



DIGBY WELLS

ENVIRONMENTAL

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Proposed Development of an Underground Coal Mine and Associated Infrastructure near Hendrina, Mpumalanga

Heritage Impact Assessment

Project Number:

XST3791

Prepared for:

Umcebo Mining (Pty) Ltd

July 2016

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DECLARATION OF INDEPENDENCE

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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 Umcebo Mining (Pty) Ltd, other than fair remuneration for work performed, specifically in connection with the Heritage Resources Management (HRM) Process for proposed development of an underground coal mine and associated infrastructure, located near Hendrina, Mpumalanga Province.

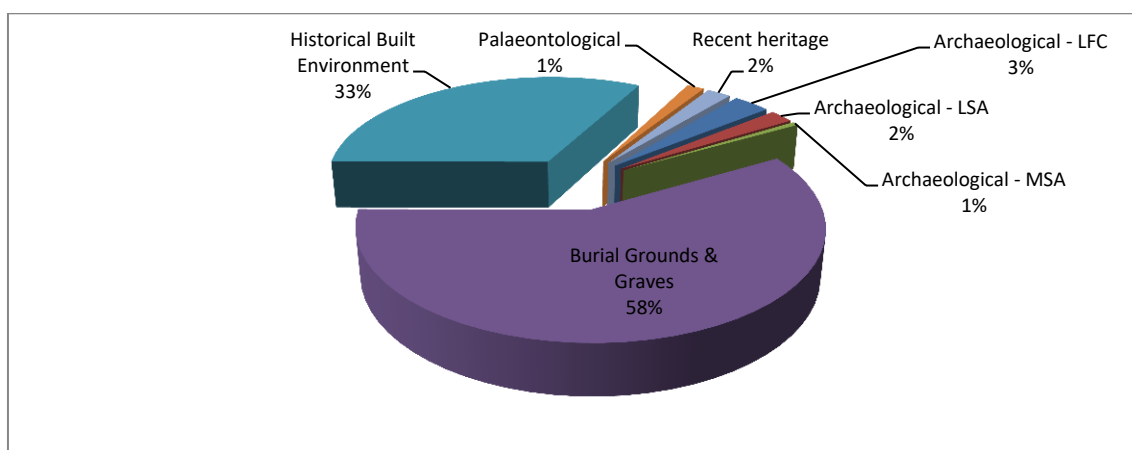
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EXECUTIVE SUMMARY

Umcebo Mining (Pty) Ltd (hereinafter Umcebo) is proposing the development and operation of a new underground coal mine with associated infrastructure at a site situated approximately 10 to 22 kilometres (km) southeast of Hendrina in the Mpumalanga Province, South Africa. In terms of the requirements of the Mineral and Petroleum Resources Development Act, 2002 (Act No. 28 of 2002) (MPRDA) as amended, a Mining Right Application (MRA) must be submitted to the Department of Mineral Resources (DMR) for the Project.

Digby Wells Environmental (hereinafter Digby Wells) has completed the Scoping Report and submitted a Notification of Intent to Develop (NID) and Heritage Scoping Report (HSR) to the South African Heritage Resources Agency (SAHRA) and Mpumalanga Heritage Resources Agency (MPHRA) for Statutory Comment as required by Section 38(8) of the National Heritage Resources Act, 1999 (Act No. 25 of 1999) (NHRA) on 20 April 2016. The NID and HSR recommended a Heritage Impact Assessment (HIA) be completed during Environmental Impact Assessment (EIA) phase. This report constitutes the Heritage Impact Assessment (HIA) to inform the EIA and Environmental Management Plan (EMP) completed in terms of the National Environmental Management Act, 1998 (Act No. 107 of 1998) (NEMA).

This assessment considered the baseline cultural landscape at local, site specific and development footprint study area level to define the cultural landscape and identify any tangible heritage resources that may be impacted upon by the proposed Project. A total of 542 sites were identified within the local study area, ranging from palaeontological resources through to the historic period. This indicated the Project is situated in a historic agrarian landscape with a palaeontological and archaeological component that is sensitive.



The identified Cultural Significance (CS) and field ratings of heritage resource types considered assisted in the assessment of potential impacts and providing appropriate management and mitigation measures in accordance with the published SAHRA minimum standards. The results of these assessments are presented below.

No heritage resources were identified within the development footprint of surface infrastructure, and no direct impacts are envisaged for this component of the Project. To mitigate against the exposure of previously unidentified heritage resources, project specific Chance Find Protocols (CFPs) must be developed for the project. The purpose of the CFPs is to establish procedures that aim to minimise damage and destruction to any heritage resources that may be accidentally exposed during the course of development activities. The CFPs must clearly describe the type of heritage resources that may occur within the site specific project area, the protocol to follow in the event of accidental exposure of previously unidentified heritage resources, and the appropriate management measures and reporting structures to be adhered to. The CFP at a minimum should include the following:

- Definitions as defined by Section 2 and 38(1) of the NHRA;
- Proactive archaeological monitoring procedures;
- Procedures that detail the following:
 - How to spot a chance find;
 - Steps to be undertaken when a chance find is made;
 - Internal reporting structures;
 - Recording of chance finds; and
 - Legal processes and requirements.

The CFPs must be defined and established as a condition of authorisation prior to the pre-construction phase of the proposed Project.

Potential impacts to heritage resources occurring outside of the development have been identified and assessed. To reduce the identified impacts, it is recommended that a Conservation Management Plan (CMP) for the Project be developed and implemented during the pre-construction phase as a condition of authorisation. The CMP must at a minimum include the following:

- All identified heritage resources within the site-specific study area;
- Identify all heritage resources within a 100 m buffer of proposed infrastructure and 500 m blasting radius during the construction phase;
- Identify all heritage resources that fall within the underground mining development footprint;
- Have a detailed baseline record of the condition of identified heritage resources;
- Establish a roles and responsibilities matrix;
- Establish a monitoring process and schedule;
- Define conditions and protocols for access; and
- Define the project specific management and monitoring protocol.



Heritage Resource Type	Cultural Significance	Field Rating
Burial grounds and graves	Very High	Grade III A
Rock Art	High	Grade II
Werfs	Negligible	General Protection IV C
LFC Site	Negligible	General Protection IV C

Code	Impact	Pre-mitigation:						Post-mitigation:					
		Duration	Extent	Intensity	Consequence	Probability	Significance	Duration	Extent	Intensity	Consequence	Probability	Significance
Blasting and Excavation	Loss of integrity of rock art sites	Permanent	National	Extremely high - negative	Extremely detrimental	Probable	Moderate - negative	Permanent	Limited	Extremely high - positive	Highly beneficial	Certain	Major - positive
Construction of Surface Infrastructure	Degradation of intrinsic CS of burial grounds and graves	Project Life	National	High - negative	Highly detrimental	Certain	Major - negative	Immediate	National	High - positive	Moderately beneficial	Likely	Minor - positive
Underground blasting and mining	Damage to surface dressing of burial grounds and graves	Project Life	National	High - negative	Highly detrimental	Probable	Minor - negative	Immediate	National	High - positive	Moderately beneficial	Likely	Minor - positive



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LIST OF ACRONYMS

Abbreviation	Meaning
ASAPA	Association of Southern African Professional Archaeologists
BA	Bachelor of Arts
BID	Background Information Document
BSc	Bachelor of Science
c.	circa, meaning approximately
CE	Common Era
CFP	Chance Find Protocol
CMP	Conservation Management Plan
CRR	Comments and Response Report
CS	Cultural Significance
Digby Wells	Digby Wells Environmental
EA	Environmental Authorisation
EAP	Environmental Assessment Practitioner
EFC	Early Farming Community (also known as Early Iron Age)
EIA	Environmental Impact Assessment
EMP	Environmental Management Plan
ESA	Early Stone Age
GIS	Geographical Information System
GN R	Government Notice Regulation
GPS	Global Positioning System
HIA	Heritage Impact Assessment
Hons	Honours degree
HRAs	Heritage Resources Authorities
HRM	Heritage Resources Management
HSR	Heritage Scoping Report
ICOMOS	International Council on Monuments and Sites
Kya	Thousand years ago
LED	Local Economic Development
LFC	Late Farming Community also known as Late Iron Age
LSA	Late Stone Age

Abbreviation	Meaning
MIA	Middle Iron Age
MPRDA	Mineral and Petroleum Resources Development Act, 2002 (Act No. 28 of 2002)
MPRHA	Mpumalanga Provincial Heritage Resources Authority
MSA	Middle Stone Age
MSc	Master of Science
NEMA	National Environmental Management Act, 1998 (Act No. 107 of 1998)
NHRA	National Heritage Resources Act, 1999 (Act No. 25 of 1999)
NID	Notification of Intent to Develop
RoD	Record of Decision
SAHRA	South African Heritage Resources Agency
SAHRIS	South African Heritage Resources Information System
SCF	Statutory Comment Feedback
SEP	Stakeholder Engagement Process
SoW	Scope of Work
ToR	Terms of Reference
UP	University of Pretoria
Wits	University of the Witwatersrand



GLOSSARY

Term	Definition
Alter	Any action affecting the structure, appearance or physical properties of a place or object, whether by way of structural or other works, by painting, plastering or other decoration or any other means.
Archaeological	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.
Archaeologist	A trained professional who uses scientific methods to excavate record and study archaeological sites and deposits.
Artefact	Any object manufactured or modified by human beings.
Ceramic (syn. pottery)	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.
Ceramic facies / facies	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.
Ceramic tradition	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.
Ceramic classification	Ceramic classification is universally used by archaeologists to establish relative cultural-historical temporal sequences within southern African Farming Communities. In this way, relative dates can be assigned to sites, as well as inferring tenuous cultural similarities or associations. Huffman (1970) postulated that the migration of farming communities could be recognised via a technique of 'ceramic seriation'. Ceramic seriation is based on the premise that certain styles of ceramics,



Term	Definition
	<p>including vessel shape and decorative motifs, follow each other chronologically, and can be attributed to certain archaeological 'cultures' (Huffman, 1970; 1980).</p> <p>Huffman (1970) and Phillipson (1977) demonstrated that Bantu-speaking groups may have migrated southwards in three 'streams' from a possible central homeland, over different periods (See Figure 6 4). These streams are generally associated with diverse Eastern Bantu-speaking societies and various farming community periods. Although these hypotheses have since undergone meaningful reviews and received significant opposition, a general consensus remains that ceramic seriation can be used to reconstruct population movements.</p>
Compulsory repair order	<p>A heritage resources authority may serve on the owner of a heritage site an order to repair or maintain such site, to the satisfaction of the heritage resources authority, within a reasonable period of time as specified in the order where the heritage resources authority considers that such site:</p> <ul style="list-style-type: none"> ▪ Has been allowed to fall into disrepair for the purpose of effecting or enabling its destruction or demolition, enabling the development of the designated land, or enabling the development of any land adjoining the designated land. ▪ Is neglected to such an extent that it will lose its potential for conservation.
Conservation	<p>In relation to heritage resources includes the protection, maintenance, preservation and sustainable use of places or objects so as to safeguard their cultural significance.</p>
Cultural significance (CS)	<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"> ▪ Importance in the community, or pattern of South Africa's history. ▪ Possession of uncommon, rare or endangered aspects of South Africa's natural or cultural heritage ▪ Potential to yield information that will contribute to an understanding of South Africa's natural or cultural heritage. ▪ Importance in demonstrating the principal characteristics of a particular class of South Africa's natural or cultural places or objects. ▪ Importance in exhibiting particular aesthetic characteristics valued by a community or cultural group. ▪ Importance in demonstrating a high degree of creative or technical achievement at a particular period. ▪ Strong or special association with a particular community or cultural group for social, cultural or spiritual reasons. ▪ Strong or special association with the life or work of a person, group or organisation of importance in the history of South Africa.



