recommendations included:

- A Watching Brief for the built structures during the construction phase of the project;
- A burial grounds and graves survey;
- Grave relocation of:
 - the burial ground GY03; and
 - any other graves that may be identified during the burial ground and graves survey.
- Demarcation of all graves outside of the TSF footprint but within the TSF study area.

GLOSSARY OF ABBREVIATIONS AND TERMS

ASAPA	Association of Southern African Professional Archaeologists
BA	Bachelor of Arts
CE	Common Era
CANE	Coalition Against Nuclear Energy
CoH	Cradle of Humankind
CRM	Cultural Resource Management
EA	Environmental Authorisation
EAP	Environmental Assessment Practitioner
EHS	Environmental Health and Safety
EIA	Environmental Impact Assessment
EMP	Environmental Management Plan
EP	Equator Principle
EPFI	Equator Principles Financial Institution
ESA	Early Stone Age
EWT	Endangered Wildlife Trust
FSE	Federation for a Sustainable Environment
GAA	Golder Associates Africa
GDARD	Gauteng Department of Agriculture and Rural Development
GNR	Government Notice Regulation
HIA	Heritage Impact Assessment
HRM	Heritage Resource Management
I&APs	Interested and Affected Parties
IFC	International Finance Corporation
Ka	Thousand years ago
LRC	Legal Resource Centre
LSA	Later Stone Age
MSA	Middle Stone Age
MSc	Master of Science
Mt	Million tons
Mya	Million years ago
NAARIS	National Automated Archival Retrieval Information System
NEMA	National Environmental Management Act, 1998 (Act No. 107 of 1998)
NEMPA	National Environmental Management: Protected Areas Act, 2003 (Act No. 57 of 2003)
NHRA	National Heritage Resources Act, 1999 (Act No. 25 of 1999)
OECD	Organisation for Economic Co-operation and Development
OP	Operational Facilities
PHRA	Provincial Heritage Resources Authority

PPP	Public Participation Process
SAHRA	South African Heritage Resources Agency
SANCO	South African National Civic Organisation
SAPS	South African Police Service
SoW	Scope of Work
STP	Shovel Test Pit
TAUSA	Transvaal Agricultural Union South Africa
ToR	Terms of Reference
TSF	Tailings Storage Facility
WAWA	Women Against Abuse of Women and Children
WESSA	Wildlife and Environmental Society of South Africa
WHCA	World Heritage Convention Act, 1999 (Act No. 49 of 1999)
Wits	University of the Witwatersrand

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1 INTRODUCTION

Rand Uranium, now a wholly owned subsidiary of Gold One International Limited (Gold One), commenced with the authorisation process for the Cooke Uranium Project during 2009. Since the project commenced various environmental permits were applied for and are currently being approved by the various relevant authorities.

During this process, Golder Associates Africa (GAA) was appointed by Rand Uranium as the Environmental Assessment Practitioner (EAP) to undertake the environmental authorisation processes for the whole project including the Tailings Storage Facility (TSF) and pipeline project. With the takeover by Gold One of Rand Uranium the preference was to separate the functions of engineering and the duties of the EAP and as a result Digby Wells Environmental (Digby Wells) has been appointed to complete the Geluksdal TSF and Pipeline Project authorisation process and have appointed their own EAP going forward.

An application for environmental authorisation for the TSF and pipeline in terms of the National Environmental Management Act, 1998 (Act No. 107 of 1998) (NEMA) was submitted to and accepted by the Gauteng Department of Agriculture and Rural Development (GDARD) during March 2010 (Ref: GAUT 002/09-10/N0736). As part of this process, a Public Participation Process (PPP) was undertaken and various environmental studies commenced on the preferred TSF site. These focused on the Geluksdal site (Site 35) and alternate pipe line routes to access this site. Site 35 had been selected after a comprehensive site selection process fully supported by a PPP.

Due to unforeseen economic circumstances it was decided by Rand Uranium to put the project on hold during the third quarter of 2010. At that stage the Draft Scoping Report was in preparation and will now be continued by Digby Wells.

2 BACKGROUND INFORMATION OF PROJECT

2.1 Report type: NHRA Section 38(8) Heritage Impact Assessment

Digby Wells has been appointed to complete environmental authorisation process in terms of the NEMA for the Geluksdal TSF and Pipeline Project. This Heritage Impact Assessment (HIA) forms part of the Environmental and Social Impact Assessment (Environmental Impact Assessment and Environmental Management Plan (EIA/EMP)) completed for the development of the Geluksdal TSF and Pipeline Project.

2.2 Context of Development

2.2.1 Type of development

Gold One wishes to re-mine the existing tailings facilities in Westonaria, Randfontein, Mogale City and Johannesburg regions and to establish a single large new TSF for the residual tailings from the re-mining process at Geluksdal in the Westonaria area. In addition,

the construction of pipelines connecting the proposed Cooke Uranium Project, a proposed permitted uranium plant near Toekomsrus (Randfontein area) and the TSF are also planned.

The objectives of the project are to:

- Re-mine the old tailings dams;
- Re-process the tailings to extract gold, sulphur and uranium; and
- Consolidate the residue tailings from the processing plant onto one large modern TSF.

There are a number of historic tailings dams in the Randfontein area that are being considered as part of this project. The size of the proposed operations in the Randfontein area will initially measure about 150 million tons (Mt) which will be ultimately extendable to 350/400 Mt of tailings from these existing tailings dams. The re-mining of tailings presents an opportunity to consolidate tailings facilities spread across a wide urbanised region into a single large TSF located away from highly populated areas. This will allow for the application of state of the art engineering of the new facility, better management of the facility and the implementation of stricter control on environmental management, which historical facilities may not have been taken into account.

2.2.2 Description of alternatives

Site Selection of the TSF

A thorough and extensive site selection process was undertaken by GAA and involved the screening of over 80 sites. The site selection process identified potential areas that were of a suitable size to accommodate the proposed TSF, within a 50 km radius of the Cooke Gold Plant and proposed adjacent uranium plant. This process yielded 22 candidate sites/areas, mostly grouped south of the project centroid area, which were evaluated further. Based on the results of the final site selection process that was carried out, two remaining sites were considered and evaluated in more detail. The Geluksdal site was selected as the optimal site predominantly because of its distance from the urban edge.

Alternative Pipeline Routes

Alternative pipeline routes are described in Table 2-1 below.

Table 2-1: Pipeline Alternatives

Consideration	Northern Section	Southern section Route 1 (West)	Southern section Route 2 (East)
Description	<ul style="list-style-type: none"> Runs from the proposed uranium plant to the R28 road; Largely on existing pipe routes; Traverses mine-owned land; and Will cross under the N12 and R559 via existing culvert. 	<ul style="list-style-type: none"> Preferred route; Travels along the servitude of an existing road and crosses underneath via existing culverts; Slightly longer and less direct; Fewer anticipated impacts; and ±8 km along existing pipeline routes. 	<ul style="list-style-type: none"> Alternative route; Traverses several smallholdings; and Landowners could be impacted.

2.2.3 Rezoning and/or land subdivision

The land is currently zoned for agriculture and will be rezoned for mining.

2.3 Client, Consultant and Land Owner Contact Details

Table 2-2: Client Contact Details

ITEM	COMPANY CONTACT DETAILS
Company	Gold One International Limited
Contact person	Rex Zorab
Tel no	011 707 6914
Fax no	086 273 3327
E-mail address	rex.zorab@gold1.co.za
Postal address	Private Bag X9, Randfontein, 1760, South Africa

Table 2-3: Consultant Contact Details

ITEM	COMPANY CONTACT DETAILS
Company	Digby Wells Environmental
Contact person	Danie Otto
Tel no	011 789 9495
Fax no	011 789 9498
E-mail address	danie.otto@digbywells.com
Postal address	Private Bag X10046, Randburg, 2125, South Africa

Table 2-4: Land Owner: Geluksdal 396 IQ Remaining Extent

ITEM	CONTACT DETAILS
Contact person	Rand Uranium
Postal address	Postnet Suite 290, Private Bag X51

Table 2-5: Land Owner Contact Details: Cardoville 364 IQ Portion 2

ITEM	CONTACT DETAILS
Contact person	Randfontein Estates Ltd / Rand Uranium
Tel no	057 231 2111
Postal address	P O Box 2, Randfontein, 1760

Table 2-6: Land Owner Contact Details: Barnardsrus 628 IQ Remaining Extent

ITEM	CONTACT DETAILS
Contact person	Randfontein Estates Ltd
Tel no	083 516 5356

3 TERMS OF REFERENCE

3.1 Client Term of Reference (ToR)

Gold One requested Digby Wells to undertake a HIA as part of the EIA/EMP processes completed for the development of the Geluksdal TSF and Pipeline Project.

3.2 Scope of Work

As part of the EIA and recommended ToR received from the client, the Scope of Work (SoW) for the heritage component of the Geluksdal TSF and Pipeline Project consisted of compiling a HIA report which included the Aims and Objectives discussed in Section 3.3 below.

3.3 Aims and Objectives

The aim of this Phase 1 HIA was to assist the client in identifying, documenting and managing archaeological and heritage resources found in the proposed project area in a responsible manner. This assessment also aimed to protect, preserve and develop resources within relevant legislative frameworks. In essence, this study aimed to:

- Identify, record and document significant archaeological, cultural and historic sites, including graves and cemeteries, within the proposed development area;
- Evaluate whether proposed activities will have any negative impacts on these archaeological, cultural, historical and natural heritage resources during construction, operation and decommissioning phases;
- Recommend mitigation and management measures to avoid or ameliorate any negative impacts on areas of archaeological, cultural or historical importance; and
- Promote the overall conservation and protection of natural and cultural resources in the proposed project area and its surroundings.

3.4 Legislative Requirements

The Heritage Statement is governed by national legislation and standards; and International Best Practise. These are discussed below.

3.4.1 National Environmental Management Act, 1998 (Act No. 107 of 1998) (NEMA)

The NEMA stipulates under Section 2(4)(a) that sustainable development requires the consideration of all relevant factors including (iii) the disturbance of landscapes and sites that constitute the nation's cultural heritage must be avoided, or where it cannot be altogether avoided, is minimised and remedied. Heritage assessments are implemented in terms of the NEMA Section 24 in order to give effect to the general objectives. Procedures considering heritage resource management in terms of the NEMA are summarised under Section 24(4) as amended in 2008. In addition to the NEMA, the National Environmental Management: Protected Areas Act, 2003 (Act No. 57 of 2003) (NEMPA) may also be

applicable. This act applies to protected areas and world heritage sites, declared as such in terms of the World Heritage Convention Act, 1999 (Act No. 49 of 1999) (WHCA).

3.4.2 World Bank

3.4.2.1 World Bank Operational Policies

The World Bank Operational Policies (OP) for cultural resources (OP4.11) falls within the broader Environmental Authorisation Policies (EAPs). Physical cultural resources are important as sources of valuable scientific and historical information, as assets for economic and social development, and as integral parts of a people's cultural identity and practices. This policy assists countries to avoid or mitigate adverse impacts on physical cultural resources from development projects that are financed through the World Bank. The impacts on physical cultural resources resulting from project activities, including mitigating measures, may not contravene either the borrower's national legislation, or its obligations under relevant international environmental treaties and agreements.

3.4.2.2 Equator Principles (EPs)

The Equator Principles Financial Institutions (EPFIs) adopted principles in order to ensure that the projects financed are developed in a manner that is socially responsible and reflect sound environmental management practices. By doing so, negative impacts on project-affected ecosystems and communities should be avoided where possible, and if these impacts are unavoidable, they should be reduced, mitigated and/or compensated for appropriately.

Principle 2: Social and Environmental Assessment

For each project assessed as being either Category A or Category B, the borrower has conducted a Social and Environmental Assessment ("Assessment") process to address, as appropriate and to the EPFI's satisfaction, the relevant social and environmental impacts and risks of the proposed project. The Assessment should also propose mitigation and management measures relevant and appropriate to the nature and scale of the proposed project.

Principle 3: Applicable Social and Environmental Standards

For projects located in non-OECD (Organisation for Economic Co-operation and Development) countries, and those located in OECD countries not designated as High-Income, as defined by the World Bank Development Indicators Database, the Assessment will refer to the then applicable International Finance Corporation (ICF) Performance Standards and the then applicable Industry Specific Environmental Health and Safety (EHS) Guidelines ("EHS Guidelines"). The Assessment will establish to a participating EPFI's satisfaction the project's overall compliance with, or justified deviation from, the respective Performance Standards and EHS Guidelines.

3.4.2.3 International Finance Corporation (IFC)

The IFC's Performance Standards form part of the EP's and aims to manage social and environmental risks (and impacts) to enhance development opportunities in its private sector financing in its member countries eligible for financing (IFC, 2012). The main focus of the risk assessment of a proposed development is primarily on the potential impacts associated with the project activities during construction, operation, and decommissioning and closure phases.

3.4.3 National Heritage Resources Act, 1999 (Act No. 25 of 1999) (NHRA)

3.4.3.1 Section 34 – Structures older than 60 years

The proposed activities associated with the Geluksdal TSF and Pipeline Project will include the construction and subsequent operation of an underground mine, an opencast mine, and associated infrastructure. This will require the removal of existing structures that may be older than 60 years.

Section 34 of the NHRA provides for general protection of structures older than 60 years. Most importantly, Section 34(1) clearly states that no structure or part thereof may be altered or demolished without a permit issued by the relevant Provincial Heritage Resources Authority (PHRA). These permits will not be granted without a HIA being completed.

A destruction permit will thus be required before any removal and/or demolition may take place, unless exempted by the PHRA according to Section 34(2) of the NHRA.

3.4.3.2 Section 35 – Archaeological and palaeontological resources and meteorites

Construction and operation activities associated with the Geluksdal TSF and Pipeline Project – in the immediate receiving environment – are likely to impact on archaeological resources.

Section 35 of the NHRA provides for the general protection of archaeological and palaeontological resources, and meteorites. In the event that archaeological resources are discovered during the course of development, Section 38(3) specifically requires that the discovery must immediately be reported to the PHRA, or local authority or museum who must notify the PHRA. Furthermore, no person may without permits issued by the South African Heritage Resources Agency (SAHRA) destroy, excavate, or make any alterations to archaeological or palaeontological resources encapsulated in Section 38(4).

3.4.3.3 Section 36 – Burial grounds and graves

Construction and operation activities associated with the Geluksdal TSF and Pipeline Project – in the immediate receiving environment – are likely to impact on burial grounds and graves.

Section 36 of the NHRA allows for the general protection of burial grounds and graves. Should burial grounds or graves be found during the course of development, Section 36(6) stipulates that such activities must immediately cease and the discovery reported to the

responsible heritage resources authority and the South African Police Service (SAPS). Furthermore, as specified in Section 38(3) no person may destroy, damage, exhume or alter any burial site without a permit issued by SAHRA.

3.4.3.4 Section 37 – Public monuments and memorials

Section 37 makes provision for the protection of all public monuments and memorials in the same manner as places which are entered in a heritage register referred to in Section 30 of the NHRA.

