



DIGBY WELLS  
ENVIRONMENTAL

## Environmental Impact Assessment for Sibanye Gold Limited's West Rand Tailings Retreatment Project

### Heritage Impact Assessment

**SAHRIS Case ID:** 8430, 8432, 8433, 8434

**Project Number:**

GOL2376

**Prepared for:**

Sibanye Gold Ltd

January 2016

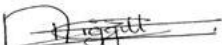




Digby Wells and Associates (South Africa) (Pty) Ltd  
(Subsidiary of Digby Wells & Associates (Pty) Ltd). Co. Reg. No. 2010/008577/07. Turnberry Office Park, 48  
Grosvenor Road, Bryanston, 2191. Private Bag X10046, Randburg, 2125, South Africa  
Tel: +27 11 789 9495, Fax: +27 11 789 9498, info@digbywells.com, www.digbywells.com

Directors: DJ Otto, GB Beringer, LF Koeslag, AJ Reynolds (Chairman) (British)\*, J Leaver\*, GE Trusler  
(C.E.O)  
\*Non-Executive



This document has been prepared by Digby Wells Environmental.

<b>Report Type:</b>	<b>Heritage Impact Assessment</b>
<b>Project Name:</b>	<b>Environmental Impact Assessment for Sibanye Gold Limited's West Rand Tailings Retreatment Project</b>
<b>Project Code:</b>	<b>GOL2376</b>

<b>Name</b>	<b>Responsibility</b>	<b>Signature</b>	<b>Date</b>
<b>Natasha Higgitt</b> <small>Assistant Heritage Consultant ASAPA Member No.335</small>	Reconnaissance		May 2015
<b>Justin du Piesanie</b> <small>Heritage Management Consultant ASAPA Member No 270</small>	Heritage Impact Assessment Report Compilation  Recommendations		July 2015  Updated January 2016
<b>Johan Nel</b> <small>HRM Unit Manager ASAPA Member No 095</small>	Technical Review		July 2015
<b>Marcelle Radyn</b> <small>Project Manager</small>	2 <sup>nd</sup> Review		July 2015
<b>Grant Beringer</b> <small>Director</small>	3 <sup>rd</sup> Review		July 2015

*This report is provided solely for the purposes set out in it and may not, in whole or in part, be used for any other purpose without Digby Wells Environmental prior written consent.*

## Declaration of Independence

### Digby Wells and Associates (South Africa) (Pty) Ltd

**Contact person: Justin du Piesanie**

Digby Wells House  
48 Grosvenor Road  
Turnberry Office Park, Bryanston  
2191

Tel: 011 789 9495  
Fax: 011 789 9498  
E-mail: Justin.dupiesanie@digbywells.com

I, Justin du Piesanie as duly authorised representative of Digby Wells and Associates (South Africa) (Pty) Ltd., hereby confirm my independence (as well as that of Digby Wells and Associates (South Africa) (Pty) Ltd.) and declare that neither I nor Digby Wells and Associates (South Africa) (Pty) Ltd. have any interest, be it business, financial, personal or other, in any proposed activity, application or appeal in respect of Sibanye Gold Limited, other than fair remuneration for work performed, specifically in connection with the Heritage Resources Management (HRM) Process for the proposed West Rand Tailings Retreatment Project, Gauteng Province.



---

Full name: Justin du Piesanie  
Title/ Position: HRM Consultant: Archaeologist  
Qualification(s): MSc  
Experience (years): 9 years  
Registration: Association of Southern African Professional Archaeologists (ASAPA)  
International Council on Monuments and Sites (ICOMOS) South Africa

## GLOSSARY OF TERMS

Term	Definition
<b>Archaeological</b>	Material remains resulting from human activity that are in a state of disuse and older than 100 years, including artefacts, human and hominid remains and artificial features and structures. Rock art created through human agency older than 100 years, including any area within 10 m of such representation. Wrecks older than 60 years - either vessels or aircraft - or any part thereof that was wrecked in South Africa on land, internal or territorial waters, and any cargo, debris or artefacts found or associated therewith. Features, structures and artefacts associated with military history that are older than 75 years and the sites on which they are found, e.g. battlefields.
<b>Archaeologist</b>	A trained professional who uses scientific methods to excavate, record and study archaeological sites and deposits.
<b>Artefact</b>	Any object manufactured or modified by human beings.
<b>Burial Grounds and Graves Consultation (BGGC)</b>	The regulated consultation process required in terms of Section 36 of the NHRA and Regulation GNR 548 to the Act when burial grounds and graves are identified within a project area.
<b>Ceramic (syn. pottery)</b>	In an archaeological context any vessel or other object produced from natural clay that has been fired. Indigenous ceramics associated with Farming Communities are low-fired wares, typically found as potsherds. Imported and more historic ceramics generally include high-fired wares such as porcelain, stoneware, etc.
<b>Ceramic facies / facies</b>	Subgroups of a primary ceramic tradition or sequence. Typically used in ceramic analyses. Various facies are attributed to different temporal periods based on radiometric dates obtained from archaeological contexts. Facies are often used to infer cultural identity of archaeological groups. However, in context of this study identified ceramic facies merely provide a relative temporal context for archaeological sites in the landscape.
<b>Ceramic tradition</b>	The sequence of ceramic styles that develop out of each other and form a continuum. A tradition is the primary group to which subsequent ceramic facies belong. A ceramic tradition can be broadly associated with various linguistic and cultural groups, but do not represent any given ethnic identity, especially during the LFC period.
<b>Conservation</b>	In relation to heritage resources includes the protection, maintenance, preservation and sustainable use of places or objects so as to safeguard their cultural significance.

Term	Definition
<b>Cultural significance (CS)</b>	<p>The aesthetic, architectural, historical, scientific, social, spiritual, linguistic or technological value or significance. A heritage may have cultural significance or other special value because of its:</p> <ul style="list-style-type: none"> <li>Importance in the community, or pattern of South Africa's history.</li> <li>Possession of uncommon, rare or endangered aspects of South Africa's natural or cultural heritage</li> <li>Potential to yield information that will contribute to an understanding of South Africa's natural or cultural heritage.</li> <li>Importance in demonstrating the principal characteristics of a particular class of South Africa's natural or cultural places or objects.</li> <li>Importance in exhibiting particular aesthetic characteristics valued by a community or cultural group.</li> <li>Importance in demonstrating a high degree of creative or technical achievement at a particular period.</li> <li>Strong or special association with a particular community or cultural group for social, cultural or spiritual reasons.</li> <li>Strong or special association with the life or work of a person, group or organisation of importance in the history of South Africa.</li> <li>Significance relating to the history of slavery in South Africa.</li> </ul>
<b>Development</b>	<p>Any physical intervention, excavation, or action, other than those caused by natural forces, which may in the opinion of a heritage authority in any way result in a change to the nature, appearance or physical nature of a place, or influence its stability and future well-being, including:</p> <ul style="list-style-type: none"> <li>Construction, alteration, demolition, removal or change of use of a place or a structure at a place.</li> <li>Carrying out any works on or over or under a place.</li> <li>Subdivision or consolidation of land comprising, a place, including the structures or airspace of a place.</li> <li>Constructing or putting up for display signs or hoardings.</li> <li>Any change to the natural or existing condition or topography of land.</li> <li>Any removal or destruction of trees, or removal of vegetation or topsoil.</li> </ul>
<b>Early Farming Community/ies</b>	<p>The first Farming Communities (also known as Early Iron Age) that appear in the southern archaeological record during the early first millennium CE. The EFC period is generally dated from c. 200 CE to 1000 CE.</p>
<b>Early Stone Age</b>	<p>The South African ESA dates from ~3 Mya to c. 250 Kya. This period is associated with later <i>Australopithecus</i> and early <i>Homo</i> species. The lithic industries that characterise the ESA include Oldowan and Early Acheulian, typically as simple core tools, choppers handaxes and cleavers.</p>

Term	Definition
<b>Excavation</b>	The scientific excavation, recording and retrieval of archaeological deposit and objects through the use of accepted archaeological procedures and methods, and excavate has a corresponding meaning.
<b>Farming Community/ies</b>	Term signifying the appearance in the southern African archaeological of Bantu-speaking agricultural based societies from the early first millennium CE. The term replaces the <i>Iron Age</i> as a more accurate description for groups who practiced agriculture and animal husbandry, extensive manufacture and use of ceramics, and metalworking. The Farming Community period is divided into an Early and Late phase. The use of Later Farming Communities especially removes the artificial boundary between archaeology and history.
<b>Field Rating</b>	SAHRA requires heritage resources to be provisionally rated in accordance with Section 7 of the NHRA that provides a three tier grading system of resources that form part of the national estate. The rating system distinguishes between four categories: Grade I: Heritage resources with qualities so exceptional that they are of special national significance. Grade II: Heritage resources which, although forming part of the national estate, can be considered to have special qualities which make them significant within the context of a province or a region. Grade III: Other heritage resources worthy of conservation. General Protected: i.e. generally protected in terms of Sections 33 to 37 of the NHRA.
<b>Formal protection</b>	Places with qualities so exceptional that they are of special national significance as national heritage sites or that have special qualities as provincial heritage sites.
<b>General protection</b>	General protections are afforded to: Objects protected in terms of laws of foreign states. Structures older than 60 years. Archaeological and palaeontological sites and material and meteorites. Burial grounds and graves. Public monuments and memorials.
<b>Grave</b>	A place of interment and includes the contents, headstone or other marker of such a place, and any other structure on or associated with such place.



Term	Definition
<b>Heritage Impact Assessment (HIA)</b>	An assessment of the cultural significance of, and possible impacts on, diverse heritage resources that may be affected by a proposed development. A HIA may include several specialist elements such as archaeological, built environment and palaeontological studies. The HIA must supply the heritage authority with sufficient information about the sites to assess, with confidence, whether or not it has any objection to a development, indicate the conditions upon which such development might proceed and assess which sites require permits for destruction, which sites require mitigation and what measures should be put in place to protect sites that should be conserved. The content of HIA reports are clearly outlined in Section 38(3) of the NHRA and SAHRA Minimum Standards.
<b>Heritage resource</b>	Any place or object of cultural significance.
<b>Heritage resources management</b>	Process required when development is intended categorised as: Any linear development exceeding 300m in length. Construction of a bridge or similar structure exceeding 50 m in length. Any activity which will change the character of a site exceeding 0.5 hectares in extent or involving three or more existing erven or subdivisions thereof or that have been consolidated within the past five years or costs of which will exceed a sum set in terms of regulations by SAHRA or a provincial heritage resources authority. Re-zoning of a site exceeding one hectare in extent. Any other category of development provided for in regulations by SAHRA or a provincial heritage resources authority.
<b>Heritage site</b>	Any place declared to be a national heritage site by SAHRA or a place declared to be a provincial heritage site by a provincial heritage resources authority.
<b>Late Farming Community/ies</b>	Farming Communities who either developed / evolved from EFC groups, or who migrated into southern African from the late first millennium / early second millennium CE. The LFC period evidences distinct changes in socio-political organisation, settlement patterns, trade and economic activities, including extensive trade routes. The LFC period is generally dated from c. 1000 CE well into the modern historical period of the nineteenth century.
<b>Late Stone Age</b>	The South African LSA dates from ~30 Kya. This period is associated with modern <i>Homo sapiens sapiens</i> and the complex hunter-gatherer societies, ancestral to the Bushmen / San and Khoi. The LSA lithic assemblage contains microlithic technology and composite tools such as arrows commonly produced from fine-grained cryptocrystalline, quartz and chert. The LSA is also associated with archaeological rock art including both paintings and engravings.

Term	Definition
<b>Living / intangible heritage</b>	The intangible aspects of inherited culture that could include cultural tradition, oral history, performance, ritual, popular memory, skills and techniques, indigenous knowledge systems, the holistic approach to nature, society and social relationships.
<b>Management</b>	In relation to heritage resources, includes the conservation, presentation and improvement of a place protected in terms of the NHRA.
<b>Middle Stone Age</b>	The South African MSA dates from ~300 Kya to c. 30 Kya. This period is associated with the changing behavioural patterns and the emergence of modern cognitive abilities in early <i>Homo sapiens</i> species. The lithic industries that characterise the MSA are typically more complex tools with diagnostic identifiers, including convergent flake scars, multi-faceted platforms, retouch and backing. Assemblages are characterised as refined lithic technologies such as prepared core techniques, retouched blades and points manufactured from good quality raw material.
<b>National estate</b>	<p>The national estate as defined in Section 3 of the NHRA, i.e. heritage resources of South Africa which are of cultural significance or other special value for the present community and for future generations. The national estate may include:</p> <p>Places, buildings, structures and equipment of cultural significance.</p> <p>Places to which oral traditions are attached or which are associated with living heritage.</p> <p>Historical settlements and townscapes.</p> <p>Landscapes and natural features of cultural significance.</p> <p>Geological sites of scientific or cultural importance.</p> <p>Archaeological and palaeontological sites.</p> <p>Graves and burial grounds, including ancestral graves, royal graves and graves of traditional leaders, graves of victims of conflict, graves of individuals designated by the Minister by notice in the Gazette, historical graves and cemeteries, and other human remains which are not covered in terms of the National Health Act, 2003.</p> <p>Sites of significance relating to the history of slavery in South Africa.</p> <p>Movable objects, including objects recovered from the soil or waters of South Africa, including archaeological and palaeontological objects and material, meteorites and rare geological specimens; objects to which oral traditions are attached or which are associated with living heritage; ethnographic art and objects; military objects; objects of decorative or fine art; objects of scientific or technological interest.</p> <p>Books, records, documents, photographic positives and negatives, graphic, film or video material or sound recordings, excluding those that are public records as defined in section 1(xiv) of the National Archives of South Africa Act, 1996 (Act No. 43 of 1996).</p>



Term	Definition
<b>Palaeontological</b>	Any fossilised remains or fossil trace of animals or plants which lived in the geological past, other than fossil fuels or fossiliferous rock intended for industrial use, and any site which contains such fossilised remains or trace.
<b>Palaeontologist</b>	A trained professional who uses scientific methods to excavate, collect, record and study palaeontological sites and fossils.
<b>Pedestrian survey</b>	A method of examining a site in which surveyors, spaced at regular intervals, systematically walk over the area being investigated.
<b>Phase 1 Archaeological Impact Assessment (AIA)</b>	Phase 1 AIAs generally involve the identification and assessment of sites during a field survey of a portion of land that is going to be affected by a potentially destructive or landscape-altering activity.
<b>Phase 2 Archaeological Impact Assessment (AIA)</b>	Phase 2 AIAs are primarily based on salvage or mitigation excavations preceding development that will destroy or impact on a site. This may involve collecting of artefacts from the surface and / or excavation of representative samples of the artefactual material to allow characterisation of the site and the collection of suitable materials for dating the sites. Phase 2 AIAs aim to obtain a general idea of the age, significance and meaning of the site that is to be lost and to store a sample that can be consulted at a later date for research purposes. Phase 2 excavations can only be done under a permit issued by SAHRA, or other appropriate heritage agency, to the appointed archaeologist.
<b>Phase 3 Management Plan / Conservation Management Plan (CMP)</b>	On occasion, a site may require a Phase 3 programme involving the modification of the site or the incorporation of the site into the development itself as a site museum, a special conservation area or a display. Alternatively it is often possible to relocate or plan the development in such a way as to conserve the archaeological site or any other special heritage significance the place may have. For example, in a wilderness area or open space when sites are of public interest the development of interpretative material is recommended and adds value to the development. Permission for the development to proceed can be given only once the heritage resources authority is satisfied that measures are in place to ensure that the archaeological sites will not be damaged by the impact of the development or that they have been adequately recorded and sampled. Careful planning can minimise the impact of archaeological surveys on development projects by selecting options that cause the least amount of inconvenience and delay. The process as explained above allows the rescue and preservation of information relating to our past heritage for future generations. It balances the requirements of developers and the conservation and protection of our cultural heritage as required of SAHRA and the provincial heritage resources authorities (ASAPA).

Term	Definition
<b>Pre-disturbance survey (syn. reconnaissance)</b>	A survey to record a site as it exists, with all the topographical and other information that can be collected, without excavation or other disturbance of the site.
<b>Reconnaissance</b>	A broad range of techniques involved in the location of archaeological sites, e.g. surface survey and the recording of surface artefacts and features, the sampling of natural and mineral resources, and sometimes testing of an area to assess the number and extent of archaeological resources. However, in terms of South African practice, reconnaissance during a so-called Phase 1 AIA never includes sampling as this is a permitted activity, usually undertaken during so-called Phase 2 AIAs (ASAPA).
<b>Site</b>	Any area of land, including land covered by water, and including any structures or objects thereon.
<b>Structure</b>	Any building, works, device or other facility made by people and which is fixed to land, and includes any fixtures, fittings and equipment associated therewith.
<b>Tangible heritage</b>	Physical heritage resources such as archaeological sites, historical buildings, burial grounds and graves, fossils, etc. Tangible heritage may be associated with intangible elements, e.g. the living cultural traditions, rituals and performances associated with burial grounds and graves and deceased persons.
<b>Werf (pl. werfs)</b>	The Afrikaans word for 'farmyard', and a more correct one in the local context as it includes the buildings on it, more than just the space itself. It is the roughly level, uncultivated but close-cropped open space on which the buildings of a farm complex are arranged.

## LIST OF ACRONYMS

Abbreviation	Description
<b>AIA</b>	Archaeological Impact Assessment
<b>ARD/AMD</b>	Acid Rock Drainage/Acid Mine Drainage
<b>ASAPA</b>	Association of Southern African Professional Archaeologists
<b>AWTF</b>	Advanced Water Treatment Facility
<b>BA</b>	Bachelor of Arts
<b>BGGC</b>	Burial Grounds and Graves Consultation
<b>BWSF</b>	Bulk Water Storage Facility
<b>C4S</b>	Cooke 4 South TSF
<b>CMP</b>	Conservation Management Plan
<b>CPP</b>	Central Processing Plant
<b>CS</b>	Cultural Significance
<b>CTSF</b>	Central Tailings Storage Facility (Expanded from the Doornpoort TSF)
<b>CUP</b>	Cooke Uranium Project
<b>DWE</b>	Digby Wells Environmental
<b>EIA</b>	Environmental Impact Assessment
<b>EMP</b>	Environmental Management Plan
<b>EMS</b>	Environmental Management Systems
<b>ESIA</b>	Environmental and Social Impact Assessment
<b>Gold One</b>	Gold One International Limited
<b>GRP</b>	Grave Relocation Plan
<b>ha</b>	Hectare
<b>HIA</b>	Heritage Impact Assessment
<b>HRA</b>	Heritage Resources Authority
<b>HRM</b>	Heritage Resources Management
<b>HSR</b>	Heritage Scoping Report
<b>I&amp;AP</b>	Interested and Affected Parties
<b>ICOMOS</b>	International Council on Monuments and Sites
<b>IDP</b>	Integrated Development Plan
<b>IFC</b>	International Finance Corporation
<b>LFC</b>	Late Farming Community also known as Late Iron Age
<b>LoM</b>	Life of Mine
<b>mbgl</b>	Metres below ground level
<b>Mine Dumps</b>	Deposits of Sand, Slime, Waste Rock and Overburden.

Abbreviation	Description
<b>MSc</b>	Master of Science
<b>Mt/m</b>	Mega tonne per month
<b>MWP</b>	Mining work programme
<b>NBT</b>	North Block Thickener
<b>NHRA</b>	National Heritage Resources Act, 1999 (Act No. 25 of 1999)
<b>NID</b>	Notification of Intent to Develop
<b>NoK</b>	Next-of-Kin
<b>PCDs</b>	Pollution Control Dams
<b>PFS</b>	Pre-Feasibility Study
<b>PHRA-G</b>	Gauteng Provincial Heritage Resources Authority
<b>PRA</b>	Prospecting Right Application
<b>RAP</b>	Resettlement Action Plan
<b>RO</b>	Reverse osmosis
<b>RoM</b>	Run of Mine
<b>RTSF</b>	Regional Tailings Storage Facility
<b>RWD</b>	Return Water Dam
<b>SAHRA</b>	South African Heritage Resources Agency
<b>SBT</b>	South Block Thickener
<b>SCF</b>	Statutory Comment Feedback
<b>SEP</b>	Stakeholder Engagement Process
<b>SIA</b>	Socio-economic Impact Assessment
<b>STP</b>	Shovel Test Pit
<b>TSF</b>	Tailings Storage Facility
<b>UNESCO</b>	United Nations Educational, Scientific and Cultural Organisation
<b>WBT</b>	West Block Thickener
<b>WRD</b>	Waste Rock Dump
<b>WRTRP</b>	West Rand Tailings Retreatment Project
<b>WWP</b>	West Wits Project

## EXECUTIVE SUMMARY

Digby Wells Environmental (hereafter DWE) was appointed to undertake the environmental authorisation for reclamation activities of the initial implementation of the Sibanye Gold Limited's (SGL) West Rand Tailings Retreatment Project (WRTRP).

The ultimate WRTRP involves the construction of a large-scale Central Processing Plant (CPP) for the recovery of gold, uranium and sulfur from the available resources. The CPP, centrally located to the West Rand resources, will be developed in phases to eventually treat up to 4Mt/month of tailings inclusive of current arising's. The resultant tailings will be deposited on a modern tailings storage facility (TSF) called the regional TSF (RTSF).

This report constitutes the draft Heritage Impact Assessment (HIA) report required in terms of section 38 of the National Heritage Resources Act, 1999 (Act No. 25 of 1999) (NHRA). The Scope of Work required to complete the HIA included:

- Reconnaissance and pre-disturbance survey of the proposed development footprint;
- Assessment of the cultural significance of any identified heritage resources;
- Assessment of impacts on identified heritage resources;
- Developing mitigation measures to avoid and / or reduce negative impacts and enhance positive ones.

A total of 27 heritage resources were identified through the HIA, within the development footprints of the proposed linear infrastructure outside existing servitudes, and within the development footprints of the CPP and RTSF. These comprise:

- One LFC site with low significance;
- Eight structures with negligible significance;
- Thirteen werfs with negligible significance; and
- Four burial grounds with very high significance.

The LFC site (LFC-021) must be recorded including detailed site mapping, and possibly surface sampling. The site is generally protected under section 35 of the NHRA; it is recommended that the proposed routing of the Kloof 4 to RTSF OHL power line be amended as far as feasible to preserve the site *in situ*.

Where this is not possible, amend the design of the proposed power line to ensure that pylons are at least 50 m from the site. To ensure that this recommendation is implemented correctly, the extent of the site must be determined by an accredited archaeologist and mapped in detail through the use of differential GPS technology. Additionally, a Watching Brief should be implemented during the construction phase. This will entail the presence of an accredited archaeologist to be on site during earth moving activities to assess any material culture exposed and guide the construction to minimise the risk of damage to the site.

The result of the CS assessment indicated that the identified structures and werfs are sufficiently recorded through this assessment and no further mitigation of these resources is required. Regardless of this, it was confirmed through a review of aerial imagery that the majority of these resources are older than 60 years, and therefore afforded general protection under section 34 of the NHRA. As such, a Section 34 Permit Application with PHRA-G is required prior to any direct impacts on these resources to ensure compliance with the NHRA and Chapter III of the Regulations to the Act.

The two of the identified burial grounds (BGG-015 and BGG-022) will be directly impacted upon by the proposed construction of the RTSF. Based on our understanding, redesign of the RTSF development footprint is not feasible as it has been determined as the most suitable site and layout/design from a technical and environmental perspective. It is recommended that a BGGC Process be undertaken in accordance with section 36 of the NHRA and Chapter XI of the Regulations to the Act to:

- Identify as far as possible the bona fide NoK;
- Consult and reach agreement with the NoK and SGL to the management of the burial ground through a CMP.

Where *in situ* conservation of the burial grounds is not possible, a GRP supported through the BGGC Process must be completed.

The burial grounds BGG-023 and BGG-027 are situated directly adjacent to the proposed CPP to RSTF Pipeline routing. It is recommended that BGG-023 and BGG-027 be included in the BGGC Process described above. Furthermore, it is recommended that a 50 m buffer be established around the burial grounds, the sites be clearly demarcated through fencing, and a Watching Brief be implemented during the construction phase. This will entail the presence of an accredited archaeologist to be on site during earth moving activities to guide the construction to minimise the risk of damage to the site.



## TABLE OF CONTENTS

1	Introduction .....	1
1.1	Appointment .....	1
1.2	The Ultimate WRTRP .....	1
1.2.1	<i>Cooke Mining Right Area</i> .....	3
1.3	Defining the Study Area .....	4
1.4	Terms of Reference .....	8
1.5	Scope of Work .....	8
1.6	Structure of the HIA Report .....	9
2	Details of the Specialist .....	10
3	Aims and Objectives .....	11
4	Methodology .....	12
4.1	Qualitative Data – Desktop Screening Assessment .....	12
4.2	Quantitative Data Collection .....	12
4.3	Evaluation of Significance .....	13
4.4	Field Rating .....	15
4.5	Mitigation Measures and Recommendations .....	17
5	Assumptions and Limitations .....	19
6	Screening Assessment .....	20
7	Updated Baseline Environment .....	22
7.1	Current Natural Environment .....	22
7.2	Cultural Significance Assessment .....	22
7.3	Results of Reconnaissance .....	31
7.3.1	<i>Kloof Mining Right</i> .....	31
7.3.2	<i>Driefontein Mining Right</i> .....	47
7.3.3	<i>Ezulwini Mining Right</i> .....	49
8	Sensitivity Analysis and No-Go Area .....	50
9	Heritage Impact Assessment .....	51



9.1	Methodology .....	51
9.1.1	<i>Impact Assessment</i> .....	51
9.2	Heritage Impacts .....	58
9.2.1	<i>Kloof Mining Right Area Impact Assessment</i> .....	58
9.2.2	<i>Driefontein Mining Right Area Impact Assessment</i> .....	65
9.2.3	<i>Cooke Mining Right Area Impact Assessment</i> .....	68
9.2.4	<i>Ezulwini Mining Right Area Impact Assessment</i> .....	69
10	Cumulative Impacts on the Cultural Landscape .....	72
11	Unplanned Events and Low Risks .....	74
11.1	Unplanned Events .....	74
11.2	Low Risk to Farming Community Site .....	74
12	Environmental Management Plan .....	77
12.1	Project Activities with Potentially Significant Impacts .....	77
12.2	Summary of Mitigation and Management .....	78
13	Consultation .....	81
13.1	Records of Formal Stakeholder Engagement .....	81
13.2	Records of Informal Consultation .....	81
14	Comments and Responses .....	82
15	Conclusion .....	83

## LIST OF FIGURES

Figure 1-1: CUP pipeline routing (see red) previously considered under Case ID: 871 .....	3
Figure 7-1: Typical features of the current natural environment of the WRTRP, including agricultural fields, rocky outcrops and natural grasslands .....	22
Figure 7-2: View of Ste-001 .....	31
Figure 7-3: View of the interior and exterior of the house at Wf-002 .....	32
Figure 7-4: View of the house of Wf-003 .....	33
Figure 7-5: View of Ste-004 .....	33
Figure 7-6: View of structures associated with Wf-005 .....	34

Figure 7-7: View of Ste-006.....	35
Figure 7-8: View of residential structure within Wf-008.....	35
Figure 7-9: View of Wf-012.....	36
Figure 7-10: View of Wf-013.....	37
Figure 7-11: Ariel view of Wf-014 .....	38
Figure 7-12: View of graves in BGG-015.....	38
Figure 7-13: Interior view of Ste-016 and collapsed stone structure .....	39
Figure 7-14: View of Ste-017.....	40
Figure 7-15: View of Wf-018.....	40
Figure 7-16: View of Ste-019.....	41
Figure 7-17: View of Wf-020.....	42
Figure 7-18: Views of the stone walls at Ste-021. Note the large amount of cables lying around the site. ....	43
Figure 7-19: View of graves within BGG-022. ....	43
Figure 7-20: View of graves within BGG-023. ....	44
Figure 7-21: View of Wf-024.....	45
Figure 7-22: View of Ste-025.....	45
Figure 7-23: Aerial view of Wf-026, southern view of the werf and older structure.....	46
Figure 7-24: View of grave within BGG-027 and tombstone.....	47
Figure 7-25: Location of Wf-009 marked by trees.....	47
Figure 7-26: View of Ste-010.....	48
Figure 7-27: View of Ste-011.....	49
Figure 7-28: View of one of the residential structures of Wf-007 .....	49
Figure 9-1: Graphical representation of impact assessment concept .....	52
Figure 9-2: Example of how potential impacts were considered. ....	52
Figure 9-3: Kloof Mining Right area and identified heritage resources.....	58
Figure 9-4: Driefontein Mining Right area and identified heritage resources.....	65
Figure 9-5: Cooke Mining Right area.....	68
Figure 9-6: Ezulwini Mining Right Area and identified heritage resources .....	69
Figure 11-1: Identified stonewalled settlement on Rietfontein 349 IQ Portion 73.....	75

## LIST OF TABLES

Table 4-1: Ratings and descriptions used in determining CS and field ratings .....	16
Table 7-1: CS of identified heritage resources .....	23
Table 9-1: Description of duration, extent, intensity and probability ratings used in impact assessment.....	55
Table 9-2: Impact significance ratings, categories and relationship between consequence, probability and significance .....	57
Table 9-3: Relevant listed activities in relation to the heritage study for the Kloof Mining Right .....	59
Table 9-4: Summary of the direct impact to burial grounds and graves .....	63
Table 9-5: Relevant listed activities in relation to the heritage study for the Driefontein Mining Right .....	65
Table 9-6: Relevant listed activities in relation to the heritage study for the Ezulwini Mining Right .....	70
Table 10-1: Summary of potential cumulative impacts .....	72
Table 11-1: Unplanned events and their management measures .....	74
Table 11-2: Summary of HIA.....	76
Table 12-1: Potential Significant Impacts of the Initial Implementation of the WRTRP.....	77
Table 12-2: Impacts .....	79
Table 12-3: Objectives and Outcomes of the EMP .....	79
Table 12-4: Mitigation.....	80
Table 12-5: Prescribed Environmental Management Standards, Practice, Guideline, Policy or Law .....	80

## LIST OF APPENDICES

Appendix A: Specialists CV

## 1 Introduction

There is a long history of gold and uranium mining in the broader West Rand area with an estimated 1.3 billion tonnes of surface tailings, containing in excess of 170 million pounds of uranium and 11 million ounces of gold. Sibanye Gold Limited (SGL) currently owns the majority of the tonnage and its gold and uranium content. SGL plans to ultimately exploit all these resources to develop a strong, long life and high yield surface business. Key to the successful execution of this development strategy is the West Rand Tailings Retreatment Project (WRTRP). The concept of the WRTRP is well understood with an 8 year history of extensive metallurgical test work, feasibility studies and design by a number of major mining houses. A pre-feasibility study (PFS) completed during 2013 for the WRTRP has confirmed that there is a significant opportunity to extract value from the SGL surface resources in a cost effective sequence.