Term	Definition
	<ul style="list-style-type: none"> Significance relating to the history of slavery in South Africa.
Development	<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"> Construction, alteration, demolition, removal or change of use of a place or a structure at a place. Carrying out any works on or over or under a place. Subdivision or consolidation of land comprising, a place, including the structures or airspace of a place. Constructing or putting up for display signs or hoardings. Any change to the natural or existing condition or topography of land. Any removal or destruction of trees, or removal of vegetation or topsoil.
Early Farming Community/ies	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.
Early Stone Age	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.
Excavation	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.
Farming Community/ies	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.
Field Rating	<p>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:</p> <ul style="list-style-type: none"> 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



Term	Definition
	<p>national estate, can be considered to have special qualities which make them significant within the context of a province or a region.</p> <ul style="list-style-type: none"> ▪ Grade III: Other heritage resources worthy of conservation. ▪ General Protected: i.e. generally protected in terms of Sections 33 to 37 of the NHRA.
General protection	<p>General protections are afforded to:</p> <ul style="list-style-type: none"> ▪ 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.
Grave	<p>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.</p>
Heritage Impact Assessment (HIA)	<p>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.</p>
Heritage resource	<p>Any place or object of cultural significance.</p>
Heritage resources management	<p>Process required when development is intended categorised as:</p> <ul style="list-style-type: none"> ▪ 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.



Term	Definition
Heritage site	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.
Late Farming Community/ies	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.
Late Stone Age	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.
Living / intangible heritage	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.
Management	In relation to heritage resources, includes the conservation, presentation and improvement of a place protected in terms of the NHRA.
Middle Stone Age	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 species</i> . 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.
National estate	<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> <ul style="list-style-type: none"> ▪ Places, buildings, structures and equipment of cultural significance. ▪ Places to which oral traditions are attached or which are associated with living heritage. ▪ Historical settlements and townscapes. ▪ Landscapes and natural features of cultural significance. ▪ Geological sites of scientific or cultural importance.



Term	Definition
	<ul style="list-style-type: none"> ▪ Archaeological and palaeontological sites. ▪ 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 (Act No. 61 of 2003). ▪ Sites of significance relating to the history of slavery in South Africa. ▪ 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. ▪ 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).
Object	Any movable property of cultural significance which may be protected in terms of any provisions of this Act, including: any archaeological artefact; palaeontological and rare geological specimens; meteorites; and other objects referred to in Section 3 of the NHRA.
Pedestrian survey	A method of examining a site in which surveyors, spaced at regular intervals, systematically walk over the area being investigated.
Phase 1 Archaeological Impact Assessment (AIA)	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.
Phase 2 Archaeological Impact Assessment (AIA)	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.



Term	Definition
Phase 3 Management Plan / Conservation Management Plan (CMP)	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).
Place	A place includes: a site, area or region; a building or other structure which may include equipment, furniture, fittings and articles associated with or connected with such building or other structure; a group of buildings or other structures which may include equipment, furniture, fittings and articles associated with or connected with such group of buildings or other structures; an open space, including a public square, street or park; and in relation to the management of a place, includes the immediate surroundings of a place.
Pre-disturbance survey (syn. reconnaissance)	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.
Presentation	In relation to a heritage resource, site or place includes: the exhibition or display of; the provision of access and guidance to; the provision, publication or display of information in relation to; and performances or oral presentations related to, heritage resources protected in terms of the NHRA.
Provisional protection	A protected area or heritage resource provisionally protected by SAHRA or a provincial heritage resources authority by a notice in the Gazette or Provincial Gazette.
Reconnaissance	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



Term	Definition
	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).
Site	Any area of land, including land covered by water, and including any structures or objects thereon.
Stop work order	An order served on a person by the Minister on advice of SAHRA or MEC to immediately cease all work in and around a heritage site for a period not exceeding 10 years. The order attaches to land is binding on the current owner and any future owner.
Structure	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.
Tangible heritage	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.



1 Introduction

Umcebo Mining (Pty) Ltd (hereinafter Umcebo) appointed Digby Wells Environmental (hereinafter Digby Wells) to undertake the necessary environmental and social studies required for Environmental Authorisation (EA) of the proposed Hendrina Underground Coal Mine Project (the Project).

Digby Wells has completed the Scoping Report and submitted a Notification of Intent to Develop (NID) and Heritage Scoping Report (HSR) to the South African Heritage Resources Agency (SAHRA) and Mpumalanga Heritage Resources Agency (MPHRA) for Statutory Comment as required by Section 38(8) of the National Heritage Resources Act, 1999 (Act No. 25 of 1999) (NHRA) on 20 April 2016¹.

This report constitutes the Heritage Impact Assessment (HIA) to inform the Environmental Impact Assessment (EIA) and Environmental Management Plan (EMP) completed in terms of the National Environmental Management Act, 1998 (Act No. 107 of 1998) (NEMA).

1.1 Project Background

Umcebo is proposing the development and operation of a new underground coal mine with associated infrastructure at a site situated approximately 10 to 22 kilometres (km) southeast of Hendrina in the Mpumalanga Province, South Africa. Umcebo is a subsidiary of Glencore Operations South Africa (Pty) Ltd (Glencore) and the holder of two Prospecting Rights (PR) in the Ermelo Coal Field, namely:

- MP 1265 PR (referred to as Mooivley East and Mooivley West); and
- MP 1266 PR (referred to as Hendrina South area).

In terms of the requirements of the Mineral and Petroleum Resources Development Act, 2002 (Act No. 28 of 2002) (MPRDA) as amended, a Mining Right Application (MRA) must be submitted to the Department of Mineral Resources (DMR) for the Project. In support of the MRA, an EIA process must be undertaken in accordance with the new EIA Regulations, 2014 (GN R 982) promulgated in terms of the NEMA, as amended. The EIA process will also serve to support the following applications:

- EA for listed activities² as contained in Listing Notices (GN R 983, 984 and 985); and
- Waste Management Licence (WML) in terms of the National Environmental Management: Waste Act, 2008 (Act No. 59 of 2008) (NEM: WA).

¹ Submission of the NID and HSR was completed via the SAHRIS and a case reference (Case ID: 9404) was generated. The NID and HSR can be located at the following link
<http://www.sahra.org.za/sahris/cases/umcebo-hendrina-underground-coal-mine-mining-right-application>

² Please refer to Section 1.5 for relevant listed activities considered as part of the EIA process

Furthermore, an Integrated Water Use Licence Application (IWULA) in terms of the National Water Act, 1998 (Act No. 36 of 1998) (NWA) will also be made for water uses associated with the Project.

The purpose of the EIA process is to ensure that potential environmental and social impacts associated with construction, operation and closure of the Project are identified, assessed and appropriately managed.

1.2 Project Description³

The Project comprises three underground reserve blocks, i.e. Mooivley East, Mooivley West, and Hendrina South, with an estimated Life of Mine (LoM) of 30 years⁴. The location details of these are summarised in Table 1-1. Considering the depth of the mineral resource (*i.e. coal*) (32 m – 128 m below ground level), it is proposed to utilise underground mining methodologies.

The various reserves will be accessed through three incline shafts to be established during the construction phase of the Project. A mechanised underground bord and pillar methodology will be employed as part of the operational activities. This will entail the development of a series of “roadways” (bords) in the coal seam connected via splits (cut-through) to form pillars that are left behind as the primary overburden support system. Any overburden material extracted will be stockpiled and used to rehabilitate the incline shafts during the decommissioning phase of the Project.

The current suggestion is that the Run of Mine (RoM) be transported via conveyor to the existing Crushing and Screening Plant situated in the Mooivley West area for beneficiation. The processed coal product will be transported via conveyor to the proposed stockpile area to create “cone type” stockpiles of 30 m diameter each.

Associated mine infrastructure includes the following:

- Crushing and Screening Plant;
- Overburden and Product Stockpiles;
- Access and Service Roads (with weighbridge);
- Overland Conveyors;
- Three Access Points to the Underground Reserve (Two shafts per Access Point);
- Three ventilation shafts (One per Access Point);
- Office Complex (change house, workshop, offices);

³ A detailed project description, including definitions and the relevant regulatory framework is provided in the HSR and EIA. This is not repeated here for the sake of brevity. This section provides an abbreviated description of the Project to provide the reader with the relevant context of the proposed development.

⁴ The MRA will be made for an initial period of 30 years, the maximum allowed in terms of the provisions of Section 23 of the MPRDA. At the end of this period an application for renewal of the mining right will be made for any remaining reserves.



- Three Pollution Control Dams (PCDs) and water pipelines;
- Five Aboveground Storage Tanks for the storage of diesel (8 000 Litres (ℓ) to 16 000 ℓ) will be utilised onsite with three tanks located at the shafts and two tanks located near the Crushing and Screening Plant;
- Three waste bins per shaft;
- Site fencing located around the Conveyer Belt and each Mining Complex;
- Diesel generator and sub-station;
- Water Treatment Plant; and
- Package Sewage Treatment Plant.

Table 1-1: Project location details

Prospecting Right	Farm	Portions	Extent		Distance and Direction from Hendrina
MP 1265 PR – Mooivley East & West	Mooivley 219 IS	2, 4, 5 and RE	1 018 ha	3 923 ha	12 km South East
	Tweefontein 203 IS	2, 15, 16 and 17	1 023 ha		8 km South East
	Uitkyk 220 IS	2 and 3	1 246 ha		10 km South
	Orange Vallei 201 IS	1 and RE	639 ha		8 km South East
MP 1266 PR – Hendrina South	Elim 247 IS	RE	516 ha	2 787 ha	19 km South East
	Geluksdraai 240 IS	1 and 2	258 ha		22 km South East
	Bosmanskrans 217 IS	1, 3, 4, 6, 8, 9 and RE	1 941 ha		22 km South East
	Orpenskraal 238 IS	RE	65 ha		22 km South East

1.3 Terms of Reference

The Terms of Reference (ToR) for the specialist heritage study was to conduct a Heritage Resources Management (HRM) Process in support of the EA applications applicable to the MRA. The HRM Process is being completed in accordance with Section 38(8) of the NHRA.

1.4 Scope of Work

The Scope of Work (SoW) that was completed for the HIA to comply with the ToR included:

- Assessment of Cultural Significance (CS) of identified heritage resources;
- Identification of potential impacts to heritage resources based on Project activities;



- Recommend feasible and commensurate management or mitigation measures to avoid and/or reduce negative impacts and enhance positive ones;
- Submission of the HIA report to the SAHRA and MPHRA for Statutory Comment as required under Section 38(8) of the NHRA.