3.4.3.5 Section 38 – Heritage Resource Management (HRM)

Section 38 (8): The provisions of this section do not apply to a development as described in Section 38 (1) if an evaluation of the impact of such development on heritage resources is required in terms of the Environment Conservation Act, 1989 (Act No. 73 of 1989), or the integrated environmental management guidelines issued by the Department of Environment Affairs and Tourism, or the Minerals Act, 1991 (Act No. 50 of 1991), or any other legislation. Section 38(8) ensures cooperative governance between all responsible authorities through ensuring that the evaluation fulfils the requirements of the relevant heritage resources authority in terms of Subsection (3), and any comments and recommendations of the relevant heritage resources authority with regard to such development have been taken into account prior to the granting of the consent.

The Listed Activities in terms of the Government Notice Regulations (GNRs) stipulated under NEMA for which Environmental Authorisation (EA) will be applied for will trigger a HIA as contemplated in Section 38(1) above as follows:

Table 3-1: Listed Activities in terms of the GNRs stipulated under NEMA

NEMA Listed Activity	Potential risk
Linear development	
GNR 544/9 The construction of facilities or infrastructure exceeding 1000 m in length for the bulk transportation of water, sewage or storm water.	<ul style="list-style-type: none"> ■ Site clearance that will be required to prepare construction sites may destroy or damage physical heritage resources, including but not limited to, historical sites, and burial grounds and graves; ■ Site clearance and construction will increase human traffic, increasing the risk to nearby heritage resources in

NEMA Listed Activity	Potential risk
<p>GN R 544/22</p> <p>The construction of a road, outside urban areas.</p>	<p>terms of accidental or purposeful damage or destruction;</p> <ul style="list-style-type: none"> ■ Blasting that may be required could result in damage to or loss of structures, including monuments; ■ Operation and maintenance of facilities will create long-term risk associated with more regular and increased human traffic, allowing access to nearby heritage resources; and ■ Construction of facilities may change the landscape character and may impact on the integrity of remaining nearby heritage resources.
Non-linear development	
<p>GN R 545/10</p> <p>The construction of facilities or infrastructure for the transmission and distribution of electricity.</p>	<ul style="list-style-type: none"> ■ Site clearance that will be required to prepare construction sites may destroy or damage physical heritage resources, including but not limited to, historical sites, and burial grounds and graves; ■ Site clearance and construction will increase human traffic, increasing the risk to nearby heritage resources in terms of accidental or purposeful damage or destruction; ■ Operation and maintenance of facilities will create long-term risk associated with more regular and increased human traffic, allowing access to nearby heritage resources; ■ Increased emissions that may include effluent, dust, ash and other forms of pollution may result in a change to the integrity of certain types of tangible heritage resources; ■ Construction of facilities may change the landscape character and may impact on the integrity of remaining nearby heritage resources. Powerlines may be routed through heritage sites.
<p>GN R 545/8</p> <p>The construction of facilities or infrastructure for the transmission and distribution of electricity with a capacity of 275 kilovolts or more, outside an urban area or industrial complex.</p>	
<p>GN R 544/23</p> <p>Physical alteration of undeveloped, vacant or derelict land for residential, retail, commercial, recreational, industrial or institutional use where the total area to be transformed is 20 hectares or more;</p>	

3.5 Expertise of Specialists

Justin du Piesanie completed a Master of Science (MSc) degree in archaeology at the University of the Witwatersrand (Wits). Justin holds the position of Archaeology Consultant in the Social Science Department at Digby Wells.

Johan Nel has completed a Bachelor of Arts (BA) degree in archaeology and anthropology and a BA Honours degree in archaeology at the University of Pretoria. Johan holds the position of Unit Manager for HRM in the Social Science Department at Digby Wells

4 METHODOLOGY

This HIA consists of a desktop study including background literature reviews and a review of relevant impact assessment reports, inferred information – and a vehicle and pedestrian site survey. A heritage site visit was undertaken for the identification and documentation of potential heritage resources, as stipulated in the NHRA and SAHRA Minimum Standards (2006). Fieldwork took place on 9 May 2012 and on 17 May 2012. The integrated Phase 1 HIA process consisted of the following steps.

4.1 Survey

A vehicle and pedestrian survey was undertaken on 9 May 2012 and on 17 May 2012 along the proposed pipeline routes and TSF area. This survey was aimed at locating and documenting potential sites of heritage significance located within the project boundaries and its immediate surrounds. General site conditions and features on site were recorded by means of photographs, GPS location, and description. A physical, pedestrian survey was done to identify and record any sites found *in situ*.

4.2 Data Acquisition

The first step was aimed at information gathering relating to known heritage resources within and surrounding the proposed area for development. Project information and data was obtained through intensive research, data gathering and consultation, including a variety of primary and secondary sources such as academic journals, textbooks and records, national and provincial websites, archaeological field guides, national guidelines, maps, photographs and plans. Surveys of topographical maps, satellite imagery and other cartographic material was undertaken to plot potential sites. Some older maps such as the Major Jackson series of early 20th century topographical maps were also consulted and integrated into the HIA where applicable. These are invaluable resources, as they often include features and information not recorded on later maps.

4.3 Assessment

The identified heritage resources were assessed to determine their significance in context of the National Estate in terms of Section 3 of the NHRA. Potential impacts on the heritage resources were assessed in terms of Digby Wells' standard EIA methodology, as well as in terms of the impact assessment criteria and ratings as detailed in the Association of Southern African Professional Archaeologists (ASAPA) and SAHRA guidelines. The site significance and impact assessment were integrated into the final EIA report.

5 DESCRIPTION OF PROPERTY AND/OR AFFECTED ENVIRONMENT

5.1 Details of Area Surveyed

The Cooke Uranium Project (the Project) entails the reclamation and re-processing of existing tailings dams in the Westonaria, Randfontein, Mogale City and Johannesburg regions. In addition some underground ore is being mined from the various Cooke shafts. The Project is located in the West Rand District Municipality and Johannesburg Municipality in the Gauteng Province. Fochville, Cardoville, Sebokeng and Westonaria are some of the towns and residential suburbs closest to the proposed project.

A summary of the geographical location of the Geluksdal TSF and Pipeline Project is presented in Table 5-1 on Page 11.

Table 5-1: Location Data

Province	Gauteng
Magisterial District / Local Authority	West Rand District Municipality
Municipality	Johannesburg Municipality
Property Name and Number	Geluksdal 396 IQ Cardoville 364 IQ Barnardsrus 628 IQ
1: 50 000 Map Sheet	2627BA Randfontein 2627BC Westonaria 2627DA Lindequesdrift
1: 10 000 Aerial Photo	N/A
GPS Co-ordinates	East/LON/X: 27.6229
(relative centre point of study area)	South/LAT/Y: -26.5368

5.1.1 Location maps

The regional settings of the Geluksdal TSF and Pipeline Project are depicted in Plan 1 and Plan 2 in Appendix B: Location and Site Maps.

5.1.2 Site maps

The position of Heritage Sites is depicted in Plan 3 and the pipeline route with photo sites is depicted in Plan 4 in Appendix B: Location and Site Maps.

6 RESTRICTIONS, LIMITATIONS, AND KNOWLEDGE GAPS

The following restriction was encountered during the course of this study:

- There was limited access to the TSF area during the field visit as permission was not granted from the land owners or they were not available during the survey to grant access. As a result the, the graves located within the TSF area were initially found by Pistorius and the information and descriptions were used from his report. The following limitation was encountered during the course of the study:
 - Due to restricted access, the location of the graves recorded by Pistorius (2009a, 2009c) could not be verified through ground truthing. The assessment of these graves was therefore based on the report compiled by Pistorius (2009a, 2009c).

The following knowledge gaps were identified during the course of the study:

- Although this report has been written as comprehensively and inclusive as possible, it should be noted that some archaeological and heritage sites may be located on a sub-surface level. Site access was also hampered by restrictions in access to sites at the time of the survey.
- The report by Pistorius records the burial grounds and graves located in and around the Geluksdal TSF and Pipeline Project area. However the report by Pistorius lacks visual records such as photographs of the burial grounds and graves. In addition, the graves could not be verified or photographed because, as discussed above, access was restricted. As a result there are no photographs of the burial grounds and graves discussed in this HIA report.

Due to the limitations, restrictions and knowledge gaps, potential chance finds of heritage resources may occur and consequently chance find procedures must be implemented. This implies that an archaeologist or heritage specialist must immediately be contacted should any additional archaeological or heritage features be uncovered during the construction or operational phase (i.e. environmental monitoring). Such heritage features and/or objects may not be disturbed or removed in any way until such time that the specialist has been able to do an assessment of the site/object.

7 SITE CONDITIONS AND LOCATION DATA

Table 7-1: GPS/GIS Data

GPS type and model used	Garmin eTrex Legend HCx	
Datum	WGS 84	
Average accuracy	~5 m	
Site co-ordinates	Site Names	
East/LON/X: 27.6396 South/LAT/Y: -26.5401	GY01	Two graves on Raatskraal 524 IQ (Pistorius)
East/LON/X: 27.6334 South/LAT/Y: -26.5359	GY02	25 graves on Geluksdal 396 IQ (Pistorius)
East/LON/X: 27.6159 South/LAT/Y: -26.5306	GY03	30 graves on Cardolville 364 IQ (Pistorius)
East/LON/X: 27.6071 South/LAT/Y: -26.5316	GY04	15 graves on Geluksdal 396 IQ (Pistorius)
East/LON/X: 27.7060 South/LAT/Y: -26.4032	RAN1386/DW004	Residential complex
East/LON/X: 27.6947 South/LAT/Y: -26.4250	RAN1386/DW007	Residential complex
East/LON/X: 27.6820 South/LAT/Y: -26.5071	RAN1386/DW017	Residential complex
East/LON/X: 27.6008 South/LAT/Y: -26.5328	RAN1386/DW025	Residential complex on Geluksdal 396 IQ

8 DESCRIPTION OF CONSULTATION WITH STAKEHOLDERS AND INTERESTED AND AFFECTED PARTIES

The PPP conducted for this project followed a consultative approach. This was achieved by encouraging active engagement from stakeholders so that suggestions and comments can be incorporated into the project design and that concerns and conflicts can be openly addressed in an on-going manner. Through the PPP, adequate and timely information was provided to all Interested and Affected Parties (I&AP) to ensure they are given sufficient opportunity to voice their opinions, concerns and issues. The following tasks were undertaken:

- Stakeholder identification;
- Development of appropriate documentation;
- Stakeholder notification (through the dissemination of information and meeting invitations);
- One-on-one meetings were undertaken with relevant local authorities, directly affected and surrounding landowners, farm occupiers and land claimants; and
- The compilation of a Draft Scoping Report which was made available to I&APs from 11 April 2012 to 21 May 2012.

8.1 Parties Consulted

Representatives of 44 registered conservation bodies were registered as stakeholders and are presented in Table 8-1 below. No specific local bodies were identified.

Table 8-1: Registered conservation bodies for the Geluksdal TSF and Pipeline Project

Registered Conservation Bodies	
Alan Cluett	Afrisam (South Africa)
C du Toit	AGRI South Africa
Johan Pienaar	AGRI South Africa
Reg Prosch	Association of Private Nature Reserves
John Capel	Bench Marks Foundation of Southern Africa
Louise Muller	Bronberg Conservation Association
Carin Bosman	Carin Bosman Sustainable Solutions
Mike Kantey	Coalition Against Nuclear Energy (CANE)
David Dorling	DDS Science cc Environmental Monitoring
John Eayrs	Disaster Management and Fire Protection Association
Tristen Taylor	Earthlife Africa
Keenan van Wyk	Earthlife Africa
Candis Lubbe	Ecopartners
Rynette Coetzee	Endangered Wildlife Trust (EWT)
Yolanda Friedman	EWT

Registered Conservation Bodies	
Anique Greyling	EWT
Christine Mentzel	EWT
Sylvia Barnard	Federation for a Sustainable Environment (FSE)
Siphamandla Buthelezi	FSE
Thembisa Dandi	FSE
Mariette Liefferink	FSE
Gladys Morobi	FSE
Koos Pretorius	FSE
Patricia Selebogo	FSE
Jacob Seloana	FSE
Thandi Ntseane	FSE
Michelle Sholto-Douglas	Footprints Environmental Centre
Sabina Khoza	Gauteng African Farmers Union
Bob Dehning	Gauteng Conservancy Association and NACSA
Dirk Boucher	Hartbeespoort Water Action Group
Brand Nthako	Jubilee South Africa
Theuns Pretorius	Kaalfontein Boerevereniging Distriks Landbou Unie
Japie Mostert	Krugersdorp Nature Reserve
Sushila Dhever	Legal Resource Centre (LRC)
Mnr Cloete	Magaliesberg TREPC
Helen Duigan	National Association of Conservancy of South Africa - Gauteng
Carmen Nottingham	Planner Bee Plant Care
Paul Potgieter	Potch Petitioners
Rene Potgieter	Potch Petitioners
Marc de Fontaine	Rand Water Rietspruit Blesbokspruit Forum
Michael Bothma	Randfontein Environmental Action Group
Tienie de Jager	Randfontein Environmental Action Group
Frans le Grange	Randfontein Environmental Action Group
Ivan Martin	Randfontein Environmental Action Group
Chris Mentz	Randfontein Environmental Action Group
Sello Ramanyai	Randfontein Environmental Action Group
Shan Holms	Realsearch Environmental Management and Development
Peter Irons	Seringveld Conservancy
Umesh Bahadur	South African National Biodiversity Institute
Thomani Manungufala	South African National Biodiversity Institute
Mlungisi Hlongwane	South African National Civic Organisation (SANCO)
Samson Mokoena	Steel Valley Crisis Committee
Val Payn	Sustain the Wildcoast Campaign
Grzegorz Pawlowski	Sustaining the Wildcoast
Carin Webb	Toekomsrus Crisis Committee
Getruida Ramrock	Toekomsrus Crisis Committee

Registered Conservation Bodies	
Matilda Padayachee	Toekomsrus Crisis Committee
George Isaacs	Toekomsrus Crisis Committee
Zamile Dyeshana	Toekomsrus Crisis Committee
Doneven Cloete	Toekomsrus Crisis Committee
Elvis Battis	Toekomsrus Crisis Committe
Louis Adriaanse	Toekomsrus Crisis Committee
Pastor Louis Adriaanse	Toekomsrus Crisis Committee/Toekomsrus Ministers Fraternal
Lynette du Plessis	Transvaal Agriculture Union
Louis Adriaanse Meintjes	Transvaal Agricultural Union South Africa (TAUSA)
Francois Durand	University of Johannesburg
Junior Potloane	Water Institute of Southern Africa
Maria Georgiou	Wilderness Eco Estates
Andrew Muir	Wilderness Foundation
Garth Barnes	Wildlife and Environment Society of South Africa (WESSA)
Marina Caird	WESSA
Karin Marx	WESSA
Bryan Haveman	WESSA
John Wesson	WESSA
Mike Whitcutt	WESSA
Katrin Gamble	WESSA
Colin and Elana Coreejas	Witfontein Action Group
Moses Green	Women Against Abuse of Women and Children (WAWA)
Ryan Green	WAWA
Hester Green	WAWA
Griffith Jansen	WAWA
Marcia Keet	WAWA
Therese Brinkcate	World Wide Fund for Nature South Africa
Louis van der Merwe	Zwartkrans Community Association

8.2 Results with regard to heritage resources

The comments pertaining to heritage that were addressed in the Comments and Response Report are presented in Table 8-2 below.