The ultimate WRTRP involves the construction of a large-scale Central Processing Plant (CPP) for the recovery of gold, uranium and sulfur from the available resources. The CPP, centrally located to the West Rand resources, will be developed in phases to eventually treat up to 4 Mt/month of tailings inclusive of current arisings. The resultant tailings will be deposited on a modern tailings storage facility (TSF) called the Regional TSF (RTSF).

### 1.1 Appointment

Digby Wells Environmental (hereafter DWE) was appointed to undertake the environmental authorisation for reclamation activities of the initial implementation of the WRTRP. A Notification of Intent to Develop (NID) and Heritage Scoping Report (HSR) were completed during the Scoping Phase and submitted to the South African Heritage Resources Agency (SAHRA) and Gauteng Provincial Heritage Resources Authority (PHRA-G) for Statutory Comment as required under section 38(8) of the National Heritage Resources Act, 1999 (Act No. 25 of 1999) (NHRA).

The ultimate WRTRP was considered at a screening level in the HSR and is summarised under Section 6 below. Further consideration at this level is outside of the scope of this assessment, and will be considered in detail at the time of environmental authorisation of future reclamation activities. This document constitutes the draft Heritage Impact Assessment (HIA) for reclamation activities of the initial implementation phase of the WRTRP.

### 1.2 The Ultimate WRTRP<sup>1</sup>

Simplistically, SGL's surface historical TSF holdings in the West Rand can be divided into three blocks; the Northern, Southern and Western Blocks. Each of these blocks contains a

---

<sup>1</sup> Detailed project descriptions, including consideration of alternatives, definitions, legal frameworks and baseline cultural landscape descriptions were reported on in the HSR and not repeated in this report for the sake of brevity.

number of historical TSFs. Each of the blocks will be reclaimed in a phased approach. Initially the Driefontein 3 TSF (Western Block) together with the Cooke TSF (Northern Block) will be reclaimed first. Following reclamation of Driefontein 3 TSF, Driefontein 5 TSF (Western Block) and Cooke 4 Dam South (C4S) (Southern Block) will be reclaimed.

- Western Block comprises: Driefontein 1, 2, 3, 4 and 5 TSF, and Libanon TSF. Once the Driefontein 3 and 5 TSFs have been depleted the remainder of the Driefontein TSFs, namely Driefontein 1, 2 and 4 and the Libanon TSF, will be processed through the CPP;
- Northern Block comprises: Cooke TSF, Venterspost North TSF, Venterspost South TSF and Millsite Complex (38, 39 and 40/41 and Valley). Venterspost North and South TSFs and Millsite Complex (38, 39 and 40/41 and Valley) will be processed with the concurrent construction of Module 2 float and gold plants; and
- Southern Block comprises: Kloof No.1 TSF, Kloof No.2 TSF, South Shaft TSF (future), Twin Shaft TSF (future), Leeudoorn TSF and C4S TSF. Following completion of the Module 3 float and gold plants, Kloof 1 and 2 TSFs, South Shaft TSF (future), Twin Shaft TSF (future) and Leeudoorn TSF will be reclaimed.

Once commissioned the project will initially reclaim and treat the TSFs at a rate of 1.5 Mt/m (1 Mt/m from Driefontein 3 (followed sequentially by Driefontein 5 and C4S) and 0.5 Mt/m from Cooke TSF). Reclamation and processing capacity will ultimately ramp up to 4 Mt/m over an anticipated period of 8 years. At the 4 Mt/m tailings retreatment capacity, each of the blocks will be reclaimed and processed simultaneously.

The tailings material will be centrally treated at the CPP. In addition to gold and uranium extraction, sulfur will be extracted to produce sulfuric acid, an important reagent required for uranium leaching.

To minimise the upfront capital required for the WRTRP, only essential infrastructure will be developed during initial implementation. Use of existing and available infrastructure may be used to process gold and uranium until the volumetric increase in tonnage necessitates the need to expand the CPP.

The authorisation, construction and operation of a new deposition site for the residue from the CPP will be located in an area that has been extensively studied as part of the original West Wits Project (WWP) and Cooke Uranium Project (CUP). The “deposition area” on which the project is focussing, has been termed the RTSF and is anticipated to accommodate the entire tonnage from the district. The RTSF if proved viable will be one large facility as opposed to the two independent deposition facilities proposed by the WWP and CUP respectively.

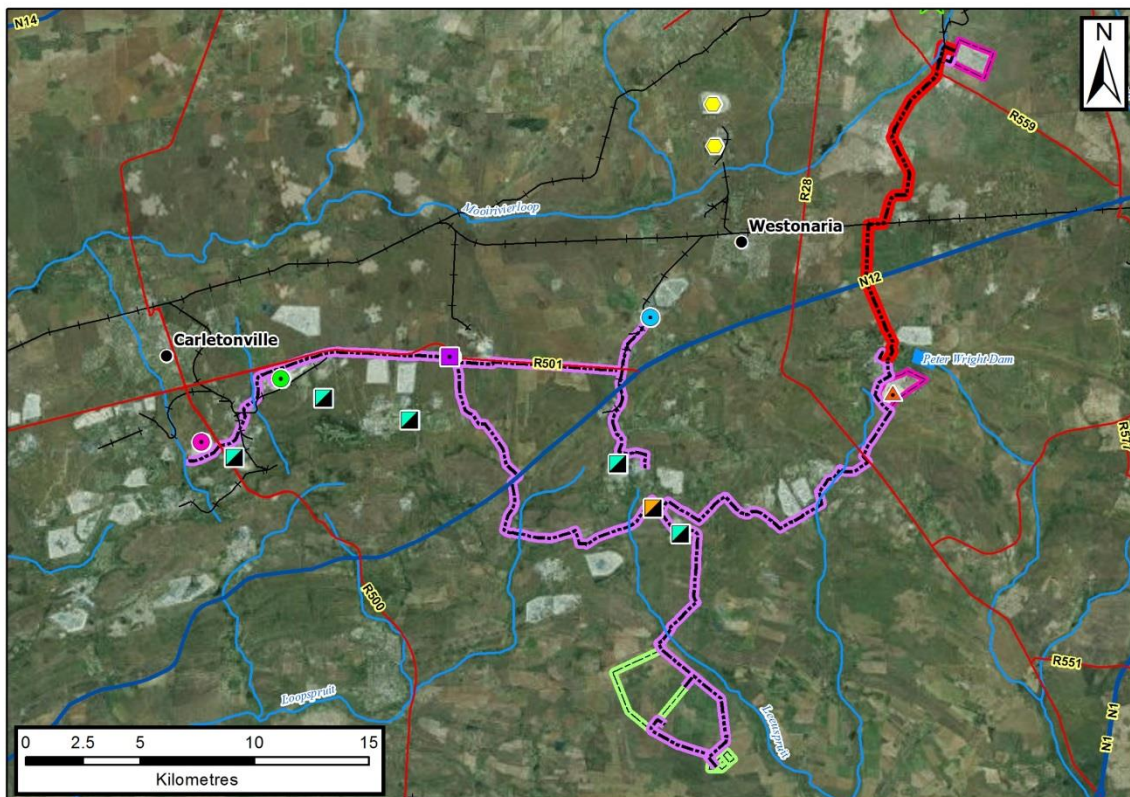
Note: Amendments to various MWPs and EMPs will be applied for in due course pending the inclusion of additional TSFs as the WRTRP grows to process 4 Mt/m. The RTSF will be assessed for the complete footprint to ensure that the site is suitable for all future deposition requirements.



### 1.2.1 Cooke Mining Right Area

DWE completed an HIA<sup>2</sup> for the Gold One International Limited (Gold One) CUP in May 2012. At this time, Gold One intended to reclaim historical TSF's in Westonaria, Randfontein, Mogale City and Johannesburg regions and establish a new TSF at Geluksdal in the Westonaria area.

Some infrastructures considered as part of the CUP now form part of the WRTRP, specifically the northern portion of the pipeline between the Cooke Dump and Ezulwini. This routing runs from the Cooke Dump to the R28 road largely within existing servitudes, traversing mine owned land and crossing under the N12 and R559 via existing culverts. In light of the proposed routing options, no direct impacts to heritage resources were identified during the HIA. Only two built structures, generally protected under section 34 of the NHRA, were identified in proximity to the proposed pipeline routing. Recommendations provided in the assessment included the implementation of a Watching Brief during the construction phase of the pipeline to ensure no direct impact on these structures would occur.



**Figure 1-1: CUP pipeline routing (see red) previously considered under Case ID: 871**

<sup>2</sup> This report was submitted to SAHRA via SAHRIS (Case ID: 871) in July 2012 for Statutory Comment. The HIA and final comment issued on Case ID: 871 is available online at the following link: <http://www.sahra.org.za/sahris/cases/geluksdal-tailings>

As this portion of the WRTRP was previously considered (Case ID 871), and final comment received, this portion of the WRTRP is **not considered further**.

### 1.3 Defining the Study Area

Three 'concentric' study areas were defined for the purposes of the heritage study. These areas are defined below; each one encompasses its precursor and exceeds it in scale:

The *regional study area* - this area was defined as the district municipality. Where necessary, the regional study area was extended outside the boundaries of the district municipality to include much wider regional expressions of specific types of heritage resources and historical events. The regional study area also provided the regional development and planning context that may contribute to cumulative impacts (Plan 1).

The *local study area* – the area most likely to be influenced by any changes to heritage resources in the project area, or where project development could cause heritage impacts. This area was defined as the immediate surrounding properties / farms, as well as the affected local municipality. The local study area was specifically examined to provide a backdrop to the socio-economic conditions within which the proposed development will occur. The local study area furthermore provided the local development and planning context that may contribute to cumulative impacts (See Plan 2).

The *development footprint study area* – this is the area where heritage impacts are most probable due to development. This area is defined as the extent of the infrastructure of the proposed project area including a 500 m buffer area around project area. The development footprint study area may extend linearly. In such instances, the linear development, e.g. a pipeline, includes a 200 m buffer either side of the development footprint (See Plan 3).



# Sibanye WRTRP

## EIA

### Regional Setting (District Level)

#### Legend

- Capital City
- Major Town
- Secondary Town
- National Roads
- Railway Line
- River
- Dam
- District Municipality Boundary
- Affected District Municipality

#### Infrastructure

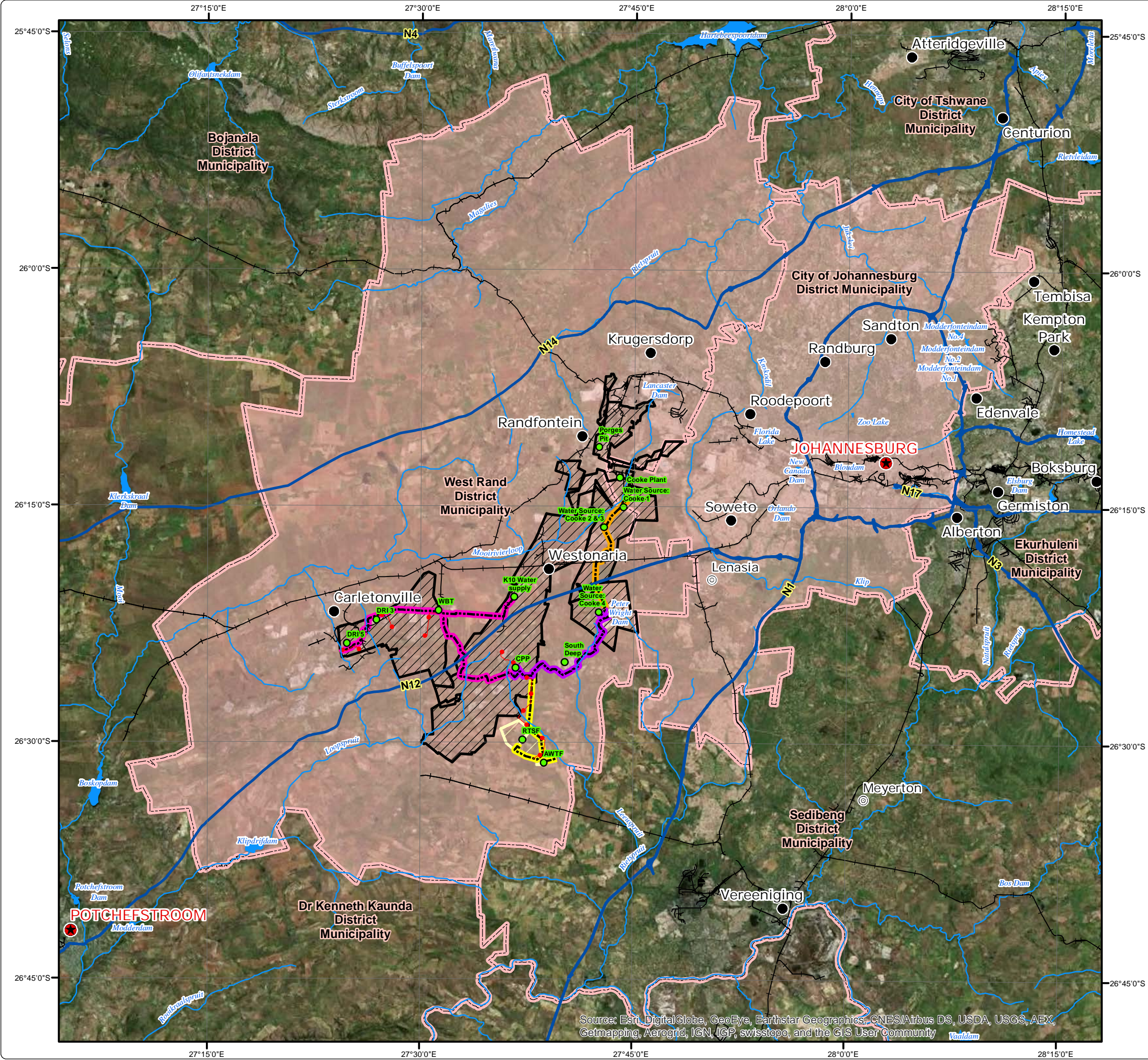
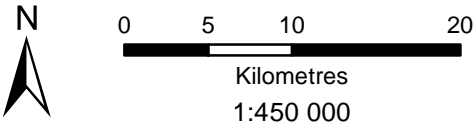
- Infrastructure Point
- Powerlines
- Pipelines: Kloof Mining Right
- Pipelines: Driefontein Mining Right
- Pipelines: Cooke Mining Right
- Pipelines: Ezulwini Mining Right
- Regional Tailings Storage Facility
- Mining Right Boundary



DIGBY WELLS  
ENVIRONMENTAL

• Sustainability • Service • Positive Change • Professionalism • Future Focused • Integrity

Projection: Transverse Mercator      Ref #: sdp.GOL2376.201507.035  
Datum: WGS 1984      Revision Number: 1  
Central Meridian: 27°E      Date: 01/12/2015





# Sibanye WRTRP

## EIA

### Local Setting

#### (Municipal Level)

#### Legend

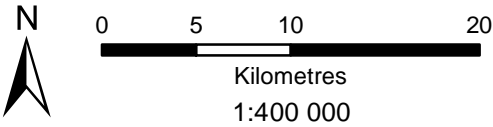
- Capital City
  - Major Town
  - Secondary Town
  - National Roads
  - Railway Line
  - River
  - Dam
  - Local Municipal Boundary
  - Affected Local Municipality
- #### Infrastructure
- Infrastructure Point
  - Powerlines
  - Pipelines: Kloof Mining Right
  - Pipelines: Driefontein Mining Right
  - Pipelines: Cooke Mining Right
  - Pipelines: Ezulwini Mining Right
  - Regional Tailings Storage Facility
  - Mining Right Boundary



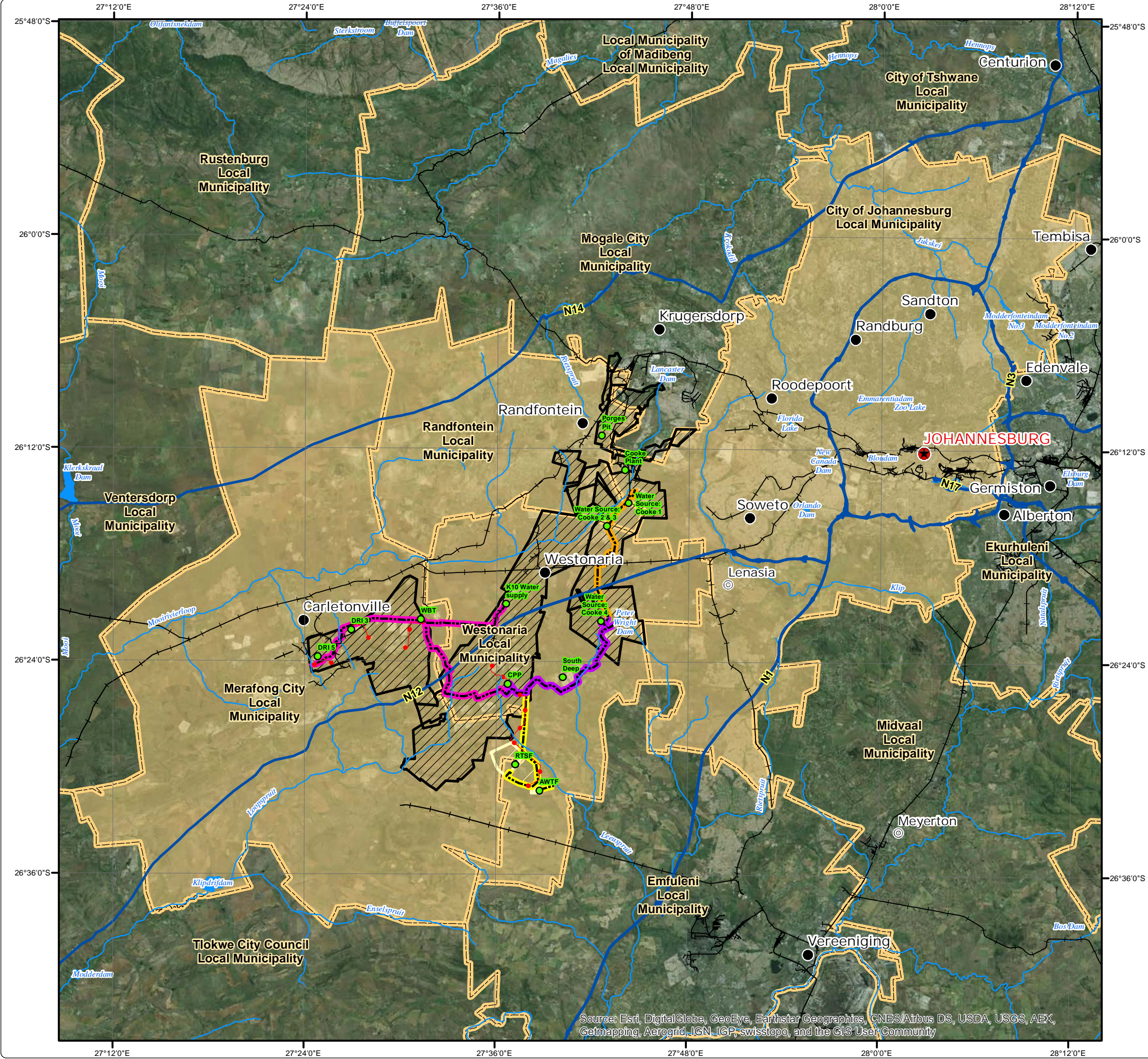
DIGBY WELLS  
ENVIRONMENTAL

• Sustainability • Service • Positive Change • Professionalism • Future Focused • Integrity

Projection: Transverse Mercator      Ref #: sdp.GOL2376.201502.036  
Datum: WGS 1984      Revision Number: 1  
Central Meridian: 27°E      Date: 01/12/2015



Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, swisstopo, and the GIS User Community





# Sibanye WRTRP EIA

## Development Footprint

### Legend

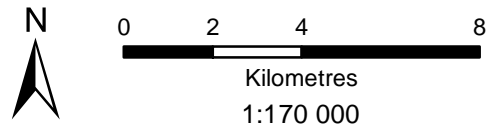
- Major Town
  - Main Roads
  - National Roads
  - Railway Line
  - River
  - Dam
- Infrastructure**
- Infrastructure Point
  - Powerlines
  - Pipelines: Kloof Mining Right
  - Pipelines: Driefontein Mining Right
  - Pipelines: Cooke Mining Right
  - Pipelines: Ezulwini Mining Right
  - CPP Footprint
  - Regional Tailings Storage Facility
  - TSF within Kloof Mining Right
  - TSF within Driefontein Mining Right
  - TSF within Cooke Mining Right
  - Kloof Mining Right
  - Driefontein Mining Right
  - Cooke Mining Right
  - Ezulwini Mining Right



DIGBY WELLS  
ENVIRONMENTAL

• Sustainability • Service • Positive Change • Professionalism • Future Focused • Integrity

Projection: Transverse Mercator      Ref #: sdp.GOL2376.201507.087  
Datum: WGS 1984      Revision Number: 1  
Central Meridian: 27°E      Date: 01/12/2015



Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, swisstopo, and the GIS User Community



## 1.4 Terms of Reference

The HSR considered the ultimate WRTRP through a screening assessment, and the initial implementation phase at a scoping level. The initial implementation considered the potential risks of the development footprint on heritage resources, specifically the:

- West Block Thickener (WBT);
- Bulk Water Storage (BWS) complexes;
- Pump stations;
- CPP;
- RTSF;
- Return Water Dam (RWD);
- Advanced Water Treatment Facility (AWTF); and
- Pipeline and power line routings.

The Terms of Reference for the HIA are based on the recommendations provided in the NID and HSR. These required that an HIA be completed and submitted to the relevant Heritage Resources Authorities (HRAs) prior to the development, and must include:

- An Archaeological Impact Assessment (AIA) including reconnaissance of the proposed development footprint of the CPP, RTSF, RWD and AWTF and linear infrastructure outside of existing servitudes requiring further consideration;
- An assessment of burial grounds and graves including reconnaissance to identify, record and document all burials that may exist in the development footprint; and
- Integration of additional specialist studies to determine any possible living heritage in the project area.

## 1.5 Scope of Work

The key deliverables as part of this assessment included an HIA and Statutory Comment Feedback (SCF) Report. The Scope of Work required completing these deliverables included:

- Reconnaissance and pre-disturbance survey of the proposed development footprint;
- Assessment of the cultural significance (CS) of any identified heritage resources;
- Assessment of impacts on identified heritage resources;
- Developing mitigation measures to avoid and / or reduce negative impacts and enhance positive ones;
- Compilation of an HIA report;
- Submission of the HIA report to SAHRA and PHRA-G for Statutory Comment;



- Compilation of an SCF Report.

## 1.6 Structure of the HIA Report

The remainder of the HIA Report is structured as follows:

- Chapter 2 provides the details of the specialist who undertook the HIA;
- Chapter 3 describes the aims and objectives of this study;
- Chapter 4 details the methodology employed during the qualitative and quantitative data collection, evaluation of significance, field ratings and a rationale for the mitigation measures and recommendations provided;
- Chapter 5 lists the assumptions and limitation experienced during the HIA;
- Chapter 6 summarises the most salient findings from the screening assessment described in detail in the HSR;
- Chapter 7 provides an update of the cultural baseline described in detail in the HSR;
- Chapter 8 discussed the sensitivities of the development footprint and potential 'no-go' areas;
- Chapter 9 details the heritage impact assessment, including the definitions and methodology utilised to determine impacts to identified heritage resources;
- Chapter 10 provides a narrative description of potential cumulative impacts on the cultural landscape;
- Chapter 11 identifies potential unplanned events and low risks to heritage resources by the initial implementation of the WRTRP;
- Chapter 12 provides heritage related input into the Environmental Management Plan (EMP) to ensure compliance with national legislative requirements for the mitigation and management of heritage resources;
- Chapter 13 details the record of consultation undertaken for the environmental authorisation process to date, and informal consultation completed by the heritage specialists;
- Chapter 14 provides a summary of comments and responses received from stakeholder with specific reference to heritage; and
- Chapter 15 summarises the most salient findings from the HIA Report.

## 2 Details of the Specialist

**Natasha Higgitt undertook the reconnaissance for the HIA report.** She obtained her Bachelor of Arts (BA) Honours degree in Archaeology in 2010 from the University of Pretoria. She currently holds the position of Assistant Heritage Consultant: Archaeology Specialist at Digby Wells. She has more than 5 years' experience in archaeological survey and gained further generalist heritage experience since her appointment at Digby Wells in South Africa and Liberia.

Natasha is a professional member of the Association of Southern African Archaeologists (ASAPA) (*Member No. 335*).

**Justin du Piesanie compiled the HIA report.** He obtained his Master of Science (MSc) degree in Archaeology from the University of the Witwatersrand in 2008, specialising in the Southern African Iron Age. Justin also attended courses in architectural and urban conservation through the University of Cape Town's Faculty of Engineering and the Built Environment Continuing Professional Development Programme in 2013. He currently holds the position of Heritage Management Consultant: Archaeologist at Digby Wells. He has over 9 years combined experience in Heritage Resources Management (HRM) in South Africa, including heritage assessments, archaeological mitigation and grave relocation. Justin has gained further generalist experience since his appointment at Digby Wells in Botswana, Burkina Faso, the Democratic Republic of Congo, Liberia and Mali on projects that have required compliance with International Finance Corporation (IFC) requirements such as Performance Standard 8: Cultural Heritage.

Justin is a professional member of ASAPA (*Member No. 270*) and the International Council on Monuments and Sites (ICOMOS) South Africa (*Member No. 14274*).

**Johan Nel undertook the technical review of this HIA.** He has more than 15 years of combined experience in the field of HRM including archaeological and heritage assessments, grave relocation, social consultation and mitigation of archaeological sites. He has gained experience both within urban settings and remote rural landscapes. Since 2010 he has been actively involved in environmental management that has allowed me to investigate and implement the integration of heritage resources management into EIAs. Many of the projects since have required compliance with IFC requirements such as Performance Standard 8: Cultural Heritage. This exposure has allowed Johan to develop and implement a HRM approach that is founded on international best practice, leading international conservation bodies such as the United Nations Educational, Scientific and Cultural Organisation (UNESCO) and ICOMOS and aligned to the South African legislation. Johan has worked in most South African Provinces, as well as Swaziland, the Democratic Republic of the Congo, Liberia and Sierra Leone.

Johan is a professional member of ASAPA (*Member No. 095*) and ICOMOS South Africa (*Member No. 13839*).

Refer to Appendix A for detailed specialist curriculum vitae.

### 3 Aims and Objectives

The primary aim of this HIA report, including the NID and HSR, was to furnish the responsible HRAs with details regarding the location, nature and extent of the proposed development, and the possible impacts associated. The specific objectives of the HIA report were to enable the responsible HRAs to:

- Timeously decide, in consultation with the proponent, i.e. SGL, whether or not the development may proceed;
- Stipulate any limitations or conditions to be applied to the development;
- Determine what general protections apply in terms of the NHRA, and what formal protections may be consequently be applied;
- Determine if any compensatory action is required in respect of any heritage resources damaged or destroyed as a result of the development; and
- Determine the need to appoint specialists as a condition of approval of the proposed development.

## 4 Methodology

Information collated in the HSR assisted in the development of a cultural heritage baseline profile for the study area, as well as determining cultural significance and assessing heritage impacts. Where necessary, qualitative data presented in the HSR was updated. The HIA places emphasis on quantitative (*i.e. field based*) data collected, specifically tangible heritage. The methodology adopted is discussed below.

### 4.1 Qualitative Data – Desktop Screening Assessment<sup>3</sup>

A survey of diverse information repositories was made to identify appropriate relevant information sources that were analysed for credibility and relevance. Credible, relevant sources were then critically reviewed. The objectives of the literature review were to:

- Gain an understanding of the cultural landscape within which the proposed ultimate WRTRP is located;
- Identify any potential fatal flaws, sensitive areas, current social complexities / issues and known or possible tangible heritage; and
- Inform the scoping site visit.

Repositories that were surveyed included the SAHRIS, online / electronic journals and platforms, and certain internet sources.

Historical layering is a process whereby diverse cartographic sources from various time periods are layered chronologically using Geographic Information System (GIS). The rationale behind historical layering is threefold, as it:

- Enables a virtual representation of changes in the land use of a particular area over time;
- Provides relative dates based on the presence / absence of visible features; and
- Identifies potential locations where heritage resources may exist within an area.

### 4.2 Quantitative Data Collection

Quantitative data was collected by Natasha Higgitt (refer to Appendix A for specialists CV) on 12 – 14 May 2015, and 30 June 2015. Data collection was completed through adaptive, non-intrusive (*i.e. no sampling was undertaken*) pre-disturbance surveys of development footprints (See Section 1.3 above) of the following proposed infrastructure outside of existing servitudes not assessed in detail during the HSR:

- The proposed RTSF, RWD and AWTF development footprint;

---

<sup>3</sup> A summary of the cultural baseline was reported on in the HSR and has only been updated in this report where relevant. This report must be read in conjunction with the HSR and Literature Review, where a detailed reference list of cited sources is available

- The proposed CPP development footprint;
- Sections of the proposed Slurry Pipeline from Driefontein 3 and Driefontein 5 to the West Block Thickener to the CPP outside of existing servitudes;
- Sections of the proposed Uranium Rich Tailings Pipeline from the CPP to the Ezulwini Uranium Plant outside of existing servitudes;
- Sections of the proposed Tailings Pipeline from the CPP to the RTSF outside of existing servitudes; and
- Sections of proposed power line from the Kloof 4 substation to the RTSF outside of existing servitudes.