1.5 Structure of the HIA Report

The remainder of the report is structured as follows:

Chapter	Description
2 -	Summarises listed activities as per GN R 983, GN R 984 and GN R 985 for which Environmental Authorisation will be required, and that may result in heritage impacts.
3 -	Provides the details and relevant expertise of the specialist involved in the compilation of this report.
4 -	Outlines the aims and objectives of the specialist heritage study.
5 -	Describes the methodology employed in the data collection and impact assessment.
6 -	Identifies the specific constraints and limitations of the HIA.
7 -	Provides an update of the baseline cultural landscape.
8 -	Considers the real and potential sensitivities of the cultural landscape in relation to the various alternatives under consideration in this assessment.
9 -	Outlines identified impacts and assess the intensity of predicted heritage impacts.
10 -	Categorises cumulative impacts on the cultural landscape that may manifest due to various existing and proposed developments in the local study area.
11 -	Highlights potential unplanned events and low risks that may manifest as potential future impacts.
12 -	Examines the identified heritage impacts against the sustainable socio-economic benefits of the Project.
13 -	Provides a summary of the heritage inputs into the EMP.
14 -	Summarises the Stakeholder Engagement Process (SEP) that has taken place to date with specific reference to the heritage.
15 -	Collates the most salient points of the heritage assessment and concludes with the specific outcomes and recommendations of the study.
16 -	Lists the source material used in the development of the report.

2 Listed Activities

When proposed activities exceed thresholds encapsulated in the EIA Regulations, 2014, EA for the Project is required. For this project, specific reference is made to GN R 984 and 985.



The regulatory HRM process is in turn required when thresholds contained in in Section 38(1) of the NHRA area exceeded, as well as in terms of Section 38(8) of the NHRA when impact assessments are required as part of EA's.

A summary of the relevant activities are presented in Table 2-1.

Table 2-1: Listed Activities and NHRA Activities

Name of Activity	Extent of the activity	Listed Activity	Applicable EIA Listing Notice	NHRA Activity
Coal Mining (Bord and Pillar)	6714 ha	X – Activity 17	GN R 984	Section 38 (1)(c) any development or other activity which will change the character of a site – (i) exceeding 5 000 m ² in extent; and 38 (8)
Site Clearance (boxcut, roads and infrastructure placement)	37 ha – combined area	X – Activity 27 X – Activity 12	GN R 983 GN R 985	
Development of haul/access roads	15 291 m – combined length	X – Activity 24	GN R 983	Section 38 (1)(a) – the construction of a road, wall, power line, pipeline, canal or similar form of linear development or barrier exceeding 300 m in length; and 38 (8)
Establishment of incline ventilation shafts	Per mining area: 2 x incline shafts – 0.5 ha and 1x ventilation shaft – 0.25 ha	X - Activity 17 X – Activity 12	GN R 984 GN R 985	Section 38 (1)(c) any development or other activity which will change the character of a site – (i) exceeding 5 000 m ² in extent; and 38 (8)
Establishment of offices, workshop, change house, silo bins, security fencing	43 ha – combined area	N/A	Not Listed	
Diesel generator set	104 m ² – combined area	X – Activity 2	GN R 983	
Crushing and Screening Plant	0.4 ha – combined area	X – Activity 21	GN R 984	
Sewage Treatment Plant	44 m ² – combined area	X – Activity 25	GN R 983	
Water Treatment Plant	44 m ² – combined area	N/A	Not listed	



Name of Activity	Extent of the activity	Listed Activity	Applicable EIA Listing Notice	NHRA Activity
Stockpiling	Topsoil – 9 ha combined area Overburden Stockpile – 3 ha combined area Product Stockpile – 74 ha combined area	X – Activity 6 X - Activity 17	GN R 984 GN R 984	
PCD	3 x 0.6 ha	X – Activity 6	GN R 984	
Water pipelines	2 300 m – combined length	X – Activity 9	GN R 983	Section 38 (1)(a) – the construction of a road, wall, power line, pipeline, canal or similar form of linear development or barrier exceeding 300 m in length; and 38 (8)
Mine dewatering	To be confirmed	X – Activity 6	GN R 984	Section 38(8)
Storage of fuel	732 m ² – combined area	X – Activity 4	GN R 984	Section 38 (1)(c) any development or other activity which will change the character of a site – (i) exceeding 5 000 m ² in extent; and 38 (8)
Generation and temporary storage of waste (hazardous and general)	To be confirmed	N/A	GN R 921	Section 38(8)
Overland conveyor	3 196 m	X – Activity 17 X – Activity 7 X – Activity 8	GN R 984 GN R 984 GN R 985	Section 38 (1)(a) – the construction of a road, wall, power line, pipeline, canal or similar form of linear development or barrier exceeding 300 m in length; and 38 (8)



Name of Activity	Extent of the activity	Listed Activity	Applicable EIA Listing Notice	NHRA Activity
Rehabilitation of Project area	37 ha	N/A	Not Listed	Section 38 (1)(c) any development or other activity which will change the character of a site – (i) exceeding 5 000 m ² in extent; and 38 (8)

3 Specialists Expertise

The relevant expertise of the specialist involved in the HRM process are summarised in Table 3-1.

Table 3-1: Expertise of specialists⁵

<p>Justin du Piesanie ASAPA Member 270 ICOMOS Member 14274</p>	<p>Justin holds the position of Heritage Management Consultant: Archaeologist at Digby Wells, after joining the company in August 2011. 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. Justin is a professional member of the Association of Southern African Professional Archaeologists (ASAPA), and accredited by the association's Cultural Resources Management (CRM) section. He is also a member of the International Council on Monuments and Sites (ICOMOS), an advisory body to the UNESCO World Heritage Convention. He has over 10 years combined experience in 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 IFC requirements such as Performance Standard 8: Cultural Heritage.</p>
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⁵ Please refer to Appendix A for the Curriculum Vitae of the relevant specialists.



Johan Nel ASAPA Member 095 ICOMOS Member 13839	Johan is the manager of the HRM unit. He joined Digby Wells in June 2010 as an archaeologist and was subsequently made unit manager of the HRM unit in the Social Department. Johan holds an Honours degree in Archaeology from the University of Pretoria. He is a professional member of the ASAPA, and accredited by the association's CRM section. He is also a member of the ICOMOS. He has more than 17 years' experience in undertaking HRM projects, including archaeological mitigation and grave relocation. Johan has diverse international HRM experience in various African countries including Botswana, the Democratic Republic of Congo, Liberia, Sierra Leone and South Africa. This experience includes archaeological surveys, excavations, community consultation and grave relocations completed to IFC and other international standards. He has also acted as an expert reviewer of HRM projects undertaken in, amongst other countries, Malawi and Tanzania. Johan's present focus at Digby Wells is to develop the HRM unit into an integrated vehicle for assessing impacts on heritage resources through multidisciplinary approaches, following international HRM principles and standards.
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4 Aims and Objectives

The primary aim of this HIA report was to furnish the responsible Heritage Resources Authorities (HRAs), in this instance SAHRA and MPHRA, with details regarding the location, nature and extent of the Project, and the possible impacts to the identified heritage resources. The specific objectives of the HIA report in terms of Section 38(3) of the NHRA were to enable SAHRA and MPHRA to:

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

5 Methodology

This section describes the methods used to compile the HIA report. The following activities were completed:

- Defining study areas;
- Data collection;



- Determining CS and field ratings of identified heritage resources;
- Assessing risk and potential impacts to identified heritage resources; and
- Decisive consideration of management and mitigation measures in relation to prescribed minimum standards.

5.1 Defining Study Areas⁶

Three concentric study areas were defined for the purposes of this assessment:

- A **primary study area** comprising the Project's physical development footprint. It is anticipated that this will be where heritage impacts are most probable.
- A **site specific study area**, comprising the Project boundary, including any exclusion zones, servitudes and other operational boundaries.
- A **local study area** comprising the applicable local municipality and include the land and properties adjacent to and surrounding the Project area. In this instance, the local study area is roughly bounded by four major towns, to the north, south, east and west. These towns are Emalahleni (*North*), Bethal (*South*), Carolina (*East*) and Kriel (*West*).

In the context of this report, the defined areas also informed the CS of the cultural landscape and identified heritage resources. In turn, CS influenced the predicted intensities of heritage impacts, field ratings and consequent minimum required heritage resources mitigation and management measures.

5.2 Data Collection

Secondary and primary data were collected to develop a cultural heritage baseline profile of the study areas under consideration.

5.2.1 Secondary Data Collection

A survey of diverse information repositories was made to identify relevant information sources. These sources 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 Project is located; and
- Identify any potential fatal flaws, sensitive areas, current social complexities / issues and known or possible tangible heritage.

⁶ The various study areas were defined and motivated within the HSR. This section provides an abridged summary of the defined study areas.

Repositories that were surveyed included the South African Heritage Resources Information System (SAHRIS), online / electronic journals and platforms, and certain internet sources⁷.

5.2.2 Primary Data Collection

Two pre-disturbance surveys were completed for the Project. The initial survey was over a three-day period from 15 – 17 March 2016, completed by Johan Nel and Justin du Piesanie. The survey focussed primarily on undisturbed areas, outcrops and watercourses within the site-specific study area. The second survey was completed on 23 May 2016 by Justin du Piesanie on Oranjevallei 201 IS to assess areas within the primary and site-specific study area where access was previously denied.

The surveys were a non-intrusive (i.e. no sampling was undertaken). The survey was pedestrian in primary study areas (i.e. development footprints) and vehicular based outside of defined development areas to cover as much of the extent of the site-specific study area in the time allotted. The objectives of the pre-disturbance survey were to:

- Record visually the current state of the cultural landscape;
- Ground truth certain heritage resources and sites identified through the literature; and
- Record a representative sample of visible tangible heritage resources present within the secondary study area.

Identified heritage resources were recorded as waypoints using handheld GPSs and documented through written and photographic records. The actual surveys were recorded as track logs.

5.3 Developing Cultural Significance and Field Ratings

5.3.1 Cultural Significance

CS was determined based on identified resources' importance or contribution to four broad value categories: aesthetic, historical, scientific and social values. These categories summarised the CS and other values described in Section 3(3) of the NHRA. The resources' importance or contributions to these values were considered in terms of associative (qualitative) and / or rarity (quantitative) attributes, based on collected secondary data. The results were collated into the cultural heritage baseline profile reported on in the HSR and under Section 7 below.

The integrity or condition of resources further influenced the CS. Integrity is largely determined based on resources' current, observed state of conservation, as well as notable changes made to it over the years.

⁷ A comprehensive reference list is provided as part of the HSR under Section 13. Information sources used in the compilation of this report are appropriately referenced under Section 16.



5.3.2 Field Ratings

Field ratings assist the responsible heritage resources authority to grade heritage resources into national (Grade I), provincial (Grade II) or local (Grade III) categories, and are required under Chapter II Section 7(J) of the SAHRA Archaeology, Palaeontology and Meteorites (APM) Guidelines.

Field ratings considered the assigned CS and the level of official management required or the local competency of heritage authorities⁸.

5.4 Impact Assessment

Impacts on heritage resources can broadly be divided into three categories – direct, indirect and cumulative⁹. The assessments of these impacts are done by assigning a numerical value to the significance of the identified impacts.

The assessment of impacts inherently considered the CS and field ratings. The consequence of the potential impact was weighted against parameters of intensity, spatial scale and duration. To identify the significance of the impact, the consequence was measured against the probability of the impact occurring.

The magnitude of the potential impact was applied to both pre- and post-mitigation scenarios with the aim of removing all negative impacts on heritage resources, and enhancing positive ones.

5.5 Risk versus Impact

Risk is defined as the potential consequence(s) of an interaction combined with its likelihood. Should a risk eventuate, it will manifest as an impact. These concepts are often misconstrued and lead to disproportionate amounts of effort spent on assessing minor risks with potentially insignificant impacts, at the cost of overlooking more important ones.

Broad mitigation and monitoring measures were provided for low risks and unplanned events¹⁰, however, they **were not assessed in detail** (i.e., with impact significance ratings). In general, monitoring is an accepted form of mitigation for low risks.