Table 8-2: Stakeholders and I&APs consulted and the comments pertaining to heritage that were raised during the PPP

I&AP	Date and media	Issue	Response
Mr F H Pelsier Rietfontein 519/24	21 May 2012	Features such as 100 year old houses are to be found (Mr Keyser) and are still inhabited.	A Heritage Impact Assessment was carried out as part of the EIA. The property discussed falls outside of the proposed impact area and will not be impacted upon
Mr MRW Gietzman Rietfontein 519		On the Keyser farm burial grounds with grave from 1861 – 1932, 1926 are to be found	Due to restricted access to the TSF area, the section of the farm Rietfontein was not assessed.
JC Keyser Rietfontein 519 (3 portions)			
C Van Heerden Rietfontein			
Andrew Salomon	18 April 2012	In terms of the National Heritage Resources Act, Act 25 of 1999, heritage resources, including archaeological or palaeontological sites over 100 years old, graves older than 60 years and structures older than 60 years have to be protected. These may not be disturbed without a permit for the relevant heritage resources authority.	A Heritage Impact Assessment was carried out as part of the EIA. All identified heritage resources were recorded, including those listed from previous impact assessments. Restricted access to the TSF area did not allow for extensive ground truthing. It is recommended that a Burial Grounds and Graves survey be conducted for the TSF area.
Sias and Gerda Rossouw Landowner Doornfontein	21 March 2012	We are concerned about the loss of our cultural heritage (old buildings and graves).	A Heritage Impact Assessment was conducted as part of the EIA. Graves and buildings with heritage value were identified as part of the study. Gold One has to comply with the National Heritage Resources Act (Act 25 of 1999) in terms of proposed mitigation measures. All recommendations made serve to minimise negative impacts to identified heritage resources.



I&AP	Date and media	Issue	Response
Mariette Liefferink Federation for a Sustainable Environment	26 April 2010	It is recommended that the cultural landscape of the affected area is fully described and the intersections between impacts on environmental, human health and cultural activities are defined and included in the EIA documents. This would need to include an assessment of traditional knowledge systems, descriptions of how flora and fauna affected by the project are used by society and how the project will impact upon these cultural activities.	This was assessed in the EIA.
Mariette Liefferink Federation for a Sustainable Environment	26 April 2010	It is recommended from this information (cultural landscape) and discussion with affected people, the projected future impacts upon the cultural landscape are also defined. Mitigation and remediation strategies designed to minimise the impacts on cultural activities should then be developed and included into the EIA documents.	This was assessed in the EIA.

9 STATE OF RECEIVING ENVIRONMENTAL - CULTURAL LANDSCAPE

9.1 Literature Review

9.1.1 The Stone Age

The Stone Age in southern Africa is divided into three periods, the Early, Middle and Late Stone Age. As our ancestors advanced physically, socially, and mentally, the use of stone tools allowed them to exploit the natural resources, access high protein foodstuff, and ultimately increase brain development. The Early Stone Age (ESA), dating from 2.5 million years ago (mya) to 200 000 years ago (ka), is marked by the use of large, fairly unsophisticated stone tool assemblages: the Oldowan (coarse simple flaked pebbles used as choppers) and the Acheulean (classic tear-drop shaped, bifacial flaked hand axes and cleavers) (Mitchell, 2002). In Gauteng, approximately 45 km north of the project area lay the Cradle of Humankind (CoH), declared a World Heritage Site in 1999. As a complex system of dolomitic caves, this area has produced evidence for occupation dating back to at least 2.3 mya, and yielding the largest collection of fossil remains pertaining to the evolution of modern man. It is here, at sites such as Sterkfontein and Swartkrans that stone tools dating to the ESA and MSA and hominid remains such as *Australopithecus*, *Paranthropus* and *Homo habilis* have been studied since the 1940's (Brodie, 2008).

The MSA is marked by a significant trend in the manufacture of the tools to smaller dimensions and increasing variety. In Southern Africa the earliest MSA industries are characterised by high proportions of minimally modified blades with the Levallois technique present. Regional traditions became more varied with a greater degree of local differentiation, making the Southern African MSA difficult to interpret (Clark, 1982). LSA tool technology is highly sophisticated when compared to ESA and MSA industries, with specific tools being created for specific purposes, and the inclusion of bone tools into the assemblages (Mitchell, 2002).

9.1.1.1 The Iron Age

The Iron Age in South Africa emerges in the archaeological record at around 2 000 years ago. A migration of Bantu-speakers arrived in southern Africa around this time bringing with them several technological and social innovations. These included metal working, ceramic production, domesticated animals (specifically cattle), agriculture and eventually certain settlement pattern motifs. The Iron Age has been studied by classifying the different ceramic styles into various facies. These facies track the migration of different groups of people, as well as the shifting and dynamic identities within these various groups and time periods of the Iron Age (Hall, 1987).

Using ceramic facies distributions outlined by Huffman (2007), five different ceramic styles may occur within the project area.

Table 9-1: Possible ceramic facies occurring in the project area (Huffman, 2007)

Ceramic facies	Period
Mzonjani	450 CE – 750 CE
Ntsuanatsatsi	1450 CE – 1650 CE
Olifantspoort	1500 CE – 1700 CE
Uitkomst	1650 CE – 1820 CE
Buispoort	1700 CE – 1840 CE

Stone walls identified by Huffman et al. (1991) share affinities with Klipriviersberg walling to the east. This type of walling belongs to the Ntsuanatsatsi cluster and is commonly associated with the *Uitkomst* facies. Historically, the Kwena moved southeast across the Vaal to find the Fokeng cluster at Ntsuanatsatsi Hill. Through a process of intermarriage with the Fokeng, the Kwena legitimised their takeover and became the Kwena-Fokeng where they moved north across the Vaal River (Huffman, 2007, p. 429).

Ethnographic research conducted by Breutz (1956) and Vorster (1969) indicated a cultural sequence of the Late Iron Age pertaining to the Bakwena-ba Mare-a-Phogole. The origins of this group can be traced to an area close to the Zeerust area on the border of Botswana (Breutz, 1956; Vorster, 1969). It is here where Phogole I, a son of Kwena-a-Malope, lived. A large famine dating to 1470 CE – 1500 CE drove Phogole I away from the area into parts of Rustenburg and the Free State to the last known settlement associated with the group around Fochville. Studies in surrounding areas (Fourie & van der Walt, 2005) have identified stone walled settlements associated with this group.

9.1.1.2 Historical Period

This period covers the emergence of South Africa as a modern state, through the colonial period, to the Anglo-Boer war and into the 20th century, with the creation of the Union of South Africa, and the eventual creation of the Republic of South Africa following the Second World War. The History of the Apartheid system and freedom struggle is also considered to be part of this period.

The project area was first settled by Europeans with the arrival of the Voortrekkers in 1838, attracted by the well watered shallow valleys and strong dolomitic fountains. Several homesteads were erected pre-Boer War. These homesteads were primarily associated with 'bywoners', a name given to poor white families (Huffman, et al., 1991) a group of poor whites dating from 1840 CE to 1890 CE. The structures were simple stone walled houses with one or two rooms. In what is today known as Westonaria, four farms were demarcated,

namely Venterspost, Gembokfontein, Libanon and Uitval and distributed amongst the families that arrived with Andries Hendrik Potgieter.

In 1886, gold was discovered on the Witwatersrand and the town of Johannesburg was established. It was originally thought that the gold bearing reef ending abruptly at a rupture known as the Witpoortjie Fault. Two prospectors, David and Edward Pullinger did not believe this to be true and established the company West Rand Estates that bought the mining rights for the four farms originally demarcated by the Voortrekkers. It was around this time that the British were occupying the area and burning down the houses of the Boers (Huffman, et al., 1991). From their prospecting, they demonstrated that the gold reef continued in the west and sank a shaft to mine for gold in 1902. Unfortunately, due to the lack of technology to pump the large quantity of water from the shaft while keeping operations economically viable, the mining operations were abandoned.

After a 24 year hiatus from mining in and around West Rand, Colonel James Donaldson and Mr Caliss bought up the mining rights for the four farms Venterspost, Gembokfontein, Libanon and Uitval and several other surrounding farms in 1926. They established the company Western Areas Limited and began the development of the area. In 1930, with the renewed interest in the far West Rand, there was a drive to determine whether the gold bearing reef was economically viable to mine. Goldfields of South Africa was the first group to invest in the region, taking over the Pullingers brothers firm and establishing West Witwatersrand Limited in 1932. In 1934, production at its first mine situated on Venterspost began, driving the need to establish associated infrastructure, including a town.

In 1937, the suburb called Venterspost was established and administered by the company Western Areas Limited. Westonaria also came into existence with the establishment of Venterspost, but its name would only be given to it the following year. With the rapid expansion of the town driven by the mining industry, Westonaria acquired town status in October 1948, being one of the first to be directly upgraded from the status of health committee to a town council (Anonymous, 2012).

At the same time as the major developments were happening in Westonaria, developments toward the east, in what would later become known as Soweto, began. In 1905, the town of Klipspruit was established directly to the east of the project area and was one of the first African townships. The first residents here were African miners that moved to Johannesburg with the discovery of gold on the Witwatersrand. Originally confined to live on the mining properties in tightly controlled single-sex barracks, and in interracial slums of the inner city as the population grew, government established Klipspruit 13 km from Johannesburg city centre.

A few years later to address the increasing populations in the Johannesburg slums, the Johannesburg City Council bought land on the farm Klipspruit Number 8 in 1930 to establish Orlando, or what they termed the 'biggest and finest township in the Union of South Africa'. Though this was the official stance, the conditions in Orlando were poor and there was a lack of facilities that could only be found in the city. By 1936, 12 000 people lived in Orlando and with the 'slum clearance programme' initiated by the Johannesburg City Council, the

numbers were growing resulting in squatters (Bonner & Segal, 1998). By 1946, squatters from Orlando forcibly occupied the construction site of the new Orlando West Township as a protest to what was said to be housing for black resident from areas the government wanted to declare 'white areas'. By 28 January 1947, the council conceded that the housing shortage and squatters was a serious problem that could no longer be controlled by force and established a new emergency camp called Moroko.

With the establishment of the Apartheid Government, Soweto became the centre of political resistance for African communities. At the centre were grievances against the pass laws with forced removals and unaffordable rents also at the forefront of contention and thereby instigating the defiance campaign. Meadowlands was established in 1953 as the site for the relocation of Sophiatown residents and in 1955 the forced removals were carried out. A second major event in the history of Soweto in 1955 was the Congress of the People held at Kliptown between 26 and 27 June 1955. The congress was a culmination of a two year campaign aimed at drawing up a charter of demands on behalf of the disenfranchised black population (Bonner & Segal, 1998).

During the height of Apartheid developed the 'black consciousness' movement where it had been decided that the time had come to challenge the status quo rejecting passive acceptance of white dominance. Figures such as Steve Biko were pivotal in this movement, but actualisation of 'black consciousness' in the minds of the population would only firmly take hold in 1976 with the events surrounding the Soweto Uprising. As resistance against the 'Afrikaans Medium Decree' in which it was declared that Afrikaans be the official medium in which schools were to teach students, school groups from around Soweto assembled on 16 June 1976 to conduct a peaceful march. The students were met by excessive force from police, in which tear gas was released and shots were fired without warning into the crowd. The official death toll was 23, though some estimate it to be around 200 with many more injured.

9.2 Relevant Databases and Collections

The archival and database survey was conducted by consulting the following resources:

- National Automated Archival Information Retrieval System (NAARIS);
- Genealogical Society of South Africa database; and
- University of the Witwatersrand (Wits) Archaeology Site Database.

A total of 22 sites around the project area were identified during the reports, archive and database survey.

The NAARIS was surveyed and no information was gathered.

The Genealogical Society of South Africa database was surveyed. All known cemeteries recorded on the database occurred outside of the proposed footprint of the project and will not be impacted upon.

The Wits Archaeological Site Database was consulted and no sites were identified within the project area, or in the immediate surrounds.

9.3 Relevant Previous Impact Assessment Reports

Seven Cultural Resource Management (CRM) reports were reviewed as baseline information locating identified cultural resources within or near the project area. These are discussed separately below.

Huffman et al. (1991) identified several sites pertaining to the Stone Age. Stone Tools associated with the ESA, MSA and LSA were noted along the proposed road development but all of these were found in disturbed contexts such as graded roads and quarries and were rated with low significance. Four historic structures were identified. These include the homes of 'bywoners' (1840 CE to 1890 CE) and African labourers and associated kraals. Additionally, one standing building older than 60 years was also identified. No geographic (GPS) reference was given for the recorded sites in the report.

Huffman et al. (1991) identified ten Stone Age sites, eight Late Iron Age cattle posts and a series of historic buildings dating to the 19th and 18th century for the Rietfontein Housing Scheme survey. ESA, MSA and LSA stone tools were identified, and with the exception of one MSA deposit and one MSA/LSA complex found *in situ*, the remainder were out of context in disturbed areas and rated with low significance. Several Late Iron Age sites were identified, primarily along the crest and tops of hills. The stone walling, though not extensive, seems to have an affinity with Klipriviersberg type, and is suggested to be cattle posts for the larger settlements to the east of the project area. Historic structures were also identified; these include stone foundations of 'bywoner' homesteads and a blockhouse built by the British during the 2nd Anglo-Boer War of 1898 – 1902. No GPS reference was given for the recorded sites in the report.

Van Schalkwyk (1997) conducted a survey of the Sebokeng area to the south east of the proposed TSF. In the report mention was made to Stone Age surface scatters found during the survey. These finds were rated with a low significance because they were found on the surface and thus out of context. Several historical structures were identified relating to homesteads or old farm houses but deemed with a low significance (Van Schalkwyk, 1997). It must be noted that reference to living heritage was made, where rituals and initiations were still being conducted in the area. It was recommended that communities be consulted to ascertain the intangible heritage significance of the landscape. No GPS reference was given for the recorded sites in the report.

Fourie & van der Walt (2005) conducted a heritage assessment on Waterpan 292 IQ and identified 16 sites of cultural heritage significance related to cemeteries, historic structures and cultural practice as well as Late Iron Age sites. The identified cemeteries and Late Iron Age sites were given a high significance rating (Fourie & van der Walt, 2005). It was also noted that pertaining to the living heritage of the area were also present in the project area.

Pistorius (2009a) conducted a survey north of the proposed pipeline. A memorial to Bernard Daniel de Beer dated to 21 September 1939, a graveyard and a historical townscape were

identified as heritage resources. The memorial and graveyard were within the project area, given a high significance rating and recommended that they remain *in situ* (Pistorius, 2009a). The historical townscape lies outside of the project area, but it is noted that the greater area is characterised by mining villages with buildings and associated mining infrastructure older than 60 years. No GPS reference was given for the recorded sites in the report.