The objectives of the survey were to:

- Verify heritage resources identified during the scoping assessment;
- Visually record the current state of the cultural landscape;
- Ground truth certain heritage identified in the literature; and
- Record visible tangible heritage resources as far as possible within the proposed development footprints presented above.

Due to the extent and nature of the initial implementation phase of the WRTRP (See Sections 1.2 and 1.3), the reconnaissance was completed primarily through a vehicular pre-disturbance survey of the linear infrastructure to cover as much of the proposed infrastructure within the designated timeframes, and pedestrian pre-disturbance survey of the development footprint of the RSTF, RWD, AWTF and CPP. The identified heritage resources were recorded as waypoints and track logs using handheld GPS and documented through written and photographic record.

### 4.3 Evaluation of Significance

The significance rating process is designed to provide a numerical rating of the cultural significance<sup>4</sup> of identified heritage resources. The evaluation was done as objectively as possible through a matrix developed by Digby Wells for this purpose. In addition, the methodology aims to allow ratings to be reproduced independently should it be required, provided that the same information sources are used.

---

<sup>4</sup> Cultural significance is defined in the NHRA as the intrinsic “aesthetic, architectural, historical, scientific, social, spiritual, linguistic or technological value or significance” of a heritage resource. These attributes are combined and reduced to four themes used in the Digby Wells significance matrix: aesthetic, historical, scientific and social.

This matrix takes into account heritage resources assessment criteria set out in subsection 3(3) of the NHRA (see Box 1), which determines the intrinsic, comparative and contextual significance of identified heritage resources. A resource's importance rating is based on information obtained through review of available credible sources and representivity or uniqueness (i.e. known examples of similar resources to exist). The final significance attributed to a resource furthermore takes into account the physical integrity of the fabric of the resource. The formula used to determine significance can be summarised in Box 2.

Dimension	Attributes considered		NHRA Ref.
Aesthetic & technical	1	Importance in aesthetic characteristics	S.3(3)(e)
	2	Degree of technical / creative skill at a particular period	S.3(3)(f)
Historical importance & associations	3	Importance to community or pattern in country's history	S.3(3)(a)
	4	Site of significance relating to history of slavery	S.3(3)(i)
	5	Association with life or work of a person, group or organisation of importance in the history of the country	S.3(3)(h)
Information potential	6	Possession of uncommon, rare or endangered natural or cultural heritage aspects	S.3(3)(b)
	7	Information potential	S.3(3)(c)
	8	Importance in demonstrating principle characteristics	S.3(3)(d)
Social	9	Association to community or cultural group for social, cultural or spiritual reasons	S.3(3)(g)

**Box 1: NHRA section 3 criteria**

The rationale behind the heritage value matrix takes into account the fact that a heritage resource's value is a direct indication of its sensitivity to change (impacts). Value therefore needs to be determined prior to the completion of any assessment of impacts.

This matrix rates the potential, or importance, of an identified resource relative to its contribution to certain values – aesthetic, historical, scientific and social.

The significance of a resource is directly related to the impact on it that could result from project-related activities, as it provides minimum accepted levels of change to the resource. SAHRA has published minimum standards that include minimum required mitigation of heritage resources. These minimum requirements are integrated into the matrix to guide both assessments of impacts and recommendations for mitigation and management of resources.

The weight assigned to the various parameters for significance in the formula, significance ratings and recommended mitigation are presented in Table 4-1.

$$\begin{aligned}
 & \text{Value} = \text{Importance} \times \text{Integrity} \\
 & \text{where} \\
 & \text{Importance} = \text{average sum} \\
 & \text{of} \\
 & \text{Aesthetic} + \text{Historic} + \text{Scientific} + \text{Social}
 \end{aligned}$$

**Box 2: CS formula**



## 4.4 Field Rating

Although grading of heritage resources remains the responsibility of heritage resources authorities, SAHRA requires in terms of its Minimum Standards that heritage reports include Field Ratings for identified resources to comply with section 38 of the NHRA. The NHRA in terms of section 7 provides for a system of grading of heritage resources that form part of the national estate, distinguishing between three categories.

The field rating process is designed to provide a numerical rating of the recommended grading of identified heritage resources. The evaluation was done as objectively as possible by integrating the field rating into the significance matrix. Field ratings guide decision-making in terms of appropriate minimum required mitigation measures and consequent management responsibilities in accordance with section 8 of the NHRA. The formula used to determine field ratings is summarised in Box 3. The weight assigned to the various field rating parameters in the formula and the sum of the average ratings are presented in Table 4-1.

$$\text{Field Rating} = \text{average sum} \\ \text{of} \\ \text{Aesthetic} + \text{Historic} + \text{Scientific} + \text{Social}$$

**Box 3: Field rating formula**

**Table 4-1: Ratings and descriptions used in determining CS and field ratings**

<b>Rating</b>	<b>IMPORTANCE</b> <i>A heritage resource's contribution to aesthetic, historic, scientific and social value.</i>	<b>INTEGRITY</b> <i>The undivided or unbroken state, material wholeness, completeness or entirety of a resource or site</i>	<b>FIELD RATING</b> <i>Recommended grading of identified heritage resources in terms of NHRA Section 7</i>
-	Not assessed - dimension and/or attribute not considered in determining value.		Not assessed - dimension and/or attribute not considered in field rating.
0	The resource exhibits attributes that may be considered in a particular dimension, but it is so poorly represented that it cannot or does not contribute to the resource's overall value.	No information potential, complete loss of meaning, Fabric completely degraded, original setting lost	
1	Common, well represented throughout diverse cultural landscapes	Fabric poorly preserved, limited information, little meaning ascribed, extensive encroachment on setting	Resources under general protection in terms of NHRA sections 34 to 37 with Negligible significance Grade IV C
2	Generally well represented but exhibits superior qualities in comparison to other similar examples	Fabric is preserved, some information potential (quality questionable) and meaning evident, some encroachment on setting	Resources under general protection in terms of NHRA sections 34 to 37 with Low significance Grade IV B
3	The resource exhibits attributes that are rare and uncommon within a region. It is important to specific communities.	Fabric well preserved, good quality information and meaning evident, limited encroachment	Resources under general protection in terms of NHRA sections 34 to 37 with Medium to Medium-High significance Grade IV A
4	Rare and uncommon, value of national importance	Excellent preservation of fabric, high information potential of high quality, meaning is well established, no encroachment on setting	Resources under general protection in terms of NHRA sections 34 to 37 with High significance Grade III B
5	The resource exhibits attributes that are considered singular, unique and/or irreplaceable to the degree that its significance can be universally accepted.		Resources under general protection in terms of NHRA sections 34 to 37 with Very High significance Grade III A
6			Heritage resources under formal protection that can be considered to have special qualities which make them significant within the context of a province or a region Grade II
7			Heritage resources under formal protection that can be considered to have special qualities which make them significant within a national and / or international context. Grade I

## 4.5 Mitigation Measures and Recommendations

The desired outcome of an impact assessment is the removal of negative impacts on heritage resources through the implementation of feasible mitigation measures. The mitigation and management measures recommended in this section comply with the General Principles set out under section 5 of the NHRA. The recommendations further considered the cultural significance of heritage resources and were guided by the minimum mitigation contained in the SAHRA Minimum Standards (See Box 4).

Designation	Recommended mitigation
Negligible	Sufficiently recorded, no mitigation required
Low	Resource must be recorded before destruction, including detailed site mapping, surface sampling may be required
Medium	Mitigation of resource to include detailed recording and mapping, and limited sampling, e.g. STPs.
Medium High	Project design should aim to reduce or remove changes; Mitigation of resource to include extensive sampling and recording, e.g. test excavation, analyses, etc.
High	Project design must aim to avoid change to resource; Partly conserved, Conservation Management Plan (CMP)
Very High	Project design must change to avoid all change to resource; Conserved in entirety, CMP

**Box 4: Recommended minimum level of required mitigation**

Recommended mitigation is therefore divided into two categories: *project-related* and *mitigation of heritage resources* defined below.

- Project-related mitigation requires changes or amendments to project design, planning and siting of infrastructure to avoid or reduce physical impacts on heritage resources. Project-related mitigation measures are always the preferred option, especially where heritage resources with higher cultural significance will be impacted on. Project-related mitigation may include:
  - *In situ* preservation (i.e. no-development) of heritage resources for which Conservation Management Plans (CMPs) are required; and
  - Conservation of heritage resources through, for example, incorporating the resources into project design and planning, for which CMPs are also required.
- Mitigation of heritage resources may be necessary where project-related mitigation will not sufficiently reduce or remove impacts, thus resulting in partial or complete changes (including destruction) to a resource. Such resources need to be mitigated to ensure that they are fully recorded, documented and researched before any negative change occurs. This may require actions such as:
  - Intensive detailed recording of sites through various non-intrusive techniques to create a documentary record of the site – “preservation by record”;
  - Intrusive recording and sampling such as shovel test pits (STPs) and excavations, relocation (usually burial grounds and graves, but certain types of sites may be relocated), restoration and alteration. Any form of intrusive mitigation is a regulated permitted activity for which permits need to be issued by

the relevant heritage authorities. Such mitigation may result in a reassessment of the value of a resource that could require conservation measures to be implemented. Alternatively, an application for a destruction permit may be made if the resource has been sufficiently sampled; and

- Where resources have negligible significance the specialist may recommend that no further mitigation is required and the site may be destroyed, for which a destruction permit must be applied for.

Appropriate mitigation measures were identified for each impact, and the procedure discussed above was to assess the possible consequence, probability and significance of each impact post-mitigation.

The post-mitigation rating provided an indication of the significance of residual impacts, while the difference between an impact's pre- and post-mitigation ratings represents the degree to which the recommended mitigation measures are expected to be effective in reducing or ameliorating that impact.

## 5 Assumptions and Limitations

The following constraints and limitations were experienced during the completion of this study:

- Archaeological sites commonly occur at sub-surface levels with no or limited trace evidence on the surface. To investigate the potential of subsurface occurrences, permits regulated under section 35 of the NHRA is required. The HRAs do not issued permits for so-called Phase 1 HIAs, and as such, it is possible that archaeological sites may be identified during the construction phase of the project;
- Access to Doornkloof 350 IQ Portion 6 was not possible at the time of the pre-disturbance survey due to landowner permission not being granted; and
- The pre-disturbance survey of Rietfontein 349 IQ Portion 73 left certain areas unsurveyed due to the presence of a large cache of possible stolen copper cables and the presence of persons that posed a safety risk to Digby Wells' staff.

## 6 Screening Assessment

The screening assessment considered the regional study area at a desktop level to define the cultural landscape within which the ultimate WRTRP is situated. The ultimate WRTRP is located within a cultural landscape that spans from the Stone Age through to the Historical Period.

This can be summarised as follows:

- Middle and Late Stone Age scatters have been identified;
- Late Farming Community (LFC) stone walled sites categorised as Type N and Klipriviersberg have been recorded;
- Historic farmsteads associated with the settlement of Voortrekkers are known to occur;
- Historic mining landscape associated with the discovery of gold on the Witwatersrand and the establishment of mining towns Krugersdorp (1887) and Randfontein (1890);
- Site of the culmination of the Jameson Raid which precipitated the start of the South African War of 1899 – 1902; and
- Mining history associated with the discovery of gold on the Gatsrand in the 1930's.

The ultimate WRTRP is underlain by complex lithologies associated with the Witwatersrand, Transvaal and Karoo Supergroups. Of significance here is that select historical TSFs are currently underlain by dolomites of the Malmani Subgroup, increasing the potential for groundwater contamination through Acid Mine Drainage (AMD), radioactive contamination and significantly, succumbing to localised instability through the development of sinkholes. These factors, in addition to economic drivers, highlight the need for the reclamation of these resources.

Notwithstanding the geological sensitivities, through the screening assessment it was determined that the ultimate WRTRP is situated in a culturally sensitive landscape primarily associated with a historic mining activities on the Witwatersrand. With the onset of the Transvaal and South African Wars, Gatsrand became a strategic location for British troops who occupied Potchefstroom. This region was located in close proximity to the Western Railway, which provided a tactical advantage. To exploit and protect this advantage, three blockhouses were constructed on the farms Driefontein 113 IQ and Driefontein 355 IQ. These structures were not identified during the pre-disturbance survey and it is assumed that they no longer exist. The next major event to take place on this region was the discovery of gold, which facilitated the establishment of several towns from the 1920s, an increase in population and an increase in services. Early mines established include Venterspost (1934), Libanon (1936), West Driefontein (1945), East Driefontein (1968) and later Kloof (1968). Shaped by these events and activities the study area has through time transformed into a historic mining landscape.

No fatal flaws were identified for the ultimate WRTRP, however, the ultimate WRTRP is situated within a sensitive cultural landscape that must be considered during the various phases of the project.



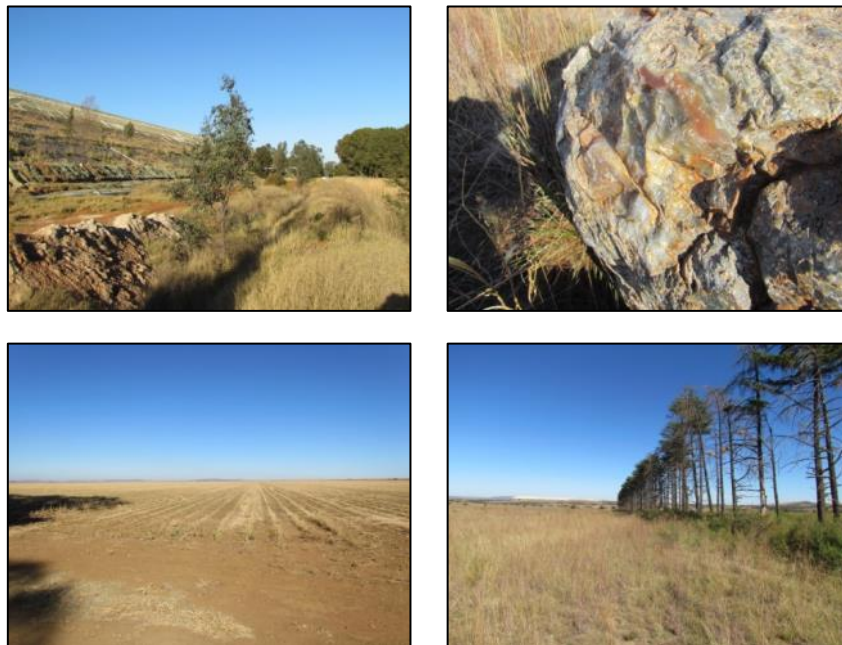
## 7 Updated Baseline Environment

### 7.1 Current Natural Environment

In general, the natural environment within which the local study area is located comprises of open grassland, associated with the Highveld grasslands biome, and agricultural fields. Four vegetation types, as defined in Mucina & Rutherford (2006) and discussed in detail in the Fauna and Flora Report are present in the proposed development footprints, namely:

- Carltonville Dolomite Grassland;
- Rand Highveld Grassland;
- Gauteng Shale Mountain Bushveld; and
- Soweto Highveld Grassland.

Intermittent rocky outcrops were identified within the area, in close proximity to the proposed Slurry Pipeline from Driefontein 3 and Driefontein 5.



**Figure 7-1: Typical features of the current natural environment of the WRTRP, including agricultural fields, rocky outcrops and natural grasslands**

### 7.2 Cultural Significance Assessment

The assessment of CS considers criteria defined in Box 1. The CS assigned to the identified heritage resources is summarised Table 7-1. The assessment of CS indicated that the identified heritage resources designations range from negligible to very high significance.

Table 7-1: CS of identified heritage resources

Resource ID	Type	Description	Cultural Significance	CS Motivation	Field Rating	Field Rating Motivation	Mitigation	Latitude	Longitude
BGG-015	Burial / grave	Burial ground with approximately 27 graves See Section 7.3.1.11	Very High	Burial grounds and graves are considered against social criteria where the significance of this resource is universally accepted. The meaning of burial grounds and graves is well established resulting in excellent preservation of fabric	General Protection IV A	Burial grounds and graves are generally protected under section 36 of the NHRA	Burial grounds and graves must be as far as possible preserved <i>in situ</i> to maintain the <i>status quo</i> . Where project design can be amended to accommodate this, it must be done. We understand, however, that the RTSF design cannot be changed as it is the most suitable site and layout/design in terms of technical and environmental criteria. Regardless of whether the resource will be impacted upon, a Burial Grounds and Graves Consultation (BGGC) process as regulated by Chapter XI of the Regulations to the Act must be implemented to identify, as far as possible, bona fide Next of Kin (NoK) and agree upon the requirements for a CMP or if required, a Grave Relocation Plan (GRP).	-26.479642	27.612981
BGG-022	Burial / grave	Burial ground with approximately 4 graves See Section 7.3.1.18						-26.493004	27.619436
BGG-023	Burial / grave	Burial ground with approximately 15 graves See Section 7.3.1.19						-26.473852	27.628666°
BGG-027	Burial / grave	Single grave associated with the du Plessis family See Section 7.3.1.23						-26.476534	27.628014
Ste-001	Structure	Historic dwelling constructed with stone. See Section 7.3.1.1	Negligible	The structure is in a dilapidated state. The structure can be considered in particular dimensions against aesthetic and social criteria, but the fabric of the structure is poorly preserved.	General Protection IV C	The structure is older than 60 years and is generally protected under section 34 of the NHRA	The structure has been sufficiently recorded. It is recommended the project design be amended as far as is feasible to preserve the structure in situ. Where this is not possible, an application for destruction must be completed and lodged with PHRA-G for authorisation before any alteration to or destruction of the structure can take place	-26.471092	27.618616

Resource ID	Type	Description	Cultural Significance	CS Motivation	Field Rating	Field Rating Motivation	Mitigation	Latitude	Longitude
Wf-002	Werf	Werf comprising of abandoned dilapidated residential structure, outbuildings, water tank and reservoir. See Section 7.3.1.2	Negligible	The werf is abandoned and in a state of ruin. The werf can be considered in particular dimensions against aesthetic and social criteria, but this type of resource is common and well represented throughout diverse cultural landscapes. The fabric of the resource is preserved and the meaning is evident.	General Protection IV C	Structures associated with Wf-002 are visible on the aerial imagery dating to 1938. These structures are generally protected under section 34 of the NHRA	The werf has been sufficiently recorded. It is recommended the project design be amended as far as is feasible to preserve the structures in situ. Where this is not possible, an application for destruction must be completed and lodged with PHRA-G for authorisation before any alteration to or destruction of the structures can take place	-26.478533	27.617049
Wf-003	Werf	Werf comprising of abandoned dilapidated residential structure and farmworker housing approximately 300m north-west of the main house. See Section 7.3.1.3	Negligible	The werf is abandoned and in a state of ruin. The werf can be considered in particular dimensions against aesthetic and social criteria, but this type of resource is common and well represented throughout diverse cultural landscapes. The fabric of the resource is preserved and the meaning is evident.	General Protection IV C	Structures associated with Wf-003 are visible on the aerial imagery dating to 1938. These structures are generally protected under section 34 of the NHRA	The werf has been sufficiently recorded. It is recommended the project design be amended as far as is feasible to preserve the structures in situ. Where this is not possible, an application for destruction must be completed and lodged with PHRA-G for authorisation before any alteration to or destruction of the structures can take place	-26.475071	27.614659
Ste-004	Structure	Historic dwelling constructed with stone. See Section 7.3.1.4	Negligible	The structure is in a dilapidated state. The structure can be considered in particular dimensions against aesthetic and social criteria, but the fabric of the structure is poorly preserved.	General Protection IV C	The structure is older than 60 years and is generally protected under section 34 of the NHRA	The structure has been sufficiently recorded. It is recommended the project design be amended as far as is feasible to preserve the structure in situ. Where this is not possible, an application for destruction must be completed and lodged with PHRA-G for authorisation before any alteration to or destruction of the structure can take place	-26.480402	27.634173
Wf-005	Werf	Werf comprising of three structures. One structure appears to be maintained, while the others are in a state of ruin. See Section 7.3.1.5	Negligible	The werf is abandoned and in a state of ruin, with the exception of one structure. The werf can be considered in particular dimensions against aesthetic and social criteria, but this type of resource is common and well represented throughout diverse cultural landscapes. Aesthetically, the werf does exhibit features not seen at other werfs, such as the pillars / columns that remain intact. The fabric of the resource is preserved and the meaning is evident.	General Protection IV C	Structures associated with Wf-005 are visible on the aerial imagery dating to 1938. These structures are generally protected under section 34 of the NHRA	The werf has been sufficiently recorded. It is recommended the project design be amended as far as is feasible to preserve the structures in situ. Where this is not possible, an application for destruction must be completed and lodged with PHRA-G for authorisation before any alteration to or destruction of the structures can take place	-26.478758	27.628762

Resource ID	Type	Description	Cultural Significance	CS Motivation	Field Rating	Field Rating Motivation	Mitigation	Latitude	Longitude
Ste-006	Structure	Structure constructed of stone. Collapsed and in state of ruin See Section 7.3.1.6	Negligible	The structure is in a dilapidated state. The structure can be considered in particular dimensions against aesthetic and social criteria, but the fabric of the structure is poorly preserved.	General Protection IV C	The structure is older than 60 years and is generally protected under section 34 of the NHRA	The structure has been sufficiently recorded. It is recommended the project design be amended as far as is feasible to preserve the structure in situ. Where this is not possible, an application for destruction must be completed and lodged with PHRA-G for authorisation before any alteration to or destruction of the structure can take place	-26.423656	27.635826
Wf-007	Werf	Werf comprising of residential structures, water tower and storage silos. Werf is abandoned and structures are dilapidated. See Section 7.3.3.1	Negligible	The werf is abandoned and in a state of ruin. The werf can be considered in particular dimensions against aesthetic and social criteria, but this type of resource is common and well represented throughout diverse cultural landscapes. The fabric of the resource is preserved and the meaning is evident.	General Protection IV C	Structures associated with Wf-007 are visible on the aerial imagery dating to 1938. These structures are generally protected under section 34 of the NHRA	The werf has been sufficiently recorded. It is recommended the project design be amended as far as is feasible to preserve the structures in situ. Where this is not possible, an application for destruction must be completed and lodged with PHRA-G for authorisation before any alteration to or destruction of the structures can take place	-26.421532	27.684837
Wf-008	Werf	Werf that is currently occupied. Werf comprises of residential structure and outbuildings. See Section 7.3.1.7	Negligible	The werf can be considered in particular dimensions against aesthetic and social criteria. This is a resource that is common and well represented throughout diverse cultural landscapes. The fabric of the resource is well preserved and the meaning is well established.	General Protection IV C	Structures associated with Wf-008 are visible on the aerial imagery dating to 1952. These structures are generally protected under section 34 of the NHRA	The werf has been sufficiently recorded. It is recommended the project design be amended as far as is feasible to preserve the structures in situ. Where this is not possible, an application for destruction must be completed and lodged with PHRA-G for authorisation before any alteration to or destruction of the structures can take place	-26.41991	27.621394
Wf-009	Werf	Werf in a state of ruin. Remnant foundations and reservoir of werf remain. See Section 7.3.2.1	Negligible	The werf can be considered in particular dimensions against aesthetic and social criteria. This is a resource that is common and well represented throughout diverse cultural landscapes. The fabric of this resource is poorly preserved and there is extensive encroachment on setting.	General Protection IV C	Structures associated with Wf-009 are visible on the aerial imagery dating to 1938. These structures are generally protected under section 34 of the NHRA	The werf has been sufficiently recorded. It is recommended the project design be amended as far as is feasible to preserve the structures in situ. Where this is not possible, an application for destruction must be completed and lodged with PHRA-G for authorisation before any alteration to or destruction of the structures can take place	-26.404282	27.413655



Resource ID	Type	Description	Cultural Significance	CS Motivation	Field Rating	Field Rating Motivation	Mitigation	Latitude	Longitude
Ste-010	Structure	Stone foundations and stone enclosure See Section 7.3.2.2	Negligible	The structure no longer exists, only stone foundations remain. The structure can be considered in particular dimensions against aesthetic and social criteria, but the fabric of the structure is poorly preserved.	General Protection IV C	The structure is older than 60 years and is generally protected under section 34 of the NHRA	The structure has been sufficiently recorded. It is recommended the project design be amended as far as is feasible to preserve the structure in situ. Where this is not possible, an application for destruction must be completed and lodged with PHRA-G for authorisation before any alteration to or destruction of the structure can take place	-26.378895	27.527086
Ste-011	Structure	Stone foundations of four individual structures. See Section 7.3.2.3	Negligible	The structure no longer exists, only stone foundations remain. The structure can be considered in particular dimensions against aesthetic and social criteria, but the fabric of the structure is poorly preserved.	General Protection IV C	The structure is older than 60 years and is generally protected under section 34 of the NHRA	The structure has been sufficiently recorded. It is recommended the project design be amended as far as is feasible to preserve the structure in situ. Where this is not possible, an application for destruction must be completed and lodged with PHRA-G for authorisation before any alteration to or destruction of the structure can take place	-26.380552	27.527917
Wf-012	Werf	Werf that is currently occupied. Werf comprises of residential structure and outbuildings. See Section 7.3.1.8	Negligible	The werf can be considered in particular dimensions against aesthetic and social criteria. This is a resource that is common and well represented throughout diverse cultural landscapes. The fabric of the resource is well preserved and the meaning is well established.	General Protection IV C	Structures associated with Wf-012 are visible on the aerial imagery dating to 1938. These structures are generally protected under section 34 of the NHRA	The werf has been sufficiently recorded. It is recommended the project design be amended as far as is feasible to preserve the structures in situ. Where this is not possible, an application for destruction must be completed and lodged with PHRA-G for authorisation before any alteration to or destruction of the structures can take place	-26.421069	27.550654
Wf-013	Werf	Werf that is currently occupied. Werf comprises of residential structure and outbuildings. See Section 7.3.1.9	Negligible	The werf can be considered in particular dimensions against aesthetic and social criteria. This is a resource that is common and well represented throughout diverse cultural landscapes. The fabric of the resource is well preserved and the meaning is well established.	General Protection IV C	Structures associated with Wf-013 are visible on the aerial imagery dating to 1938. These structures are generally protected under section 34 of the NHRA	The werf has been sufficiently recorded. It is recommended the project design be amended as far as is feasible to preserve the structures in situ. Where this is not possible, an application for destruction must be completed and lodged with PHRA-G for authorisation before any alteration to or destruction of the structures can take place	-26.423072	27.549314

Resource ID	Type	Description	Cultural Significance	CS Motivation	Field Rating	Field Rating Motivation	Mitigation	Latitude	Longitude
Wf-014	Werf	Werf comprising of house, labourer quarters and mine singles quarters. See Section 7.3.1.10	Negligible	The werf can be considered in particular dimensions against aesthetic and social criteria. This is a resource that is common and well represented throughout diverse cultural landscapes. The fabric of the resource is well preserved and the meaning is well established.	General Protection IV C	It is assumed the structures on the werf are older than 60 years as aerial imagery is not conclusive. Structures older than 60 years are generally protected in terms of section 34 of the NHRA	The werf has been sufficiently recorded. It is recommended the project design be amended as far as is feasible to preserve the structures in situ. Where this is not possible, an application for destruction must be completed and lodged with PHRA-G for authorisation before any alteration to or destruction of the structures can take place	-26.422417	27.612168
Ste-016	Structure	Single structure constructed with brick and cement. Currently in dilapidated state. See Section 7.3.1.12	Negligible	The structure is in a dilapidated state. The structure can be considered in particular dimensions against aesthetic and social criteria, but the fabric of the structure is poorly preserved.	General Protection IV C	It is assumed the structure is older than 60 years as aerial imagery is not conclusive. Structures older than 60 years are generally protected in terms of section 34 of the NHRA	The structure has been sufficiently recorded. It is recommended the project design be amended as far as is feasible to preserve the structure in situ. Where this is not possible, an application for destruction must be completed and lodged with PHRA-G for authorisation before any alteration to or destruction of the structure can take place	-26.488745	27.594602
Ste-017	Structure	Foundations of structure constructed of brick and cement. See Section 7.3.1.13	Negligible	The structure is in a dilapidated state. The structure can be considered in particular dimensions against aesthetic and social criteria, but the fabric of the structure is poorly preserved.	General Protection IV C	It is assumed the structure is older than 60 years as aerial imagery is not conclusive. Structures older than 60 years are generally protected in terms of section 34 of the NHRA	The structure has been sufficiently recorded. It is recommended the project design be amended as far as is feasible to preserve the structure in situ. Where this is not possible, an application for destruction must be completed and lodged with PHRA-G for authorisation before any alteration to or destruction of the structure can take place	-26.506426	27.620031
Wf-018	Werf	Werf comprising of several structures in a state of disrepair. See Section 7.3.1.14	Negligible	The werf is abandoned and in a state of ruin. The werf can be considered in particular dimensions against aesthetic and social criteria, but this type of resource is common and well represented throughout diverse cultural landscapes. The fabric of the resource is preserved and the meaning is evident.	General Protection IV C	Structures associated with Wf-018 are visible on the aerial imagery dating to 1952. These structures are generally protected under section 34 of the NHRA	The werf has been sufficiently recorded. It is recommended the project design be amended as far as is feasible to preserve the structures in situ. Where this is not possible, an application for destruction must be completed and lodged with PHRA-G for authorisation before any alteration to or destruction of the structures can take place	-26.513522	27.630673