5.6 Management and Mitigation Measures

Recommended management and mitigation measures are guided by the General Principles encapsulated in the NHRA, and the SAHRA Minimum Standards (SAHRA, 2007). Minimum required mitigation measures are intrinsically based on the CS of heritage resources and the

⁸ Currently the MPHRA is only competent to manage and issue permits on NHRA Section 34 heritage resources, and no local (i.e. local government) competency exists within the province. All decisions relating to archaeology, palaeontology and burial grounds and graves therefore fall under the ambit of SAHRA.

⁹ Detailed definitions of the types of impacts are presented under Section 6.2 of the HSR and not repeated here for the sake of brevity.

¹⁰ Refer to Section 0 for an assessment of unplanned events and low risks.

intensity of predicted impacts on such resources. Mitigation measures are grouped into two types:

- Project-related mitigation - requires changes or amendments to project design, planning and siting of infrastructure; and
- Mitigation of heritage resources - where project-related mitigation will not sufficiently reduce or remove impacts, resources need to be mitigated to ensure that they are fully recorded, documented and researched before any negative change occurs.

6 Constraints and Limitations

The following constraints and limitations were experienced as part of the compilations of this report:

- Historical aerial imagery does not cover the site-specific or primary study area as defined, therefore the changes to the landscape through time could not be identified, nor the relative age of identified built structures;
- Given the large areal extent of the site-specific study area, the nature of the Project (*i.e. primarily underground mining with limited surface infrastructure*) comprehensive, transect pedestrian survey of the site-specific study area's extent was not completed. The pre-disturbance surveys were limited to the areas earmarked for proposed surface infrastructure construction and other surface disturbances. In addition to these areas, natural landscape features with known heritage potential were also surveyed in detail, such as rock outcrops or shelters; and
- The inherent nature of many heritage resources, *i.e.* occurring at sub-surface levels with no or limited trace evidence on the surface, highlights the potential of subsurface occurrences. To investigate these occurrences, permits regulated under Section 35 of the NHRA are required. No permits were held by the specialists, and as such, it is possible that archaeological sites may be identified during the construction phase of the project.

7 Updated Baseline Environment¹¹

The updated cultural baseline environment considered the predominant landscape based on identified heritage resources within the local and site specific study area (Figure 7-1 and Figure 7-2). The tangible cultural landscape is predominantly associated with a historical, agrarian landscape, with a significant palaeontological¹² and archaeological component.

¹¹ A detailed description of the cultural heritage baseline is presented under Section 8 in the HSR and is not repeated here. The updated baseline presents a brief summary of the most salient points contained within the baseline description relevant to the assessment of potential impacts to heritage resources.

¹² Refer to Section 8.1.1 and 8.2.1 in the HSR, and Appendix C for information pertaining to the palaeontological context of the study area.



Archaeologically, identified heritage resources are primarily associated with the Later Stone Age (LSA). The LSA dates from approximately 40 000 years ago (kya) to the historical period. Lithics associated with the LSA are specialised: specific tools being created for specific purposes, and the inclusion of bone tools into the assemblages (Mitchell, 2002). LSA sites commonly contain diagnostic artefacts, such as microlithic scrapers and segments. In a southern African context, the LSA is closely associated with hunter-gatherer groups, such as the San. Due to the nomadic nature of LSA people, open sites are difficult to identify and usually poorly preserved. In addition to the production of LSA lithics, this period is characterised by evidence of ritual practises and complex societies, as well as rock art (Deacon & Deacon, 1999).

Identified rock art panels in the site specific study area are representative of LSA fine line and finger painting traditions associated with hunter-gatherer and pastoralist groups respectively. Hunter-gatherer rock art was produced using fine brushes, quills or sticks predominantly done in red, white and black, and more rarely bichrome and polychrome. Realistic and proportionally correct animals such as various antelope species are often found. In addition, human figures and more symbolic beings are also represented (Eastwood, van Schalkwyk, & Smith, 2002).

In contrast, pastoralist rock art is typified by predominantly finger-painted geometric images. Initially identified by Ben Smith and Sven Ouzman, the tradition extends in linear bands following the proposed migration routes of the pastoralists from southern Angola/western Zambia to the southern Cape (Smith & Zubieta, 2007). The geometric designs are composed entirely of circles, finger lines, finger dots, and handprints that are mostly painted in red pigment, sometimes in red and white, and occasionally only in white (Eastwood, van Schalkwyk, & Smith, 2002; Smith & Zubieta, 2007).

While these tangible heritage resources have been identified in the site-specific study area¹³, the landscape is dominated by heritage resources from the historical period identified by farmsteads / werfs and burial grounds. Historically, the Boers moved into the region from approximately the late 1840's. The influx of this group created tensions between themselves and the local Swazi and Pedi groups, which culminated in conflict. Subsequent to the initial influx of Boers into the region, tension between the *Zuid Afrikaansche Republiek* (ZAR) and the British increased through time, culminating in the South African War of 1899 – 1902 (also known as the Second Anglo-Boer War). Significantly in this region, the Boers enlisted the help of the San hunter-gatherers to help monitoring the movement of the British (Jones, 1999; Delius & Cope, 2007; Anonymous, 2013).

After the war, the region continued predominantly as an agrarian landscape with the working of farms and establishment of farmsteads recorded has the historical built environment.

¹³ It is important to note that no heritage resources were identified within the primary study area, i.e. the proposed development footprint of surface infrastructure for the Project.

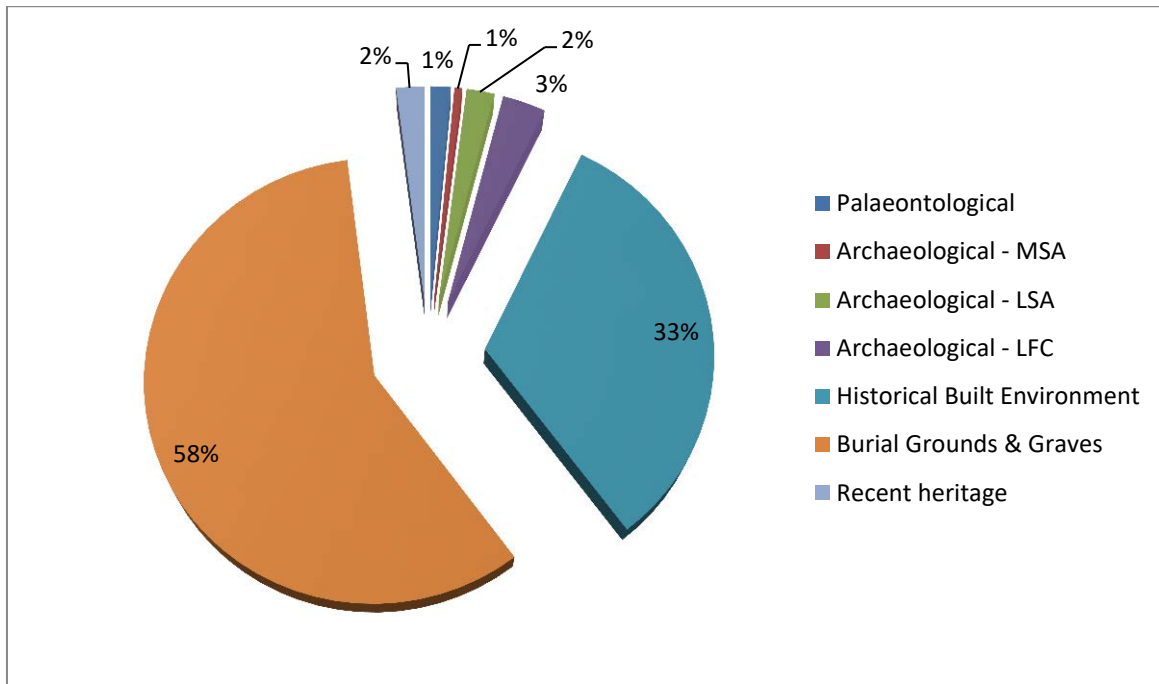


Figure 7-1: Breakdown of known heritage resources in the local study area

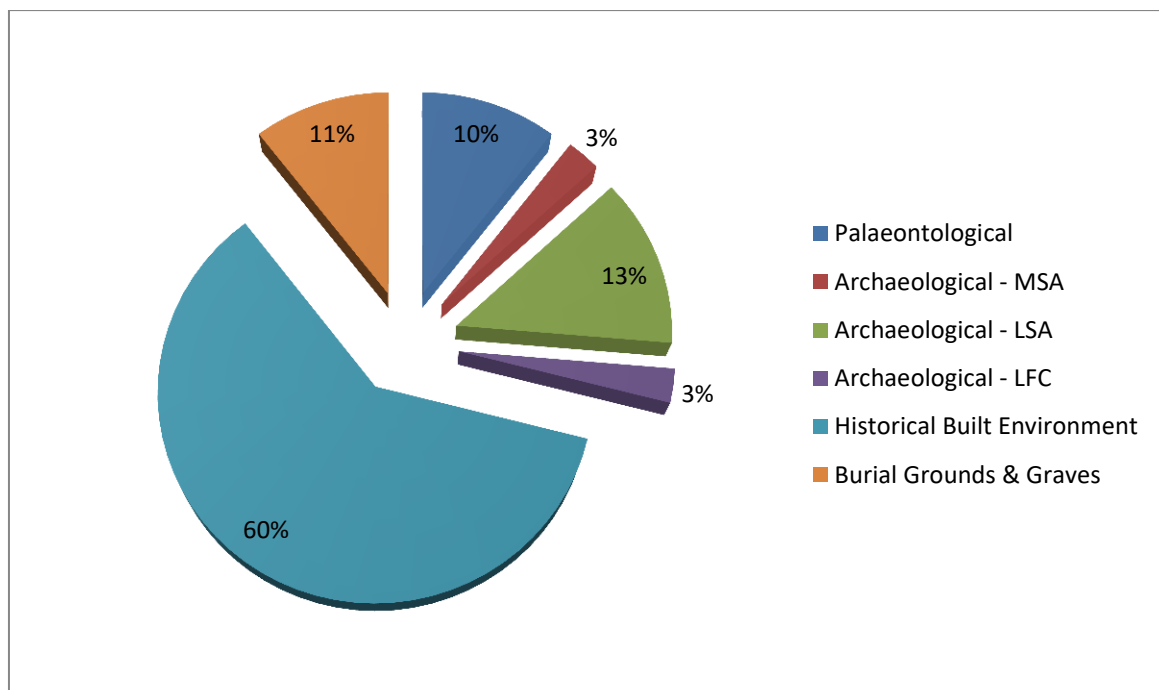


Figure 7-2: Breakdown of known heritage resources in the site-specific study area



Identified heritage resources attest to the pre-dominantly agrarian landscape described. A summary of the heritage resources within the site-specific study areas is presented in Table 7-1. No heritage resources were identified in the primary study area, i.e. proposed development footprint. However, as noted in Section 6 above, heritage resources commonly occur at sub-surface levels with no or limited trace evidence on the surface, thereby increasing potential of unidentified heritage resources to be exposed through the life of the Project.