Pistorius (2009b) conducted a survey for a proposed pit deposition project near Randfontein. A historical structure associated with the mining history of the area was identified. It is described as a formidable concrete structure with lesser impressive structures surrounding it. It was given a medium significance rating, and as it fell outside of any impacts, no mitigation was recommended (Pistorius, 2009b).

Pistorius (2009c) conducted a survey for the proposed pyrite project near the Cooke Gold Plant. Only a single graveyard was identified. This heritage resource is given a high significance rating and is recommended to remain *in situ* (Pistorius, 2009c).

10 DESCRIPTION OF BUILT ENVIRONMENT RESOURCES

10.1 RAN1386/DW004 – Residential complex

A residential complex illustrated in Figure 10-1 and indicated on Plan 3 was recorded along an existing servitude and proposed pipeline route during the survey. The site is located approximately 65 m east of the proposed pipeline route.

Table 10-1: Summary of Site RAN1386/DW004

Site Type	A residential complex
Site category	NHRA Section 34
Site location	<p>Site co-ordinates</p> <p>East/LON/X: 27.7060</p> <p>South/LAT/Y: -26.4032</p> <p>The site is located approximately 65 m away from the proposed pipeline route.</p>
Context	The resource is located along an existing servitude.
Age	Title deed dates to 1951 and the structure is possibly 62 years old.
Threats or sources of risk	
The construction of the pipeline may cause possible damage to the structure during the construction phase of the pipeline route. Other threats include water damage and vandalism as a result of the	

influx of people during the construction of the pipeline.

Recommended Mitigation

It is recommended that a Watching Brief be undertaken during the constructing phase of this project.



Figure 10-1: General view of Site RAN1386/DW004

10.2 RAN1386/DW007 – Residential complex

A residential complex illustrated in Figure 10-2 and indicated on Plan 3 was recorded along an existing servitude and proposed pipeline route during the survey. The site is located approximately 128 m west of the proposed pipeline route.

Table 10-2: Summary of Site RAN1386/DW007

Site Type	A residential complex
Site category	NHRA Section 34
Site location	<p>Site co-ordinates</p> <p>East/LON/X: 27.6947</p> <p>South/LAT/Y: -26.4250</p> <p>The site is located approximately 128 m away from the</p>

	proposed pipeline route.
Context	The resource is located along an existing servitude.
Age	Title deed dates to 1944 so the structure is possibly 69 years old.
Threats or sources of risk	
The construction of the pipeline may cause possible damage to the structure during the construction phase of the pipeline route. Other threats include water damage and vandalism as a result of the influx of people during the construction of the pipeline.	
Recommended Mitigation	
It is recommended that a Watching Brief be undertaken during the constructing phase of this project.	



Figure 10-2: General view of Site RAN1386/DW007

10.3 RAN1386/DW017 – Residential complex

A residential complex illustrated in Figure 10-3 and indicated on Plan 3 was recorded along an existing servitude and proposed pipeline route during the survey. The site is located approximately 56 m east of the proposed pipeline route.

Table 10-3: Summary of Site RAN1386/DW017

Site Type	A residential complex
Site category	NHRA Section 34
Site location	<p>Site co-ordinates</p> <p>East/LON/X: 27.6820</p> <p>South/LAT/Y: -26.5071</p> <p>The site is located approximately 56 m away from the proposed pipeline route.</p>
Context	The resource is located along an existing servitude.
Age	Title deed dates to 1909 so the structure is possibly 104 years old.
Threats or sources of risk	
The construction of the pipeline may cause possible damage to the structure during the construction phase of the pipeline route. Other threats include water damage and vandalism as a result of the influx of people during the construction of the pipeline.	
Recommended Mitigation	
It is recommended that a Watching Brief be undertaken during the constructing phase of this project.	



Figure 10-3: General view of Site RAN1386/DW017

10.4 RAN1386/DW025 – Residential complex

A residential complex illustrated in Figure 10-4 and Figure 10-5 and indicated on Plan 3 was recorded on Geluksdal 396 IQ during the survey. The site is located in TSF study area. The site is an unutilised complex on Doornfontein 522 IQ Portion 5 and a title deed for this property dates to 1946 so the structure is approximately 67 years old. Records indicate that it was originally owned by the De Bruyn family.

Table 10-4: Summary of Site RAN1386/DW025

Site Type	A residential complex
Site category	NHRA Section 34
Site location	<p>Site co-ordinates</p> <p>East/LON/X: 27.6008</p> <p>South/LAT/Y: -26.5328</p> <p>The site is located in the TSF study area.</p>
Context	The site is situated on agricultural land.

Age	Title deed dates to 1946 so the structure is possibly 67 years old.
Threats or sources of risk	
The construction of the TSF may cause possible damage to the structure during the construction phase of the TSF. Other threats include water damage and vandalism as a result of the influx of people during the construction of the pipeline.	
Recommended Mitigation	
It is recommended that a Watching Brief be undertaken during the constructing phase of this project.	



Figure 10-4: General view of Site RAN1386/DW025



Figure 10-5: An old shed part of the main complex at Sit RAN1386/DW025

11 DESCRIPTION OF BURIAL GROUNDS AND GRAVES

11.1 GY01 – Informal burial ground

Two graves were recorded by Pistorius on Raatskraal 524 IQ and are located within the TSF study area but outside of the TSF development footprint.

Table 11-1: Summary of Site GY01

Context	Informal burial ground
Site location	<p>Site co-ordinates</p> <p>East/LON/X: 27.6396</p> <p>South/LAT/Y: -26.5401</p> <p>The burial ground is located within the TSF study area but outside of the TSF development footprint.</p>
Physical Description	Two graves present
Condition	Unknown
Age	Unknown

Possible Affinity	Affinity with local community and possibly associated with farm owners.
Persons consulted	None
Threats or sources of risk and legal implications	
<ul style="list-style-type: none"> ■ Potential sources of threats and risk include vandalism by workers on site, accidental destruction or alteration of the burial ground by construction workers on site, and restricted or no access to the burial ground. ■ Legal implications based on Section 36 of the NHRA and Regulations Chapter XI (Sections 38-40), consultation with affected families and permit application for possible grave relocation. 	
Recommended Mitigation	
It is recommended that the burial ground be demarcated and that a Watching Brief be undertaken during the constructing phase of this project.	

11.2 GY02 – Informal burial ground

Approximately 25 graves were recorded by Pistorius on Geluksdal 396 IQ and are located within the TSF study area.

Table 11-2: Summary of Site GY02

Context	Informal burial ground
Site location	<p>Site co-ordinates</p> <p>East/LON/X: 27.6334</p> <p>South/LAT/Y: -26.5359</p> <p>The burial ground is located within the TSF study area but outside of the TSF development footprint.</p>
Physical Description	25 graves present
Condition	Unknown
Age	Unknown
Possible Affinity	Affinity with local community and possibly associated with farm owners.
Persons consulted	None
Threats or sources of risk and legal implications	

<ul style="list-style-type: none"> ■ Potential sources of threats and risk include vandalism by workers on site, accidental destruction or alteration of the burial ground by construction workers on site, and restricted or no access to the burial ground. ■ Legal implications based on Section 36 of the NHRA and Regulations Chapter XI (Sections 38-40), consultation with affected families and permit application for possible grave relocation.
Recommended Mitigation
It is recommended that the burial ground be demarcated and that a Watching Brief be undertaken during the constructing phase of this project.

11.3 GY03 – Informal burial ground

Approximately 30 graves were recorded by Pistorius on Cardolville 364 IQ and are located within the TSF study area.

Table 11-3: Summary of Site GY03

Context	Informal burial ground
Site location	Site co-ordinates East/LON/X: 27.6159 South/LAT/Y: -26.5306 The burial ground is located within the TSF development footprint.
Physical Description	30 graves present
Condition	Unknown
Age	Unknown
Possible Affinity	Affinity with local community and possibly associated with farm owners.
Persons consulted	None
Threats or sources of risk and legal implications	
<p>Immediate threats include the construction of the TSF which could result in irreparable damage to the graves.</p> <p>Potential sources of threats and risk include vandalism by workers on site, accidental destruction or alteration of the burial ground by construction workers on site, and restricted or no access to the burial ground.</p> <p>Legal implications based on Section 36 of the NHRA and Regulations Chapter XI (Sections 38-40),</p>	

consultation with affected families and permit application for possible grave relocation.
Recommended Mitigation
It is recommended that the burial ground be relocated.

11.4 GY04 – Informal burial ground

Approximately 15 graves were recorded by Pistorius on Geluksdal 396 IQ and are located within the TSF study area.

Table 11-4: Summary of Site GY04

Context	Informal burial ground
Site location	Site co-ordinates East/LON/X: 27.6071 South/LAT/Y: -26.5316 The burial ground is located within the TSF study area but outside of the TSF development footprint.
Physical Description	15 graves present
Condition	Unknown
Age	Unknown
Possible Affinity	Affinity with local community and possibly associated with farm owners.
Persons consulted	None
Threats or sources of risk and legal implications	
Potential sources of threats and risk include vandalism by workers on site, accidental destruction or alteration of the burial ground by construction workers on site, and restricted or no access to the burial ground. Legal implications based on Section 36 of the NHRA and Regulations Chapter XI (Sections 38-40), consultation with affected families and permit application for possible grave relocation.	
Recommended Mitigation	
It is recommended that the burial ground be demarcated and that a Watching Brief be undertaken during the constructing phase of this project.	

12 STATEMENT OF SIGNIFICANCE/HERITAGE VALUE

Table 12-1: Criteria used to determine value and significance of heritage resources, Section 3 NHRA

NHRA reference	Description of defining criteria
3(1)(a)	its importance in the community, or pattern of South Africa's history;
3(1)(b)	its possession of uncommon, rare or endangered aspects of South Africa's natural or cultural heritage;
3(1)(c)	its potential to yield information that will contribute to an understanding of South Africa's natural or cultural heritage;
3(1)(d)	its importance in demonstrating the principal characteristics of a particular class of South Africa's natural or cultural places or objects;
3(1)(e)	its importance in exhibiting particular aesthetic characteristics valued by a community or cultural group;
3(1)(f)	its importance in demonstrating a high degree of creative or technical achievement at a particular period;
3(1)(g)	its strong or special association with a particular community or cultural group for social, cultural or spiritual reasons;
3(1)(h)	its strong or special association with the life or work of a person, group or organisation of importance in the history of South Africa; and
3(1)(i)	sites of significance relating to the history of slavery in South Africa.

Table 12-2: Proposed field ratings/grades describing value and significance of heritage resources of tangible heritage resources

SIGNIFICANCE RATING	DESCRIPTION	SAHRA RATING (RSA only)	RECOMMENDED MITIGATION
7	High	Grade 1	Conservation: National Site Nomination
6	High	Grade 2	Conservation: Provincial Site Nomination
5	High	Grade 3A	Conservation: Regional Site Nomination
4	Medium	Grade 3B	Mitigation and partly conserved
3	Average	Grade 4A	Mitigation before destruction
2	Average	Grade 4B	Record before destruction
1	Low	Grade C	Destruction / none

Table 12-3: Summary of Heritage Significance Ratings per Site

Site number	PARAMETER													SIGNIFICANCE Rating (sum of A to D)
	(a) Importance	(b) Uncommon aspects	(c) Information potential	(d) Principle characteristics	(e) Aesthetic characteristics	(f) Technical / creative skill	(g) Social, cultural or spiritual association	(h) Association with life or work of a person, group or organisation	(i) Slavery	(A) Context	(B) Site integrity	(C) Extent	(D) Uniqueness	
GY01	4	2	4	2	4	1	7	3	1	3	7	4	1	4
GY02	4	2	4	2	4	1	7	3	1	3	7	4	1	4
GY03	4	2	4	2	4	1	7	3	1	3	7	4	1	4
GY04	4	2	4	2	4	1	7	3	1	3	7	4	1	4
RAN1386/DW004	2	1	2	2	2	1	1	1	1	1	7	4	1	3
RAN1386/DW007	2	1	2	2	2	1	1	1	1	1	7	2	1	3
RAN1386/DW017	2	1	2	2	2	1	1	1	1	1	7	2	1	3
RAN1386/DW025	2	1	2	2	2	1	1	1	1	1	7	2	1	3

13 DISCUSSION OF RESULTS AND FINDINGS

The physical survey was conducted by foot and vehicle survey. A review of previously identified sites was also completed, to verify sites and determine extent of sites.

Sites that were recorded in previous assessments and in the survey include historical and built environment resources such as houses, residential complexes, farmsteads. In addition, burial grounds and graves associated with these historical structures have also been recorded in the area.

Pipeline Route

The proposed pipeline runs from the Cooke Gold Plant in the north in two alternative routes to the selected Geluksdal TSF site in the south (Plan 4). The proposed pipeline routes are currently projected to run within existing pipeline servitudes. As a result, the impact area has

been highly disturbed and no impacts to heritage resources were identified during the survey. Alternative Pipeline Route 2 runs along underground pipeline servitude in close proximity to residential complexes. As an existing servitude is present, potential impacts to these sites are minimal and unlikely.

Title Deed searches were not done prior to the survey and therefore the ages of any built structures present in the area were unknown at the time of the survey. As a result, all structures within the Geluksdal TSF and Pipeline Project area were documented. A title deed search was conducted after the survey and the following sites were shown to be older than 60 years and are therefore protected under Section 34 of the NHRA:

- RAN1386/DW004;
- RAN1386/DW007;
- RAN1386/DW017; and
- RAN1386/DW025.

Thirty graves were identified at the site, with only a few consisting of formal headstones with inscriptions (Table 13-1). The remainder comprised stone surface dressing with no headstone. The site was burnt during a recent veld fire, but it was evident that it is no longer tended, suggesting that relatives of the deceased do not frequent the site. Inscriptions on some of the headstones suggest that the cemetery belongs to the Kgaole family or relatives thereof. The cemetery lies approximately 350 m away from the proposed pipeline and an existing TSF, and will not be impacted upon.

Table 13-1: Visible Inscriptions on Headstones from RAN1386/DW001

Inscription
Koos Motlhakule – 1952
Mathew Kgaole – 1949
Selopolgo Paul Kgaole Born 2-3-1936 Died 28-10-1945
Ben Kgaole
Abasai Kgaole 1-9-1942

Inscription
Ms Christina Khadle 1858 Mak 1960
Elias Kgaole Shot April 18 1959
Aolos Kgaole

TSF Area

The proposed TSF area is currently used for agricultural purposes. As a result, the area is highly disturbed. The following built structures, consisting of farms houses and associated infrastructure, were all recorded in the TSF study area during the survey because the dates were not known. After the survey, the title deed searches revealed that these structures are younger than 60 years and therefore are not protected under Section 34 of NHRA:

- RAN1386/DW027;
- RAN1386/DW028;
- RAN1386/DW029;
- RAN1386/DW030; and
- RAN1386/DW031.