Resource ID	Type	Description	Cultural Significance	CS Motivation	Field Rating	Field Rating Motivation	Mitigation	Latitude	Longitude
Ste-019	Structure	Concrete foundations. See Section 7.3.1.15	Negligible	The structure is in a dilapidated state. The structure can be considered in particular dimensions against aesthetic and social criteria, but the fabric of the structure is poorly preserved.	General Protection IV C	It is assumed the structure is older than 60 years as aerial imagery is not conclusive. Structures older than 60 years are generally protected in terms of section 34 of the NHRA	The structure has been sufficiently recorded. It is recommended the project design be amended as far as is feasible to preserve the structure in situ. Where this is not possible, an application for destruction must be completed and lodged with PHRA-G for authorisation before any alteration to or destruction of the structure can take place	-26.422417	27.612168
Wf-020	Werf	Werf comprising of main house, farm outbuildings and farm worker quarters. Currently vacant. See Section 7.3.1.16	Negligible	The werf is currently vacant. The werf can be considered in particular dimensions against aesthetic and social criteria, but this type of resource is common and well represented throughout diverse cultural landscapes. The fabric of the resource is preserved and the meaning is evident.	General Protection IV C	It is assumed the structures associated with the werf are older than 60 years as aerial imagery is not conclusive. Structures older than 60 years are generally protected in terms of Section 34 of the NHRA	The werf has been sufficiently recorded. It is recommended the project design be amended as far as is feasible to preserve the structures in situ. Where this is not possible, an application for destruction must be completed and lodged with PHRA-G for authorisation before any alteration to or destruction of the structures can take place	-26.505397	27.615051
LFC-021	Site	Stone walled settlement complex. See Section 7.3.1.17	Negligible	The stone walled settlement can be considered on particular dimensions against aesthetic, historic and scientific criteria. The fabric of the site is preserved and there is potential for information, although the quality of information may be questionable	General Protection IV C	The site is generally protected under section 35 of the NHRA	The site has been sufficiently recorded. It is recommended that the project design be amended as far as is feasible to avoid the site and preserve it <i>in situ</i> .	-26.431885	27.628248
Wf-024	Werf	Werf comprising of individual structures previously used for educational purposes See Section 7.3.1.20	Negligible	The werf can be considered in particular dimensions against aesthetic and social criteria, but this type of resource is common and well represented throughout diverse cultural landscapes. The integrity of the site is not well preserved and has implications to the fabric of the werf.	General Protection IV C	It is assumed the structures associated with the werf are older than 60 years and generally protected in terms of Section 34 of the NHRA	The werf has been sufficiently recorded. It is recommended the project design be amended as far as is feasible to preserve the structures in situ. Where this is not possible, an application for destruction must be completed and lodged with PHRA-G for authorisation before any alteration to or destruction of the structures can take place.	-26.473277	27.626593



Resource ID	Type	Description	Cultural Significance	CS Motivation	Field Rating	Field Rating Motivation	Mitigation	Latitude	Longitude
Ste-025	Structures	Modern structures / houses See Section 7.3.1.21	Negligible	The structures are considered in terms of social criteria. This resource is common and well represented throughout diverse cultural landscapes.	N/A	These structures are younger than 60 years and not protected under the NHRA	No mitigation is required	-26.458134	27.629819
Wf-026	Werf	Werf comprising of farmhouse and outbuildings. See Section 7.3.1.22	Negligible	The werf is currently vacant. The werf can be considered in particular dimensions against aesthetic and social criteria, but this type of resource is common and well represented throughout diverse cultural landscapes. The fabric of the resource is preserved and the meaning is evident.	General Protection IV C	It is assumed the structures associated with the werf are older than 60 years as aerial imagery is not conclusive. Structures older than 60 years are generally protected in terms of Section 34 of the NHRA	The werf has been sufficiently recorded. It is recommended the project design be amended as far as is feasible to preserve the structures in situ. Where this is not possible, an application for destruction must be completed and lodged with PHRA-G for authorisation before any alteration to or destruction of the structures can take place	-26.462147	27.630671



# Sibanye WRTRP EIA

## Identified Heritage Sites

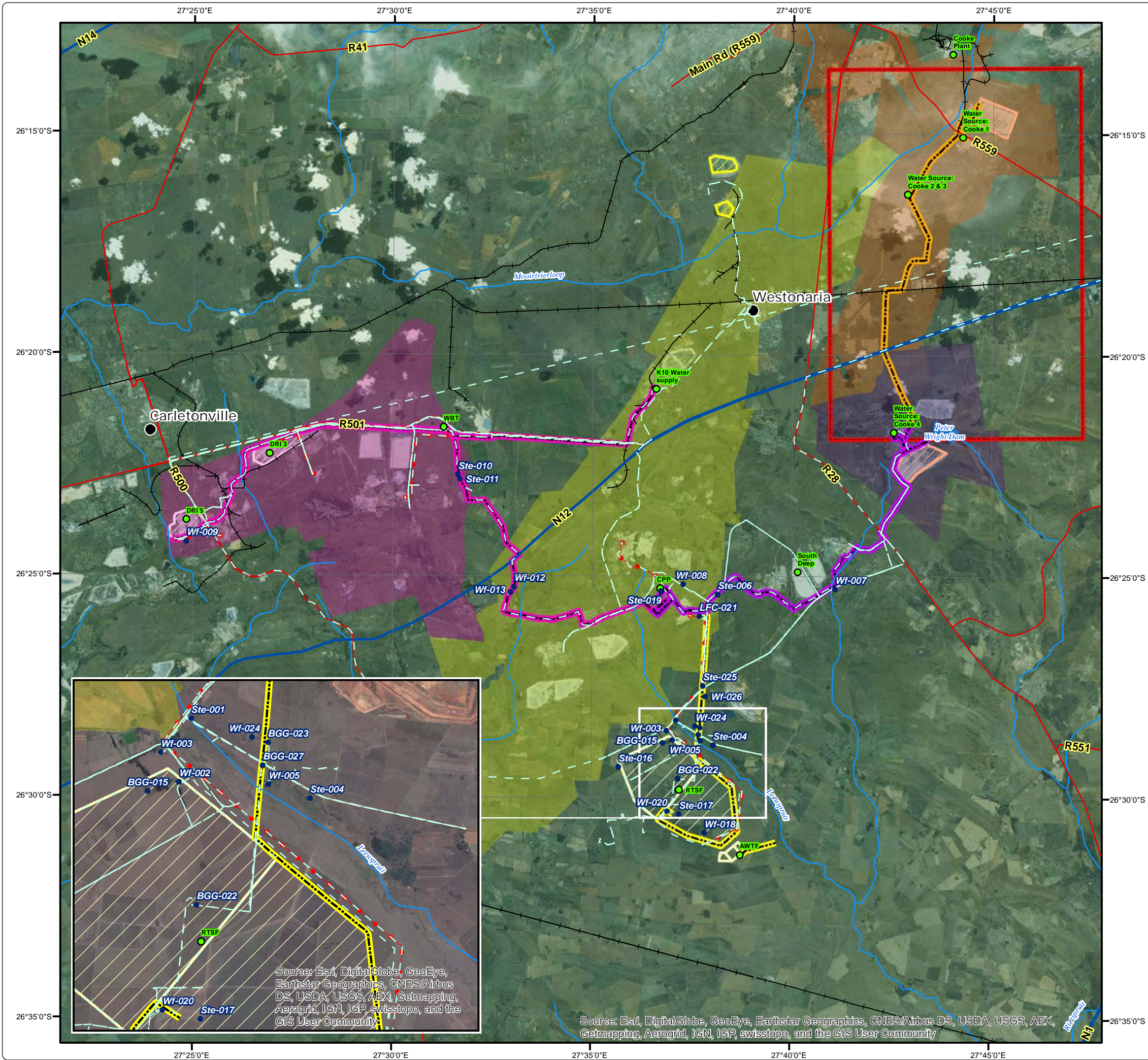
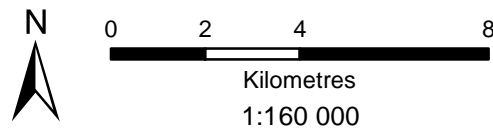
### Legend

- Major Town
- Main Roads
- National Roads
- Railway Line
- River
- Dam
- Identified Heritage Resources**
  - Heritage Site
  - Heritage Tracks
  - Area Excluded from Study
- Infrastructure**
  - Infrastructure Point
  - Powerlines
  - Pipelines: Kloof Mining Right
  - Pipelines: Driefontein Mining Right
  - Pipelines: Cooke Mining Right
  - Pipelines: Ezulwini Mining Right
  - Regional Tailings Storage Facility
  - TSF within Kloof Mining Right
  - TSF within Driefontein Mining Right
  - TSF within Cooke Mining Right
  - Kloof Mining Right
  - Driefontein Mining Right
  - Cooke Mining Right
  - Ezulwini Mining Right



• Sustainability • Service • Positive Change • Professionalism • Future Focused • Integrity

Projection: Transverse Mercator      Ref #: sdp.GOL2376.201507.088  
Datum: WGS 1984      Revision Number: 1  
Central Meridian: 27°E      Date: 01/12/2015





## 7.3 Results of Reconnaissance

The pre-disturbance survey of the proposed development footprints was undertaken over 3 days from 12 May 2015 up to and including 14 May 2015, and 30 June 2015. During the field survey, 14 heritage resources were identified in addition to those previously recorded. The results of the reconnaissance from the HSR and HIA are presented below. The significance of the identified resources is discussed under Section 7.2.

### 7.3.1 Kloof Mining Right

#### 7.3.1.1 Ste-001 - Historical Structure

Development Footprint:		Kloof 4 to RTSF OHL Power line	
Cultural Significance: Negligible	Field Rating: Grade IV C	<b>Co-ordinates</b>	
		-26.471092	27.618616

This site represents an abandoned dwelling. The relative age of the structure could not be confirmed through historical layering, but to ensure compliance with section 34 of the NHRA, it is assumed that the structure is older than 60 years and generally protected.

The structure was constructed with stone. It comprises of three rooms. The structure is in a state of ruin, and none of the original fixtures or features are intact. It is noted that some of the wooden window frames were in place at the time of survey.

The site is situated approximately 50 m east from the development footprint of the pipeline and power line.



**Figure 7-2: View of Ste-001**

### 7.3.1.2 Wf-002 - Werf

Development Footprint:		RTSF Kloof 4 to RTSF OHL Power line	
Cultural Significance: Negligible	Field Rating: Grade IV C	<b>Co-ordinates</b> -26.478533      27.617049	

The site constitutes an abandoned historical werf that is older than 60 years based on historical layering and generally protected under section 34 of the NHRA.

The werf comprise of a house, outbuildings, water tank and reservoir. The house is in a dilapidated state, where original fixtures and the roof have been salvaged through time that only the primary interior and exterior walls remains. The outbuildings are situated approximately 100 m to the south of the house, with the reservoir some 40 m to the west of the house.

The extent of the werf is approximately 200 m x 100 m. The werf is situated within the development footprint of the RTSF.



**Figure 7-3: View of the interior and exterior of the house at Wf-002**

### 7.3.1.3 Wf-003 - Werf

Development Footprint:		RTSF Kloof 4 to RTSF OHL Power line	
Cultural Significance: Negligible	Field Rating: Grade IV C	<b>Co-ordinates</b> -26.475071      27.614659	

The site constitutes an abandoned historical werf that is older than 60 years based on historical layering and generally protected under section 34 of the NHRA.

The werf comprise of a house and outbuildings to the north and east. All the structures are in a dilapidated state. The original features and fixtures of the house no longer remain.

The extent of the werf is approximately 150 m x 140 m. The werf is situated within the development footprint of the pipeline and power line.



**Figure 7-4: View of the house of Wf-003**

#### **7.3.1.4 Ste-004 - Historical Structure**

Development Footprint:		Outside of development footprint	
Cultural Significance: Negligible	Field Rating: Grade IV C	Co-ordinates	
		-26.480402	27.634173

The site constitutes an abandoned structure that is in a state of ruin. The relative age of the structure could not be confirmed through historical layering, but to ensure compliance with section 34 of the NHRA, it is assumed that the structure is older than 60 years and generally protected.

The structure is built of stone and has through time collapsed. Only some of the outer walling still stands. The internal structure has collapsed and no roof remains. The ruined dwelling is situated approximately 600 m north-east of the proposed RTSF development footprint. No other structures or heritage resources were identified within proximity to Ste-004.



**Figure 7-5: View of Ste-004**

### 7.3.1.5 Wf-005 - Werf

Development Footprint:	CPP to RTSF Pipeline	
Cultural Significance: Negligible	Field Rating: Grade IV C	<b>Co-ordinates</b>
		-26.478758      27.628762

The site constitutes a historical werf. The relative age of the werf could not be determined through historical layering, but to ensure compliance with section 34 of the NHRA it is assumed that it is older than 60 years and generally protected.

The werf comprise of three primary structures and a reservoir covering an extent of approximately 150 m x 120 m. The thatch rondavel appears to be more recent and maintained, whereas the other structures appear abandoned. The structures are constructed from stone, and no notable architectural features were noted.

It is located approximately 500 m north-east from the proposed RTSF development footprint.



**Figure 7-6: View of structures associated with Wf-005**

### 7.3.1.6 Ste-006 - Historical Structure

Development Footprint:	CPP to Ezulwini Pipeline	
Cultural Significance: Negligible	Field Rating: Grade IV C	<b>Co-ordinates</b>
		-26.423656      27.635826

The site constitutes an abandoned structure in a state of ruin. The relative age of the structure could not be determined through historical layering, but to ensure compliance with section 34 of the NHRA, it is assumed to be older than 60 years and generally protected.

The structure was constructed from stone. Only remnants of the outer primary walls remain, and no other features or fixtures could be identified.

The structure is situated approximately 90 m east from the development footprint of the

pipeline.



**Figure 7-7: View of Ste-006**

#### **7.3.1.7 Wf-008 - Werf**

Development Footprint:		CPP to Ezulwini Pipeline CPP Development footprint	
Cultural Significance: Negligible	Field Rating: Grade IV C	<b>Co-ordinates</b>	
		-26.419910	27.621394

The site constitutes a werf comprising of a house and outbuildings. The structure is older than 60 years based on historical layering and is generally protected under section 34 of the NHRA.

The werf covers an extent of approximately 150 m x 200 m. The house is currently occupied and in good condition. The house is constructed from brick and is plastered and painted. The house has a porch and the roof is made from corrugated iron.

The werf is located approximately 100 m north-east from the proposed CPP development footprint, where the house is approximately 30 m east from the proposed pipeline routing.



**Figure 7-8: View of residential structure within Wf-008**



### 7.3.1.8 Wf-012 - Werf

Development Footprint		WBT to CPP Pipeline CPP WSF to BWSF Pipeline	
Cultural Significance: Negligible	Field Rating: Grade IV C	<b>Co-ordinates</b> -26.421069      27.550654	

The site constitutes a historic werf comprising of a house and outbuildings. The werf is older than 60 years based on historical layering and is generally protected under section 34 of the NHRA.

The werf is currently occupied and in good condition. The house is constructed from brick and is plastered and painted. The house has a gable façade, a covered porch and corrugated iron roof. There are at least four outbuildings associated with this werf.

The approximate extent of the werf is 100 m x 200 m. The structures are situated at least 40 m east from the proposed pipeline routings.



**Figure 7-9: View of Wf-012**

### 7.3.1.9 Wf-013 - Werf

Development Footprint		WBT to CPP Pipeline CPP WSF to BWSF Pipeline	
Cultural Significance: Negligible	Field Rating: Grade IV C	<b>Co-ordinates</b> -26.423072      27.549314	

The site constitutes a historic werf comprising of a house and at least four outbuildings, one being a barn. The werf is older than 60 years based on historical layering and is generally protected under section 34 of the NHRA.

The werf is currently occupied and in good condition. The house is constructed from brick,

and is plastered and painted. The house has a wraparound porch and corrugated iron roof.

The approximate extent of the werf is 100 m x 200 m. The structures are situated at least 40 m east from the proposed pipeline routings.



**Figure 7-10: View of Wf-013**

#### **7.3.1.10 Wf-014 - Werf**

Development Footprint:		Kloof 1 to CPP OHL Power line CPP to RTSF Pipeline CPP to Ezulwini Pipeline CPP Development footprint	
Cultural Significance: Negligible	Field Rating: Grade IV C	<b>Co-ordinates</b> -26.422417      27.612168	

The site constitutes a werf comprising of a house, outbuildings and a reservoir. The relative age of the werf could not be confirmed through historical layering, but to ensure compliance with section 34 of the NHRA, it is assumed that the werf is older than 60 years and generally protected.

The werf is approximately 180 m x 100 m in extent, and is situated within the CPP development footprint.



**Figure 7-11: Ariel view of Wf-014**

### **7.3.1.11 BGG-015 - Burial Grounds and Graves**

Development Footprint:		RTSF Kloof 4 to RTSF OHL Power line	
Cultural Significance: Very High	Field Rating: Grade IV A	<b>Co-ordinates</b>	
		-26.479642	27.612981

The site constitutes a burial ground. Burial grounds and graves are protected under section 36 of the NHRA.

The burial ground contains at least 27 graves. Three of the graves have granite headstones, one is marked with a board, and the remaining 23 consist of stone packed cairns.

The burial ground is unfenced and unkempt, situated between agricultural fields and access roads.

As discussed under Section 13.2 below, some of the associated NoK still reside on the property, while others remain unknown.

The burial ground is located within the RTSF development footprint.



**Figure 7-12: View of graves in BGG-015**

### 7.3.1.12 Ste-016 - Structure

Development Footprint:	RTSF	
Cultural Significance: Negligible	Field Rating: Grade IV C	<b>Co-ordinates</b> -26.488745      27.594602

The site constitutes two structures that are in a state of ruin. The relative age of the structures could not be determined through historical layering, but to ensure compliance with section 34 of the NHRA, it is assumed that they are older than 60 years and generally protected.

The first is the remains of a single roomed structure constructed from brick and plastered. Only the exterior walls remain, no fixtures, windows, doors or roof remain intact. The second is a collapsed stone structure measuring approximately 5 m x 4 m directly adjacent to the first. These structures are situated approximately 100 m west from the RTSF development footprint, in between agricultural fields.



**Figure 7-13: Interior view of Ste-016 and collapsed stone structure**

### 7.3.1.13 Ste-017 - Structure

Development Footprint:	RTSF	
Cultural Significance: Negligible	Field Rating: Grade IV C	<b>Co-ordinates</b> -26.506426      27.620031

The site constitutes the three individual concrete foundations of structures that no longer exist over an area of 200 m x 50 m. The relative age of the foundations could not be determined through historical layering, but to ensure compliance with section 34 of the NHRA, it is assumed that the foundations are older than 60 years and generally protected.

The foundations are constructed from brick and cement and cover an extent of approximately 4 m x 5 m each. The structures are situated within the proposed development

footprint of the RTSF.



**Figure 7-14: View of Ste-017**

#### **7.3.1.14 Wf-018 - Werf**

Development Footprint:		RTSF	
Cultural Significance: Negligible	Field Rating: Grade IV C	<b>Co-ordinates</b>	
		-26.513522	27.630673

The site constitutes an abandoned werf comprising on at least nine structures in a dilapidated state. The werf is older than 60 years based on historical layering and is generally protected under section 34 of the NHRA.

The remaining structures of the werf include a house and outbuildings. With the majority of the structures, only the primary inner and outer walls remain. The structures were constructed with brick and plastered. No original fixtures, windows, doors or roofs remain.

The structures associated with the werf cover an approximate extent of 400 m x 80 m. The werf is situated within the proposed development footprint of the RTSF.



**Figure 7-15: View of Wf-018**



### 7.3.1.15 Ste-019 - Structure

Development Footprint:	CPP	
Cultural Significance: Negligible	Field Rating: Grade IV C	<b>Co-ordinates</b> -26.422417      27.612168

The site constitutes individual foundations of structures that no longer exist over an area of approximate 120 m x 170 m. The relative age of the foundations could not be determined through historical layering, but to ensure compliance with section 34 of the NHRA it is assumed the foundations are older than 60 years and generally protected.

Aerial imager suggest that at least 10 foundations of structures exists within the identified area. Three of the foundations are clearly visible. These are located approximately 20 m apart and measure 15 m x 12 m in size. The cement foundations show signs of smaller rooms located within the structure and concrete steps.

The site is situated within the CPP development footprint.



**Figure 7-16: View of Ste-019**

### 7.3.1.16 Wf-020 - Structure

Development Footprint:	RTSF	
Cultural Significance: Negligible	Field Rating: Grade IV C	<b>Co-ordinates</b> -26.505397      27.615051

The site constitutes a werf comprising of a house and outbuildings. The relative age could not be confirmed through historical layering. The owner indicated that the structures were built in the 1950's, but to ensure compliance with section 34 of the NHRA, it is assumed the structures are older than 60 years and generally protected.

The main house is constructed with brick and is plastered and painted. The werf is currently

occupied and in good conditions. All fixtures and features of the structures remain intact. The main house has approximately five bedrooms, two kitchens, two sitting rooms and four garages.

The werf covers an approximate extent of 200 m x 160 m. The werf is situated within the RTSF development footprint.



**Figure 7-17: View of Wf-020**

#### **7.3.1.17 LFC-021 – Stone walled settlement**

Development Footprint:		CPP to RTSF Pipeline Kloof 4 to RTSF OHL Power line	
Cultural Significance: Negligible	Field Rating: Grade IV C	<b>Co-ordinates</b> -26.431885      27.628248	

The site constitutes a large stone walled settlement. The stone walled settlement is protected under section 35 of the NHRA.

From aerial imagery, the approximate extent of the stone walled settlement is 600 m x 400 m. The stone walls are mostly intact and the integrity of the site is good. A small portion of the site closest to the proposed power line (60 m away) was examined and the walls were recorded.

The presence of a large cache of possible stolen copper cables and the presence of persons that posed a safety risk to Digby Wells' staff hampered the pre-disturbance survey of this site.

The proposed power line runs through the stone walled settlement. The pipeline is routed along the periphery of the site along established farm and dirt roads.



**Figure 7-18: Views of the stone walls at Ste-021. Note the large amount of cables lying around the site.**

#### **7.3.1.18 BGG-022 – Burial Ground**

Development Footprint:		RTSF	
Cultural Significance: Very High	Field Rating: Grade IV A	<b>Co-ordinates</b> -26.493004      27.619436	

The site constitutes a burial ground. Burial grounds and graves are generally protected under section 36 of the NHRA.

The burial ground contains at least four graves and is situated along a fence line. None of the graves have headstones. The burial ground is unfenced and unkempt.

The burial ground is situated within the RTSF development footprint.



**Figure 7-19: View of graves within BGG-022.**

#### **7.3.1.19 BGG-023 – Burial Ground**

Development Footprint:		CPP to RTSF Pipeline	
Cultural Significance: Very High	Field Rating: Grade IV A	<b>Co-ordinates</b> -26.473852      27.628666	



The site constitutes a burial ground. Burial grounds and graves are generally protected under section 36 of the NHRA.

The burial ground contains at least 15 graves comprising of a mixture between stone dressing, concrete dressing and formal headstone. Potential families associated with the burial ground are the Rapoo and Ntaopane. The graves were dates could be identified indicate that the burials are older than 60 years. At present, the burial ground is unmaintained and in an unkempt state.

The burial ground is situated adjacent to the proposed CPP to RSTF Pipeline routing.



**Figure 7-20: View of graves within BGG-023.**

#### **7.3.1.20 Wf-024 - Werf**

Development Footprint:		CPP to RTSF Pipeline	
Cultural Significance: Negligible	Field Rating: Grade IV C	<b>Co-ordinates</b>	
		-26.473277	27.626593

The site constitutes individual structures in a derelict state over an area of approximately 80 m x 100 m. The relative age of the werf could not be determined through historical layering, but to ensure compliance with section 34 of the NHRA it is assumed the foundations are older than 60 years and generally protected. Aerial imagery suggest that at least 6 individual structures exists within the identified area.

The structures appear to have been utilised for educational purposes and altered through time. The remaining structures appear to be more modern in terms of architecture and construction techniques.

The site is adjacent to the proposed CPP to RSTF Pipeline routing.



**Figure 7-21: View of Wf-024**

#### **7.3.1.21 Ste-025 - Structures**

Development Footprint:		CPP to RTSF Pipeline	
Cultural Significance: Negligible	Field Rating: Grade IV C	<b>Co-ordinates</b>	
		-26.458134	27.629819

The site constitutes six individual structures over an area of approximately 200 m. The relative age of the werf based on historical aerial imagery suggests the site is not older than 60 years or provisionally protected under section 34 of the NHRA. Architecturally and examination of the construction material, these structures appear to be recent in time. This site is not considered further in this report. The site is adjacent to the proposed CPP to RTSF Pipeline routing.



**Figure 7-22: View of Ste-025**

### 7.3.1.22 Wf-026 - Werf

Development Footprint:		CPP to RTSF Pipeline	
Cultural Significance: Negligible	Field Rating: Grade IV C	<b>Co-ordinates</b> -26.462147      27.630671	

The site constitutes a modern werf that is still currently occupied. Elements of the werf are visible on aerial imagery dating to 1952, therefore to ensure compliance with section 34 of the NHRA it is assumed the some of the structures associated with the werf are older than 60 years and generally protected.

The site is adjacent to the proposed CPP to RSTF Pipeline routing.



**Figure 7-23: Aerial view of Wf-026, southern view of the werf and older structure.**

### 7.3.1.23 BGG-027 – Burial Ground

Development Footprint:		CPP to RTSF Pipeline	
Cultural Significance: Very High	Field Rating: Grade IV A	<b>Co-ordinates</b> -26.476534      27.628014	

The site constitutes an individual grave. Burial grounds and graves are generally protected under section 36 of the NHRA.

The burial ground contains a single grave associated with the du Plessis family. The grave comprises concrete dressing and formal granite headstone. The grave dates to 1919, indicating that the burial is older than 60 years. At present, the burial ground is unmaintained and in an unkempt state.

The burial ground is situated adjacent to the proposed CPP to RSTF Pipeline routing.



**Figure 7-24: View of grave within BGG-027 and tombstone.**

### 7.3.2 Driefontein Mining Right

#### 7.3.2.1 Wf-009 – Werf

Development Footprint:	Driefontein 5 to Driefontein 3 Pipeline BWSF to Driefontein 5 Pipeline West Drie Gold (DP2 & 3) Substation to Drie 5 OHL Power line	
Cultural Significance: Negligible	Field Rating: Grade IV C	<b>Co-ordinates</b> -26.404282      27.413655

The site represents an abandoned werf that is older than 60 years based on historical layering, and generally protected under section 34 of the NHRA. Remaining structures are in a state of ruin and collapse. Only foundations of the original structures and remnants of a reservoir remain. The werf is indicated by 'ornamental' trees that surround the location of ruined structures. The approximate extent of the werf is 50 m x 70 m. The werf is situated approximately 100 m south from the proposed development footprint of the pipeline routings.



**Figure 7-25: Location of Wf-009 marked by trees**



### 7.3.2.2 Ste-010 - Structure

Development Footprint:		WBT to CPP Pipeline	
Cultural Significance: Negligible	Field Rating: Grade IV C	<b>Co-ordinates</b>	
		-26.378895	27.527086

The site represents the foundations of structures that no longer remain. The foundations are the remnants of structures that are older than 60 years based on historical layering and generally protected under section 34 of the NHRA. The foundations are identified through collapsed stone with an extent of approximately 15 m x 12 m. Associated with the stone foundations are collapsed stone walls thought to be the remains on stone enclosures. The extent of the stone walls is approximately 10 m x 10 m.

The site is situated approximately 40 m west of the proposed pipeline routing.



**Figure 7-26: View of Ste-010**

### 7.3.2.3 Ste-011 - Structure

Development Footprint:		WBT to CPP Pipeline	
Cultural Significance: Negligible	Field Rating: Grade IV C	<b>Co-ordinates</b>	
		-26.380552	27.527917

The site is represented by four individual stone foundations. The foundations appear to be rectangular in shape, and comprise of individual stones. The original structures are no longer *in situ*, and have been completely removed. The relative age of the stone foundations could not be confirmed through historical layering; however, to ensure compliance with section 34 of the NHRA, it is assumed that these structures are older than 60 years and generally protected under section 34. The extents of the stone foundations are approximately 4 m x 3 m each. The structures are approximately 30 m west from the development footprint of the pipeline routing.



**Figure 7-27: View of Ste-011**

### 7.3.3 Ezulwini Mining Right

#### 7.3.3.1 Wf-007 - Werf

Development Footprint:		CPP to Ezulwini Pipeline	
Cultural Significance: Negligible	Field Rating: Grade IV C	<b>Co-ordinates</b>	
		-26.421532	27.684837

The site represents an abandoned and dilapidated werf with structures older than 60 years based on historical layering and generally protected under section 34 of the NHRA. The werf comprise historical residential structures, a water tower and storage silos. The residential structure is in a state of ruin, and no original features of the structure remain. The roof, doors and windows and other fixtures have been salvaged through time, and only the primary outside and inside walls remain. The werf is situated approximately 150 m south from the development footprint of the pipeline routing.



**Figure 7-28: View of one of the residential structures of Wf-007**

## 8 Sensitivity Analysis and No-Go Area

A sensitivity analysis of the proposed development footprint was undertaken for the HSR against the baseline cultural heritage environment. Current project designs propose that the majority of the linear infrastructure be situated within existing servitudes. These areas have undergone disturbance and reduce the likelihood of *in situ* archaeological resources being present. Nonetheless, these routing options were examined as part of the pre-disturbance survey of the HSR. No archaeological resources were identified within the proposed footprints, and all identified built structures were well outside of the development footprints.