Table 7-1: Identified heritage resources in the site-specific study area

Heritage Resource Type	Site Name	Description Detail
Archaeological - MSA	1722/S.35-014	Single stone flake
Archaeological - LSA	1722/S.35-015	Rock Art - San
	1722/S.35-019	Rock Art - Finger Painted, red lines. Possible deposit with LSA microlith
	1722/S.35-029	Rock art/graffiti
	RA-001	Rock art comprising a panel with very faded images including humans and antelope. Antelope may represent eland (yellow pigment) and hartebeest or tsessebe (red pigment). Humans painted in reddish-brown pigment. Site is situated in a low shelter, fronted by black wattle (<i>Acacia mearnsii</i>) and blue gum (<i>Eucalyptus</i> sp.) bush. Active decay (exfoliation) evident.
	RA-002	Rock art comprising a panel with very faded images including antelope. Site is situated in a low shelter, fronted by wattle and eucalyptus. Very active decay (exfoliation) evident.
Archaeological - LFC	1722/S.35-013	Grinding area in sandstone outcrop. <i>Isifuba</i> game engraved into sandstone. Some historic glass found
	LFC-001	Remnants of at least three hut foundations. No other surface features identified associated with the site. Potential to be associated with historic farm labourer settlement.
Burial Grounds & Graves	1722/S.36-017	Informal cemetery - 1 with formal dressing, Bhesy Johanna Mpila, died 1973. Total of 22 graves.
	BGG-001	Burial ground containing at least 17 graves. Two graves have concrete slabs with rocks as headstones. Remainder either ferricrete cairns or with rock headstones.



Heritage Resource Type	Site Name	Description Detail
	BGG-002	Burial ground containing at least eight graves, associated with an occupied werf.
	BGG-005	Burial ground containing at least 27 graves. Two graves with formal dressings and headstones associated with Lekgari and Marazwani families. Remainder stone cairns or rocks as headstones.
	BGG-006	Burial ground containing at least 6 graves, four with headstone but no inscription, and two with concrete surface dressing.
Historical Built Environment	1722/S.34-030	Stonewall in between a sandstone ridge and a sandstone outcrop; and a metal fragment and fence post on the sandstone ridge
	1722/S.35-018	Stone walled enclosures amongst sandstone outcrop. 30m apart
	Ste-003	Structural remains identified through recent aerial imagery. Relative age not determined
	Wf-001	
	Wf-002	
	Wf-004	
	Wf-005	
	Wf-006	
	Wf-007	
	Wf-008	
	Wf-009	Abandoned werf comprising a residence, cow shed and several other structures such as troughs, broken down pens and water tank structure. Residence is constructed of clay brick, cinder blocks and dressed sandstone, with a corrugated roof. Building U-shaped with additions to back.
	Wf-010	Structural remains identified through recent aerial imagery. Relative age not determined
	Wf-011	
	Wf-012	
	Wf-013	
	Wf-014	
Wf-015		
Wf-016		



Heritage Resource Type	Site Name	Description Detail
	Wf-017	
	Wf-018	
	Wf-019	
	Wf-020	
	Wf-021	
Palaeontological	1722/S.35-034	Fossilised <i>Breytenia</i> on a flat sandstone outcrop
	1722/S.35-035	Fossilised plant leaf on a flat sandstone outcrop
	1722/S.35-036	Fossilised <i>Breytenia</i> on a flat sandstone outcrop
	1722/S.35-040	Fossil plant on a sandstone ridge

8 Sensitivity Analysis and Consideration of Alternatives

As part of the Scoping Phase of the Project, environmental sensitivities were identified for the various environmental and social aspects considered alongside the proposed development footprint¹⁴. The identified sensitivities were plotted against the initial infrastructure site layout and conveyor and road routing options. Based on the results of the various specialist findings, the initial proposed development footprint was amended to reduce significant negative impacts to the current environment and associated aspects.

As discussed in Section 7 above, the study area is predominantly associated with an historic agrarian landscape, with a significant palaeontological and archaeological component. Within the local study area, tangible palaeontological and archaeological resources are commonly associated with natural features observed on the surface. These include but are not limited to:

- Pans;
- Water courses and riparian features;
- Natural rock outcrops; and
- Rock shelters.

Resources associated with an agrarian landscape are associated with the historic built environment (i.e. werfs) and burial grounds and graves. Within the local and site specific study area, these resources are fairly well distributed throughout the landscape.

This section provides a consideration of the following alternatives against the identified heritage sensitivities:

¹⁴ Refer to Section 9 Item(2)(h)(i) of the Scoping Report



- Initial site layout and routing options, i.e. development footprint;
- Updated development footprint; and
- “No-go” option, i.e. maintenance of current *status quo*.

The suitability of the various alternatives considered was subjected to a multi-criteria decision analysis (MCDA) utilising a simple linear additive evaluation model. In this instance, the suitability was considered against the following criteria:

- The level of existing anthropogenic disturbance of the various development footprints that will reduce the likelihood of identifying *in situ* heritage resources;
- Potential for occurrence of unidentified heritage resources, both on the surface and at sub-surface levels, in the development footprint that may be impacted upon;
- If heritage resources occur within or in proximity to the development footprint and may be impacted upon; and
- The potential that permitting requirements may be applicable if EA of the development footprint is approved.

These criteria were rated on a scale from 1 (unsuitable) to 5 (most suitable) to quantifiably compare the suitability of the various alternatives. Once the ratings were determined against the criteria above, these were calculated to determine the overall suitability ranking of the proposed infrastructures. The results of this assessment are presented in Table 8-1 and described in the narrative below.

Table 8-1: Consideration of alternatives rating

Alternatives	Criteria 1	Criteria 2	Criteria 3	Criteria 4	Rating	Designation
Initial Development Footprint	4	2	2	2	3	Negligible / Insignificant
Updated Development Footprint	4	4	5	4	4	Suitable

**Table 8-2: Rating definitions**

Rating	
Score	Definition
5	Most suitable
4	Suitable
3	Negligible / insignificant
2	Less suitable
1	Unsuitable

The proposed site-specific study area has been subject to anthropogenic changes through time through the establishment of agricultural fields, both historically and more recently. However, the cultural landscape as discussed in Section 7 above indicates a significant palaeontological and archaeological component. Heritage resources associated with these categories inherently occur at sub-surface levels and may be exposed through ground moving activities during the construction phase.

The comparison of the proposed alternatives against the defined criteria to assess the suitability is presented in Table 8-3. This comparison considered the proposed mining methods and placement of the various surface infrastructures.

Table 8-3: Comparison of the alternate development footprints

Criteria	Initial development footprint	Updated development footprint
1	4 – Suitable Large tracks of the development footprint have been subject to anthropogenic disturbance through time. Anthropogenic disturbance has been recorded as primarily agrarian, i.e. historic and recent agricultural fields that have removed all trace surface evidence of heritage resources	4 – Suitable Large tracks of the development footprint have been subject to anthropogenic disturbance through time. Anthropogenic disturbance has been recorded as primarily agrarian, i.e. historic and recent agricultural fields that have removed all trace surface evidence of heritage resources
2	2 – Less suitable Initial routing options traversed more natural features known to have a higher potential of containing palaeontological and archaeological heritage resources, such as water courses and riparian features.	4 – Suitable Development footprint design was amended to reduce the potential of negative impacts to identified sensitivities, including natural features known to have a high potential of containing palaeontological and archaeological resources.



Criteria	Initial development footprint	Updated development footprint
3.	2 – Less suitable Proposed siting of infrastructure was in proximity to identified heritage resources and may have negatively impacted upon these resources	5 – Most suitable The updated development footprint has been amended to avoid known heritage resources and remove potential negative impacts through the establishment of infrastructures
4.	2 – Less suitable There is higher potential for exposing previously unidentified palaeontological and archaeological heritage resources as routing options traverse more natural features - Permitting requirements may be required in the event of accidental exposure of previously unidentified heritage resources	4 – Suitable There is lower potential for exposing previously unidentified heritage resources as routing options have been amended to reduce exposure to natural features known to have a high potential of containing palaeontological and archaeological heritage resources - Permitting requirements may be required in the event of accidental exposure of previously unidentified heritage resources

The analysis of the suitability of the alternative development footprint options indicates that the updated development footprint is the more suitable alternative from a heritage perspective.

The final alternative consideration for the proposed Project is the ‘no-go’ option, where the development is not undertaken, and the current *status quo* remains intact. At this stage, however, the envisaged economic benefits of the proposed development, including the potential increased skills development, job opportunities, practical use of coal for electricity production into the national grid, and the potential economic development, are high. In light of the proposed mining methodologies, and limited surface disturbance, the potential negative impacts of the project are outweighed by the potential positive benefits.

9 Impact Assessment

This section presents the assessment of the CS of identified heritage resources and the potential impacts to these based on the project specific activities.

9.1 Cultural Significance

The CS of identified heritage resources were determined following the methodology presented in Section 5.3.1 above to assist in providing appropriate management and mitigation measures in accordance with the published SAHRA minimum standards.

Some heritage resources within the site-specific study area were previously identified in a HIA report submitted and approved by SAHRA under Case ID: 1722 (du Piesanie & Nel,



2013). These resources descriptions are summarised in Table 7-1 and their assigned CS ratings presented in Table 9-1.

Table 9-1: CS ratings of identified resources as per du Piesanie & Nel, 2013 (Case ID: 1722)

Heritage Resource Type	Site Name ¹⁵	Significance Rating
Burial Grounds and Graves	1722/S.36-017	Very high
Palaeontological	1722/S.35-034	
	1722/S.35-035	
	1722/S.35-036	
	1722/S.35-040	
Archaeological – LSA	1722/S.35-015	Medium
	1722/S.35-019	
	1722/S.35-029	
Archaeological – MSA	1722/S.35-014	Negligible
Archaeological – LFC	1722/S.35-013	
Historical Built Environment	1722/S.34-030	
	1722/S.35-018	

The assessment of CS indicated that heritage resources designations range from very high to negligible. The assessment for the newly identified heritage resources as part of this report is summarised in Table 9-2.

¹⁵ Refer to Table 7-1 for a description of the identified resources (du Piesanie & Nel, 2013).

Table 9-2: CS assessment for identified heritage resources

Resource ID	Aesthetic	Historic	Scientific	Social	INTEGRITY	VALUE	Designation	Recommended Field Rating
Burial grounds and graves	- Burial grounds and graves were not assessed against aesthetic criteria as defined in Section 3(3) of the NHRA	- Burial grounds and graves were not assessed against historic criteria as defined in Section 3(3) of the NHRA	- Burial grounds and graves were not assessed against scientific criteria as defined in Section 3(3) of the NHRA	5 Burial grounds and graves have specific connections to communities or groups for spiritual reasons. The significance is universally accepted	4 The integrity of burial grounds is considered to be excellent with both tangible and intangible fabric preserved.	20	Very High	Grade III A

Resource ID	Aesthetic	Historic	Scientific	Social	INTEGRITY	VALUE	Designation	Recommended Field Rating
Rock Art Sites	5 Bushmen and Khoi rock art in the region is not widespread. It is a regional expression that needs to be considered in context of southern African rock art heritage.	5 These sites provide tangible evidence for Bushmen and Khoi groups that contribute to understanding patterns in the country's history.	5 Identified sites display principles characteristics that can yield information to contribute to understanding of associated heritage aspects.	- The rock art sites were not assessed in terms of social value.	3 The integrity of the identified sites is considered to be good, with the fabric preserved and good information potential. There is limited encroachment.	15	High	Grade II ¹⁶

¹⁶ Notwithstanding that the MPHRA has not been assessed competent to manage NHRA Section 35 heritage resources, rock art in Mpumalanga should be considered as important provincial heritage resources; the Grade II Field Rating therefore aims to highlight the importance of these resources and the required management thereof.