Figure 13-1: Photograph of structure (RAN1386/DW025)

Four burial grounds and graves were recorded in and around the TSF study area by Pistorius:

- GY01 – within the TSF study area but approximately 727 m outside of the TSF footprint
- GY02 – within the TSF study area but approximately 62 m outside of the TSF footprint;
- GY03 – In the TSF study area; and
- GY04 – within the TSF study area but approximately 721 m outside of the TSF footprint.

Of the four burial grounds and graves that were recorded, only one falls within the TSF footprint. The remaining three burial grounds and graves fall outside of the TSF footprint (Figure 13-2).



Figure 13-2: Position of recorded sites in the TSF study area

Identified sites are summarised in Table 13-2. For SAHRA grading see Appendix C: EIA Methodology and Assessment of Resource Significance/Value.

Table 13-2: Summary of Identified Heritage Resources (See Appendix A for site details)

SITE ID	DESCRIPTION	SAHRA GRADING	SIGNIFICANCE ASSESSMENT	IMPACT ASSESSMENT
GY01	Two graves on Raatskraal 524 IQ (Pistorius)	Grade 3B	4	18
GY02	Approximately 25 graves on Geluksdal 396 IQ (Pistorius)	Grade 3B	4	18
GY03	Approximately 3 graves on Cardolville 364 IQ (Pistorius)	Grade 3B	4	123

SITE ID	DESCRIPTION	SAHRA GRADING	SIGNIFICANCE ASSESSMENT	IMPACT ASSESSMENT
GY04	Approximately 15 graves on Geluksdal 396 IQ (Pistorius)	Grade 3B	4	18
RAN1386/DW004	30 graves located in 350 m away from proposed line.	Grade 3B	3	27
RAN1386/DW007	Built environment - Farm house and associated infrastructure	Grade 4A	3	27
RAN1386/DW017	Built environment - Farm house and associated infrastructure	Grade 4A	3	27
RAN1386/DW025	Built environment - Farm house and associated infrastructure	Grade 4A	3	27

13.1 Impact Assessment

This section aims to assess the significance of the potential impacts (threats or sources of risk) on heritage resources in the proposed project area. The following impact assessment was completed in compliance with the impact assessment criteria implemented for the environmental impact assessment report as well as the significance ratings and archaeological impact assessment criteria established by the ASAPA and applicable international best practise guidelines. More information on the archaeological impact assessment criteria and rating used in this study and details on the weight assigned to the various parameters for positive and negative impacts in the formula are presented in Appendix C: EIA Methodology and Assessment of Resource Significance/Value.



Activity, Phase and Impact				Impact Rating (before mitigation)									Impact Rating (after mitigation)								
Impacted Environment	Phase impact occurs (C, O, D, PC)	Activity No.	Activity	Summary of Impact	Reference in EIA	Nature of Impact (positive / Negative)	Spatial Scale (7)	Duration (7)	Severity (7)	Consequence	Probability (7)	Site significance (7)	Significance (154)	Nature of Impact (positive / Negative)	Spatial Scale (7)	Duration (7)	Severity (7)	Consequence	Probability (7)	Site significance (7)	Significance (154)
Heritage																					
GY01	C		Site Clearing and preparation along pipeline route and TSF area; Construction of TSF (incl. Sub-surface drainage system, return and storm water dams)	Possible damage to structure during construction of the TSF. Other threats may include water damage, vandalism during construction.		N	1	5	1	7	2	4	18	P	1	1	1	3	1	4	7
GY02	C		Site Clearing and preparation along pipeline route and TSF area; Construction of TSF (incl. Sub-surface drainage system, return and storm water dams)	Possible damage to structure during construction of the TSF. Other threats may include water damage, vandalism during construction.		N	1	5	1	7	2	4	18	P	1	1	1	3	1	4	7
GY03	C		Site Clearing and preparation along pipeline route and TSF area; Construction of TSF (incl. Sub-surface drainage system, return and storm water dams)	Graves will be irreparably damaged by the construction of the TSF		N	3	7	7	17	7	4	123	P	3	6	2	11	1	4	15
GY04	C		Site Clearing and preparation along pipeline route and TSF area; Construction of TSF (incl. Sub-surface drainage system, return and storm water dams)	Possible damage to structure during construction of the TSF. Other threats may include water damage, vandalism during construction.		N	1	5	1	7	2	4	18	P	1	1	1	3	1	4	7
RAN1386/DW004	C, O		Site Clearing and preparation along pipeline route and TSF area; Construction of pipeline and surface infrastructure (incl. service roads, pump houses)	Possible damage to structure during construction of the pipeline. Other threats may include water damage, vandalism during construction.		N	2	5	1	8	3	3	27	P	2	1	1	4	1	3	7



Activity, Phase and Impact				Impact Rating (before mitigation)									Impact Rating (after mitigation)								
Impacted Environment	Phase impact occurs (C, O, D, PC)	Activity No.	Activity	Summary of Impact	Reference in EIA	Nature of Impact (positive / Negative)	Spatial Scale (7)	Duration (7)	Severity (7)	Consequence	Probability (7)	Site significance (7)	Significance (154)	Nature of Impact (positive / Negative)	Spatial Scale (7)	Duration (7)	Severity (7)	Consequence	Probability (7)	Site significance (7)	Significance (154)
Heritage																					
RAN1386/DW007	C, O		Site Clearing and preparation along pipeline route and TSF area; Construction of pipeline and surface infrastructure (incl. service roads, pump houses)	Possible damage to structure during construction of the pipeline. Other threats may include water damage, vandalism during construction.		N	2	5	1	8	3	3	27	P	2	1	1	4	1	3	7
RAN1386/DW017	C, O		Site Clearing and preparation along pipeline route and TSF area; Construction of pipeline and surface infrastructure (incl. service roads, pump houses)	Possible damage to structure during construction of the pipeline. Other threats may include water damage, vandalism during construction.		N	2	5	1	8	3	3	27	P	2	1	1	4	1	3	7
RAN1386/DW025	C		Site Clearing and preparation along pipeline route and TSF area; Construction of TSF (incl. Sub-surface drainage system, return and storm water dams)	Possible damage to structure during construction of the TSF. Other threats may include water damage, vandalism during construction.		N	2	5	1	8	3	3	27	P	2	1	1	4	1	3	7

14 RECOMMENDATIONS

14.1 Mitigation

Mitigation measures fall in two categories: project-related mitigation and mitigation of sites/heritage resources.

Project-related mitigation: impacts on heritage resources may be avoided or reduced through the implementation of feasible mitigation measures related to the project design and planning. For instance, an historical building may be preserved *in situ* by changing infrastructure footprints.

Mitigation of heritage resources: where project-related mitigation does not reduce or remove impacts on a heritage resource, the resource itself may require mitigation. For example, any resource located in the open-cast pit area will inevitably be destroyed, irrespective of any project-related mitigation measures as the pit cannot be moved. Depending on the value of a resource (field rating/grading) certain prescribed site mitigation measures must then be implemented. This could include:

- *Site preservation:* Conservation is essentially a no-development recommendation and may be achieved through appropriate project-related mitigation;
- *Site mitigation:* Site conservation (no-development in the particular area) or Phase 2 mitigation (Shovel Test Pits (STPs)) after which development may legally proceed in the area; and
- *Site destruction:* If a particular identified resource is of little archaeological or cultural heritage significance, a recommendation of site destruction will be made by an accredited archaeologist. A site destruction recommendation essentially implies that the site may be destroyed during the course of development without the developer having to comply with any archaeological or cultural heritage requirements.

For the Geluksdal TSF and Pipeline Project, it is recommended that the following sites undergo project-related mitigation:

14.1.1 Mitigation of site RAN1386/DW004

Project-related mitigation

The site is situated 65 m east of the proposed pipeline route. Management measures aimed at avoiding any physical impact on the site will be sufficient to preserve the site. These management measures include the undertaking of a Watching Brief during the constructing phase of this project as well as periodic monitoring of the site and project planning to ensure continued preservation.

14.1.2 Mitigation of site Ran1386/DW007

Project-related mitigation

The site is situated 128 m west of the proposed pipeline route. Management measures aimed at avoiding any physical impact on the site will be sufficient to preserve the site. These management measures include the undertaking of a Watching Brief during the constructing phase of this project as well as periodic monitoring of the site and project planning to ensure continued preservation.

14.1.3 Mitigation of site RAN1386/DW017

Project-related mitigation

The site is situated 56 m east of the proposed pipeline route. Management measures aimed at avoiding any physical impact on the site will be sufficient to preserve the site. These management measures include the undertaking of a Watching Brief during the constructing phase of this project as well as periodic monitoring of the site and project planning to ensure continued preservation.

14.1.4 Mitigation of site RAN1386/DW025

Project-related mitigation

The site is situated in the TSF study area. Management measures aimed at avoiding any physical impact on the site will be sufficient to preserve the site. These management measures include the undertaking of a Watching Brief during the constructing phase of this project as well as periodic monitoring of the site and project planning to ensure continued preservation.

14.1.5 Mitigation of site GY01

Project-related mitigation

The site is situated in the TSF study area. Management measures aimed at avoiding any physical impact on the site will be sufficient to preserve the site. These management measures include the demarcating the burial ground by fencing. In addition, a Watching Brief must also be conducted during the constructing phase of this project.

14.1.6 Mitigation of site GY02

Project-related mitigation

The site is situated in the TSF study area. Management measures aimed at avoiding any physical impact on the site will be sufficient to preserve the site. These management measures include the demarcating the burial ground by fencing. In addition, a Watching Brief must also be conducted during the constructing phase of this project.

14.1.7 Mitigation of site GY03

This site is located within the TSF development footprint. Immediate threats include the construction of the TSF which could result in irreparable damage to the graves. Potential sources of threats and risk include vandalism by works on site, accidental destruction or alteration of the burial ground by construction workers on site, and restricted or no access to the burial ground.

According to the NHRA Section 36, no person may destroy, damage, alter, exhume or remove a grave or burial ground without a permit from SAHRA. SAHRA may only issue a permit for the destruction of the burial ground if the applicant has made arrangement for the exhumation and re-interment of the contents of the graves, to the cost of the applicant.

Based on the potential sources of threats or risk, it is recommended that the burial ground be mitigated before destruction. In terms of the NHRA Section 36, the mitigation measures recommended include grave relocation with consultation with affected families.

In addition to the grave relocation, it is also recommended that a burial grounds and grave survey be conducted for the entire TSF study area to maximise the identification of all graves prior to relocation.

14.1.8 Mitigation of site GY04

Project-related mitigation

The site is situated in the TSF study area. Management measures aimed at avoiding any physical impact on the site will be sufficient to preserve the site. These management measures include the demarcating the burial ground by fencing. In addition, a Watching Brief must also be conducted during the constructing phase of this project.

15 CONCLUSION

This HIA was undertaken with the aim of locating and identifying heritage resources along the proposed Geluksdal TSF and Pipeline Project area, assess their significance and recommend appropriate mitigations. A site visit was completed to accomplish these aims.

The proposed pipeline routes lay within existing servitudes and potential impacts on heritage resources are not expected. One burial ground and three built structures occur in close proximity to the TSF study area and proposed pipeline route. Within the proposed TSF area, one burial ground and one built structure were identified. These heritage resources have a medium to high potential of being impacted upon. An assessment methodology aimed at objectively quantifying potential impacts and site significance was used to determine impact significance and site significance.

In general, site significance and potential impacts were assessed as ranging from low to medium. Recommendations included:

- A Watching Brief for the built structures during the construction phase of the project;

- A burial grounds and graves survey;
- Grave relocation of:
 - the burial ground GY03; and
 - any other graves that may be identified during the burial ground and graves survey.
- Demarcation of all graves outside of the TSF footprint but within the TSF study area.

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Van Schalkwyk, J., 2008a. *Heritage survey report for the development of water pipelines for the Droogeheuveld and Middleveld Townships, Randfontein, Gauteng*, s.l.: Report prepared for Synergistics Environmental Services.

Van Schalkwyk, J., 2008b. *Heritage Survey Report for the Proposed Westgate-Tarlton-Kromdraai Poweline and Substation, Randfontein and Krugersdorp Magisterial Districts, Gauteng*, s.l.: Report prepared for Argus Gibb (Pty) Ltd.

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Appendix A: Curriculum Vitae of Specialists



DIGBY WELLS
ENVIRONMENTAL

JUSTIN DU PIESANIE

Mr. Justin du Piesanie
Archaeology Consultant
Social Sciences Department
Digby Wells Environmental

1 EDUCATION

University of the Witwatersrand

- BA Degree (2004)
- BA Honours Degree (2005) - Archaeology
 - Title of Dissertation - Seal Skeletal Distribution of Herder and Forager Sites at Kasteelberg, Western Cape Province of South Africa.
- Master of Science (MSc) Degree (2008) – Archaeology
 - Title of Dissertation – Understanding the Socio-Political Complexity of Leokwe Society during the Middle Iron Age in the Shashe-Limpopo Basin through a Landscape Approach

2 LANGUAGE SKILLS

English First Language
Afrikaans Second Language

3 EMPLOYMENT

2011 to Present: Archaeology Consultant at Digby Wells Environmental

2009 to 2011: Archaeology Collections Manager at the University of the Witwatersrand.

2009 to 2011: Freelance Archaeologist for Archaeology Resource Management (ARM), Matakoma Heritage Consultants, Wits Heritage Contracts Unit & Umlando Heritage Consultants.

2006 to 2007: Tour Guide at Sterkfontein Caves World Heritage Site.