The proposed development footprints that were situated outside of existing servitudes were deemed to be of medium to high sensitivity. Here the potential occurrence of *in situ* archaeological resources, built structures and graves increase. Based on the findings of the HSR it was recommended that reconnaissance of these sections of the development footprints are carried out during the HIA. This included the following:

- The proposed RTSF, RWD and AWTF development footprint;
- The proposed CPP development footprint;
- Sections of the proposed Slurry Pipeline from Driefontein 3 and Driefontein 5 to the West Block Thickener to the CPP outside of existing servitudes;
- Sections of the proposed Uranium Rich Tailings Pipeline from the CPP to the Ezulwini Uranium Plant outside of existing servitudes;
- Sections of the proposed Tailings Pipeline from the CPP to the RTSF outside existing servitudes; and
- Sections of proposed power line from the Kloof 4 substation to the RTSF outside of existing servitudes.

## 9 Heritage Impact Assessment

### 9.1 Methodology

#### 9.1.1 Impact Assessment

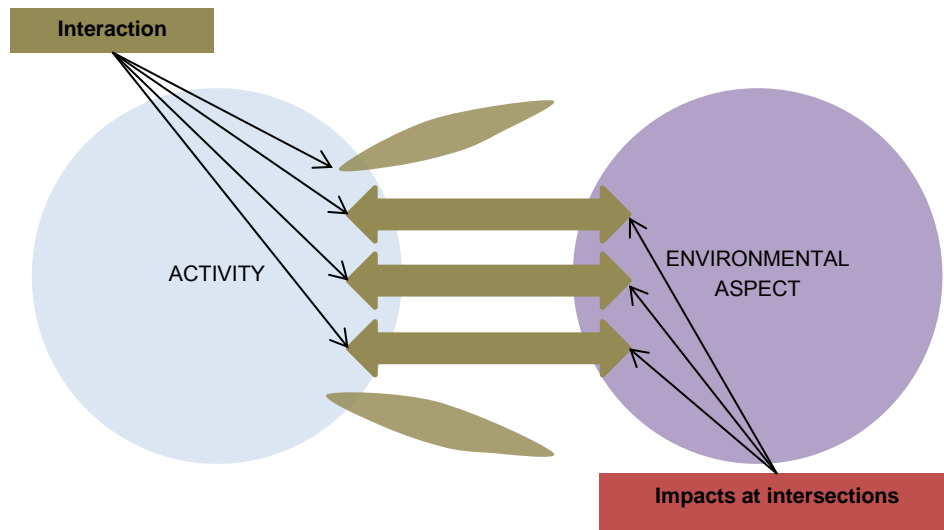
This chapter considers the potential direct and indirect impacts on heritage resources identified within the development footprint of the WRTRP, as well as those within the greater surrounding landscape. These impacts are considered in relation to a Scoping Risk Assessment completed during the Scoping Phase and the project related activities outlined in the Scoping Report. The proposed activities for which environmental authorisation are being applied for correspond to Listing Notices GNR 983, 984 and 985.

The impact assessment and mitigations measures chapter is as a narrative description of the sources of risk and potential impacts, and as a discussion of feasible mitigation measures to avoid and / or better negative impacts and enhance positive one.

The following are terms and definitions applicable to the EIA concept (ISO 14001):

- **Project Activity:** Activities associated with the project that result in an environmental interaction during the different phases (construction, operation and decommissioning), e.g., new processing plant, new stockpiles, development of open pit, dewatering, water treatment plant;
- **Interaction:** An “environmental interaction” is an element or characteristic of an activity, product, or service that interacts or can interact with the environment. Environmental interactions can cause environmental impacts (but may not necessarily do so). They can have either beneficial impacts or adverse impacts and can have a direct and decisive impact on the environment or contribute only partially or indirectly to a larger environmental change.
- **Environmental Aspect:** The term “environmental aspect” refers to the various natural and human environments that an activity may interact with. These environments extend from within the activity itself to the global system, and include air, water, land, flora, fauna (including people) and natural resources of all kinds.
- **Environmental Impact:** An “environmental impact” is a change to the environment that is caused either partly or entirely by one or more environmental interactions. An environmental interaction can have either a direct and decisive impact on the environment or contribute only partially or indirectly to a larger environmental change. In addition, it can have either a beneficial environmental impact or an adverse environmental impact.





**Figure 9-1: Graphical representation of impact assessment concept**

The potential impacts were considered through an examination of the project phase and activity, the environmental aspect, the interdependencies between aspects, an assessment and classification of categories, and consideration of the potential impact on heritage resources. An example of this process is presented in Figure 9-2.

Project Activity & Interaction		Environmental Aspect		Potential Environmental Impact	
Project Phase	Activity	Aspect	Interdependencies	Issue	Potential Impact
This relates to the consideration of the relevant phase of the project. <b>Example: Construction</b>	This refers to one or more of the activities that will be undertaken during the corresponding phase of the project. <b>Example: Topsoil clearing</b>	This identifies and considers the various aspects that will be affected by the project activity. <b>Example: Heritage, Biophysical, and Social</b>	This identifies and considers the interdependencies between the various aspects and how they may be impacted upon by the relevant activity. <b>Example: Removal of topsoil will impact on flora which may have heritage and social implications</b>	The issues considers the activity in relation to the identified aspects and interdependencies. Note: Activities and Aspects can have several issues resulting in various impacts. <b>Example: Physical alteration of the land</b>	Potential impacts are a culmination of the various categories evaluated as part of the impact assessment. <b>Example: Topsoil clearing will remove medicinal plants that will erode indigenous knowledge systems and cultural significance.</b>

**Figure 9-2: Example of how potential impacts were considered.**

### **9.1.1.1 Defining Heritage Impacts**

Different heritage impacts may manifest in different geographical areas and diverse communities. For instance, heritage impacts can simultaneously affect the physical resource and have social repercussions: this is compounded when the intensity of physical impacts and social repercussions differ significantly. In addition, heritage impacts can influence the cultural significance of heritage resources without any actual physical impact on the resources taking place. Heritage impacts can therefore generally be placed into three broad categories (adapted from Winter & Bauman 2005: 36):

- **Direct or primary heritage impacts** affect the fabric or physical integrity of the heritage resource, for example destruction of an archaeological site or historical building. Direct or primary impacts may be the most immediate and noticeable. Such impacts are usually ranked as the most intense, but can often be erroneously assessed as high-ranking.
- **Indirect, induced or secondary heritage impacts** can occur later in time or at a different place from the causal activity, or as a result of a complex pathway. For example, restricted access to a heritage resource resulting in the gradual erosion of its cultural significance that may be dependent on ritual patterns of access. Although the physical fabric of the resource is not affected through any primary impact, its significance is affected that can ultimately result in the loss of the resource itself.
- **Cumulative heritage impacts** result from in-combination effects on heritage resources acting within a host of processes that are insignificant when seen in isolation, but which collectively have a significant effect. Cumulative effects can be:
  - **Additive:** the simple sum of all the effects, e.g. the total number of development activities that will occur within the study area.
  - **Synergistic:** effects interact to produce a total effect greater than the sum of the individual effects, e.g. the effect of each different activity on the archaeological landscape in the study area.
  - **Time crowding:** frequent, repetitive impacts on a particular resource at the same time, e.g. the effect of regular blasting activities on a nearby rock art site or protected historical building high.
  - **Neutralizing:** where the effects may counteract each other to reduce the overall effect, e.g. the effect of changes in land use could reduce the overall impact on sites within the archaeological landscape of the study area.
  - **Space crowding:** high spatial density of impacts on a heritage resource, e.g. density of new buildings resulting in suburbanisation of a historical rural landscape.

The relevance of the above distinction to defining the study areas in the HSR arises from the fact that heritage resources do not exist in isolation to the wider natural, social, cultural and heritage landscape: cultural significance is therefore also linked to rarity / uniqueness, physical integrity and importance to diverse communities.

In addition, the NHRA requires that heritage resources are graded in terms of national, provincial and local concern based on their importance and consequent official (i.e. State) management effort required. The type and level of baseline information required to adequately predict heritage impacts varies between these categories. Three 'concentric' study areas were defined for the purposes of this study and are discussed in detail in the HSR.

#### **9.1.1.2 Impact Assessment**

The impact rating process is designed to provide a numerical rating of the identified heritage impacts. The significance rating follows an established impact/risk assessment formula is shown in Box 5.

The weight assigned to the various parameters for positive and negative impacts in the formula is presented in Table 9-2 below.

Project-related impacts on heritage resources have taken into account the inherent value of heritage resources, described above, and only applied to resources with values above negligible. As a result, the impact assessment did not consider individual resources, but was applied to diverse resources grouped in terms of similar values.

The magnitude will then be applied to pre- and post-mitigation scenarios with the intention of removing all impacts on heritage resources. Where project related mitigation does not avoid or sufficiently reduce negative changes/impacts on heritage resources with high values, mitigation of these resources may be required.

This may include alteration, restoration or demolition of structures under a permit issued by the HRAs.

Impacts were rated prior to mitigation and again after consideration of the proposed mitigation measures. Impacts were then categories into one of eight categories listed in Table 9-2. The relationship between the consequence, probability and significance ratings is also graphically depicted in Table 9-2.

*Significance = consequence of an event x probability of the event occurring*

*where:*

*Consequence = type of impact x (Intensity + Spatial Scale + Duration)*

*and*

*Probability = Likelihood of an impact occurring*

In the formula for calculating consequence:

Type of impact = +1 (positive) or -1 (negative)

**Box 5: Impact assessment formula**

**Table 9-1: Description of duration, extent, intensity and probability ratings used in impact assessment**

Value	DURATION RATING - A measure of the lifespan of the impact		EXTENT RATING A measure of how wide the impact would occur		INTENSITY RATING- A measure of the degree of harm, injury or loss.		PROBABILITY RATING - A measure of the chance that consequences of that selected level of severity could occur during the exposure window.	
	Probability	Description	Exposure	Description	Intensity	Description	Probability	Description
7	<b>Permanent</b>	Impact will permanently alter or change the heritage resource and/or value (Complete loss of information)	<b>International</b>	Impacts on heritage resources will have international repercussions, issues or effects, i.e. in context of international cultural significance, legislation, associations, etc.	<b>Extremely high</b>	Major change to Heritage Resource with High-Very High Value	<b>Certain/Definite</b>	Happens frequently. The impact will occur regardless of the implementation of any preventative or corrective actions.
6	<b>Beyond Project Life</b>	Impact will reduce over time after project life (Mainly renewable resources and indirect impacts)	<b>National</b>	Impacts on heritage resources will have national repercussions, issues or effects, i.e. in context of national cultural significance, legislation, associations, etc.	<b>Very high</b>	Moderate change to Heritage Resource with High-Very High Value	<b>High probability</b>	Happens often. It is most likely that the impact will occur.
5	<b>Project Life</b>	The impact will cease after project life.	<b>Region</b>	Impacts on heritage resources will have provincial repercussions, issues or effects, i.e. in context of provincial cultural significance, legislation, associations, etc.	<b>High</b>	Minor change to Heritage Resource with High-Very High Value	<b>Likely</b>	Could easily happen. The impact may occur.
4	<b>Long Term</b>	Impact will remain for >50% - Project Life	<b>Municipal area</b>	Impacts on heritage resources will have regional repercussions, issues or effects, i.e. in context of the regional study area.	<b>Moderately high</b>	Major change to Heritage Resource with Medium-Medium High Value	<b>Probable</b>	Could happen. Has occurred here or elsewhere
3	<b>Medium Term</b>	Impact will remain for >10% - 50% of Project Life	<b>Local</b>	Impacts on heritage resources will have local repercussions, issues or effects, i.e. in context of the local study area.	<b>Moderate</b>	Moderate change to Heritage Resource with Medium - Medium High Value	<b>Unlikely / Low probability</b>	Has not happened yet, but could happen once in a lifetime of the project. There is a possibility that the impact will occur.



Value	DURATION RATING - A measure of the lifespan of the impact		EXTENT RATING A measure of how wide the impact would occur		INTENSITY RATING- A measure of the degree of harm, injury or loss.		PROBABILITY RATING - A measure of the chance that consequences of that selected level of severity could occur during the exposure window.	
	Probability	Description	Exposure	Description	Intensity	Description	Probability	Description
2	<b>Short Term</b>	Impact will remain for <10% of Project Life	<b>Limited</b>	Impacts on heritage resources will have site specific repercussions, issues or effects, i.e. in context of the site specific study area.	<b>Low</b>	Minor change to Heritage Resource with Medium - Medium High Value	<b>Rare / Improbable</b>	Conceivable, but only in extreme circumstances. Have not happened during the 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	<b>Transient</b>	Impact may be sporadic/limited duration and can occur at any time. E.g. Only during specific times of operation, and not affecting heritage value.	<b>Very Limited</b>	Impacts on heritage resources will be limited to the identified resource and its immediate surroundings, i.e. in context of the specific heritage site.	<b>Very low</b>	No change to Heritage Resource with values medium or higher, or Any change to Heritage Resource with Low Value	<b>Highly Unlikely /None</b>	Expected never to happen. Impact will not occur.

**Table 9-2: Impact significance ratings, categories and relationship between consequence, probability and significance**

Score	Description	Rating
109 to 147	A very beneficial impact which may be sufficient by itself to justify implementation of the project. The impact may result in permanent positive change.	Major (positive)
73 to 108	A beneficial impact which may help to justify the implementation of the project. These impacts would be considered by society as constituting a major and usually a long-term positive change to the heritage resources.	Moderate (positive)
36 to 72	An important positive impact. The impact is insufficient by itself to justify the implementation of the project. These impacts will usually result in positive medium to long-term effect on the heritage resources.	Minor (positive)
3 to 35	A small positive impact. The impact will result in medium to short term effects on the heritage resources.	Negligible (positive)
-3 to -35	An acceptable negative impact for which mitigation is desirable but not essential. The impact by itself is insufficient even in combination with other low impacts to prevent the development being approved. These impacts will result in negative medium to short term effects on the heritage resources.	Negligible (negative)
-36 to -72	An important negative impact which requires mitigation. The impact is insufficient by itself to prevent the implementation of the project but which in conjunction with other impacts may prevent its implementation. These impacts will usually result in negative medium to long-term effect on the heritage resources.	Minor (negative)
-73 to -108	A serious negative impact which may prevent the implementation of the project. These impacts would be considered by society as constituting a major and usually a long-term change to the heritage resources and result in severe effects.	Moderate (negative)
-109 to -147	A very serious negative impact which may be sufficient by itself to prevent implementation of the project. The impact may result in permanent change. Very often these impacts are immitigable and usually result in very severe effects.	Major (negative)

Relationship between consequence, probability and significance ratings																																							
Probability	Significance																																						
	7	-147	-140	-133	-126	-119	-112	-105	-98	-91	-84	-77	-70	-63	-56	-49	-42	-35	-28	-21	21	28	35	42	49	56	63	70	77	84	91	98	105	112	119	126	133	140	147
	6	-126	-120	-114	-108	-102	-96	-90	-84	-78	-72	-66	-60	-54	-48	-42	-36	-30	-24	-18	18	24	30	36	42	48	54	60	66	72	78	84	90	96	102	108	114	120	126
	5	-105	-100	-95	-90	-85	-80	-75	-70	-65	-60	-55	-50	-45	-40	-35	-30	-25	-20	-15	15	20	25	30	35	40	45	50	55	60	65	70	75	80	85	90	95	100	105
	4	-84	-80	-76	-72	-68	-64	-60	-56	-52	-48	-44	-40	-36	-32	-28	-24	-20	-16	-12	12	16	20	24	28	32	36	40	44	48	52	56	60	64	68	72	76	80	84
	3	-63	-60	-57	-54	-51	-48	-45	-42	-39	-36	-33	-30	-27	-24	-21	-18	-15	-12	-9	9	12	15	18	21	24	27	30	33	36	39	42	45	48	51	54	57	60	63
	2	-42	-40	-38	-36	-34	-32	-30	-28	-26	-24	-22	-20	-18	-16	-14	-12	-10	-8	-6	6	8	10	12	14	16	18	20	22	24	26	28	30	32	34	36	38	40	42
	1	-21	-20	-19	-18	-17	-16	-15	-14	-13	-12	-11	-10	-9	-8	-7	-6	-5	-4	-3	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21
	Consequence																																						

## 9.2 Heritage Impacts

### 9.2.1 Kloof Mining Right Area Impact Assessment

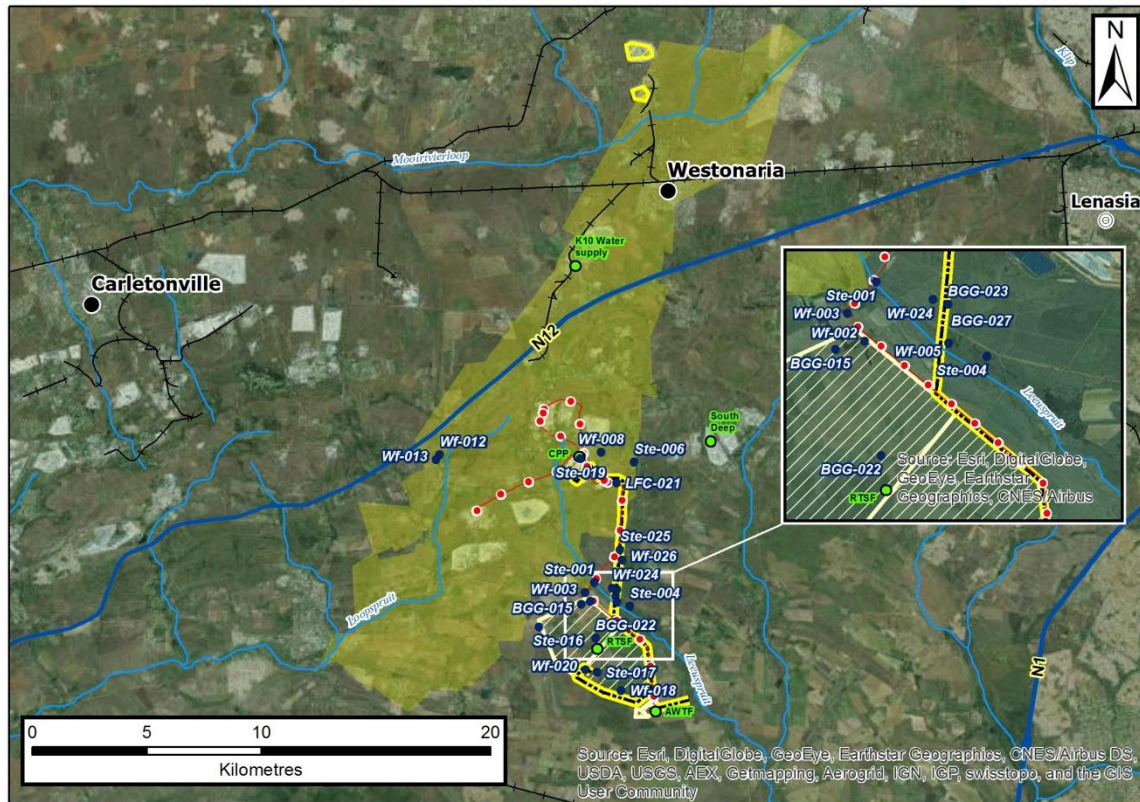


Figure 9-3: Kloof Mining Right area and identified heritage resources

**Table 9-3: Relevant listed activities in relation to the heritage study for the Kloof Mining Right**

Listed Activity		Description of Activity	Aerial extent of the activity
<b>Listing notice GNR 983 (Basic Assessment) (NEMA)</b>			
Activity 10	<p>The development and related operation of infrastructure exceeding 1 000 metres in length for the bulk transportation of sewage, effluent, process water, waste water, return water, industrial discharge or slimes-</p> <ul style="list-style-type: none"> <li>with an internal diameter of 0,36 metres or more; or</li> <li>with a peak throughput of 120 litres per second or more.</li> </ul>	Pipelines will be installed to convey slurry and process water between the RWD and RTSF.	
Activity 11	<p>The development of facilities or infrastructure for the transmission and distribution of electricity-</p> <ul style="list-style-type: none"> <li>outside urban areas or industrial complexes with a capacity of more than 33 but less than 275 kilovolts.</li> </ul>	<p>The development of facilities or infrastructure for the transmission and distribution of electricity. The electrical switch gear will be 132 kV (transmission will be either 6.6 kV or 11 kV).</p>	The total aerial extent of envisaged power lines will cover approximately 325 ha.
Activity 24	The development of a road with a reserve wider than 13.5 m, or where no reserve exists, the road is wider than 8 m.	Additional roads to be constructed to allow for access to new infrastructure such as the RTSF and CPP.	Approximately 19 km of roads.
Activity 45	<p>The expansion of infrastructure for the bulk transportation of water or storm water where the existing infrastructure-</p> <ul style="list-style-type: none"> <li>has an internal diameter of 0.36 metres or more; or</li> <li>has a peak throughput of 120 litres per second or more; and</li> <li>where the facility or infrastructure is expanded by more than 1 000 metres in length; or where the throughput capacity of the facility or infrastructure will be increased by 10% or more.</li> </ul>	Upgrade of pipelines at K10 Shaft.	The total aerial extent of envisaged pipelines will cover approximately 8 500 m <sup>2</sup> .



Listed Activity		Description of Activity	Aerial extent of the activity
Activity 67	Phased activities for all activities <ul style="list-style-type: none"> <li>listed in this Notice, which commenced on or after the effective date of this Notice; or</li> <li>similarly listed in any of the previous NEMA notices, which commenced on or after the effective date of such previous NEMA Notices</li> </ul>	Construction of the CPP and RTSF. The CPP will be constructed in phases over an eight year period. The RTSF will be constructed as required over the life of the project.	1 380 ha
<b>Listing notice GNR 984 (Full Scoping and EIA) (NEMA)</b>			
Activity 15	The clearance of an area more than 20 hectares of indigenous vegetation.	Clearing of land for the construction of the CPP, RTSF and AWTF.	More than 20 hectares of indigenous vegetation will be cleared.
Activity 16	The development of a dam where the highest part of the dam wall, as measured from the outside toe of the wall to the highest part of the wall, is 5 metres or higher or where the high water mark of the dam covers an area of 10 hectares or more.	Construction of the RTSF and the RWD. The RTSF will have a final height of 100 m and cover an area of 1 350 ha. The RTSF's RWD will have a wall height of 5 m to 10 m, and with a total storage volume of at least 3.5 Million m <sup>3</sup> .	1 380 ha
<b>Listing notice GNR 921 (Full Scoping and EIA, Category B) (NEM: WA)</b>			
Activity 1	The storage of hazardous waste in lagoons excluding storage of effluent, wastewater or sewage.	Construction and operation of the RTSF and the sewage treatment plant.	1 380 ha
Activity 11	The establishment or reclamation of a residue stockpile or residue deposit.	Establishment of the RSTF	1 380 ha

### **9.2.1.1 Direct Impacts to Built Structures with Negligible Significance**

The study area assessed for the initial implementation of the WRTRP is predominantly associated with historic agricultural and mining activities of the West Rand. Voortrekkers moved into the region during the latter part of the 19<sup>th</sup> century. It was perceived as uninhabited and large tracks of land were divided and distributed amongst the settlers. Large-scale commercial mining was established in the project area from the 1930s onwards. Early mines in the region included Venterspost (1934), Libanon (1936), West Driefontein

(1945), East Driefontein (1968) and later Kloof (1968). Shaped by these events and activities the study area has through time transformed into a historic mining landscape.

A total of 18 sites were identified within the Kloof Mining Right Area in proximity to the proposed development footprint assessed. A review of the CS of these historic resources against aesthetic and social criteria was completed. This included:

- The degree of technical / creative skill at a particular period; and
- Association to community or group for social or cultural reasons.

It was noted that most of these structures could be considered in particular dimensions against these criteria, but are nevertheless common throughout diverse cultural landscapes and are well represented. In addition, the integrity of these sites was also found to be low, where the fabric of the resources was poorly preserved.

The result of this assessment indicated that the identified structures and werfs had a CS of negligible, and had been sufficiently recorded through this assessment based on SAHRA minimum standards presented in Box 5. As such an impact assessment on these resources was not completed as part of this report.

Regardless of this, it was confirmed through a review of aerial imagery that the majority of these resources are older than 60 years, and therefore afforded general protection under section 34 of the NHRA. Where the relative age of the structures and werfs could not be confirmed through aerial imagery, it was assumed that these too were older than 60 years to ensure SGL's compliance with the NHRA. Where these structures are to be altered or demolished in any way, a Section 34 Permit Application with PHRA-G, regulated by Chapter III of the Regulations to the Act (GNR 548) is required prior to any direct impacts on these resources.

Potential direct impacts to these resources are primarily associated construction phase activities of the initial implementation of the WRTRP. This includes land clearing for construction of the RTSF, CPP, CPP to RTSF Pipeline, CPP to Ezulwini Pipeline, and West Block Thickener (WBT) to CPP Pipeline (Refer to Table 9-3 for detailed activities).

#### **9.2.1.2 Direct Impacts to Burial Grounds and Graves**

As stated in Section 9.2.1.1 above, the local study area considered is predominantly associated with historic agricultural and mining activities of the West Rand. Four burial grounds (BGG-015, BGG-022, BGG-023 and BGG-027) associated with the agricultural landscape were identified on Cardoville 358 IQ, and comprised at least 27, 4, 15 and 1 individual graves respectively. These are currently situated within the proposed RTSF development footprint and adjacent to the proposed CPP to RTSF Pipeline routing. As noted in Section 13.2, several of the identified graves within BGG-015 are associated with the Mkhwanazi families who still live in the area, and another family currently residing in Lesotho.

The CS of the three burial grounds - BGG-015, BGG-022, BGG-023 and BGG-027 – was determined in terms of associative social value, i.e. graves are generally accepted to contain intrinsic, highly significant value to communities for social, cultural religious and spiritual reasons.

Based on the current proposed activities associated with the development of the RTSF specifically, GN R 983 Activity 67, GN R 984 Activities 15 and 16, and GN R 921 Activities 1 and 11, the burial grounds (BGG-015 and BGG-022) will be directly impacted upon by either being damaged or destroyed during the construction phase of the initial implementation of the WRTRP. This includes land clearing for construction of the RSTF. Burial grounds BGG-023 and BGG-027 are situated directly adjacent to the proposed CPP to RSTF Pipeline routing and are at risk of accidental damage during the construction phase, specifically in relation to GN R 983 Activities 10 and 45.

Without appropriate mitigation, the potential direct impact to the burial grounds will be permanent with an international extent as the potential damage to or destruction of burial grounds will at the very least result in reputational damage to SGL and litigation.

The preferred mitigation measure for burial grounds and graves is to maintain the current status quo by preserving the sites *in situ*. Furthermore, it is recommended that a Burial Grounds and Graves Consultation (BGGC) Process be undertaken in accordance with section 36 of the NHRA and Chapter XI of the Regulations to the Act to:

1. Identify as far as possible the bona fide NoK; and
2. Consult and reach agreement with the NoK and SGL to the management of the burial ground through a CMP.

Where *in situ* conservation of the burial grounds of BGG-015 and BGG-022 is not feasible, a GRP supported through the BGGC Process must be completed.

In addition to the recommendations provided above, it is recommended that BGG-023 and BGG-027 be included in the BGGC Process described above. Furthermore, it is recommended that a 50 m buffer be established around the burial grounds, the sites be clearly demarcated through fencing, and a Watching Brief be implemented during the construction phase. This will entail the presence of an accredited archaeologist to be on site during earth moving activities to guide the construction to minimise the risk of damage to the site.

The impact assessment is summarised in Table 9-4 below.

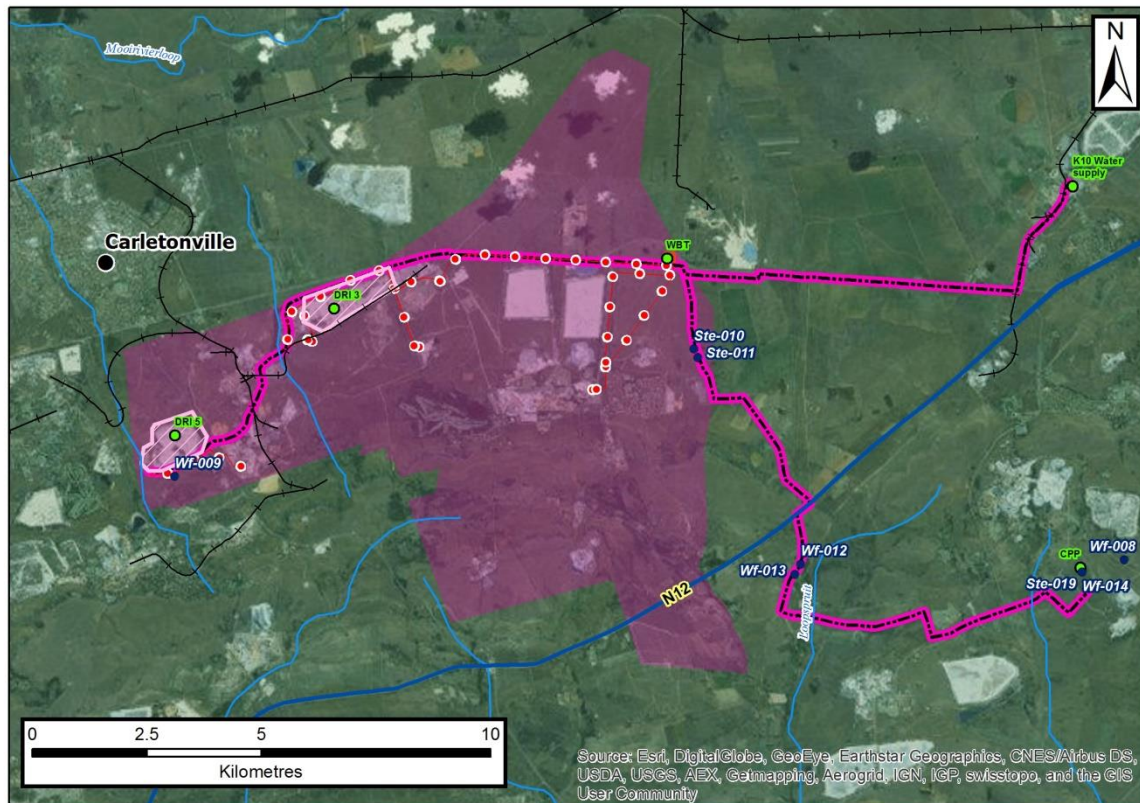
**Table 9-4: Summary of the direct impact to burial grounds and graves**

Activity and Interaction: Construction of the RTSF requires site clearing				
IMPACT DESCRIPTION: Direct Impact to Burial Grounds and Graves with Very High CS				
Predicted for project phase:	Pre-construction	Construction	Operation	Decommissioning
Dimension	Rating	Motivation		
PRE-MITIGATION				
Duration	Permanent (7)	BGG-015 and BGG-022 are situated within the proposed development footprint of the RTSF. Construction activities will permanently destroy the burial ground		Significance: Major - negative (-147)
Extent	International (7)	Potential NoK reside outside of South African borders. The destruction of burial grounds will have international reputation repercussions for SGL		
Intensity x type of impact	Extremely high - negative (-7)	This is a major change to a resource with very high CS		
Probability	Certain (7)	Without mitigation, it is certain that the burial grounds will be destroyed through the establishment of the RTSF in the proposed development footprint.		
MITIGATION:				
<p>BGGC as regulated by section 36 of the NHRA and Chapter XI of the Regulations to the Act must be implemented to:</p> <p>1. Identify as far as possible bona fide NoK</p> <p>2. Consult and reach agreement with NoK as to the appropriate management of the burial ground or grave either through a CMP or if required, GRP.</p> <p>Establish a 50 m buffer around burial grounds that are to remain in situ and clearly demarcate the site; and</p> <p>Watching brief is undertaken for BGG-023 and BGG-027 during construction activities to minimise potential risk to the site and guide construction.</p>				



Activity and Interaction: Construction of the RTSF requires site clearing				
IMPACT DESCRIPTION: Direct Impact to Burial Grounds and Graves with Very High CS				
Predicted for project phase:	Pre-construction	Construction	Operation	Decommissioning
Dimension	Rating	Motivation		
POST-MITIGATION				
Duration	Immediate (1)	The impact from relocation will be transient, occurring specifically during the pre-construction phase of the WRTRP		Significance: Minor - negative (-63)
Extent	Limited (2)	The mitigation will impact graves within the burial grounds and the associated NoK		
Intensity x type of impact	Very high - negative (-6)	The intensity of the mitigations will result in a moderate change to resources with very high CS		
Probability	Certain (7)	Based on the current proposed development footprint, it is certain that a BGGC and GRP are required.		