Resource ID	Aesthetic	Historic	Scientific	Social	INTEGRITY	VALUE	Designation	Recommended Field Rating
LFC Site	- The LFC site was not assessed against aesthetic criteria	1 The LFC site within this agrarian landscape and region of South Africa and considered common and well represented	1 The LFC is not unique and provides limited information potential that can contribute to an understanding of unique principle characteristics	3 The LFC site may have some specific significance to farming communities within the local study area	2 The fabric of the site is preserved and the meaning is evident.	3	Negligible	General Protection IV C



Resource ID	Aesthetic	Historic	Scientific	Social	INTEGRITY	VALUE	Designation	Recommended Field Rating
Werfs	- Werfs were not assessed against aesthetic criteria as defined in Section 3(3) of the NHRA as they were primarily identified via aerial survey.	1 These types of sites are considered common and well represented throughout diverse landscapes.	1 The identified werfs are not uncommon and do not display any unique principle characteristics	3 The werfs may have specific significance to the farming community within the region.	2 The fabric of the werfs is preserved, but alterations and additions through time have reduced the integrity. The meaning remains evident.	3	Negligible	General Protection IV C



9.2 Activities Assessed

The activities considered as part of this assessment are related to the Listed Activities outlined in Table 2-1. The specific project activities assessed for the project have been summarised in Table 9-3.

Table 9-3: Description of activities to be assessed

Project Phase	Project Activity	Project Structures	Relevance to the HIA
Construction	Site Clearance	<ul style="list-style-type: none"> Topsoil Stockpiles 	Potential direct impact to unidentified heritage resources protected under Sections 34 – 36 of the NHRA
	Blasting and Excavation	<ul style="list-style-type: none"> Two Shafts per mining right area 	Potential direct impact to identified and unidentified heritage resources protected under Section 34 – 36 of the NHRA
	Construction of Surface Infrastructure	<ul style="list-style-type: none"> Crushing and Screening Plant Mine Offices Change House Workshop Overburden and Product Stockpiles Site Fencing Access and Service Roads (with weighbridge) Overland Conveyor Sewage Treatment Plant Three Pollution Control Dam Water Treatment Plant Diesel Storage Tanks Ventilation Shaft per mining right area 	Potential direct impacts to unidentified heritage resources protected under Sections 34 – 36 of the NHRA
	Water Abstraction and Use	<ul style="list-style-type: none"> Water Tanks and Pipes 	
	Waste Generation and Disposal	<ul style="list-style-type: none"> Waste Skips 	N/A
	Power Generation	<ul style="list-style-type: none"> Diesel Generator 	N/A



Project Phase	Project Activity	Project Structures	Relevance to the HIA
Operation	Underground Blasting and Mining	<ul style="list-style-type: none"> Heavy Machinery and Equipment 	Potential indirect impacts to identified and unidentified heritage resources protected under Sections 34 – 36 of the NHRA
	Stockpiling	<ul style="list-style-type: none"> Waste Rock Berms Product Stockpile 	Potential direct impact to identified and unidentified heritage resources protected under Section 34 – 36 of the NHRA
	Hauling/Conveying of Coal	<ul style="list-style-type: none"> Overland Conveyor Belt Haul and Access Roads 	Increased risk of damage to identified and unidentified heritage resources protected under Sections 34 – 36 of the NHRA
	Plant and Equipment Operations	<ul style="list-style-type: none"> Crushing and Screening Plant Silo Bins Workshop and Diesel Storage Tanks 	N/A
	Water Use and Storage	<ul style="list-style-type: none"> PCD and Jo Jo Tanks 	N/A
	Waste Generation and Storage	<ul style="list-style-type: none"> Sewage Treatment Plant Waste Skips 	N/A
	Power Generation	<ul style="list-style-type: none"> Diesel Generator 	N/A
Decommissioning and Closure	Removal of infrastructure and surface rehabilitation	<ul style="list-style-type: none"> Crushing and Screening Plant Mine Offices Change House Workshop Overburden and Product Stockpiles Site Fencing Access and Service Roads (with weighbridge) Overland Conveyor Sewage Treatment Plant Three Pollution Control Dam 	Where surface infrastructure is older than 60 years at the time of decommissioning, possible permitting requirements for structures protected under Section 34 of the NHRA may be applicable.

Project Phase	Project Activity	Project Structures	Relevance to the HIA
		<ul style="list-style-type: none"> ▪ Water Treatment Plant ▪ Diesel Storage Tanks ▪ Ventilation Shaft per mining right area 	
	Waste Generation and Disposal	<ul style="list-style-type: none"> ▪ Waste Skips 	N/A

9.3 Impact Assessment

As previously stated under Section 7 above, no heritage resources were identified within the Project's primary study area, i.e. development footprint. Therefore, this section considers the potential impacts to identified heritage resources as presented in Table 7-1, by relevant project related activities summarised in Table 9-3 only. The *potential* impacts to *unidentified* heritage resources are considered under Section 11 below.

Heritage resources with a negligible CS designation have furthermore been excluded from additional assessment as these resources have been sufficiently recorded and require no further mitigation¹⁷ based on the definitions as presented in the SAHRA Minimum Standards (SAHRA, 2007).

9.3.1 Construction Phase

The construction phase of a Project presents the greatest likelihood for direct negative impacts on heritage resources to manifest. This section considers the potential negative impacts on heritage resources during the construction for the specific activities. The identified activities, impacts, and management are discussed separately below.

9.3.1.1 Applicable Project Activities Assessed

Construction activities that may have a direct negative impact on identified heritage resources include:

- Blasting and excavation; and
- Construction of surface infrastructure.

9.3.1.2 Impact Description

A summary of the relevant activities, interactions and potential impacts are presented in Table 9-4.

¹⁷ This does not preclude any requirements that may be applicable to heritage resources afforded general protection in terms of Section 34 of the NHRA



Table 9-4: Activities, interactions and potential impacts to heritage resources during the construction phase

Activity	Interaction	Potential Impact
Blasting and excavation	Vibrations	<p>Vibrations created through blasting may affect the integrity of rock art sites through structural damage to shelters, i.e. cracks or collapse. Furthermore, surface dressing of burial grounds and graves, may be damaged through intense or repetitive vibrations.</p> <p>Sites include:</p> <ul style="list-style-type: none"> ▪ 1722/S.35-014 ▪ 1722/S.35-015 ▪ 1722/S.35-019 ▪ 1722/S.35-029 ▪ RA-001 ▪ RA-002
	Dust generation	<p>Dust generation created during construction may affect the integrity of rock art sites, altering the current <i>status quo</i>.</p> <p>Sites include:</p> <ul style="list-style-type: none"> ▪ 1722/S.35-014 ▪ 1722/S.35-015 ▪ 1722/S.35-019 ▪ 1722/S.35-029 ▪ RA-001 ▪ RA-002
	Loss of or restricted access during blasting activities and through fencing of Project infrastructure areas.	<p>Degradation of the intrinsic CS of burial grounds and graves associated with living heritage.</p> <p>Sites include:</p> <ul style="list-style-type: none"> ▪ 1722/S.36-017 ▪ BGG-001 ▪ BGG-002 ▪ BGG-005 ▪ BGG-006
Construction of surface infrastructure		

9.3.1.3 Management Objectives

The management objectives for the identified potential impacts to heritage resources are:

- To avoid through project related mitigation measures to reduce the intensity of negative impacts in accordance with requirements contained in the SAHRA Minimum Standards¹⁸; or
- To mitigate heritage resources through permitted processes (such as excavations, grave relocations, destruction), where project related mitigation is not possible or feasible.

9.3.1.4 Management Actions and Targets

Heritage related mitigation and management features must be completed in accordance with the minimum levels of mitigation as published in the SAHRA Minimum Standards. For heritage resources with a CS designation of high, the project design must aim to avoid change to a resource, promote at least partial conservation, and included within a Conservation Management Plan (CMP). Here it is recommended that, in the event that EA and a mining right is granted, a specialist Phase 2 assessment of rock art sites be undertaken by qualified rock art specialists to fully record the sites prior to blasting activities. This will enable:

- Detailed documentation of the rock art sites using the latest available technology, i.e. preservation through record; and
- Develop an accurate pre-impact baseline that can be used to adequately monitor any changes.

Burial grounds and graves are considered to intrinsically have a very high CS. Here, in the event that EA and a mining right is granted, mitigation standards require that the resources be conserved *in situ* and included within a CMP. As no burial grounds and graves were identified within the primary study area, i.e. development footprint of surface infrastructure, known burial grounds and graves may be subject to loss of or restricted access. To mitigate against the potential degradation of the intrinsic CS of the resource, the procedure for consultation regarding burial grounds and graves contained in Chapter XI of the SAHRA Regulations (*Burial Grounds and Graves Consultation (BGGC) Process*) must be implemented to identify bona fide Next-of-Kin and affected communities, and reach agreement on the future of the graves. Where the outcomes of this process include agreements for the *in situ* conservation of graves, such agreements must be integrated into a project-specific CMP. Where graves are at risk of direct impacts, or where agreements with identified bona fide Next-of-Kin include relocation, the graves may need to be relocated

¹⁸ It must be noted that these minimum standards serve as a guide, and the recommendations provided in this HIA are project specific.



in accordance with the Application for permit: Burial grounds and graves process contained in Chapter IX of the SAHRA Regulations.

The results of these measures must be included into a project specific CMP to monitor and gauge any potential negative impact to identified heritage resources during the construction and phase of the Project.

The CMP must at a minimum include:

- All identified heritage resources within the site-specific study area;
- Identify all heritage resources within a 100 m buffer of proposed infrastructure and 500 m blasting radius;
- Identify all heritage resources that fall within the underground mining development footprint;
- Have a detailed baseline record of the condition of identified heritage resources;
- Establish a roles and responsibilities matrix;
- Establish a monitoring process and schedule;
- Define conditions and protocols for access; and
- Define the project specific management and monitoring protocol.

The CMP must be defined and established prior to the construction phase of the proposed Project.

9.3.1.5 Impact Ratings

The ratings for pre- and post-mitigation scenarios for the identified impacts as per Table 9-4 are summarised in tables below

Table 9-5: Summary of assessment of the potential loss of integrity of rock art sites

IMPACT DESCRIPTION: Loss of integrity of rock art sites				
Dimension	Rating	Motivation		
<i>Pre-Mitigation</i>				
Duration	Permanent (7)	Although impacts should cease when the Project ends, any damage to rock art panels will be permanent, resulting in loss of integrity that cannot be restored.	Consequence: Extremely detrimental (-20)	Significance: Moderate - negative (-80)



IMPACT DESCRIPTION: Loss of integrity of rock art sites				
Dimension	Rating	Motivation		
Extent	National (6)	Bushmen and Khoi rock art in the region is not widespread. It is a regional expression that needs to be considered in context of southern African rock art heritage; therefore any negative changes to known rock art sites could reduce the number of extant sites in the region, thereby limiting and / or reducing the holistic, national integrity of the rock art expression.		
Intensity x type of impact	Extremely high - negative (-7)	The rock art sites were determined to have high CS, therefore any negative changes to sites must be considered as extremely high.		
Probability	Probable (4)	There is a likelihood that blasting can impact on the integrity of rock art sites, especially recurring blasting and vibrations that can exacerbate inherent weaknesses in the geological formations, causing cracking or collapse of rock shelters.		
Mitigation				
<p>It is recommended that, in the event that EA and mining rights are granted, a specialist permitted (or so-called Phase 2) assessment of rock art sites be done by rock art experts to fully record the sites, prior to any blasting activities. A Phase 2 rock art assessment will enable:</p> <ul style="list-style-type: none"> ▪ Detailed documentation of the rock art, using latest available technology, to enable 'preservation through record' of the sites; and ▪ Develop an accurate pre-impact baseline that can be used to adequately monitor any changes to the rock art sites. <p>In addition, a project-specific Conservation Management Plan (CMP or so-called Phase 3 assessment) for all identified rock art sites must be developed, taking into consideration findings from the specialist Phase 2 assessments.</p>				



IMPACT DESCRIPTION: Loss of integrity of rock art sites				
Dimension	Rating	Motivation		
<i>Post-Mitigation</i>				
Duration	Permanent (7)	Any damage to rock art panels will be permanent, resulting in loss of integrity that cannot be restored	Consequence: Highly beneficial (16)	Significance: Major - positive (112)
Extent	Limited (2)	Detailed monitoring of rock art sites will enable the identification of negative impacts to specific sites. Furthermore, the preservation through record will reduce the intensity of the potential impacts by maintaining a holistic expression of rock art in the region.		
Intensity x type of impact	Extremely high - positive (7)	Given the high CS of rock art, the proposed mitigation measures will enable rock art sites to be monitored in detail, thereby limiting impacts on sites. In the event that the integrity of rock art sites are negatively impacted, the proposed mitigation, especially through Phase 2 assessments, will ensure that these sites are at least 'preserved through record'.		
Probability	Certain (7)	Implementing Phase 2 assessments will create a permanent record of the rock art sites, whilst developing and implementing the CMPs will enable adequate monitoring of sites.		