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Directors: A Sing*, AR Wilke, LF Koeslag, PD Tanner (British)*, AJ Reynolds (Chairman) (British)*, J Leaver*, GE Trusler (C.E.O)

*Non-Executive

4 EXPERIENCE

- Wits Fieldschool - Excavation at Meyersdal, Klipriviersberg Johannesburg (Late Iron Age Settlement).
- Wits Fieldschool - Phase 1 Survey of Prentjiesberg in Ugie / Maclear area, Eastern Cape.
- Wits Fieldschool – Excavation at Kudu Kopje, Mapungubwe National Park Limpopo Province.
- Wits Fieldschool – Excavation of Weipe 508 (2229 AB 508) on farm Weipe, Limpopo Province.
- Survey at Meyersdal, Klipriviersberg Johannesburg.
- Mapping of Rock Art Engravings at Klipbak 1 & 2, Kalahari.
- Survey at Sonop Mines, Windsorton Northern Cape (Vaal Archaeological Research Unit).
- Excavation of Kudu Kopje, Mapungubwe National Park Limpopo Province.
- Excavation of KK (2229 AD 110), VK (2229 AD 109), VK2 (2229 AD 108) & Weipe 508 (2229 AB 508) (Origins of Mapungubwe Project)
- Phase 1 Survey of farms Venetia, Hamilton, Den Staat and Little Muck, Limpopo Province (Origins of Mapungubwe Project)
- Excavation of Canteen Kopje Stone Age site, Barkley West, Northern Cape
- Excavation of Khami Period site AB32 (2229 AB 32), Den Staat Farm, Limpopo Province

5 PROJECT EXPERIENCE

- Phase 2 Mitigation at Meyersdal, Klipriviersberg Johannesburg (ARM)
- Phase 1 Mitigation – Mapping of Late Iron Age Site in Pilansberg, Sun City (ARM)
- Phase 1 Mitigation – Survey of Witbank dam development (ARM)
- Phase 1 Mitigation – Survey of Glen Austin AH, Johannesburg (Matakoma)
- Phase 1 Mitigation – Survey of Modderfontein AH Holding 34, Johannesburg (Matakoma)
- Phase 1 Mitigation – Survey of Modderfontein AH Holding 38, Johannesburg (Matakoma)
- Phase 1 Mitigation – Survey of Modderfontein AH Holding 44, Johannesburg (Matakoma)
- Phase 1 Mitigation – Survey of Modderfontein AH Holding 46, Johannesburg (Matakoma)
- Phase 1 Mitigation – Survey of Modderfontein AH Holding 47, Johannesburg (Matakoma)
- Phase 1 Mitigation – Survey of Modderfontein AH Holding 48, Johannesburg (Matakoma)
- Phase 1 Mitigation – Survey of Modderfontein AH Holding 49, Johannesburg (Matakoma)
- Phase 1 Mitigation – Survey of Modderfontein AH Holding 50, Johannesburg (Matakoma)



- Phase 1 Mitigation – Survey of Modderfontein AH Holding 61, Johannesburg (Matakoma)
- Phase 1 Mitigation – Survey of Modderfontein AH Holding 62, Johannesburg (Matakoma)
- Phase 1 Mitigation – Survey of Modderfontein AH Holding 71, Johannesburg (Matakoma).
- Phase 1 Mitigation – Survey of Modderfontein AH Holding 72, Johannesburg (Matakoma)
- Phase 1 Mitigation – Survey of Modderfontein 35IR Portion 40, Johannesburg (Matakoma)
- Phase 1 Mitigation – Survey of Rhino Mines, Thabazimbi Limpopo Province (ARM)
- Phase 1 Mitigation – Survey of Moddergat 389KQ, Schilpadnest 385KQ, Swartkop 369KQ, Cronimet Project, Thabazimbi Limpopo Province (Matakoma)
- Desktop Study – Desktop study for the Eskom Thohoyandou SEA Project, Limpopo Province (Matakoma)
- Phase 2 Mitigation – Excavation of Iron Age site on Wenzelrust, Shoshanguve Gauteng (Heritage Contracts Unit)
- Phase 1 Mitigation – Mapping of Late Stone Age shelter, Parys, Free State
- Phase 1 Mitigation – Survey of Vaalkrans Battlefield for the Transnet NMPP Line (Umlando)
- Phase 1 Mitigation – Survey of Portion 222 of Mindale Ext 7 Witpoortjie 254 IQ & Portion 14 of Nooitgedacht 534 IQ, Johannesburg (ARM)
- Phase 2 Mitigation – Excavation of Site 19 for the Anglo Platinum Mines Der Brochen & Booyensdal, Steelpoort, Mpumalanga (Heritage Contracts Unit)
- Phase 1 Mitigation – Mapping of sites 23, 26, 27, 28a & b for the Anglo Platinum Mines Der Brochen & Booyensdal, Steelpoort, Mpumalanga (Heritage Contracts Unit)
- Desktop Study - Desktop study for the inclusion into the Thohoyandou Electricity Master Network for Eskom, Limpopo Province (Strategic Environmental Focus)
- Phase 1 Mitigation – Mapping of historical sites as part of the mitigation for the expansion of the Bathlako Mine's impact area (Heritage Contracts Unit).
- Phase 2 Mitigation – Kibali Grave Relocation Project (KGRP) for the Kibali Gold Project, Democratic Republic of Congo (Digby Wells)
- Phase 1 Mitigation – Heritage Assessment and Survey for the proposed Kibali Hydro Power Stations, Democratic Republic of Congo (Digby Wells)
- Phase 1 Mitigation – Heritage Impact Assessment & Survey of the farm Vygenhoek for Aquarius Resources Everest North Mining Project, Steelpoort, Mpumalanga (Digby Wells)
- Phase 1 Mitigation – Heritage Impact Assessment for the Gold One International Ltd Proposed Geluksdal Tailings Storage Facility and Pipeline Infrastructure, Johannesburg, Gauteng Province (Digby Wells)
- Phase 1 Mitigation – Burial Grounds and Graves Survey (BGGS) for Platreef Resources, Mokopane, Limpopo Province (Digby Wells)
- Phase 2 Mitigation – Archaeological Impact Assessment of sites for Resource Generation Boikarabelo Mine, Steenbokpan, Limpopo Province (Digby Wells)



- Phase 1 Mitigation – Watching Brief for Bokoni Platinum Mines (Pty) Ltd, Burgersfort, Limpopo Province (Digby Wells)
- Heritage Statement for Rhodium Reefs Limited Platinum Operations on the Farm Kennedy's Vale 361 KT, Steelpoort, Mpumalanga Province (Digby Wells).
- Socio-Economic and Asset Survey, SEGA Gold Mining Project, Cluff Gold PLC, Burkina Faso (Digby Wells)

6 PROFESSIONAL AFFILIATIONS

Society for Africanist Archaeologists (SAfA) Member

7 PROFESSIONAL REGISTRATION

Association of Southern African Professional Archaeologists (ASAPA): Professional & CRM Member

8 PUBLICATIONS

- Huffman, T.N. & du Piesanie, J.J. 2011. Khami and the Venda in the Mapungubwe Landscape. *Journal of African Archaeology* 9(2): 189-206



JOHAN NEL

Mr. Johan Nel

Unit manager: Heritage Resources Management

Social Sciences

Digby Wells Environmental

1 EDUCATION

2002 BA Honors - Archaeology

2001 BA Anthropology & Archaeology

1997 Matriculated Brandwag Hoërskool

2 LANGUAGE SKILLS

Fluent in English and Afrikaans

3 EMPLOYMENT

2011 to present Unit manager: Heritage Resources Management, Digby Wells Environmental

2010-2011 Archaeologist, Digby Wells Environmental

2005-2010 Manager and co-owner, Archaic Heritage Project Management

2003-2005 Freelance archaeologist

Resident archaeologist, Rock Art Mapping Project, Ndidima, Ukhahlamba-Drakensberg World Heritage Site

2002-2003 Special Assistant: Anthropology, Department of Anatomy, University of Pretoria

2001-2002 Technical Assistant: Department of Anatomy, University of Pretoria

1999-2001 Assistant: Mapungubwe Project, National Cultural History Museum & Department of Anthropology and Archaeology, UP

4 EXPERIENCE

I have 13 years of combined experience in the field of cultural heritage resources management (HRM) including archaeological and heritage assessments, grave relocation, social consultation and mitigation of archaeological sites. I have gained experience both within urban settings and remote rural landscapes. Since 2010 I have been actively involved in environmental management that has allowed me to investigate and implement the integration of heritage resources

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*Non-Executive

management into environmental impact assessments (EIA). Many of the projects since have required compliance with International Finance Corporation (IFC) requirements and other World Bank standards. This exposure has allowed me to develop and implement a HRM approach that is founded on international best practice and leading international conservation bodies such as UNESCO and ICOMOS. I have worked in most South African Provinces, as well as Swaziland, the Democratic Republic of the Congo and Sierra Leone. I am fluent in English and Afrikaans, with excellent writing and research skills.

5 PROJECT EXPERIENCE

PHASE 1 ARCHAEOLOGICAL IMPACT ASSESSMENTS:

- Above Ground Storage Tanks survey, SASOL Oil (Pty) Ltd, Free State Province, South Africa
- Access road establishment , AGES-SA, Tzaneen, South Africa
- Boikarabelo Railway Link, Resgen South Africa, Steenbokpan, South Africa
- Conversion of prospecting rights to mining rights, Georock Environmental, Musina, South Africa
- Galaxy Gold Agnes Mine, Barberton, South Africa
- HCI Khusela Palesa Extension, Bronkhorstspuit, South Africa
- Kennedy's Vale township establishment, AGES-SA, Steelpoort, South Africa
- Koidu Diamond Mine, Koidu Holdings, Koidu, Sierra Leone
- Lonmin Platinum Mine water pipeline survey, AGES-SA, Lebowakgomo, South Africa
- Mining right application, DERA Environmental, Hekpoort, South Africa
- Mogalakwena water pipeline survey, AGES-SA, Limpopo Province, South Africa
- Nzoro Hydropower Station, Environmental and Social Impact Assessment, DRC
- Randgold Kibali Gold Project, Environmental and Social Impact Assessment, Kibali, Democratic Republic of the Congo
- Randwater Vlakfontein-Mamelodi water pipeline survey, Archaeology Africa cc, Gauteng, South Africa
- Residential and commercial development, GO Enviroscience, Schoemanskloof, South Africa
- Temo Coal, Limpopo, South Africa
- Transnet Freight Line survey, Eastern Cape and Northern Cape, ERM, South Africa
- Van Reenen Eco-Agri Development Project, GO Enviroscience, South Africa
- Platreef Platinum Mine, Ivanhoe Nickel & Platinum, Mokopane, South Africa

MITIGATION PROJECTS:



- Mitigation of Iron Age archaeological sites: Kibali Gold Project, DRC
- Mitigation of Iron Age metalworking site: Koidu Diamond Mine, Sierra Leone
- Mitigation of Iron Age sites: Boikarabelo Coal Mine, South Africa
- Exploratory test excavations of alleged mass burial site: Rustenburg, Bigen Africa Consulting Engineers, South Africa
- Mitigation of Old Johannesburg Fort: Johannesburg Development Agency (JDA), South Africa
- Site monitoring and watching brief: Department of Foreign Affairs Head Office, Imbumba-Aganang Design & Construction Joint Venture, South Africa

GRAVE RELOCATION

- Du Preezhoek-Gautrain Construction, Bombela JV, Pretoria, South Africa
- Elawini Lifestyle Estate social consultation, PGS (Pty) Ltd, Nelspruit, South Africa;
- Motaganeng social consultation, PGS (Pty) Ltd Burgersfort, South Africa
- Randgold Kibali Mine, Relocation Action Plan, Kibali, DRC
- Repatriation of Mapungubwe National Park and World Heritage Site, DEAT, South Africa
- Smoky Hills Platinum Mine social consultation, PGS (Pty) Ltd Maandagshoek South Africa
- Southstock Colliery, Doves Funerals, Witbank, South Africa
- Tygervallei. D Georgiades East Farm (Pty) Ltd, Pretoria, South Africa
- Willowbrook Ext. 22, Ruimsig Manor cc, Ruimsig, South Africa
- Zondagskraal social consultation, PGS (Pty) Ltd, Ogies, South Africa
- Zonkezizwe Gautrain, PGS, (Pty) Ltd, Midrand, South Africa

OTHER HERITAGE ASSESSMENTS AND REVIEWS:

- Heritage Scoping Report on historical landscape and buildings in Port Elizabeth: ERM South Africa
- Heritage Statement and Cultural Resources Pre-assessment scoping report on Platreef Platinum Mine, Mokopane: Platreef Ltd
- Heritage Statement and Scoping Report on five proposed Photo Voltaic Solar Power farms, Northern Cape and Western Cape: Orlight SA
- Land claim research Badenhorst family vs Makokwe family regarding Makokskraal, Van Staden, Vorster & Nysschen Attorneys, Ventersdorp South Africa
- Research report on Cultural Symbols, Ministry for Intelligence Services, Pretoria, South Africa
- Research report on the location of the remains of kings Mampuru I and Nyabela, National Department of Arts and Culture, Pretoria, South Africa
- Review of Archaeological Assessment: Resources Generation, Coal Mine Project in the Waterberg area, Limpopo Province

- Review of CRM study and compilation of Impact Assessment report, Zod Gold Mine, Armenia

6 PROFESSIONAL AFFILIATIONS

Society for Africanist Archaeologists (SAfA)

7 PROFESSIONAL REGISTRATION

Association for Southern African Professional Archaeologists (ASAPA)

Accredited by ASAPA Cultural Resources Management section

International Association of Impact Assessors (IAIA)

8 PUBLICATIONS

Nel, J. 2001. Cycles of Initiation in Traditional South African Cultures. *South African Encyclopaedia* (MWEB).

Nel, J. 2001. *Social Consultation: Networking Human Remains and a Social Consultation Case Study*. Research poster presentations at the Bi-annual Conference (SA3) Association of Southern African Professional Archaeologists: National Museum, Cape Town.

Nel, J. 2002. *Collections policy for the WG de Haas Anatomy museum and associated Collections*. Unpublished. Department of Anatomy, School of Medicine: University of Pretoria.

Nel, J. 2004. Research and design of exhibition for Eloff Belting and Equipment CC for the Institute of Quarrying 35th Conference and Exhibition on 24 – 27 March 2004.

Nel, J. 2004. *Ritual and Symbolism in Archaeology, Does it exist?* Research paper presented at the Bi-annual Conference (SA3) Association of Southern African Professional Archaeologists: Kimberley

Nel, J & Tiley, S. 2004. The Archaeology of Mapungubwe: a World Heritage Site in the Central Limpopo Valley, Republic of South Africa. *Archaeology World Report*, (1) United Kingdom p.14-22.

Nel, J. 2007. *The Railway Code: Gautrain, NZASM and Heritage*. Public lecture for the South African Archaeological Society, Transvaal Branch: Roedean School, Parktown.

Nel, J. 2009. *Un-archaeologically speaking: the use, abuse and misuse of archaeology in popular culture*. *The Digging Stick*. April 2009. 26(1): 11-13: Johannesburg: The South African Archaeological Society.

Nel, J. 2011. 'Gods, Graves and Scholars' returning Mapungubwe human remains to their resting place.' In: *Mapungubwe Remembered*. University of Pretoria commemorative publication: Johannesburg: Chris van Rensburg Publishers.

Nel, J. 2012. *HIAs for EAPs*. Paper presented at IAIA annual conference: Somerset West.