## 9.2.2 Driefontein Mining Right Area Impact Assessment



**Figure 9-4: Driefontein Mining Right area and identified heritage resources**

**Table 9-5: Relevant listed activities in relation to the heritage study for the Driefontein Mining Right**

Listed Activity		Description of Activity	Aerial extent of the activity
<b>Listing notice GNR 983 (Basic Assessment) (NEMA)</b>			
Activity 9	The development of infrastructure exceeding 1 000 m in length for the bulk transportation of water or storm water- <ul style="list-style-type: none"> <li>with an internal diameter of 0.36 metres or more; or</li> <li>with a peak throughput of 120 litres per second or more.</li> </ul>	Transportation of water from K10 Shaft to the Bulk Water Storage Facility (BWSF). The pipeline will have a diameter of at least 0.36 m with a daily throughput of approximately 230 litres per second.	The total aerial extent of envisaged pipelines will cover approximately 8 500 m <sup>2</sup> .



Listed Activity		Description of Activity	Aerial extent of the activity
Activity 10	<p>The development and related operation of infrastructure exceeding 1 000 metres in length for the bulk transportation of sewage, effluent, process water, waste water, return water, industrial discharge or slimes-</p> <ul style="list-style-type: none"> <li>with an internal diameter of 0,36 metres or more; or</li> <li>with a peak throughput of 120 litres per second or more.</li> </ul>	<p>Pipelines will be installed to convey slurry and process water between the Driefontein 3 and 5 TSFs and the WBT, as well as the WBT and the CPP.</p>	
Activity 11	<p>The development of facilities or infrastructure for the transmission and distribution of electricity-</p> <ul style="list-style-type: none"> <li>outside urban areas or industrial complexes with a capacity of more than 33 but less than 275 kilovolts.</li> </ul>	<p>The development of facilities or infrastructure for the transmission and distribution of electricity. The electrical switch gear will be 132 kV (transmission will be either 6.6 kV or 11 kV).</p>	<p>The total aerial extent of envisaged power lines will cover approximately 325 ha.</p>
Activity 24	<p>The development of a road with a reserve wider than 13.5 m, or where no reserve exists, the road is wider than 8 m.</p>	<p>Additional roads to be constructed to allow for access to new infrastructure such as the WBT and BWSF complex.</p>	<p>There will be approximately 19 km of roads.</p>
Activity 27	<p>The clearance of an area of 1 hectare or more, but less than 20 hectares of indigenous vegetation.</p>	<p>Clearing of land for the construction of the WBT and BWSF complex.</p>	<p>Approximately 3 ha will be cleared for the WBT and BWSF complex.</p>
Activity 45	<p>The expansion of infrastructure for the bulk transportation of water or storm water where the existing infrastructure-</p> <ul style="list-style-type: none"> <li>has an internal diameter of 0.36 metres or more; or</li> <li>has a peak throughput of 120 litres per second or more; and</li> <li>where the facility or infrastructure is expanded by more than 1 000 metres in length; or where the throughput capacity of the facility or infrastructure will be increased by 10% or more.</li> </ul>	<p>Upgrade of pipelines at K10 Shaft to pump water to the BWSF for use for the reclamation of the Driefontein 3 and 5 TSFs.</p>	<p>The total aerial extent of envisaged pipelines will cover approximately 8 500 m<sup>2</sup>.</p>

### **9.2.2.1 Direct Impacts to Built Structures with Negligible Significance**

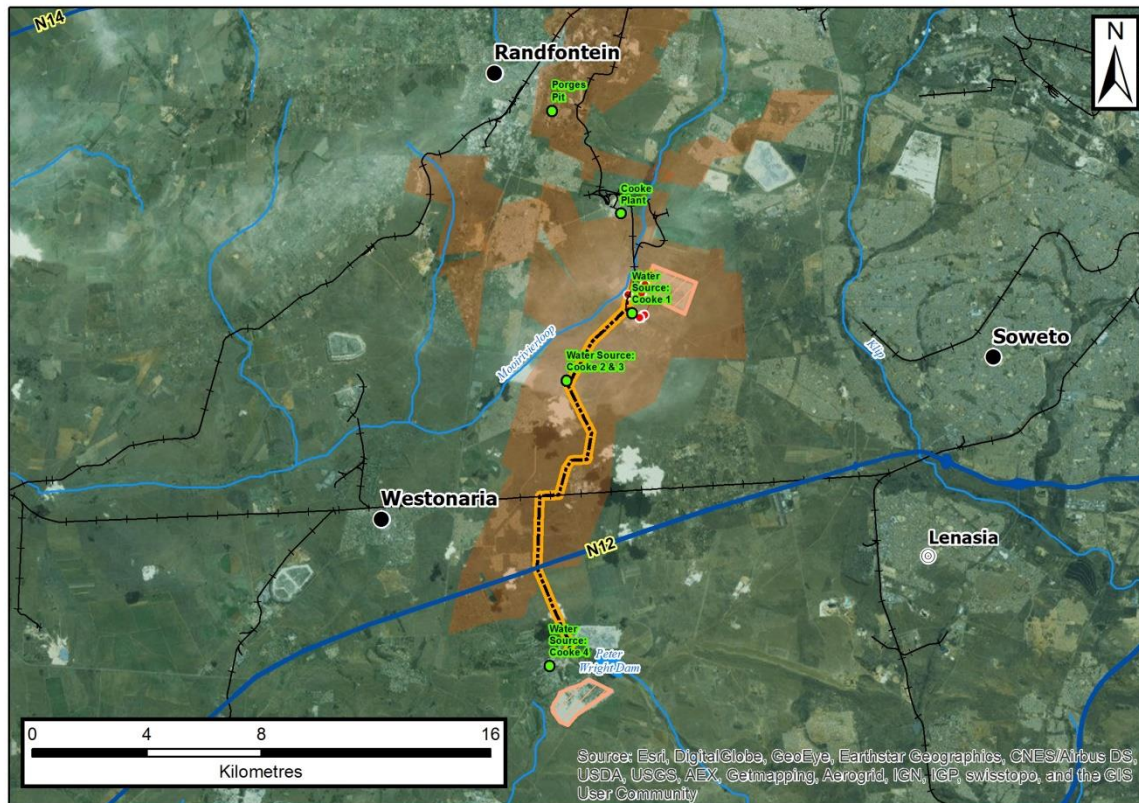
The identified structures and werfs had a negligible CS and are sufficiently recorded through this assessment, based on the SAHRA minimum standards (Box 4); therefore an impact assessment on these resources is not required.

Regardless it was confirmed through a review of aerial imagery that the majority of these resources are older than 60 years, and therefore afforded general protection under section 34 of the NHRA. Where the relative age of the structures and werfs could not be confirmed through aerial imagery, it was assumed that these too were older than 60 years to ensure SGL's compliance with the NHRA. Therefore all built structures are considered generally protected under section 34 of the NHRA.

A total of 3 sites were identified within the Driefontein Mining Right Area within / in proximity to the proposed development footprint. Potential direct impacts to these resources are primarily associated with construction phase activities of the initial implementation of the WRTRP (Refer to Table 9-5 for detailed activities). This includes land clearing for construction of the Driefontein 5 to Driefontein 3 Pipeline, Bulk Water Storage Facility (BWSF) to Driefontein 5 Pipeline and WBT to CPP Pipeline. Where these structures are to be altered or demolished in any way, a Section 34 Permit Application with PHRA-G, regulated by Chapter III of the Regulations to the Act (GNR 548) is required prior to any direct impacts on these resources.



### 9.2.3 Cooke Mining Right Area Impact Assessment



**Figure 9-5: Cooke Mining Right area**

SAHRA issued final comment on the Geluksdal TSF and Pipeline in January 2014. The SAHRA Archaeology, Palaeontology and Meteorites Unit had no objection to the development on condition that if any new evidence of archaeological sites or artefacts, palaeontological fossils, graves or other heritage resources are found during the implementation of the project, SAHRA or an archaeologist be informed immediately.

As this portion of the WRTRP was previously considered (Case ID 871), and final comment received, this portion of the WRTRP is **not considered further**.

## 9.2.4 Ezulwini Mining Right Area Impact Assessment

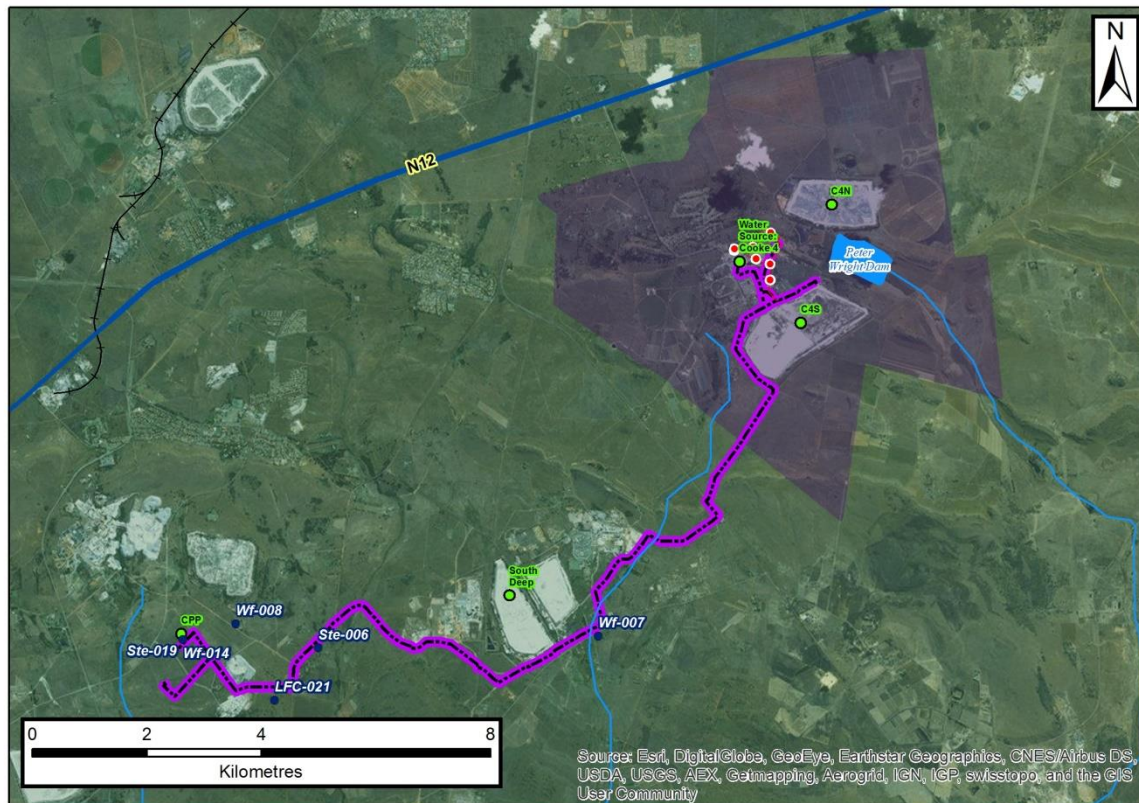


Figure 9-6: Ezulwini Mining Right Area and identified heritage resources

**Table 9-6: Relevant listed activities in relation to the heritage study for the Ezulwini Mining Right**

Listed Activity		Description of Activity	Aerial extent of the Activity
<b>Listing notice GNR 983 (Basic Assessment) (NEMA)</b>			
Activity 10	The development and related operation of infrastructure exceeding 1000 metres in length for the bulk transportation of sewage, effluent, process water, waste water, return water, industrial discharge or slimes – (i) with an internal diameter of 0,36 metres or more; or (ii) with a peak throughput of 120 litres per second or more	The transportation of tailings concentrate (50 000 t/m) from the CPP to the Ezulwini Plant for processing.	8 500 m <sup>2</sup>
Activity 12	The development of - (xii) infrastructure or structures with a physical footprint of 100 square metres or more; Where such a development occurs - (a) within a watercourse	The 18 500.00 m long pipeline route from the CPP to the Ezulwini Plant crosses a number of water courses.	8 500 m <sup>2</sup>
Activity 46	The expansion and related operation of infrastructure for the bulk transportation of sewage, effluent, process water, waste water, return water, industrial discharge or slimes where the existing infrastructure – (i) has an internal diameter of 0.36 meters or more;	The construction of the 18 502.62 m long pipeline with an internal diameter of at least 0.36 m for the bulk transportation of concentrated tailings from the CPP to the Ezulwini Plant.	8 500 m <sup>2</sup>

Listed Activity		Description of Activity	Aerial extent of the Activity
<b>Listing notice GNR 984 (Full Scoping and EIA) (NEMA)</b>			
Activity 7	The development and related operation of facilities or infrastructure for the bulk transportation Notice: of dangerous goods- (ii) in liquid form, outside an industrial complex, using pipelines, exceeding 1000 metres in length, with a throughput capacity of more than 50 cubic metres per day	The transportation of Uranium Concentrate (50 000 t/m) from the CPP to the Ezulwini Plant for processing using a 18 500.00 m long pipeline.	8 500 m <sup>2</sup>

#### **9.2.4.1 Direct Impacts to Built Structures with Negligible Significance**

The identified structures and werfs had a negligible CS and are sufficiently recorded through this assessment, based on SAHRA minimum standards presented in Box 4. As such an impact assessment on these resources is not required.

Regardless it was confirmed through a review of aerial imagery that the majority of these resources are older than 60 years, and therefore afforded general protection under section 34 of the NHRA. Where the relative age of the structures and werfs could not be confirmed through aerial imagery, it was assumed that these too were older than 60 years to ensure SGL's compliance with the NHRA. Where these structures are to be altered or demolished in any way, a Section 34 Permit Application with PHRA-G, regulated by Chapter III of the Regulations to the Act (GNR 548) is required prior to any direct impacts on these resources.

A total of 1 site was identified within the Ezulwini Mining Right Area within / in proximity to the proposed development footprint. Potential direct impacts to these resources are primarily associated construction phase activities of the initial implementation phase of the WRTRP. This includes land clearing for construction of the CPP to Ezulwini Pipeline (See Table 9-6 for detailed activities).



## 10 Cumulative Impacts on the Cultural Landscape

Cumulative impacts occur from in-combination effects of various impacts on heritage resources acting within a host of processes that result in an incremental effect. The importance of identifying and assessing cumulative impacts is that the whole is often greater than the sum of its parts. This implies that the total effect of multiple stressors or change processes acting simultaneously on a system may be greater than the sum of their effects when acting in isolation.

As demonstrated in the cultural baseline presented in the HSR, the regional and local study area contribute to the historic mining landscape associated with the West Rand, and the mining history of Johannesburg at large.

The cumulative impacts manifest as additive, synergistic and neutralising. These are summarised in Table 10-1 and discussed separately below.

**Table 10-1: Summary of potential cumulative impacts**

Type	Cumulative Impact	Direction of Change	Extent of Impact
Neutralising	The sense of place will be altered insofar as the historical mining landscape, characterised by the numerous individual historical dumps, will change to a modernised mining landscape through the development of the proposed RTSF. This change, however, is an inherent, organic continuation of a living mining heritage. The creation of new mining-related sites neutralises the removal of older, existing structures. The overall sense of place, however, remains intrinsically associated with a mining heritage.	Neutral to positive	Local, Regional
Additive	The <i>historic</i> mining landscape will be permanently changed through the reclamation of historical TSFs, i.e. tangible markers of the mining history of the West Rand.	Negative	Local, Regional
Synergistic	The removal of historical TSFs will increase the historical cultural significance of remaining TSFs and other mining infrastructure. The significance of these will exponentially increase as more features are removed.	Negative	Site Specific, Local & Regional

As demonstrated, the area within which the proposed development footprint is situated is associated with historic mining activities of the West Rand specifically, but that also contributes to the overall mining heritage of the greater Johannesburg area. Visible tangible

markers associated with this history are historic mining infrastructures, such as headgears, and more significantly, historical TSFs.

The proposed WRTRP will have neutralising cumulative impact to the local and regional study area. These will be manifested primarily through the alteration to the sense-of-place in so far as the historic mining landscape characterised by the numerous individual historical dumps will be changed into a modernised mining landscape through the establishment of the proposed RTSF. The overall sense-of-place, however, will remain intrinsically associated with the mining landscape, which is a part of a living mining heritage and cannot therefore be “preserved” through keeping of the static *status quo*.

The proposed reclamation activities of the initial implementation will result in an additive cumulative impact to the historic mining landscape, i.e. the sum of all the effects of the reclamation. Reclamation activities will decrease the number of remaining historical TSFs as tangible markers of historic mining activities on the West Rand.

The removal of the historical TSF's will subsequently gradually increase the significance of *in situ* resources. Through time, the remaining historical TSFs associated with the mining heritage of the greater Johannesburg region will have a high CS regardless of the integrity of the resource.

## 11 Unplanned Events and Low Risks

### 11.1 Unplanned Events

Unplanned events may occur on any project at any time. Based on the proposed project activities, potential unplanned events and the associated impacts and management measures have been identified and summarised in Table 11-1 below.

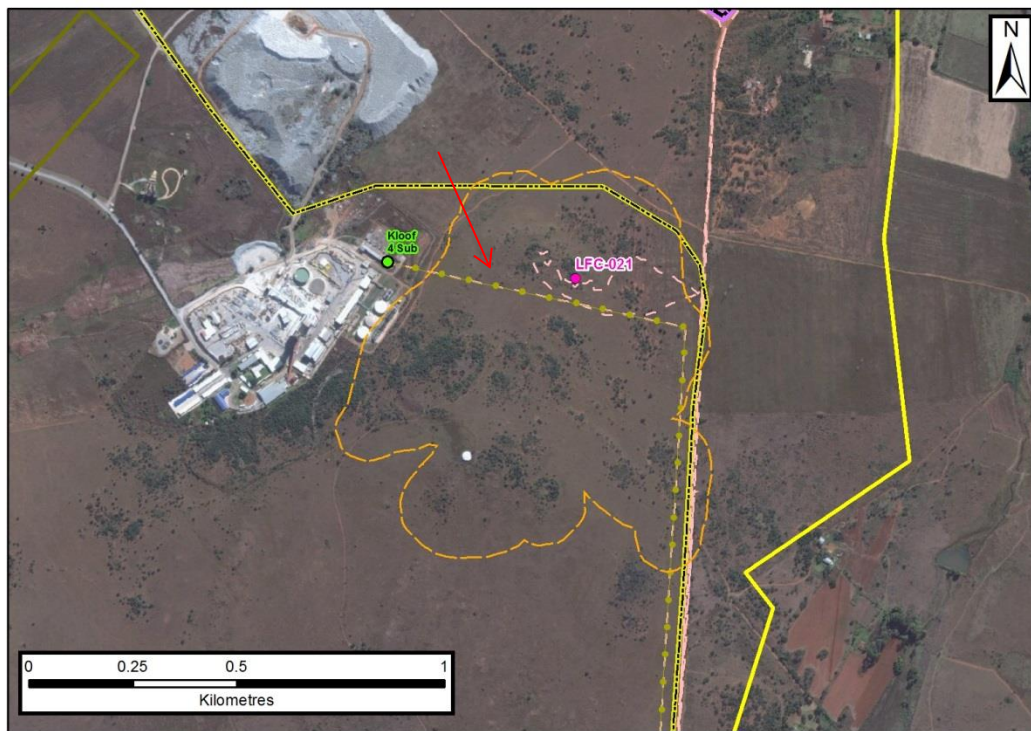
**Table 11-1: Unplanned events and their management measures**

Unplanned event	Potential impact	Mitigation/ Management/ Monitoring
Accidental exposure of unidentified heritage resources	Damage and/or destruction of heritage resources generally protected under section 35 and 36 of the NHRA	<p>Chance Finds Procedures (CFPs) must be developed and included as a condition of authorisation that clearly describes the process and appropriate management of the exposure of previously unidentified heritage resources.</p> <p>The established and defined CFPs must be implemented prior to any development taking place as part of the WRTRP</p>
Slurry pipeline burst	Damage to heritage resources protected under section 34 – 37 of the NHRA	<p>Electronic monitoring of pipeline pressure to identify a burst as soon as possible.</p> <p>Should it occur, emergency valves need to be shut down to prevent spillage.</p> <p>Known heritage resources in proximity must be inspected to assess the extent of damage (if any). Any change to the <i>status quo</i> of the identified heritage resource must be reported to the responsible HRA immediately.</p>

### 11.2 Low Risk to Farming Community Site

Evidence for LFC occupation within the study area was recorded. Stone walled settlements categorised as Type N were previously identified on the farms Driefontein 113 IQ and Driefontein 355 IQ. These sites were, however, destroyed through mining activities during the 1990s, and were not identified during the pre-disturbance survey.

A review of historical aerial imagery suggested that stone walled settlements occurred on the farm Doornkloof 350 IQ Portions 1, 21 & Re within the ultimate project area. These sites fall outside the proposed development footprint and are not considered further in this report. One stone walled complex (LFC-021) was identified on Rietfontein 349 IQ Portion 73. The approximate location of this site is currently in proximity to the proposed power line routing between the Kloof 4 substation and the RTSF.



**Figure 11-1: Identified stonewalled settlement on Rietfontein 349 IQ Portion 73.**

LFC-021 must be recorded including detailed site mapping, and possibly surface sampling. The site is generally protected under section 35 of the NHRA; it is recommended that the proposed routing of the Kloof 4 to RTSF OHL power line be amended as far as feasible to preserve the site *in situ*. Where this is not possible, amend the design of the proposed power line to ensure that pylons are at least 50 m from the site. To ensure that this recommendation is implemented correctly, the extent of the site must be determined by an accredited archaeologist and mapped in detail through the use of differential GPS technology. Additionally, a Watching Brief should be implemented during the construction phase. This will entail the presence of an accredited archaeologist to be on site during earth moving activities to assess any material culture exposed and guide the construction to minimise the risk of damage to the site.



Table 11-2: Summary of HIA

Activity No	Project Phase	Project Activity		Environmental Aspects		Potential Impact	
		Activity	Interaction	Aspect	Interdependencies	Issue	Potential Impact
1	Pre-construction	Initiation of WRTRP	Public Reaction / Perception	Social	Public reaction to the change of the historic mining landscape	Alteration to sense-of-place	Delay of implementation of the WRTRP through public resistance
				Heritage			
			Temporary construction camps	Heritage		Physical alteration to the surface	Physical damage to or destruction of heritage resources generally protect under section 34 - 37 of the NHRA
2	Construction	CPP	Land clearing	Heritage		Physical alteration to the surface	Physical damage to or destruction of heritage resources generally protect under section 34 - 37 of the NHRA
	Construction & Operation		Fencing off of the CPP	Heritage	Community reaction to restricted or loss of access to sites of cultural significance, such as graves	Loss of and/or restricted access	Erosion of cultural significance of heritage resources through time
				Social			Disruption of construction activities through public resistance
	Decommissioning		Demolition of CPP	Heritage		Structures older than 60 years generally protected under section 34 of the NHRA	Physical damage to or destruction of structures generally protect under section 34 of the NHRA
3	Construction	BWSF & WBT	Land clearing	Heritage		Physical alteration to the surface	Physical damage to or destruction of heritage resources generally protect under section 34 - 37 of the NHRA
4	Construction	AWTF	Land clearing	Heritage		Physical alteration to the surface	Physical damage to or destruction of heritage resources generally protect under section 34 - 37 of the NHRA
5	Construction	RTSF & RWD	Land clearing	Heritage		Physical alteration to the surface	Physical damage to or destruction of heritage resources generally protect under section 34 - 37 of the NHRA
			Fencing off of RTSF & RWD development footprint	Heritage	Community reaction to restricted or loss of access to sites of cultural significance, such as graves	Loss of and/or restricted access	Erosion of cultural significance of heritage resources through time
				Social			Disruption of construction activities through public resistance
	Operation	Physical presence of the RTSF	Heritage		Alteration to sense-of-place	Alteration from agricultural landscape to new mining landscape	
6	Construction	Pipelines	Land clearing of new servitudes	Heritage		Physical alteration to the surface	Physical damage to or destruction of heritage resources generally protect under section 34 - 37 of the NHRA
7	Construction	Pump stations	Land clearing	Heritage		Physical alteration to the surface	Physical damage to or destruction of heritage resources generally protect under section 34 - 37 of the NHRA
8	Operation	Historical TSFs	Reclamation	Heritage	Community reaction to removal of tangible markers of historic mining landscape	Alteration to sense-of-place	Alteration from a historic mining landscape to new mining landscape
				Social			
9	Construction	Power lines	Land clearing of new servitudes	Heritage		Physical alteration to the surface	Physical damage to or destruction of heritage resources generally protect under section 34 - 37 of the NHRA

## 12 Environmental Management Plan

The objective of an EMP is (a) to manage undue or reasonably avoidable adverse impacts associated with the development of a project and (b) to enhance potential positives.

Mitigation measures will sometimes be built into the base of a project and should be considered as part of the “pre-mitigation” scenario; additional mitigation must be recommended if the impact assessment indicates it is necessary.

The key objectives of environmental and social management plans are to give S.M.A.R.T. mitigation measures to:

- Identify the actual environmental, socio-economic and public health impacts of the project and check if the observed impacts are within the levels predicted in the Environmental and Social Impact Assessment (ESIA);
- Determine that mitigation measures or other conditions attached to project approval (e.g. by legislation) are properly implemented and work effectively;
- Adapt the measures and conditions attached to project approval in the light of new information or take action to manage unanticipated impacts if necessary;
- Provide an auditable management plan that can follow the Deming Cycle;
- Gauge if predicted benefits of the project are being achieved and maximized; and
- Gain information for improving similar projects and ESIA practice in the future.

The ESMP must consider each activity and its potential (significant) impacts during the construction, operational, decommissioning and post closure phases.

### 12.1 Project Activities with Potentially Significant Impacts

The significant impacts to heritage resources was discussed under Section 9.2 above, and summarised in Table 12-1.

**Table 12-1: Potential Significant Impacts of the Initial Implementation of the WRTRP**

Aspects	Issue	Potential Impact
<b>RTSF</b>		
Burial grounds and graves	Physical alteration of the surface through land clearing and construction activities	Physical damage to and /or destruction of burial grounds and graves protected under section 36 of the NHRA

## 12.2 Summary of Mitigation and Management

This section provides a summary of the proposed mitigation and management measures as relevant to the identified heritage resources within the initial implementation of the WRTRP. Information on the frequency of mitigation, relevant legal requirements, recommended management plans, timing of implementation, and roles and responsibilities of persons implementing the EMP are also provided.

**Table 12-2: Impacts**

Activities	Phase	Size and scale of disturbance	Potential Impact	Mitigation Measures	Compliance with standards	Time period for implementation
RTSF	Construction	62 m <sup>2</sup>	Damage and / or destruction of burial grounds and graves	Burial grounds and graves must be as far as possible preserved <i>in situ</i> to maintain the <i>status quo</i> . Where project design can be amended to accommodate this, it must be done. We understand, however, that the RTSF design cannot be changed as it is the most suitable site and layout/design in terms of technical and environmental criteria. Regardless of whether the resource will be impacted upon, a Burial Grounds and Graves Consultation (BGGC) process as regulated by Chapter XI of the Regulations to the Act must be implemented to identify, as far as possible, bona fide Next of Kin (NoK) and agree upon the requirements for a CMP or if required, a Grave Relocation Plan (GRP).	Burial grounds and graves are protected under section 36 of the NHRA. The BGGC process is regulated by Chapter XI of the Regulations to the NHRA.	Prior to the development of the initial implementation of the WRTRP
RTSF & CPP		RTSF – 1 ha CPP – 4 ha	Damage or destruction of built structures older than 60 years	Section 34 Permit Application with PHRA-G is required	Structures older than 60 years are protected under section 34 of the NHRA. Section 34 Permit Application is regulated under Chapter III of the Regulations to the Act (GNR 548).	