Table 9-6: Summary of assessment of the potential degradation of CS of burial grounds and graves

IMPACT DESCRIPTION: Degradation of intrinsic CS of burial grounds and graves				
Dimension	Rating	Motivation		
<i>Pre-Mitigation</i>				
Duration	Project Life (5)	The degradation of the intrinsic CS through unconditioned restricted access to burial grounds should only occur during the LoM, and can be restored post-mining.	Consequence: Highly detrimental (-16)	Significance: Major - negative (-112)
Extent	National (6)	A conservative approach, assuming NoK could be distributed throughout South Africa, has been adopted. Any unpermitted changes to burial grounds can at the very least affect descendent communities and possibly result in social and / or legal repercussions that may require intervention by national structures (e.g. SAHRA).		
Intensity x type of impact	High - negative (-5)	Burial grounds are assigned very high CS in addition to be generally protected under the NHRA and other national and provincial legislation. Any unpermitted changes to burial grounds are therefore considered highly negative.		
Probability	Certain (7)	The reduction in intrinsic CS through restricted access is certain to occur during the LoM.		



IMPACT DESCRIPTION: Degradation of intrinsic CS of burial grounds and graves				
Dimension	Rating	Motivation		
Mitigation				
<p>If the Project is awarded EA and mining rights, the <i>Procedure for consultation regarding burial grounds and graves</i> contained in Chapter XI of the SAHRA regulations must be implemented. Where the outcomes of this process include agreements for the in situ conservation of graves, such agreements must be integrated into a project-specific CMP.</p> <p>Where graves are at risk of direct impacts, or where agreements with identified bona fide Next-of-Kin include relocation, the graves may need to be relocated in accordance with the <i>Application for permit: Burial grounds and graves</i> process contained in Chapter IX of the SAHRA Regulations.</p>				
Post-Mitigation				
Duration	Immediate (1)	Implementing Chapter XI of the SAHRA Regulations will enable negotiated agreements with NoK to be reached. The degradation of intrinsic CS through agreed upon conditional access can therefore be eliminated or reduced.	Consequence: Moderately beneficial (12)	Significance: Minor - positive (60)
Extent	National (6)	A conservative approach, assuming NoK could be distributed throughout South Africa, has been adopted. Changes to burial grounds, including approval of CMPs or issuing permits to exhume and relocate contents of graves, will need to be authorised by national, provincial and local authorities.		
Intensity x type of impact	High - positive (5)	If the proposed mitigation measures are implemented, burial grounds will be conserved, access will not be lost, or graves can be relocated to formal cemeteries.		



IMPACT DESCRIPTION: Degradation of intrinsic CS of burial grounds and graves			
Dimension	Rating	Motivation	
Probability	Likely (5)	It is likely that by following the proposed mitigations, nearly all impacts on identified burial grounds can be removed or avoided.	

9.3.2 Operational Phase

9.3.2.1 Project Activities Assessed

Project related activities during the operational phase of the Project generally have limited impacts to identified heritage resources as direct impacts would have either occurred during the construction phase, or would have been mitigated to remove impacts. Nevertheless, activities during the operational phase of the Project considered in the impact assessment comprise underground mining and blasting.

9.3.2.2 Impact Description

A summary of the relevant activities, interactions and potential impacts are presented in Table 9-7.

Table 9-7: Activities, interactions and potential impacts to heritage resources during the operational phase

Activity	Interaction	Potential Impact
Underground blasting and mining	Vibrations	<p>Vibrations created through blasting may affect the integrity of rock art sites through structural damage to shelters, i.e. cracks or collapse. Furthermore, surface dressing of burial grounds and graves, such as tombstones may be damaged through intense or repetitive vibrations.</p> <p>Sites¹⁹ include:</p> <ul style="list-style-type: none"> ▪ 1722/S.35-014 ▪ 1722/S.35-015 ▪ 1722/S.35-019 ▪ 1722/S.35-029 ▪ RA-001 ▪ RA-002 ▪ 1722/S.36-017 ▪ BGG-001

¹⁹ Only sites 1722/S.35-019 and BGG-001 fall directly above undermining areas.



Activity	Interaction	Potential Impact
		<ul style="list-style-type: none"> ▪ BGG-002 ▪ BGG-005 ▪ BGG-006

9.3.2.3 Management Objectives

The management objectives for the identified potential impacts to heritage resources are to firstly avoid through project related mitigation measures. Where this is not possible or feasible, heritage related mitigation measures should aim to reduce the severity of the negative impact, in accordance with the minimum level of mitigation as published in the SAHRA Minimum Standards.

9.3.2.4 Management Actions and Targets

As stated under Section 9.3.1.4, it is recommended a BGGC be undertaken and the results included into a CMP for the Project. These recommendations are applicable here and are not repeated for the sake of brevity.

9.3.2.5 Impact Ratings

The ratings for pre- and post-mitigation scenarios for the identified impacts as per Table 9-7 are summarised in this section. For the assessment of the loss of integrity of Rock Art sites, please refer to Table 9-5 above.

Table 9-8: Summary of assessment of the potential damage to surface dressing of burial grounds and graves

IMPACT DESCRIPTION: Damage to surface dressing of burial grounds and graves				
Dimension	Rating	Motivation		
<i>Pre-Mitigation</i>				
Duration	Project Life (5)	Unmitigated damage to surface dressing of graves will be permanent		
Extent	National (6)	A conservative approach, assuming NoK could be distributed throughout South Africa, has been adopted. Any unpermitted changes to burial grounds can result in social and / or legal repercussions that may require intervention by	Consequence: Highly detrimental (-16)	Significance: Minor - negative (-64)



IMPACT DESCRIPTION: Damage to surface dressing of burial grounds and graves				
Dimension	Rating	Motivation		
		national structures (e.g. SAHRA).		
Intensity x type of impact	High - negative (-5)	Burial grounds are assigned very high CS in addition to be generally protected under the NHRA and other national and provincial legislation. Any unpermitted changes to burial grounds are therefore considered highly negative. However, accidental or unintended impacts may be reversible.		
Probability	Probable (4)	It is likely that where potential impacts are not mitigated, the identified impacts will manifest.		
Mitigation				
<p>If the Project is awarded EA and mining rights, the <i>Procedure for consultation regarding burial grounds and graves</i> contained in Chapter XI of the SAHRA regulations must be implemented. Where the outcomes of this process include agreements for the in situ conservation of graves, such agreements must be integrated into a project-specific CMP.</p> <p>Where graves are at risk of direct impacts, or where agreements with identified bona fide Next-of-Kin include relocation, the graves may need to be relocated in accordance with the <i>Application for permit: Burial grounds and graves</i> process contained in Chapter IX of the SAHRA Regulations.</p>				
Post-Mitigation				
Duration	Immediate (1)	Implementing Chapter XI of the SAHRA Regulations will enable negotiated agreements with NoK to be reached. Loss of access can therefore be eliminated or reduced.	Consequence: Moderately beneficial (12)	Significance: Minor - positive (60)
Extent	National (6)	A conservative approach, assuming NoK could be distributed throughout South Africa, has been adopted. Changes to		



IMPACT DESCRIPTION: Damage to surface dressing of burial grounds and graves				
Dimension	Rating	Motivation		
		burial grounds, including approval of CMPs or issuing permits to exhume and relocate contents of graves, will need to be authorised by national, provincial and local authorities.		
Intensity x type of impact	High - positive (5)	If the proposed mitigation measures are implemented, burial grounds will be conserved, access will not be lost, or graves can be relocated to formal cemeteries.		
Probability	Likely (5)	It is likely that by following the proposed mitigations, nearly all impacts on identified burial grounds can be removed or avoided.		

9.3.3 Decommissioning and Closure

Although no impacts during the decommissioning and closure phase of the Project have been identified, Umcebo should be cognisant that if, at the time of decommissioning and closure any infrastructure is older than 60 years, it will be subject to permitting requirements as required under Section 34 of the NHRA and Chapter III of the SAHRA Regulations.

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.

It has been determined that the regional and, more specifically, local study area is rich in cultural and natural history. In light of this, the Project cannot be viewed in isolation from the greater cultural landscape, and the current existing and proposed developments surrounding the site-specific study area. As identified in du Piesanie & Nel (2013) and within the HSR,

several operations have been proposed or are currently operating within the local study area. The current operations are summarised in Table 10-1.

Table 10-1: Current operations within proximity to the Project

Mining operations	Koornfontein Coal Mine
	Kranspoort Coal Mine
	Middelburg Mine
	New Clydesdale Colliery
	Optimum Colliery
	Tavistock Coal Mine
	Woestalleen Coal Colliery
	Arnot Coal Mine
Power generation	Eskom's Arnot Coal-fired Power Station
	Eskom's Hendrina Coal-fired Power Station
	Eskom's Komati Coal-fired Power Station

As indicated in the Gert Sibande District Municipality IDP (2012), the mining sector has been identified as a key growth area. The addition of mining operations, while in line with the strategic development plan for Mpumalanga; will significantly alter the primarily agrarian historical landscape into an industrial, mining landscape. The envisaged cumulative impacts are additive and space-crowding. These impacts are described as the sum of all the effects and the high spatial density of impacts on heritage resources resulting in negative cumulative impacts. This may include:

- Change to the sense-of-place from an historical agrarian and archaeological landscape to an industrial landscape;
- Industrialisation that may promote the increase of informal settlements or urban sprawl that will encroach on the historical and archaeological element of the cultural landscape; and
- Sterilisation of the land where tangible heritage such as palaeontological and archaeological sites are destroyed and consequently the integrity of intangible heritage are degraded.

Synergistic cumulative impacts were also identified. These impacts are categorised as the interaction of individual effects to produce a total effect greater than the sum of the individual effect. In this instance, the damage or destruction of heritage resources within the landscape will increase the CS of those resources that remain undisturbed and *in situ* regardless of integrity.