Appendix B: Location and Site Maps



Plan 1: Regional Location of Project

Gold One TSF & Pipeline Regional Setting

Legend

-  Cooke Plant
-  Proposed Pipeline Route
-  Alternative Pipeline Route 1
-  Alternative Pipeline Route 2
-  150 Mt TSF Footprint
-  Study Area
-  City
-  Major Town
-  Secondary Town
-  Other Town
-  Settlement
-  Arterial / National Route
-  Main Road
-  Railway Line
-  Non-Perennial Stream
-  Perennial Stream
-  Dam / Lake





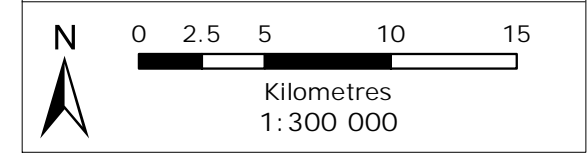
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








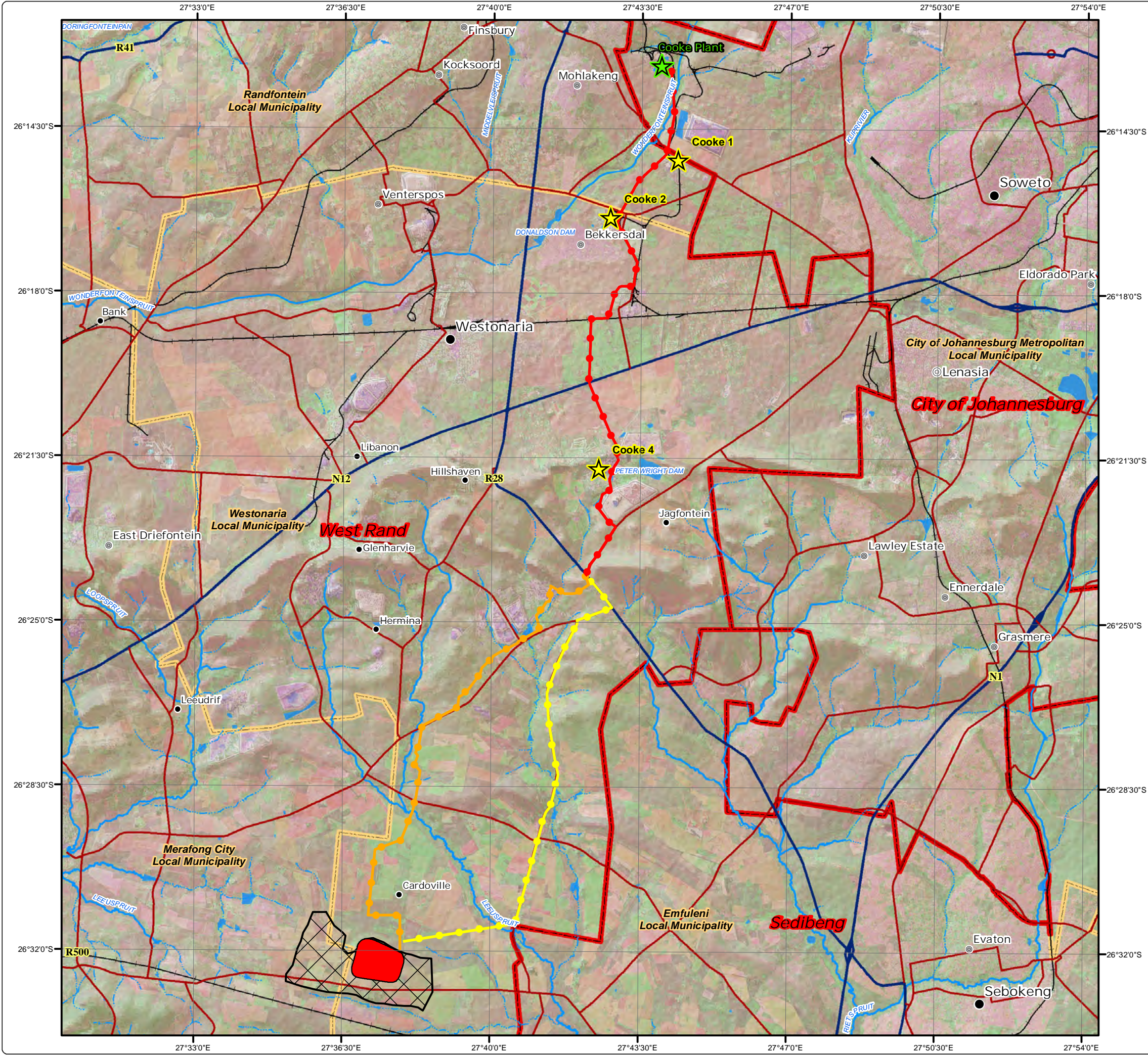


Plan 2: Local Setting of Project

Gold One TSF & Pipeline Local Setting

Legend

-  Cooke Plant
-  Cooke Shafts
-  Proposed Pipeline Route
-  Alternative Pipeline Route 1
-  Alternative Pipeline Route 2
-  150 Mt TSF Footprint
-  Study Area
-  City
-  Major Town
-  Secondary Town
-  Other Town
-  Settlement
-  Arterial / National Route
-  Main Road
-  Railway Line
-  Non-Perennial Stream
-  Perennial Stream
-  Dam / Lake
-  District Municipal Boundary
-  Local Municipal Boundary

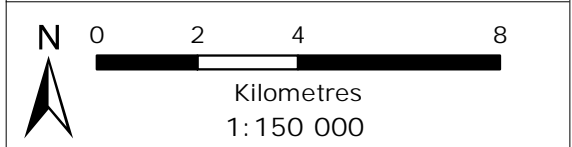


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Plan 3: Position of sites in Project and Study Areas

Gold One TSF & Pipeline Heritage Sites

Legend

-  150 Mt TSF Footprint
-  Study Area
-  Cooke Plant
-  Proposed Pipeline Route
-  Alternative Pipeline Route 1
-  Alternative Pipeline Route 2
-  Heritage Tracks
-  Farms

Heritage Sites

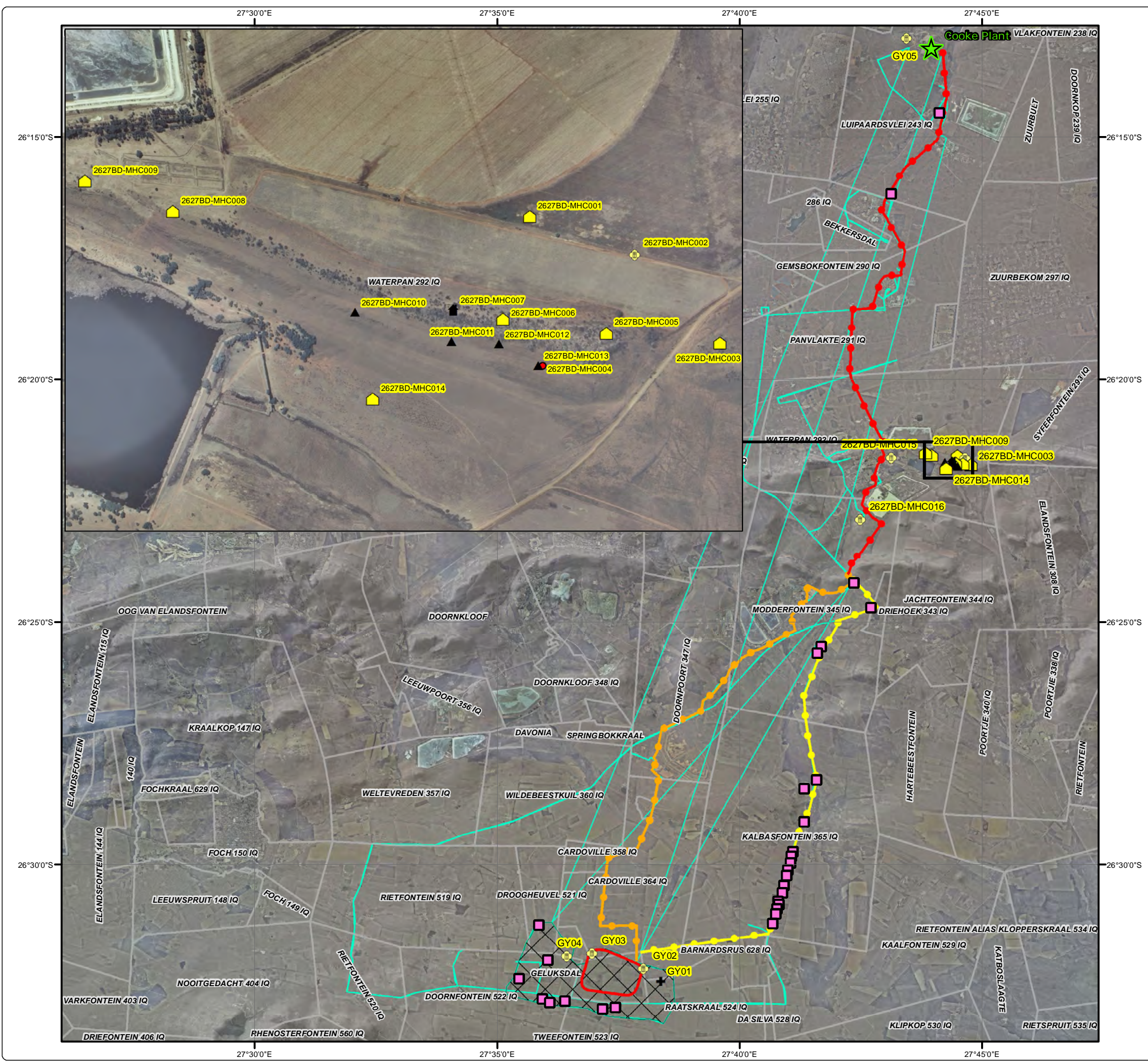
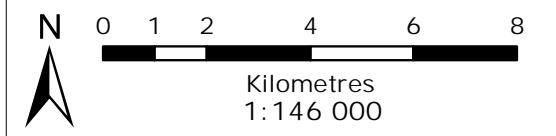
-  2 Graves
-  Cemetery
-  Cultural Place
-  Historic Extended Settlement
-  Historic Structure
-  Late Iron Age Structure
-  Mining Heritage Remains
-  Built Structures

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





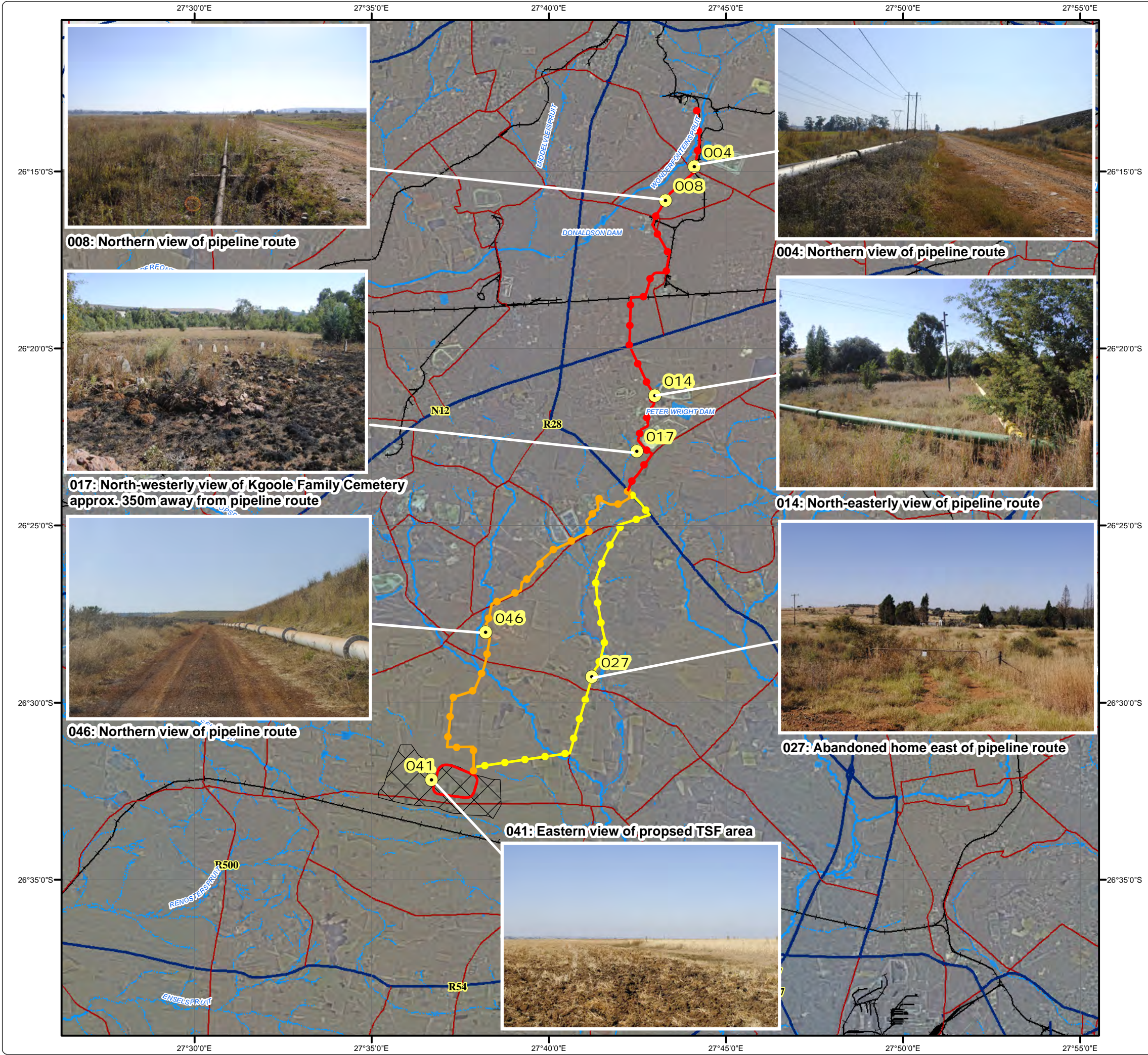


Plan 4: Plan of pipeline route with photographs

Gold One TSF & Pipeline Heritage Photo Sites

Legend

-  150 Mt TSF Footprint
-  Study Area
-  Photo Sites
-  Proposed Pipeline Route
-  Alternative Pipeline Route 1
-  Alternative Pipeline Route 2
-  Arterial / National Route
-  Main Road
-  Railway Line
-  Non-Perennial Stream
-  Perennial Stream
-  Dam / Lake



008: Northern view of pipeline route



004: Northern view of pipeline route



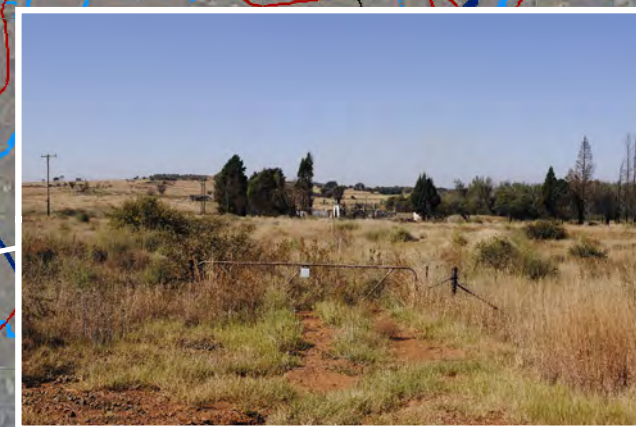
017: North-westerly view of Kgoole Family Cemetery approx. 350m away from pipeline route



014: North-easterly view of pipeline route



046: Northern view of pipeline route



027: Abandoned home east of pipeline route

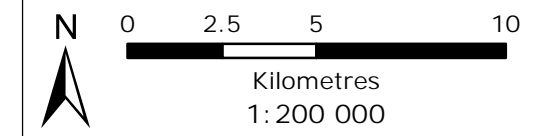


041: Eastern view of proposed TSF area

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Projection: Transverse Mercator Ref #: amc.RAN1386.201205.094
 Datum: Hartebeesthoek 1994 Revision Number: 1
 Central Meridian: 29°E Date: 24/05/2012



Appendix C: EIA Methodology and Assessment of Resource Significance/Value

1.1 EIA Methodology

In order to clarify the purpose and limitations of the impact assessment methodology, it is necessary to address the issue of subjectivity in the assessment of the significance of environmental impacts. Even though Digby Wells, and the majority of environmental impact assessment practitioners, propose a numerical methodology for impact assessment, one has to accept that the process of environmental significance determination is inherently subjective. The weight assigned to the each factor of a potential impact, and also the design of the rating process itself, is based on the values and perception of risk of members of the assessment team, as well as that of the I&AP's and authorities who provide input into the process. Whereas the determination of the spatial scale and the duration of impacts are to some extent amenable to scientific enquiry, the severity value assigned to impacts is highly dependent on the perceptions and values of all involved.