**Table 12-3: Objectives and Outcomes of the EMP**

Activities	Potential impacts	Aspects affected	Phase	Mitigation	Standard to be achieved/objective
RTSF	Damage to and / or destruction of burial grounds and graves	Heritage & Social (Burial grounds and Graves)	Construction	Modify through amendment to the design as far as is feasible to preserve burial grounds and graves <i>in situ</i> , and conduct a BGGC process to establish in conjunction with identified bona fide NoK, a CMP for the identified burial grounds and graves. Where project alternatives are not feasible, the potential impact to burial grounds and graves must be remedied through the implementation of a BGGC and GRP.	Compliance with the section 36 of the NHRA and Chapter XI of the Regulations to the Act (GNR 548).
	Damage to and / or destruction of built structures older than 60 years	Heritage (Structures older than 60 years)		Structures older than 60 years are protected under section 34 of the NHRA, and a Section 34 Permit Application with PHRA-G regulated by Chapter III of the Regulations to the Act (GNR 548) is required prior to any alterations or demolition if such structures.	Compliance with section 34 of the NHRA and Chapter III of the Regulations to the Act (GNR 548).



Activities	Potential impacts	Aspects affected	Phase	Mitigation	Standard to be achieved/objective
CPP	Damage to and / or destruction of built structures older than 60 years	Heritage (Structures older than 60 years)		Structures older than 60 years are protected under section 34 of the NHRA, and a Section 34 Permit Application with PHRA-G regulated by Chapter III of the Regulations to the Act (GNR 548) is required prior to any alterations or demolition if such structures.	Compliance with section 34 of the NHRA and Chapter III of the Regulations to the Act (GNR 548).

**Table 12-4: Mitigation**

Activities	Potential impacts	Aspects affected	Mitigation type	Time period for implementation	Compliance with standards
RTSF	Damage and / or destruction of burial grounds and graves	Heritage & Social (Burial Grounds and Graves)	Modify through amendment to the design as far as is feasible to preserve burial grounds and graves <i>in situ</i> , and conduct a BGGC process to establish in conjunction with identified bona fide NoK, a CMP for the identified burial grounds and graves. Where project alternatives are not feasible, the potential impact to burial grounds and graves must be remedied through the implementation of a BGGC and GRP.	Mitigation measures must be implemented prior to any development in regards to the initial implementation of the WRTRP	Mitigation measures comply with section 36 of the NHRA and Chapter XI of the Regulations to the Act (GNR 548).
	Damage to and / or destruction of built structures older than 60 years	Heritage (Structures older than 60 years)	Structures older than 60 years are protected under section 34 of the NHRA, and a Section 34 Permit Application with PHRA-G regulated by Chapter III of the Regulations to the Act (GNR 548) is required prior to any alterations or demolition if such structures.		Compliance with section 34 of the NHRA and Chapter III of the Regulations to the Act (GNR 548).
CPP	Damage to and / or destruction of built structures older than 60 years	Heritage (Structures older than 60 years)	Structures older than 60 years are protected under section 34 of the NHRA, and a Section 34 Permit Application with PHRA-G regulated by Chapter III of the Regulations to the Act (GNR 548) is required prior to any alterations or demolition if such structures.		Compliance with section 34 of the NHRA and Chapter III of the Regulations to the Act (GNR 548).
Kloof 4 to RTSF Power line	Damage to LFC settlement complex	Heritage (Archaeological sites)	LFC sites are protected under section 35 of the NHRA and cannot be impacted upon without the necessary permits issued by SAHRA. In order to avoid potential impacts to LFC sites, a buffer of 50 m around the complex must be maintained.		Compliance with section 35 of the NHRA

**Table 12-5: Prescribed Environmental Management Standards, Practice, Guideline, Policy or Law**

Specialist field	Applicable standard, practice, guideline, policy or law			
Heritage	National Heritage Resources Act, 1999 (Act No. 25 of 1999)	Chapter XI of the Regulations to the NHRA (GNR 548)	Chapter III of the Regulations to the NHRA (GNR 548)	Municipal by-laws

## 13 Consultation

Formal consultation was, and is being undertaken through the Stakeholder Engagement Process (SEP), and not by the heritage specialist. Informal consultation was undertaken by the heritage specialists during the reconnaissance of the proposed development footprint.

Records of consultation are summarised below.

### 13.1 Records of Formal Stakeholder Engagement

Formal stakeholder engagement has been undertaken at the pre-announcement phase of the WRTRP. The SEP aims to distribute information to identified stakeholders and record comments that have a direct bearing on the proposed WRTRP. Meetings held to date include:

- Department of Water and Sanitation – 2 & 11 December 2014
- National Nuclear Regulator – 2 December 2014
- Department of Environmental Affairs – 2 December 2014
- Gauteng Department of Agriculture and Rural Development – 3 & 11 December 2014
- West Rand District Municipality – 3 December 2014
- Department of Mineral Resources – 10 December 2014
- Section 80 Committee, West Rand District Municipality (Environmental Portfolio) – 3 February 2015 & 15 April 2015
- Focus Group Meeting with Authorities – 16 April 2015
- Focus Group Meeting with Landowners – 16 April 2015
- Focus Group Meeting with Environmental NGOs – 21 April 2015

### 13.2 Records of Informal Consultation

An informal conversation was conducted with Aletta Mkhwanazi and Alesa Mkhwanazi on 13 May 2015.

The Mkhwanazi's are farmworkers who reside on the farm Wildebeestkuil 360 IQ Portion 7, and are familiar with the area under consideration. They were questioned regarding the identified burial ground BGG-015 and were able to provide some information in that regard. According to Mkhwanazi's, nine graves contained in the cemetery are deceased relatives of the Mkhwanazi family who still live in the area. Seven of the identified graves are apparently associated with Nthabiseng Mkhwanazi, who is not a relation to Aletta and Alesa. Another three are apparently associated with a family resident in in Lesotho, but no particulars are known. They could not provide any further information regarding the remaining unknown graves.

## 14 Comments and Responses

No comments related to heritage were recorded in the Comments and Response Report (CRR) for the SEP undertaken during the project launch.

## 15 Conclusion

DWE undertook an HIA as part of the environmental authorisation process for the initial implementation of the WRTRP, to promote compliance with section 38(8) of the NHRA. In addition screening level assessment of the ultimate project was also carried out during the HSR and re-iterated here.

No fatal flaws were identified for the ultimate WRTRP, however, the ultimate WRTRP is situated within a sensitive cultural landscape that must be considered during the various phases of the project.

A total of 27 heritage resources were identified through the HIA, within the development footprints of the proposed linear infrastructure outside existing servitudes, and within the development footprints of the CPP and RTSF. These comprise:

- One LFC site with low significance;
- Nine structures with negligible significance;
- Thirteen werfs with negligible significance; and
- Four burial grounds with very high significance.

The LFC site (LFC-021) must be recorded including detailed site mapping, and possibly surface sampling. The site is generally protected under section 35 of the NHRA; it is recommended that the proposed routing of the Kloof 4 to RTSF OHL power line be amended as far as feasible to preserve the site *in situ*.

Where this is not possible, amend the design of the proposed power line to ensure that pylons are at least 50 m from the site. To ensure that this recommendation is implemented correctly, the extent of the site must be determined by an accredited archaeologist and mapped in detail through the use of differential GPS technology. Additionally, a Watching Brief should be implemented during the construction phase. This will entail the presence of an accredited archaeologist to be on site during earth moving activities to assess any material culture exposed and guide the construction to minimise the risk of damage to the site.

The result of the CS assessment indicated that the identified structures and werfs are sufficiently recorded through this assessment and no further mitigation of these resources is required. Regardless of this, it was confirmed through a review of aerial imagery that the majority of these resources are older than 60 years, and therefore afforded general protection under section 34 of the NHRA. As such, a Section 34 Permit Application with PHRA-G is required prior to any direct impacts on these resources to ensure compliance with the NHRA and Chapter III of the Regulations to the Act.



Two of the identified burial grounds (BGG-015 and BGG-022) will be directly impacted upon by the proposed construction of the RTSF. Based on our understanding, redesign of the RTSF development footprint is not feasible as it has been determined as the most suitable site and layout/design from a technical and environmental perspective. It is recommended that a BGGC Process be undertaken in accordance with section 36 of the NHRA and Chapter XI of the Regulations to the Act to:

- Identify as far as possible the bona fide NoK;
- Consult and reach agreement with the NoK and SGL to the management of the burial ground through a CMP.

Where *in situ* conservation of the burial grounds is not possible, a GRP supported through the BGGC Process must be completed.

The burial grounds BGG-023 and BGG-027 are situated directly adjacent to the proposed CPP to RSTF Pipeline routing. It is recommended that BGG-023 and BGG-027 be included in the BGGC Process described above. Furthermore, it is recommended that a 50 m buffer be established around the burial grounds, the sites be clearly demarcated through fencing, and a Watching Brief be implemented during the construction phase. This will entail the presence of an accredited archaeologist to be on site during earth moving activities to guide the construction to minimise the risk of damage to the site.

Heritage Impact Assessment

Environmental Impact Assessment for Sibanye Gold Limited's West Rand Tailings Retreatment Project

GOL2376



DIGBY WELLS  
ENVIRONMENTAL

## Appendix A: Specialists CV

## NATASHA HIGGITT

Ms Natasha Higgitt  
Assistant Heritage Consultant  
Social Department  
Digby Wells Environmental

### 1 EDUCATION

- University of Pretoria
- BA Degree (2008)
- Archaeology Honours (2010)
- Title of Dissertation- Pass the Salt: An Archaeological analysis of lithics and ceramics from Salt Pan Ledge, Soutpansberg, for evidence of salt working and interaction.

### 2 LANGUAGE SKILLS

- English - Excellent (read, write and speak)
- Afrikaans - Fair (read, write and speak)
- Italian – Poor (Speaking only)

### 3 EMPLOYMENT

- July 2011 to Present: Assistant Heritage Consultant at Digby Wells Environmental
- April 2011 to June 2011: Lab assistant at the Albany Museum Archaeology Department, Grahamstown, Eastern Cape
- April 2010 to March 2011: Intern at the Archaeology Department, Albany Museum, Grahamstown, Eastern Cape under the Department of Sports, Recreation, Arts and Culture, Eastern Cape Government, South Africa (DSRAC)

### 4 FIELD EXPERIENCE

- Human remains rescue excavation at St Francis Bay, Eastern Cape
- Human remains rescue excavation at Wolwefontein, Eastern Cape
- Recorded two rock art sites at Blaauwbosch Private Game Reserve, Eastern Cape

- Attended a 2 week excavation/study tour in the Friuli Region in Italy, organised by the *Società Friulana di Archeologia*, sponsored by *Ente Friuli nel Mondo*, and excavated a 12th century medieval castle
- Attended a 2 week excavation in Limpopo, Waterpoort Archaeological Project organised by Xander Antonites (Yale PhD Candidate)
- A total of 5 University of Pretoria Archaeology field schools in Limpopo and Gauteng spanning over 4 years

## 5 PROJECT EXPERIENCE

- Notification of Intent to Develop for the Doornkloof Flood Remedial Measures Project, Centurion, Gauteng Province for Iliso Consulting (Pty) Ltd (Digby Wells Environmental)
- Notification of Intent to Develop for the Oakleaf Open Cast Coal Mine, Bronkhorstspuit, Gauteng Province for Oakleaf Resources (Digby Wells Environmental)
- Notification of Intent to Develop for the Rietfontein 101IS Prospecting Project for Rustenburg Platinum (Digby Wells Environmental)
- Heritage Impact Assessment for the Weltevreden Open Cast Coal Mine, Belfast, Mpumalanga for Northern Coal (Pty) Ltd (Digby Wells Environmental)
- Notification of Intent to Develop for the Grootegeeluk Expansion Project, Lephalale, Limpopo Province for Exxaro Resources (Pty) Ltd (Digby Wells Environmental)
- Notification of Intent to Develop and Heritage Statement for the London Road Petrol Station, Alexandria, Gauteng for ERM Southern Africa (Pty) Ltd (Digby Wells Environmental)
- Heritage Impact Assessment for the Roodepoort Strengthening Project, Roodepoort, Gauteng for Fourth Element (Digby Wells Environmental)
- Heritage Statement for the Stoffel Park Bridge Upgrade, Mamelodi, Gauteng for Iliso Consulting (Pty) Ltd (Digby Wells Environmental)
- Heritage Statement for the Witrand Prospecting EMP, Bethal, Mpumalanga for Rustenburg Platinum (Digby Wells Environmental)
- Heritage Statement for the Onverwacht Prospecting EMP, Kinross, Mpumalanga for Rustenburg Platinum (Digby Wells Environmental)
- Heritage Statement for a Proposed Acetylene Gas Production Facility, located near Witkopdorp, Daleside, south of Johannesburg, Gauteng Province for Erm Southern Africa (Pty) Ltd (Digby Wells Environmental)
- Heritage Impact Assessment for the Platreef Platinum Project, Mokopane, Limpopo for Platreef Resources (Digby Wells Environmental)
- Heritage Statement for ATCOM and Tweefontein Dragline Relocation Project, near Witbank, Mpumalanga Province for Jones and Wagner Consulting Civil Engineers (Digby Wells Environmental)

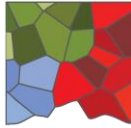


- Heritage Statement Report for the Wilgespruit Bridge Upgrade, Pretoria, Gauteng Province for Iliso Consulting (Pty) Ltd (Digby Wells Environmental)
- Heritage Statement Report for the Kosmosdal sewer pipe bridge upgrade, Pretoria, Gauteng Province for Iliso Consulting (Pty) Ltd (Digby Wells Environmental)
- Phase 1 Heritage Impact Assessment for the Thabametsi Coal Mine, Lephalale, Limpopo for Exxaro Coal (Digby Wells Environmental)
- Heritage Statement for the Zandbaken Coal Mine Project, Zandbaken 585 IR, Sandbaken 363 IR and Bosmans Spruit 364 IS, Standerton, Mpumalanga for Xtrata Coal South Africa (Digby Wells Environmental)
- Phase 1 Heritage Impact Assessment for the Brakfontein Thermal Coal Mine, Mpumalanga for Universal Coal (Digby Wells Environmental)
- Development of a RAP for Aureus Mining for the New Liberty Gold Mine Project, Liberia (Digby Wells Environmental)
- Phase 1 Archaeological Impact Assessment for the MBET Pipeline, Steenbokpan, Limpopo (Digby Wells Environmental)
- Notice of Intent to Develop and Cultural Resources Pre-Assessment for Orlight SA (PTY) Ltd Solar PV Project. 2012. (Digby Wells Environmental)
- Agricultural Survey for Platreef ESIA, Mokopane, Limpopo. 2011. (Digby Wells Environmental)
- Cultural Resources Pre-Assessment for the Proposed Sylvania Everest North Mining Development in Mpumalanga, near Lydenburg. 2011. (Digby Wells Environmental)
- Phase 2 Mitigation of Archaeological sites at Boikarabelo Coal Mine, Steenbokpan, Limpopo. 2011. (Digby Wells Environmental)
- Cultural Resources Pre-Assessment for Proposed Platinum Mine Prospecting in Mpumalanga, near Bethal for Anglo Platinum. 2011. (Digby Wells Environmental)
- Cultural Resources Pre-Assessment for proposed Platinum Mine at Mokopane, Limpopo for Ivanhoe Platinum. 2011. (Digby Wells Environmental)
- Phase 1 AIA Mixed-use housing Development, Kwanobuhle, Extension 11, Uitenhage, Eastern Cape. 2011.
- Phase 1 AIA Centane to Qholora and Kei River mouth road upgrade survey, Mnquma Municipality, Eastern Cape. 2011. (SRK Consulting)
- Phase 1 AIA Clidet Data Cable survey, Western Cape, Northern Cape, Free State and Eastern Cape. 2011. (SRK Consulting)
- Phase 1 AIA Karoo Renewable Energy Facility, Victoria West, Northern Cape. 2011. (Savannah Environmental)
- Phase 1 AIA Windfarm survey in Hamburg, Eastern Cape. 2010. (Savannah Environmental)

- Phase 1 AIA Windfarm survey in Molteno, Eastern Cape. 2010. (Savannah Environmental)
- Phase 1 AIA Housing Development at Motherwell, P.E. 2010. (SRK Consulting)
- Phase 1 AIA Sand quarry survey in Paterson, Eastern Cape. 2010. (SRK Consulting)
- Phase 1 AIA Quarry Survey at Victoria West. 2010. (Acer [Africa] Environmental Management Consultants)
- Phase 1 AIA Quarry Survey at Port Elizabeth. 2010. (E.P Brickfields)

## **6 PROFESSIONAL AFFILIATIONS**

- Association of Southern African Professional Archaeologists (ASAPA): Professional member
- Association of Southern African Professional Archaeologists (ASAPA): CRM Practitioner (Field Supervisor: Stone Age, Iron Age and Rock Art)
- South African Museums Association (SAMA): Member



# DIGBY WELLS

## ENVIRONMENTAL

Mr. Justin du Piesanie  
Heritage Management Consultant: Archaeologist  
Social Sciences Department  
Digby Wells Environmental

### 1 Education

Date	Degree(s) or Diploma(s) obtained	Institution
2013	Continued Professional Development Programme, Architectural and Urban Conservation: Researching and Assessing Local Environments	University of Cape Town
2008	MSc	University of the Witwatersrand
2005	BA (Honours) (Archaeology)	University of the Witwatersrand
2004	BA	University of the Witwatersrand
2001	Matric	Norkem Park High School

### 2 Language Skills

Language	Written	Spoken
English	Excellent	Excellent
Afrikaans	Proficient	Good

### 3 Employment

Period	Company	Title/position
08/2011 to present	Digby Wells Environmental	Heritage Management Consultant: Archaeologist

Digby Wells and Associates (South Africa) (Pty) Ltd (Subsidiary of Digby Wells & Associates (Pty) Ltd). Co. Reg. No. 2010/008577/07. Fern Isle e, Section 10, 359 Pretoria Ave Randburg Private Bag X10046, Randburg, 2125, South Africa  
Tel: +27 11 789 9495, Fax: +27 11 789 9498, [info@digbywells.com](mailto:info@digbywells.com), [www.digbywells.com](http://www.digbywells.com)

Directors: A Sing\*, AR Wilke, DJ Otto, GB Beringer, LF Koeslag, AJ Reynolds (Chairman) (British)\*, J Leaver\*, GE Trusler (C.E.O)  
\*Non-Executive

Period	Company	Title/position
2009-2011	University of the Witwatersrand	Archaeology Collections Manager
2009-2011	Independent	Archaeologist
2006-2007	Maropeng & Sterkfontein Caves UNESCO World Heritage Site	Tour guide

## 4 Professional Affiliations

Position	Professional Body	Registration Number
Member	Association for Southern African Professional Archaeologists (ASAPA); ASAPA Cultural Resources Management (CRM) section	270
Member	International Council on Monuments and Sites (ICOMOS)	14274
Member	Society for Africanist Archaeologists (SAfA)	N/A

## 5 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

## 6 Experience

I have 5 years experiences in the field of heritage resources management (HRM) including archaeological and heritage assessments, grave relocation, social consultation and mitigation of archaeological sites. During my studies I was involved in academic research projects associated with the Stone Age, Iron Age, and Rock Art. These are summarised below:

- 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 Meyerdal, 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

Since 2011 I have been actively involved in environmental management throughout Africa, focusing on heritage assessments in compliance with International Finance Corporation (IFC) Performance Standards and other World Bank Standards and Equator Principles. This exposure to environmental, and specifically heritage management has allowed me to work to international best practice standards in accordance with international conservation bodies such as UNESCO and ICOMOS. In addition, I have also been involved in the collection of quantitative data for a Relocation Action Plan (RAP) in Burkina Faso. The exposure to this aspect of environmental management has afforded me the opportunity to understand the significance of integration of various studies in the assessment of heritage resources and recommendations for feasible mitigation measures. I have worked throughout South Africa, as well as Burkina Faso, the Democratic Republic of Congo, Liberia and Mali.

## 7 Project Experience

Please see the following table for relevant project experience:





Project Title	Project Location	Date:	Description of the Project	Role of Firm in the Project	Own Role in the Project	Time involved (man months)	Name of Client	Contract Outcomes	Reference
Klipriviersberg Archaeological Survey	Meyersdal, Gauteng, South Africa	2005 2006	Survey of residential development in Meyersdal. This included the recording of identified stone walled settlements through detailed mapping and photographs. Included was the Phase 2 Mitigation of two stone walled settlements	Archaeological Impact Assessments	Researcher, Archaeological Assistant	2 Months		Completed survey, excavations and reporting	Archaeological Resource Management (ARM) Prof T.N. Huffman thomas.huffman@wits.ac.za
Sun City Archaeological Site Mapping	Sun City, Pilanesberg, North West Province, South Africa	2006 2006	Recording of an identified Late Iron Age stonewalled settlement through detailed mapping	Mapping	Archaeological Assistant, Mapper	1 Month	Sun City	Completed mapping	Archaeological Resources Management (ARM) Prof T.N. Huffman thomas.huffman@wits.ac.za
Witbank Dam Archaeological Impact Assessment	Witbank, Mpumalanga, South Africa	2007 2007	Archaeological survey for proposed residential development at the Witbank dam	Archaeological Impact Assessment	Archaeological Assistant	1 Week		Completed Archaeological Impact Assessment report	Archaeological Resources Management (ARM) Prof T.N. Huffman thomas.huffman@wits.ac.za
Archaeological Assessment of Modderfontein AH Holdings	Johannesburg, Gauteng, South Africa	2008 2008	Archaeological survey and basic assessment of Modderfontein Holdings	Archaeological Impact Assessment	Archaeologist	1 Month		Completed the assessment of 13 properties	Heritage Contracts Unit Jaco van der Walt jaco.heritage@gmail.com
Heritage Assessment of Rhino Mines	Thabazimbi, Limpopo Province, South Africa	2008 2008	Heritage Assessment for expansion of mining area at Rhino Mines	Heritage Impact Assessment	Archaeologist	2 Weeks	Rhino Mines	Completed the assessment	Archaeological Resources Management (ARM) Prof T.N. Huffman thomas.huffman@wits.ac.za
Cronimet Project	Thabazimbi, Limpopo Province, South Africa	2008 2008	Archaeological survey of Moddergat 389 KQ, Schilpadnest 385 KQ, and Swartkop 369 KQ,	Archaeological Impact Assessment	Archaeologist	1 Weeks	Cronimet	Completed field survey and reporting	Heritage Contracts Unit Jaco van der Walt jaco.heritage@gmail.com



Project Title	Project Location	Date:	Description of the Project	Role of Firm in the Project	Own Role in the Project	Time involved (man months)	Name of Client	Contract Outcomes	Reference
Eskom Thohoyandou SEA Project	Limpopo Province, South Africa	2008 2008	Heritage Statement defining the cultural landscape of the Limpopo Province to assist in establishing sensitive receptors for the Eskom Thohoyadou SEA Project	Heritage Statement	Archaeologist	2 Months	Eskom	Completed Heritage Statement	Heritage Contracts Unit Jaco van der Walt jaco.heritage@gmail.com
Wenzelrust Excavations	Shoshanguve, Gauteng, South Africa	2009 2009	Contracted by the Heritage Contracts Unit to help facilitate the Phase 2 excavations of a Late Iron Age / historical site identified in Shoshanguve	Excavation and Mapping	Archaeologist	1 Week	Heritage Contracts Unit	Completed excavations	Heritage Contracts Unit Jaco van der Walt jaco.heritage@gmail.com
University of the Witwatersrand Parys LIA Shelter Project	Parys, Free State, South Africa	2009 2009	Mapping of a Late Iron Age rock shelter being studied by the Archaeology Department of the University of the Witwatersrand	Mapping	Archaeologist	1 Day	University of the Witwatersrand	Completed mapping of the shelter	University of the Witwatersrand Karim Sadr karim.sadr@wits.ac.za
Transnet NMPP Line	Kwa-Zulu Natal, South Africa	2010 2010	Heritage Survey of the Anglo-Boer War Vaalkrans Battlefield where the servitude of the NMP pipeline	Heritage Impact Assessment	Archaeologist	1 Week	Umlando Consultants	Completed survey	Umlando Consultants Gavin Anderson umlando@gmail.com
Archaeological Impact Assessment – Witpoortjie Project	Johannesburg, Gauteng, South Africa	2010 2010	Heritage survey of Witpoortjie 254 IQ, Mindale Ext 7 and Nooitgedacht 534 IQ for residential development project	Archaeological Impact Assessment	Archaeologist	1 Week	ARM	Completed survey for the AIA	Archaeological Resources Management (ARM) Prof T.N. Huffman thomas.huffman@wits.ac.za
Der Brochen Archaeological Excavations	Steelpoort, Mpumalanga, South Africa	2010 2010	Phase 2 archaeological excavations of Late Iron Age Site	Archaeological Excavation	Archaeologist	2 Weeks	Heritage Contracts Unit	Completed excavations	Heritage Contracts Unit Jaco van der Walt jaco.heritage@gmail.com



Project Title	Project Location	Date:	Description of the Project	Role of Firm in the Project	Own Role in the Project	Time involved (man months)	Name of Client	Contract Outcomes	Reference
De Brochen and Booyensdal Archaeology Project	Steelpoort, Mpumalanga, South Africa	2010 2010	Mapping of archaeological sites 23, 26, 27, 28a & b on the Anglo Platinum Mines De Brochen and Booyensdal	Mapping	Archaeologist	1 Week	Heritage Contracts Unit	Completed Mapping	Heritage Contracts Unit Jaco van der Walt jaco.heritage@gmail.com
Eskom Thohoyandou Electricity Master Network	Limpopo Province, South Africa	2010 2010	Desktop study to identify heritage sensitivity of the Limpopo Province	Desktop Study	Archaeologist	1 Month	Strategic Environmental Focus	Completed Report	Strategic Environmental Focus (SEF) Vici Napier vici@sefsa.co.za
Bathako Mine Expansion	North-West Province, South Africa	2010 2010	Mapping of historical sites located within the Bathako Mine Expansion Area	Mapping	Archaeologist	1 Week	Heritage Contracts Unit	Completed Mapping	Heritage Contracts Unit Jaco van der Walt jaco.heritage@gmail.com
Kibali Gold Project Grave Relocation Plan	Oriental Province, Democratic Republic of Congo	2011 2013	Implementation of the Grave Relocation Project for the Randgold Kibali Gold Project	Grave Relocation	Archaeologist	2 Years	Randgold Resources	Successful relocation of approximately 3000 graves	Kibali Gold Mine Cyrille Mutombo Cyrille.c.mutombo@kibaligold.com
Kibali Gold Hydro-Power Project	Oriental Province, Democratic Republic of Congo	2012 2014	Assessment of 7 proposed hydro-power stations along the Kibali River	ESIA	Heritage Consultant	2 Years	Randgold Resources	Completed Heritage Impact Assessment	Randgold Resources Charles Wells Charles.wells@randgoldresources.com
Everest North Mining Project	Steelpoort, Mpumalanga, South Africa	2012 2012	Heritage Impact Assessment on the farm Vygenhoek	EIA and EMP	Heritage Consultant	6 Months	Aquarius Resources	Completed Heritage Impact Assessment	Aquarius Resources
Environmental Authorisation for the Gold One Geluksdal TSF and Pipeline	Gauteng, South Africa	2012 2012	Heritage impact Assessment for the proposed TSF and Pipeline of Geluksdal Mine	EIA and EMP	Heritage Consultant	4 Months	Gold One International	Completed Heritage Impact Assessment	Gold One International
Platreef Burial Grounds and Graves Survey	Mokopane, Limpopo Province, South Africa	2012 2012	Survey for Burial Grounds and Graves	Burial Grounds and Graves Management Plan	Heritage Consultant	4 Months	Platreef Resources	Project closed by client due to safety risks	Platreef Resources Gerick Mouton



Project Title	Project Location	Date:	Description of the Project	Role of Firm in the Project	Own Role in the Project	Time involved (man months)	Name of Client	Contract Outcomes	Reference
Resgen Boikarabelo Coal Mine	Limpopo Province, South Africa	2012 2012	Archaeological Excavation of identified sites	Archaeological Excavation	Heritage Consultant	4 Months	Resources Generation	Completed excavation and reporting, destruction permits approved	Resources Generation Louise Nicolai
Bokoni Platinum Road Watching Brief	Burgersfort, Limpopo Province, South Africa	2012 2012	Watching brief for construction of new road	Watching Brief	Heritage Consultant	1 Week	Bokoni Platinum Mine	Completed watching brief, reviewed report	Bokoni Platinum Mines (Pty) Ltd
SEGA Gold Mining Project	Burkina Faso	2012 2013	Socio Economic and Asset Survey	RAP	Social Consultant	3 Months	Cluff Gold PLC	Completed field survey and data collection	Cluff Gold PLC
SEGA Gold Mining Project	Burkina Faso	2013 2013	Specialist Review of Heritage Impact Assessment	Reviewer	Heritage Consultant	1 Week	Cluff Gold PLC	Reviewed specialist report and made appropriate recommendations	Cluff Gold PLC
Consbrey and Harwar Collieries Project	Breyton, Mpumalanga, South Africa	2013 2013	Heritage Impact Assessment for the proposed Consbrey and Harwar Collieries	EIA and EMP	Heritage Consultant	2 Months	Msobo	Completed Heritage Impact Assessments	Msobo
New Liberty Gold Project	Liberia	2013 2014	Implementation of the Grave Relocation Project for the New Liberty Gold Project	Grave Relocation	Heritage Consultant	5 Months	Aureus Mining	Grave Relocation completed	Aureus Mining
Falea Uranium Mine Environmental Assessment	Falea, Mali	2013 2013	Heritage Scoping for the proposed Falea Uranium Mine	Environmental Assessment	Heritage Consultant	2 Months	Rockgate Capital	Completed scoping report and recommended further studies	Rockgate Capital
Putu Iron Ore Mine Project	Petroken, Liberia	2013 2014	Heritage impact Assessment for the proposed Putu Iron Ore Mine, road extension and railway line	EIA and EMP	Heritage Consultant	6 Months	Atkins Limited	Completed Heritage Impact Assessment and provided recommendations for further studies	Atkins Limited Irene Bopp Irene.Bopp@atkinsglobal.com