It is for this reason that it is crucial that all EIA's make reference to the environmental and socio-economic context of the proposed activity in order to reach an acceptable rating of the significance of impacts. Similarly, the perception of the probability of an impact occurring is dependent on perceptions, aversion to risk and availability of information.

It has to be stressed that the purpose of the EIA process is not to provide an incontrovertible rating of the significance of various aspects, but rather to provide a structured, traceable and defensible methodology of rating the relative significance of impacts in a specific context. The methodology employed for environmental impact assessment is divided into two distinct phases, namely, impact identification and impact assessment.

1.1.1 Impact identification

Impact identification is performed by use of an Input-Output model which serves to guide the assessor in assessing all the potential instances of ecological and socio-economic change, pollution and resource consumption that may be associated with the activities required during the construction, operational, closure and post-closure phases of the project.

Outputs may generally be described as any changes to the biophysical and socio-economic environments, both positive and negative in nature, and also include the product and waste produced by the activity. Negative impacts could include gases, effluents, dust, noise, vibration, other pollution and changes to the bio-physical environment such as damage to habitats or reduction in surface water quantity. Positive impacts may include the removal of invasive vegetation, construction of infrastructure, skills transfer or benefits to the socio-economic environment. During the determination of outputs, the effect of outputs on the various components of the environment (e.g. topography, water quality, etc.) is considered.

During consultation with I&APs perceived impacts were identified. These perceived impacts will become part of the impact assessment and significance rating in order to differentiate between probable impacts and perceived impacts.

1.1.2 Impact rating

The impact rating process is designed to provide a numerical rating of the various environmental impacts identified by use of the Input-Output model. As discussed above, it has to be stressed that the purpose of the EIA process is not to provide an incontrovertible rating of the significance of various aspects, but rather to provide a structured, traceable and defensible methodology of rating the relative significance of impacts in a specific context. This gives the project proponent a greater understanding of the impacts of his project and the issues which need to be addressed by mitigation and also give the regulators information on which to base their decisions.

The equations and calculations were deviated using Aucamp (2009).

The standard EIA significance rating process follows the established impact/risk assessment formula. However, this matrix has been adapted to reflect heritage resources' Site significance:

$$\text{Significance} = (\text{Consequence} \times \text{Probability}) + \text{Site significance}$$

Where *Consequence = Severity + Spatial Scale + Duration*

And *Probability = Likelihood of an impact occurring*

The impact matrix describing impacts on the cultural and heritage environment thus calculates the rating out of 154 instead of the standard 147, whereby Severity, Spatial Scale, Duration, Probability and Site significance are rated out of seven. Calculation of Site significance is explained below. Impacts are rated prior to mitigation and again after consideration of the mitigation measure proposed in the EMP. The significance of an impact is then determined and categorised into one of four categories, as indicated in **Table 1-1**. In accordance with Regulation 51 of the MPRDA and Section 38 of the NHRA, management actions will be assigned for all identified impacts.

Table 1-1: Significance threshold limits

Significance		
High	>114	
Medium-High	77 - 114	
Medium-Low	38 - 76	
Low	<38	

Table 1-2: Impact assessment parameter ratings

Rating	Severity		Spatial scale	Duration	Probability
	Environmental	Social, cultural and heritage			
7	Very significant impact on the environment. Irreparable damage to highly valued species, habitat or eco system. Persistent severe damage.	Irreparable damage to highly valued items of great cultural significance or complete breakdown of social order.	<u>International</u> The effect will occur across international borders	<u>Permanent: No Mitigation</u> No mitigation measures of natural process will reduce the impact after implementation.	<u>Certain/ Definite.</u> The impact will occur regardless of the implementation of any preventative or corrective actions.
6	Significant impact on highly valued species, habitat or ecosystem.	Irreparable damage to highly valued items of cultural significance or breakdown of social order.	<u>National</u> Will affect the entire country	<u>Permanent: Mitigation</u> Mitigation measures of natural process will reduce the impact.	<u>Almost certain/Highly probable</u> It is most likely that the impact will occur.
5	Very serious, long-term environmental impairment of ecosystem function that may take several years to rehabilitate	Very serious widespread social impacts. Irreparable damage to highly valued items	<u>Province/ Region</u> Will affect the entire province or region	<u>Project Life</u> The impact will cease after the operational life span of the project.	<u>Likely</u> The impact may occur.
4	Serious medium term environmental effects. Environmental damage can be reversed in less than a	On-going serious social issues. Significant damage to structures / items of cultural	<u>Municipal Area</u> Will affect the whole municipal area	<u>Long term</u> 6-15 years	<u>Probable</u> Has occurred here or elsewhere and could therefore occur.

Rating	Severity		Spatial scale	Duration	Probability
	Environmental	Social, cultural and heritage			
	year	significance			
3	Moderate, short-term effects but not affecting ecosystem functions. Rehabilitation requires intervention of external specialists and can be done in less than a month.	On-going social issues. Damage to items of cultural significance.	<u>Local</u> Local extending only as far as the development site area	<u>Medium term</u> 1-5 years	<u>Unlikely</u> Has not happened yet but could happen once in the lifetime of the project, therefore there is a possibility that the impact will occur.
2	Minor effects on biological or physical environment. Environmental damage can be rehabilitated internally with/ without help of external consultants.	Minor medium-term social impacts on local population. Mostly repairable. Cultural functions and processes not affected.	<u>Limited</u> Limited to the site and its immediate surroundings	<u>Short term</u> Less than 1 year	<u>Rare/ improbable</u> Conceivable, but only in extreme circumstances and/ or has not happened during lifetime of the project but has happened elsewhere. The possibility of the impact materialising is very low as a result of design, historic experience or implementation of adequate mitigation measures
1	Limited damage to minimal area of low significance, (e.g. ad hoc spills within plant area). Will have no impact on the environment.	Low-level repairable damage to commonplace structures.	<u>Very limited</u> Limited to specific isolated parts of the site.	<u>Immediate</u> Less than 1 month	<u>Highly unlikely/None</u> Expected never to happen.



1.2 AIA and HIA methodology

Unlike the natural environment, the cultural environment or landscape is often localised. The impact is therefore limited to identified sites or heritage resources. However, it must be noted that heritage resources are not independent of the natural environment, nor can they be viewed in isolation of other heritage resources that may occur in the immediate environment or in the general landscape. It is thus necessary to determine the context of any identified heritage resource in relation to:

- Known heritage resources; and
- The potential of the identified resource to provide additional or new information regarding past environments and history.

In this regard, SAHRA has published minimum standards that must be complied with when undertaking Heritage and Archaeological Impact Assessments. The specialist is also required to rate identified heritage resources according to these minimum standards, which are based on criteria described in the NHRA. Although the NHRA is specifically South African legislation, it is based on international standards such as the Burra Charter, UNESCO guidelines and various other international heritage and cultural organisations that define significance of cultural heritage resources. The site significance rating is thus determined using certain parameters described in international standards and South African legislation, as well as the professional minimum standards of ASAPA and SAHRA.

1.2.1 Site significance identification

Site significance identification is determined by rating a heritage resource mainly in terms of its potential to supply or add information to an existing body of research. The heritage specialist is thus guided in assessing attributes that may influence a heritage resource's significance. The attributes generally describe qualities that can be attached to a heritage resource based on prior knowledge (obtained through baseline studies and literature reviews) of potential heritage resources that may occur in any given area. There are no impacts associated with determining site significance. In contrast to the EIA model, these attributes are unaffected by any environmental impact.

A total of thirteen attributes are used, divided into nine 'aspects' and four 'parameters'. The nine aspects provide a rating for the 'Context' parameter. The four parameters – Context, Integrity, Extent and Uniqueness – provide a site significance rating out of seven. All ratings follow a seven tier system in an attempt to remain consistent with the EIA methodology and ratings used where one is 1 lowest and 7 highest. Descriptions of these aspects and parameters are provided in Table 1-1.

Appropriate mitigation recommendations are made based on the Site significance rating and the potential impacts identified in the EIA impact rating. However, it must be noted that mitigation measures are based primarily on the significance of resources and not necessarily the potential environmental impacts on those resources. For instance, where environmental impacts rated high on heritage resources rated low, may need no mitigation. Conversely, low environmental impacts on a high rated significant may have major mitigation implications or no-go options.

1.2.2 Site significance rating

These criteria have been adapted and incorporated into a Site significance matrix where significance is determined based on nine aspects and four parameters. The aim is that any identified heritage resource can be objectively measured against the aspects and parameters included in the matrix. A site's significance should ideally reflect an unbiased, objective and quantified rating, based on sound research and knowledge of heritage resources in any given area. The rating is the sum of four parameters:

$$\text{Site significance} = (\text{sum of Context} + \text{Integrity} + \text{Extent} + \text{Uniqueness}) \div 4$$

Where $\text{Context} = (\text{sum of aspects } a \text{ to } i) \div 9$

Each aspect and parameter is calculated out of seven to remain consistent with the standard EIA matrix used. The sum of the aspects making up Context is 63. The total is reduced to seven ($63 \div 9 = 7$) and added to Integrity, Extent and Uniqueness.

The Site significance matrix calculates the rating out of 28 and is reduced to a rating out of seven ($28 \div 4 = 7$). This rating is then added to the EIA matrix to reflect a site's significance in terms of heritage value. Therefore, high environmental impacts on a low significant site may be considered low; conversely, low environmental impacts on a high significant site may be high.

Table 1-1: Description of attributes determining significance of heritage resources.

ASPECTS DETERMINING CONTEXT									
Value	a. Importance to community or pattern in country's history	b. Possession of uncommon, rare or endangered natural or cultural heritage aspects	c. Information potential	d. Importance in demonstrating principle characteristics	e. Importance in aesthetic characteristics	f. Degree of technical / creative skill at a particular period	g. Association to community or cultural group for social, cultural or spiritual reasons	h. Association with life or work of a person, group or organisation of importance in the history of the country	i. Site of significance relating to history of slavery
7	Extremely important to the country's community or to the country's history on a national level.	Endemic / exclusive to very specific localities / other occurrences unknown	Extremely high information potential: national and international	Exceptional example, complete, unique	Exceptional example, complete, unique	Uncommon / unique skill for period	Exceptional high socio-cultural significance in terms of identity, custom, religion, ancestry, etc.	Exceptional high association	Exceptionally important site, great significance on national and international slavery
6	Extremely important to the country's community or to the country's history on a provincial level.	Endemic / exclusive to specific localities / other occurrence infrequent	Extremely high information potential: national	Exceptional example, mostly complete, rare	Exceptional example, mostly complete, rare	Exception degree of skill for period	Very high socio-cultural significance in terms of identity, custom, religion, ancestry, etc.	Very high association	Very important site, high significance on national and international slavery
5	Extremely important to the community or to the history on a regional level.	Localised to only few specific localities	High information potential: national	Exceptional example, incomplete, rare	Exceptional example, incomplete, rare	High degree of skill for period	High socio-cultural significance in terms of identity, custom, religion, ancestry, etc.	High association	Important site, high significance on national slavery
4	Very important to the community or to the history on a district level.	Rarely occurs at this locality	High information potential	Exceptional example, common	Exceptional example, common	Above average degree of skill for period	Above average socio-cultural significance in terms of identity, custom, religion, ancestry, etc.	Above average association	Important site, areas may have significance on national slavery
3	Important to the community or to the history on a municipal level.	Occurs at this locality, but occurrence unusual	Average Information potential	Good example, incomplete, common	Good example, incomplete, common	Average degree of skill for period	Average socio-cultural significance in terms of identity, custom, religion, ancestry, etc.	Average association	Site has a high likelihood of being associated with slavery
2	Important to the community or to the history on a local level.	Occurs at this locality, but not widespread	Low information potential	Common example, incomplete	Common example, incomplete	Limited degree of skill for period	Low socio-cultural significance in terms of identity, custom, religion, ancestry, etc.	Lesser association	Possible slavery site, but unlikely
1	Little importance to the community or to the history on any level.	Occurs widespread	No information potential	Damaged, destroyed, altered to extent where example is useless	Damaged, destroyed, altered to extent where example is useless	Common skill for period	No socio-cultural significance in terms of identity, custom, religion, ancestry, etc.	No association	No significance

Value	A. CONTEXT	B. INTEGRITY	C. EXTENT	D. UNIQUENESS		SIGNIFICANCE RATING	DESCRIPTION	SAHRA RATING (RSA only)	RECOMMENDED MITIGATION
7	Exceptional context and information potential.	Resource more than 80% intact, primary spatial context	Extensive resource: high site complexity, deep and various deposits, 5 or more features present, large surface area >1 ha	Unique in present environment / landscape; no other examples known.		7	High	Grade 1	Conservation: National Site Nomination
6	High context and information potential	Resource more than 60% intact, primary spatial context	Extensive resource: potential high site complexity, deep and various deposits, 3-5 features present, large surface area >0.5 ha	Unique in present environment / landscape; few examples known elsewhere.		6	High	Grade 2	Conservation: Provincial Site Nomination
5	Medium context and information potential.	Resource more than 50% intact, primary spatial context.	Extensive resource: potential complex site, shallow deposit present, at least 1 or more features present, large surface area >0.5 ha	Good example of uncommon resource in present environment / landscape; limited distribution / occurrence in other places.		5	High	Grade 3A	Conservation: Regional Site Nomination
4	Good context and information potential.	Resource ±50% intact, primary spatial context	Good resource: site complexity exists, shallow deposit, possible features present, large surface <0.5 ha	Good example of resource in present environment / landscape; occurs fairly commonly in other places.		4	Medium	Grade 3B	Mitigation and partly conserved
3	Average context and information potential	Resource less than 50% intact, primary spatial context.	Average resource: average site complexity, deposit present, possible features present, large surface >50 m2	Good examples of common resource in present environment / landscape; also occurs commonly in other places.		3	Average	Grade 4A	Mitigation before destruction
2	Low but significant context and information potential.	Resource partly intact, mostly secondary spatial context	Little to no site complexity, little to no deposit present, no features present, surface area <50 m2	Fair example of common resource in present environment / landscape; also occurs commonly in other places.		2	Average	Grade 4B	Record before destruction
1	No significant context or information potential.	Resource completely altered, damaged or destroyed OR in tertiary spatial context.	Single, isolated find; find spot	Very common or poor example of resource occurring throughout different environments; many similar and better examples exists elsewhere.		1	Low	Grade C	Destruction / none