Project Title	Project Location	Date:	Description of the Project	Role of Firm in the Project	Own Role in the Project	Time involved (man months)	Name of Client	Contract Outcomes	Reference
Sasol Twistdraai Project	Secunda, Mpumalanga, South Africa	2013 2014	Notification of intent to Develop and Heritage Statement for the Sasol Twistdraai Expansion	NID	Heritage Consultant	2 Months	ERM Southern Africa	Completed NID and Heritage Statement	ERM Southern Africa Alan Cochran Alan.Cochran@erm.com
Daleside Acetylene Gas Production Facility	Gauteng, South Africa	2013 2013	Project Management of the heritage study	NID	Project Manager	3 Months	ERM Southern Africa	Project completed	ERM Southern Africa Kasantha Moodley Kasantha.Moodley@erm.com
Exxaro Belfast, Paardeplaats and Eerstelingsfontein GRP	Belfast, Mpumalanga, South Africa	2013 2014	Grave Relocation Plan for the Belfast, Paardeplaats and Eerstelingsfontein Projects	GRP	Project Manager, Heritage Consultant	2 Years	Exxaro	Burial Grounds and Graves consultation complete and applications to authorities submitted for permitting	Exxaro Johan van der Bijl Johan.vanderbijl@exxaro.com
Nzoro 2 Hydro Power Project	Oriental Province, Democratic Republic of Congo	2014 2014	Social consultation for the Relocation Action Plan component of the Nzoro 2 Hydro Power Station	RAP	Social Consultant	2 Months	Randgold Resources	Completed introductory meetings – project has been placed on hold	Kibali Gold Mine Cyrille Mutombo Cyrille.c.mutombo@kibaligold.com
Eastern Basin AMD Project	Springs, Gauteng, South Africa	2014 2014	Heritage Impact Assessment for the proposed new sludge storage facility and pipeline	EIA and EMP	Heritage Consultant	2 Months	AECOM	Completed HIA and submitted to the authorities	AECOM
Soweto Cluster Reclamation Project	Soweto, Gauteng, South Africa	2014 2014	Heritage Impact Assessment for reclamation activities associated with the Soweto Cluster Dumps	EIA and EMP	Heritage Consultant	3 Months	ERGO	Completed HIA and submitted to the authorities	ERGO Greg Ovens greg.ovens@drdgold.com
Klipspruit South Project	Ogies, Mpumalanga, South Africa	2014 2014	NID and Heritage Statement for the Section 102 Amendment of the Klipspruit Mine EMP	EIA and EMP	Heritage Consultant	6 Months	BHP Billiton	HIA finalised and submitted to the authorities	BHP Billiton





Project Title	Project Location	Date:	Description of the Project	Role of Firm in the Project	Own Role in the Project	Time involved (man months)	Name of Client	Contract Outcomes	Reference
Klipspruit Extension: Weltevreden Project	Ogies, Mpumalanga, South Africa	2014 2014	NID and Heritage Statement for the expansion of the Klipspruit Mine	EIA and EMP	Heritage Consultant	6 Months	BHP Billiton	HIA finalised and submitted to authorities	BHP Billiton
Ergo Rondebult Pipeline Basic Assessment	Johannesburg, South Africa	2014 2014	NID and Heritage Statement for the construction of the Rondebult Pipeline	BA	Heritage Consultant	1 Week	ERGO	Completed screening assessment and NID	ERGO Greg Ovens greg.ovens@drdgold.com
Kibali ESIA Update Project	Orientele Province, Democratic Republic of Congo	2014 2014	Update of the Kibali ESIA for the inclusion of new open-cast pit areas	ESIA	Heritage Consultant	1 Month	Randgold Resources	Completed heritage assessment and input into the ESIA	Randgold Resources Charles Wells Charles.wells@randgoldresources.com
GoldOne EMP Consolidation	Westonaria, Gauteng, South Africa	2014 2014	Gap analysis for the EMP consolidation of operations west of Johannesburg	Gap Analysis	Heritage Consultant	1 Month	Gold One International	Gap analysis complete and proposed way forward submitted	Gold One International
Yzermitte PIA	Wakkerstroom, Mpumalanga, South Africa	2014 2014	Palaeontological Assessment for the Yzermyne Project	PIA	Project Management	1 Month	EcoPartners	Completed report and submitted to authorities	EcoPartners San Oosthuizen san@ecopartners.co.za
Sasol Mooikraal Basic Assessment	Sasolburg, Free State, South Africa	2014 2014	Heritage Basic Assessment for the proposed Mooikraal Pipeline	HBA	Heritage Consultant	4 Months	Sasol Mining	Completed Heritage Basic Assessment and submitted to the authorities	
Everest North Mining Project	Steelpoort, Mpumalanga, South Africa	2012 2015	EIA and EMP for the Aquarius Everest North Mining Project	EIA and EMP	Project Manager	1 Year	Aquarius Resources	EIA and EMP amended and submitted to authorities. Authorisation received.	Aquarius Resources Robyn Mellett Robyn.Mellett@aquariussa.co.za
Oakleaf ESIA Project	Bronkhorstspuit, Gauteng, South Africa	2014 2015	Heritage impact Assessment for the Oakleaf Project	EIA and EMP	Heritage Consultant	4 Months	Oakleaf Investment Holdings	HIA report finalised and submitted to the authorities	



Project Title	Project Location	Date:	Description of the Project	Role of Firm in the Project	Own Role in the Project	Time involved (man months)	Name of Client	Contract Outcomes	Reference
Rea Vaya Phase II C Project	Johannesburg, Gauteng, South Africa	2014 2014	Heritage Impact Assessment on 2 structures along Rea Vaya Routing	HIA	Project Manager	1 year	Iliso Consulting	HIA report finalised and submitted to the authorities	Iliso Consulting
NTEM Iron Ore Mine and Pipeline Project	Cameroon	2014 2015	Review of Heritage Impact Assessment for the NTEM ESIA	EIA and EMP	Specialist Reviewer	1 Month	International Mining and Infrastructure Corporation plc	Specialist reports reviewed and comments provided	
Imvula Project	Kriel, Mpumalanga, South Africa	2014 2015	Heritage Scoping Report for Imvula EIA	EIA and EMP	Heritage Consultant	1 Year 4 Months	Ixia Coal	Project completed and submitted	
Sibanye WRTRP	Gauteng, South Africa	2014 2016	Heritage Impact Assessment for the Sibanye WRTRP	EIA and EMP	Heritage Consultant	On-going	Sibanye	Project is on-going	
VMIC Vanadium EIA Project	Mokopane, Limpopo, South Africa	2014 2015	Heritage Impact Assessment for the Vanadium Project	EIA and EMP	Heritage Consultant	1 Year	VM Investment Company	HIA report finalised and submitted to the authorities	
NLGM Constructed Wetlands Project	Liberia	2015 2015	Heritage Assessment for the proposed constructed wetlands	HIA	Heritage Consultant	1 Month	Aureus Mining	HIA report finalised and submitted	
ERPM Section 34 Destruction Permits Applications	Johannesburg, Gauteng, South Africa	2015 2015	Section 34 Destruction Permit Applications for the SEV and Cason Shafts	HIA and S.34 Applications	Project Manager	4 Months	Ergo Mining	Application submitted and permits received	Ergo Mining Greg Ovens <a href="mailto:greg.ovens@drdgold.com">greg.ovens@drdgold.com</a>
JMEP II EIA	Botswana	2015 2015	Heritage Impact Assessment for the JMEP II Wellfields	HIA	Heritage Consultant	2 Months	Jindal	HIA completed and submitted to authorities	
Gino's Building Section 34 Destruction Permit Application	Johannesburg, Gauteng, South Africa	2015 2016	Heritage Impact Assessment and Section 34 Destruction Permit Application	HIA and S. 34 Applications	Project Manager	On-going	Bigen Africa Services (Pty) Ltd	Project is on-going	Bigen Africa Services (Pty) Ltd Kamantha Veerasamy <a href="mailto:Kamantha.Veerasamy@bigenafrica.com">Kamantha.Veerasamy@bigenafrica.com</a>
EDC Block Refurbishment Project	Johannesburg, Gauteng, South Africa	2015 2016	Heritage Impact Assessment and Section 34 Permit Application	HIA and S. 34 Applications	Project Manager	On-going	Bigen Africa Services (Pty) Ltd	Project is on-going	Bigen Africa Services (Pty) Ltd Taka Sande <a href="mailto:Taka.Sande@bigenafrica.com">Taka.Sande@bigenafrica.com</a>

Project Title	Project Location	Date:	Description of the Project	Role of Firm in the Project	Own Role in the Project	Time involved (man months)	Name of Client	Contract Outcomes	Reference
Namane IPP and Transmission Line EIA	Steenbokpan, Limpopo Province, South Africa	2015 - 2016	Heritage Impact Assessment	EIA and EMP	Heritage Consultant	On-going	Namane Resources (Pty) Ltd	Project is on-going	
Temo Coal Road Diversion and Rail Loop EIA	Steenbokpan, Limpopo Province, South Africa	2015 - 2016	Heritage Impact Assessment	EIA and EMP	Heritage Consultant	On-going	Namane Resources (Pty) Ltd	Project is on-going	

## **JOHAN NEL**

Mr Johan Nel

Unit manager: Heritage Resources Management

Social Sciences

Digby Wells Environmental

### **1 EDUCATION**

<b>Date</b>	<b>Degree(s) or Diploma(s) obtained</b>	<b>Institution</b>
2014	Integrated Heritage Resources Management Certificate, NQF Level 6	Rhodes University
2002	BA (Honours) (Archaeology)	University of Pretoria
2001	BA	University of Pretoria
1997	Matric with exemption	Brandwag Hoërskool

### **2 LANGUAGE SKILLS**

<b>Language</b>	<b>Speaking</b>	<b>Writing</b>	<b>Reading</b>
English	Excellent	Excellent	Excellent
Afrikaans	Excellent	Excellent	Excellent

### **3 EMPLOYMENT**

<b>Period</b>	<b>Company</b>	<b>Title/position</b>
09/2011 to present	Digby Wells Environmental	Manager: Heritage Resources Management unit
05/2010-2011	Digby Wells Environmental	Archaeologist
10/2005-05/2010	Archaic Heritage Project Management	Manager and co-owner
2003-2007		Freelance archaeologist
	Rock Art Mapping Project	Resident archaeologist

2002-2003	Department of Anatomy, University of Pretoria	Special assistant: Anthropology
2001-2002	Department of Anatomy, University of Pretoria	Technical assistant
1999-2001	National Cultural History Museum & Department of Anthropology and Archaeology, UP	Assistant: Mapungubwe Project,

## 4 EXPERIENCE

Johan Nel has 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 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, Liberia and Sierra Leone. I am fluent in English and Afrikaans, with excellent writing and research skills.

## 5 PROFESSIONAL REGISTRATION

Position	Professional Body	Registration Number
Council member	Association for Southern African Professional Archaeologists (ASAPA);  ASAPA Cultural Resources Management (CRM) section	095
Member	International Association of Impact Assessors (IAIA)	N/A
Member	International Council on Monuments and Sites (ICOMOS)	
Member	Society for Africanist Archaeologists (SAfA)	N/A



## 6 PUBLICATIONS AND CONFERENCE PAPERS

Authors and Year	Title	Published in/presented at
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 the 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	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.
Nel, J. 2013.	The Matrix: A proposed method to evaluate significance of, and change to, heritage resources.	Paper presented at the 2013 ASAPA Biennial conference: Gaborone, Botswana.
Nel, J. 2013	HRM and EMS: Uncomfortable fit or separate process.	. Paper presented at the 2013 ASAPA Biennial conference: Gaborone, Botswana.

## 7 PROJECT EXPERIENCE

### 7.1 Archaeological Surveys and Impact Assessments

- 2003-2004. Freelance consulting archaeologist. Roodt & Roodt CC. RSA. Archaeological surveys. Specialist.
- 2004-2005. Resident archaeologist Rock Art Mapping Project. University of KwaZulu-Natal. Kwazulu-Natal, RSA. Rock art mapping & recording. Specialist.

### 7.2 Archaeological Mitigation

- 2007. Archaeological investigation of Old Johannesburg Fort. Johannesburg Development Agency. Gauteng, RSA. Archaeological mitigation. Project manager.
- 2008. Final consolidated report: Watching Brief on Soutpansberg Road Site for the new Head Offices of the Department of Foreign Affairs, Pretoria Gauteng. Imbumba-Aganang D & C Joint Venture. Gauteng, RSA. Watching Brief. Project manager.
- 2011. Sessenge archaeological site mitigation. Randgold Resources. Doko, DRC. Archaeological mitigation. Specialist.
- 2011. Mitigation of three sites, Koidu Kimberlite Project. Koidu Holdings SA. Koidu, Sierra Leone. Archaeological mitigation. Project manager.
- 2012. Boikarabelo Phase 2 Mitigation of Archaeological Sites. Ledjadja Coal (Pty) Ltd. Limpopo, RSA. Archaeological permitting and mitigation. Project manager.
- 2012. Additional Archaeology Mitigation of Sites. Ledjadja Coal (Pty) Ltd. Limpopo, RSA. Archaeological permitting and mitigation. Project manager.
- 2013. Archaeological Excavations of Old Well, Rhodes University, Grahamstown. Rhodes University. Eastern Cape, RSA. Archaeological mitigation. Specialist.
- 2014. Archaeological Site Destruction. Ledjadja Coal (Pty) Ltd. Limpopo, RSA. Archaeological permitting and mitigation. Project manager.

### 7.3 Heritage Impact Assessments

- 2005. Final consolidated Heritage Impact Assessment report: Proposed development of high-cost housing and filling station, Portion of the farm Mooiplaats 147 JT. Go-Enviroscience. Mpumalanga, RSA. Heritage Impact Assessment. Project manager.
- 2006. Final report: Heritage resources Scoping survey and preliminary assessment for the Transnet Freight Line EIA, Eastern Cape and Northern Cape. ERM Southern Africa (Pty) Ltd. Northern & Eastern Cape, RSA. Heritage Scoping Assessment. Project manager.
- 2007. Proposed road upgrade of existing, and construction of new roads in Burgersfort, Limpopo Province. AGES South Africa (Polokwane). Limpopo, RSA. Heritage Impact Assessment. Project manager.
- 2007. Recommendation of Exemption: Above-ground SASOL fuel storage tanks located at grain silos in localities in the Eastern Free State. Sasol Group Services (Pty) Ltd. Free State, RSA. Letter of Exemption. Project manager.
- 2008. Summary report: Old dump on premises of the new Head Offices, Department of Foreign Affairs, Pretoria, Gauteng. Imbumba-Aganang D & C Joint Venture. Gauteng, RSA. Archaeological Impact Assessment. Project manager.
- 2008. Van Reenen Eco-Agri Development Project. Go-Enviroscience. Kwazulu-Natal & Free State, RSA. Heritage Impact Assessment. Project manager.
- 2008. Heritage Impact Assessment for proposed water pipeline routes, Mogalakwena District, Limpopo Province. AGES South Africa (Polokwane). Limpopo, RSA. Heritage Impact Assessment. Project manager.
- 2008. Phase 1 Heritage and Archaeological Impact Assessment: Proposed establishment of an access road between Sapekoe Drive and Koedoe Street, Erf 3366 (Extension 22) and the Remainder of Erf 430 (Extension 4). AGES South Africa (Polokwane). Limpopo, RSA. Heritage Impact Assessment. Project manager.
- 2008. Heritage resources scoping survey and preliminary assessment: Proposed establishment of township on Portion 28 of the farm Kennedy's Vale 362 KT, Steelpoort, Limpopo Province. AGES South Africa (Polokwane). Limpopo, RSA. Heritage Scoping Assessment. Project manager.
- 2008. Randwater Vlakfontein-Mamelodi water pipeline survey. Archaeology Africa CC. Gauteng, RSA. Heritage Impact Assessment. Specialist.
- 2010. Heritage Impact Assessment for conversion of PR to MRA. Georock Environmental. Northwest, RSA. Heritage Impact Assessment. Project manager.
- 2010. Temo Coal Project. Namane Commodities (Pty) Ltd. Limpopo, RSA. Heritage Impact Assessment. Specialist.
- 2011. Marapong Treatment Works. Ceenex (Pty) Ltd. Limpopo, RSA. Archaeological Impact Assessment. Project manager.

- 2011. Complete Environmental Authorisation. Rhodium Reefs Ltd. Limpopo, RSA. Archaeological Impact Assessment. Specialist.
- 2011. Big 5 PV Solar Plants. Orlight (Pty) Ltd. Western and Northern Cape, RSA. Heritage Impact Assessment. Specialist.
- 2011. Heritage Impact Assessment for Koidu Diamond Mine. Koidu Holdings SA. Koidu, Sierra Leone. Heritage Impact Assessment. Specialist.
- 2012. TSF and Pipeline. Gold One. Gauteng, RSA. Heritage Impact Assessment. Project manager.
- 2012. Kangra Coal Heritage Screening Assessment. ERM Southern Africa (Pty) Ltd. Mpumalanga, RSA. Heritage Screening Assessment. Project manager.
- 2012. Environmental and Social Studies. Platreef Resources (Pty) Ltd. Limpopo, RSA. Heritage specialist advice. Project manager.
- 2012. ESKOM Powerline EIA. Ledjadja Coal (Pty) Ltd. Limpopo, RSA. Notification of Intent to Develop. Project manager.
- 2012. Falea Project ESIA. Denison Mines Corp. (Rockgate Capital Corp). Falea, Mali. Heritage Impact Assessment. Specialist.
- 2012. EIA for Proposed Emergency Measures to Pump and Treat. AECOM SA (Pty) Ltd. Gauteng, RSA. Heritage Impact Assessment. Specialist.
- 2012. Tonguma Baseline Studies. Koidu Holdings SA. Tonguma, Sierra Leone. Heritage Impact Assessment. Specialist.
- 2012. Vedanta IPP. Black Mountain Mining (Pty) Ltd. Limpopo, RSA. Heritage Impact Assessment. Specialist.
- 2012. Boikarabelo Railway Realignment. Ledjadja Coal (Pty) Ltd. Limpopo, RSA. Heritage Impact Assessment. Specialist.
- 2012. Platreef ESIA. Platreef Resources (Pty) Ltd. Limpopo, RSA. Heritage Impact Assessment. Specialist.
- 2012. Roodekop EIA. Universal Coal Development 4 (Pty) Ltd. Mpumalanga, RSA. Heritage Impact Assessment. Specialist.
- 2012. Kangala HIA. Universal Coal Development 1 (Pty) Ltd. Mpumalanga, RSA. Heritage Impact Assessment and permitting. Specialist.
- 2012. Roodepoort Strengthening. Eskom Holdings SOC Ltd. Gauteng, RSA. Notification of Intent to Develop. Specialist.
- 2012. Trichardtsfontein EIA / EMP. Xstrata Coal South Africa. Limpopo, RSA. Heritage Impact Assessment. Specialist.
- 2012. Zandbaken EIA/EMPR. Xstrata Coal South Africa. Limpopo, RSA. Heritage Impact Assessment. Specialist.

- 2013. ATCOM Tweefontein NID. Jones & Wagener (Pty) Ltd. Mpumalanga, RSA. Burial grounds and graves consultation, permitting and relocation. Project manager.
- 2013. Roodepoort Heritage Impact Assessment. Fourth Element Consulting (Pty) Ltd. Gauteng, RSA. Heritage Impact Assessment. Project manager.
- 2013. JHB BRT Phase 2 Heritage Impact Assessment. Iliso Consulting (Pty) Ltd. Gauteng, RSA. Heritage Impact Assessment. Project manager.
- 2013. Kangra Coal HIA. ERM Southern Africa (Pty) Ltd. Mpumalanga, RSA. Heritage Impact Assessment. Project manager.
- 2013. Slyphsteen Bulk Sample Application. Summer Season Trading (Pty) Limited. Northern Cape, RSA. Heritage Impact Assessment. Project manager.
- 2013. Kempton Park Heritage Statement and NID. ERM Southern Africa (Pty) Ltd. Gauteng, RSA. Notification of Intent to Develop. Project manager.
- 2013. Sasol Twistdraai CFD. ERM Southern Africa (Pty) Ltd. Gauteng, RSA. Notification of Intent to Develop. Project manager.
- 2013. HRS & NID - River Crossings Upgrade. Iliso Consulting (Pty) Ltd. Gauteng, RSA. Notification of Intent to Develop. Project manager.
- 2013. Waterberg Prospecting Right Applications. Platinum Group Metals (Pty) Ltd. Limpopo, RSA. Notification of Intent to Develop. Project manager.
- 2013. Landau Waste Licence Application. Anglo Operations (Pty) Limited. Mpumalanga, RSA. Notification of Intent to Develop. Reviewer / specialist.
- 2013. Prospecting Right Consultation Report. Rustenburg Platinum Mines Limited. Mpumalanga, RSA. Notification of Intent to Develop. Reviewer / specialist.
- 2013. Witrand Prospecting EMP. Rustenburg Platinum Mines Limited. Mpumalanga, RSA. Notification of Intent to Develop. Reviewer / specialist.
- 2013. EMP Amendment for CST. Copper Sunset Trading (Pty) Ltd. Mpumalanga, RSA. Notification of Intent to Develop. Reviewer / specialist.
- 2013. Maseve IFC ESHIA. Maseve Investment (Pty) Ltd. Mpumalanga, RSA. Notification of Intent to Develop. Reviewer / specialist.
- 2013. Dalyshope ESIA. Anglo Operations (Pty) Limited. Limpopo, RSA. Heritage Impact Assessment. Specialist.
- 2013. Klipfontein Opencast Project. Bokoni Platinum Mines (Pty) Ltd. Limpopo, RSA. Heritage Impact Assessment. Specialist.
- 2013. Consbrey and Harwar MPRDA EIA/EMP. Msobo Coal (Pty) Ltd. Mpumalanga, RSA. Heritage Impact Assessment. Specialist.
- 2013. Slyphsteen 102 EMP Amendment. Summer Season Trading (Pty) Limited. Northern Cape, RSA. Heritage Impact Assessment. Specialist.



- 2013. Putu Iron Ore ESIA. Atkins Limited Incorporated. Putu, Liberia. Heritage Impact Assessment. Specialist.
- 2013. Ash backfilling at Sigma Colliery. Sasol Mining (Pty) Ltd. Gauteng, RSA. Notification of Intent to Develop. Specialist.
- 2013. Syferfontein Block 4 - Underground Coal Mining for Sasol. Sasol Mining (Pty) Ltd. Mpumalanga, RSA. Notification of Intent to Develop. Specialist.
- 2013. Prospecting Right Amendment to Include Bulk Sampling. Sikhuliso Resources (Pty) Ltd. Mpumalanga, RSA. Notification of Intent to Develop. Specialist.
- 2013. Nootgedacht EIA, EMP Amendment & Gap Analysis. Xstrata Coal South Africa. Limpopo, RSA. Heritage Impact Assessment. Specialist.
- 2014. Gold One EMP Consolidation Phase 0. Gold One. Gauteng, RSA. Heritage Impact Assessment. Reviewer / specialist.
- 2014. Kilbarchan Audit and EIA. Eskom Holdings SOC Ltd. Kwazulu-Natal, RSA. Heritage Impact Assessment. Reviewer / specialist.
- 2014. Klipspruit Extension Environmental Assessment. BHP Billiton Energy Coal South Africa Limited. Mpumalanga, RSA. Heritage Impact Assessment. Reviewer / specialist.
- 2014. Klipspruit South BECSA EIA. BHP Billiton Energy Coal South Africa Limited. Mpumalanga, RSA. Heritage Impact Assessment. Reviewer / specialist.
- 2014. EIA/EMP Soweto Cluster. DRD GOLD ERGO (Ergo Mining (Pty) Ltd. Gauteng, RSA. Notification of Intent to Develop. Reviewer / specialist.
- 2014. London Road Heritage Statement. ERM Southern Africa (Pty) Ltd. Gauteng, RSA. Notification of Intent to Develop. Reviewer / specialist.
- 2014. Grootegeluk MPRDA, NEMA and IWULA. Exxaro Coal (Pty) Ltd. Limpopo, RSA. Notification of Intent to Develop. Reviewer / specialist.
- 2014. Kibali ESIA & EMP Update. Randgold Resources. Doko, DRC. Heritage Impact Assessment. Specialist.
- 2014. Nokuhle Colliery NEMA Process. HCI Coal (Pty) Ltd. Mpumalanga, RSA. Heritage Impact Assessment. Specialist.
- 2014. HRM Process for Hendrina Wet Ashing. Lidwala Consulting Engineers (Pty) Ltd. Mpumalanga, RSA. Heritage Impact Assessment. Specialist.
- 2014. Weltevreden NEMA. Northern Coal (Pty) Ltd. Mpumalanga, RSA. Heritage Impact Assessment. Specialist.
- 2014. Sasol Sigma Mooikraal Pipeline BA. Sasol Mining (Pty) Ltd. Mpumalanga, RSA. Notification of Intent to Develop. Specialist.

## 7.4 Burial Grounds and Graves Consultation and Relocation

- 2005. Report on exhumation, relocation and re-internment of 49 graves on Portion 10 of the farm Tygervallei 334 JR, Kungwini Municipality, Gauteng D Georgiades East Farm (Pty) Ltd. Gauteng, RSA. Burial grounds and graves consultation, permitting and relocation. Project manager.
- 2005. Southstock Collieries Grave Relocation. Doves Funerals, Witbank. Mpumalanga, RSA. Burial grounds and graves consultation, permitting and relocation. Project manager.
- 2005. Social consultation for Smoky Hills Platinum Mine Grave Relocation. PGS (Pty) Ltd. Limpopo, RSA. Stakeholder consultation on burial grounds and graves. Social consultant.
- 2005. Social consultation for Elawini Lifestyle Estate Grave Relocation. PGS (Pty) Ltd. Mpumalanga, RSA. Stakeholder consultation on burial grounds and graves. Social consultant.
- 2006. Social consultation for Zonkezizwe Grave Relocation. PGS (Pty) Ltd. Gauteng, RSA. Stakeholder consultation on burial grounds and graves. Social consultant.
- 2006. Social consultation for Motaganeng Residential Development Grave Relocation. PGS (Pty) Ltd. Mpumalanga, RSA. Stakeholder consultation on burial grounds and graves. Social consultant.
- 2006. Social consultation for Zondagskraal Coal Mine Grave (Pty) Ltd. Mpumalanga, RSA. Stakeholder consultation on burial grounds and graves. Social consultant.
- 2007. Exploratory excavation of an unknown cemetery at Du Preezhoek, Fountains Valley, Portion 383 of the farm Elandspoort 357 JR, Pretoria, Gauteng. Bombela Civil Joint Venture. Gauteng, RSA. Burial grounds and graves consultation, permitting and relocation. Project manager.
- 2007. Final consolidated report: Phase 2 test excavations ascertaining the existence of alleged mass graves, Tlhabane West, Extension 2, Rustenburg, Northwest Province. Bigen Africa Consulting Engineers. Northwest, RSA. Burial grounds and graves consultation, permitting and relocation. Project manager.
- 2007. Repatriation of Mapungubwe Human Remains. Department of Environmental Affairs and Tourism. Limpopo, RSA. Repatriation. Project manager.
- 2008. Report on skeletal material found at Pier 30, R21 Jones Street off-ramp, Kempton Park. Bombela Civil Joint Venture. Gauteng, RSA. Heritage Scoping Assessment. Project manager.
- 2011. Kibali Grave Relocation. Randgold Resources. Doko, DRC. International grave relocation. Specialist.
- 2012. Platreef Platinum Mine Burial Grounds and Graves Census. Platreef Resources (Pty) Ltd. Limpopo, RSA. Stakeholder consultation on burial grounds and graves. Project manager.

- 2013. New Liberty Grave Relocation Process. Aureus Mining Inc. Kinjor, Liberia. International grave relocation. Project manager.
- 2013. Bokoni Burial Grounds and Grave Census and Grave Relocation Plan. Bokoni Platinum Mines (Pty) Ltd. Limpopo, RSA. Stakeholder consultation on burial grounds and graves. Project manager.
- 2014. Arnot Colliery Grave Relocation Project. Exxaro Coal (Pty) Ltd. Mpumalanga, RSA. Burial grounds and graves consultation, permitting and relocation. Project manager.
- 2014. Paardeplaats and Belfast RAPs. Exxaro Coal (Pty) Ltd. Mpumalanga, RSA. Burial grounds and graves consultation, permitting and relocation. Reviewer / specialist.
- 2014. Thabametsi EIA, EMP, IWULA, IWWMP and PPP. Exxaro Coal (Pty) Ltd. Limpopo, RSA. Stakeholder consultation on burial grounds and graves. Specialist.

## **7.5 Research Reports and Reviews**

- 2007. Research report on cultural symbols. Ministry of Intelligence Services. RSA. Research report. Project manager.
- 2007. Research report on the remains of kings Mampuru I and Nyabela. National Department of Arts and Culture. RSA. Research report. Project manager.
- 2012. Baseline Scoping and Pre-feasibility Songwe Rare Earth Element Project. Mkango Resources Limited. Songwe, Malawi. Heritage Impact Assessment. Reviewer / specialist.
- 2013. Fatal Flaw Analysis and EIA Process for AMD Man in Eastern Basin. AECOM SA (Pty) Ltd. Gauteng, RSA. Heritage Impact Assessment. Reviewer / specialist.