**Table 10-2: Summary of potential cumulative impacts**

Type	Cumulative Impact	Direction of Change	Extent of Impact
Additive Space crowding	Change to the sense-of-place of the cultural landscape	Negative	Local
Additive Space crowding	Increased industrialisation and potential urban sprawl that may encroach on the agrarian and archaeological landscape	Negative	Local
Additive Space crowding Synergistic	Sterilisation of tangible heritage resources, such as Rock Art sites and consequently the possible effect on the integrity of the local intangible heritage, i.e. Bushmen and Khoi histories	Negative	Local
Additive Synergistic	Increased significance of remaining <i>in situ</i> archaeological sites and accumulations regardless of integrity	Negative	Site specific and local

11 Unplanned Events and Low Risks

Certain project activities may represent low risks to heritage resources or cause unplanned events. Low risks, where identified, can be monitored to gauge if the baseline changes and mitigation is required. Unplanned events are events that can occur on any project and cannot be monitored, but can, however, be planned for to reduce the severity of potential impacts if and where they occur.

Information on the potential impacts of these events and management plans are summarised in Table 11-1.

Table 11-1: Summary of potential unplanned events, potential impacts, and proposed mitigation and management

Unplanned event	Potential impact	Mitigation / Management / Monitoring
Accidental exposure of previously unidentified heritage resources during the construction of the Project.	Damage or destruction of heritage resources generally protected under Section 35 of the NHRA	Project specific Chance Find Protocols (CFPs) must be developed and included in the EMP as a condition of authorisation. The CFPs must clearly describe the type of heritage resources that may occur within the site specific project area, the protocol to follow in the event of accidental exposure of previously unidentified heritage resources,



Unplanned event	Potential impact	Mitigation / Management / Monitoring
Accidental exposure of human remains during the construction phase of the Project.	Damage or destruction of heritage resources generally protected under Section 36 of the NHRA	and the appropriate management measures and reporting structures to be adhered to. The CFPs must be defined and established prior to the construction phase of the proposed Project.

Table 11-2: Summary of low risk events, potential impacts, and proposed mitigation and management

Low risk	Potential impact	Mitigation / Management / Monitoring
Blasting and excavation	Blasting will create fly rock that may result in accidental damage to historic structures or werfs situated within a 500 m blasting radius	A CMP must be developed to monitor and gauge any potential negative impact to identified heritage resources during the construction and operational phases of the Project.
Underground blasting and mining	Voids created through underground mining has the potential to result in subsidence that could potentially affect the <i>status quo</i> of heritage resources protected under Section 34 – 36 of the NHRA that are being under-mined.	<p>The CMP must at a minimum include:</p> <ul style="list-style-type: none"> ▪ All identified heritage resources within the site-specific study area; ▪ Identify all heritage resources within a 100 m buffer of proposed infrastructure and 500 m blasting radius; ▪ Identify all heritage resources that fall within the underground mining development footprint; ▪ Have a detailed baseline record of the condition of identified heritage resources; ▪ Establish a roles and responsibilities matrix; ▪ Establish a monitoring process and schedule; ▪ Define conditions and protocols for access; and ▪ Define the project specific management and monitoring protocol. <p>The CMP must be defined and established prior to the pre-construction phase of the proposed Project.</p>
	Access to heritage resources protected under Section 34 – 36 of the NHRA by non-employees of the mine pose a health and safety risk to visitors.	
Hauling/Conveying of Coal	Hauling of coal along access routes pose a risk to heritage resources protected under Section 34 -36 of the NHRA in proximity to the established routes that could be damaged in the event a vehicular accident occurs.	



12 Heritage Impacts vs. Sustainable Socio-Economic Benefits

As demonstrated in the HSR and Social Impact Assessment (SIA), the mining sector is a key contributor to the economy of Mpumalanga, as well as a major source of employment. Additionally, there is an increased emphasis on coal mining in terms of Local Economic Development (LED) at both the District and Local Municipal level. With the decrease of the agricultural sector in this region and a national strategic directive on increased energy security, the potential heritage impacts are outweighed by the potential socio-economic benefits of the project.

This assumption is based on the following:

- No heritage resources were identified within the primary study areas (i.e. development footprint of surface infrastructure);
- Heritage resources with a CS of medium or higher can be conserved *in situ* and, if necessary, mitigated through the proposed interventions;
- The project will contribute to the economic development of the region and potentially create 371 new jobs; and
- The project will promote the growth of both the formal and informal retail and service sector that may benefit individuals through indirect employment.

13 Environmental Management Plan

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

The key objectives of EMPs are to give S.M.A.R.T.²⁰ 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 EIA;
- 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;

²⁰ S.M.A.R.T refers to specific, measurable, attainable, realistic and timely mitigation measures.

- Provide an auditable management plan that can follow the Deming Cycle²¹;
- Gauge if predicted benefits of the project are being achieved and maximized; and
- Gain information for improving similar projects and EIA practice in the future.

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

13.1 Project Activities with Potential Significant Impacts

Project activities that may impact upon heritage resources include:

- Blasting and excavation;
- Construction of surface infrastructure; and
- Underground blasting and mining.

These are summarised in Table 13-1.

Table 13-1: Potential significant project impacts

Activities	Potential significant project impacts
Blasting and excavation	Loss of integrity of rock art sites
Construction of surface infrastructure	Degradation of intrinsic CS of burial grounds and graves
Underground blasting and mining	Loss of integrity of Rock Art panels
	Damage to surface dressing of burial grounds and graves

13.2 Summary of Mitigation and Management

This section provides a summary of the project activities relevant to this study, the environmental aspect and impacts on the receiving environment. Information on the recommended mitigation, relevant legal requirements, recommended management plans and timing of implementation is presented in Table 13-2 and Table 13-3.

²¹ The Deming cycle refers to a four-part management method that promotes continuous improvement. The Deming cycle is made up of:

Plan: Choose a process and set objectives

Do: Implement the plan and begin collecting data on the results

Check/Study: Analyse the results using statistical methods

Act: Decide what changes to make in order to improve the process

Table 13-2: Mitigation and management plan

Activities	Potential Impact	Size and scale of disturbance	Aspects Affected	Phase	Mitigation Type/Measures	Compliance with standards/Standard to be achieved	Time period for Implementation
Blasting and excavation	Loss of integrity of Rock Art sites Degradation of intrinsic CS of burial grounds and graves	Per Mining Area: 2 x incline shafts – 0.5 ha and 1x ventilation shaft – 0.25 ha	Heritage	Construction	Reduce the intensity of potential negative impacts through the establishment and implementation of a CMP relative to the SAHRA Minimum Standards.	Compliance with Section 35 and 36 of the NHRA, Chapter XI of the NHRA Regulations (GN R 548), and SAHRA Minimum Standards	Pre-construction
Construction of surface infrastructure	Degradation of intrinsic CS of burial grounds and graves	37 ha – combined area		Operational			
Underground blasting and mining	Loss of integrity of Rock Art panels Damage to surface dressing of burial grounds and graves	6 714 ha					

Table 13-3: Prescribed environmental management standards, practice, guideline, policy or law

Applicable Standard, Practice, Guideline, Policy or Law		
Title	Description of Requirements	Relevance to Project
Legislation (National, Provincial, Local)		
The National Heritage Resources Act, 1999 (Act No. 25 of 1999)	Heritage resources within the Project development footprint are protected under Section 35 of the NHRA, and may not be impacted upon without the approval and necessary permits issued by SAHRA	Heritage resources protected under Section 35 have been identified.
Regulations to the National Heritage Resources Act, 1999 (Act No. 25 of 1999) (GN R 548) (SAHRA Regulations)	Provisions for permit applications are regulated under Chapter II of GN R 548. Furthermore, applications for heritage resources protected under Section 35 of the NHRA are regulated by Chapter IV.	Mitigation of archaeological sites is a permitted activity regulated by GN R 548. These activities must be cognisant of and adhere to the regulations to ensure compliance with the legislative framework.
	Provisions for the procedure for consultation regarding burial grounds and graves are contained in Chapter XI. Where required, the application for relocation of graves is regulated by Chapter IX.	Burial grounds and graves have been identified within the site-specific study area. Agreement on the conservation of the graves must be reached in accordance with the regulations to ensure compliance with the legislative framework.
The Mpumalanga Cemeteries, Crematoria and Exhumation of Bodies Act, 2005 (Act No. 8 of 2005) (MCCEBA)	Section 14 of this Act outlines the process in respect of consultation and approvals	
Applicable Guideline/Standards		
SAHRA Minimum Standards: Archaeological and Palaeontological Components of Impact Assessment Reports	The guidelines provide the minimum standards for recommended mitigation under Section 7(1)(L)(d).	Specialist recommendations were considered against the minimum standards provided.

13.3 Monitoring Plan

Project specific CFPs must be developed for the Project. The purpose of the CFPs is to establish procedures that aim to minimise damage and destruction to any heritage resources that may be accidentally exposed during the course of development activities.

The CFPs must clearly describe the type of heritage resources that may occur within the site specific project area, the protocol to follow in the event of accidental exposure of previously unidentified heritage resources, and the appropriate management measures and reporting structures to be adhered to. The CFP at a minimum should include the following:

- Definitions as defined by Section 2 and 38(1) of the NHRA;
- Proactive archaeological monitoring procedures;
- Procedures that detail the following:
 - How to spot a chance find;
 - Steps to be undertaken when a chance find is made;
 - Internal reporting structures;
 - Recording of chance finds; and
 - Legal processes and requirements.

The CFPs must be defined and established as a condition of authorisation prior to the pre-construction phase of the proposed Project.

A CMP must be developed to monitor and gauge any potential negative impact to identified heritage resources during the construction and operational phases of the Project.

The CMP must at a minimum include:

- All identified heritage resources within the site-specific study area;
- Identify all heritage resources within a 100 m buffer of proposed infrastructure and 500 m blasting radius;
- Identify all heritage resources that fall within the underground mining development footprint;
- Have a detailed baseline record of the condition of identified heritage resources;
- Establish a roles and responsibilities matrix;
- Establish a monitoring process and schedule;
- Define conditions and protocols for access; and
- Define the project specific management and monitoring protocol.

The CMP must be defined and established prior to the pre-construction phase of the proposed Project. A summary of the proposed monitoring plan is presented in Table 13-4.

Table 13-4: Monitoring plan

Activities	Impacts requiring monitoring programmes	Functional requirements for monitoring	Roles and responsibilities (For the execution of the monitoring programmes)	Monitoring and reporting frequency and time periods for implementing impact management actions
Blasting and excavation	Loss of integrity of Rock Art panels	Baseline condition recording Monitoring after blasting activities Reporting on possible manifestation of negative impacts Implementation of mitigation measures to reduce impacts	To be developed as part of the CMP	After blasting activities
	Degradation of intrinsic CS of burial grounds and graves	N/A		N/A
Construction of surface infrastructure	Degradation of intrinsic CS of burial grounds and graves	N/A		N/A
Underground blasting and mining	Loss of integrity of Rock Art panels	Baseline condition recording Monitoring after blasting activities Reporting on possible manifestation of negative impacts Implementation of mitigation measures to reduce impacts		After blasting activities
	Damage to surface dressing of burial grounds and graves		Quarterly	



14 Consultation

The consultation process afforded Interested and Affected Parties (I&APs) opportunities engage in the EA process. The objectives of the Stakeholder Engagement Process (SEP) included the following:

- To ensure that I&APs are informed about the project;
- To provide I&APs with an opportunity to engage and provide comment on the project;
- To draw on local knowledge by identifying environmental and social concerns associated with the project;
- To involve I&APs in identifying methods in which concerns can be addressed;
- To verify that stakeholder comments have been accurately recorded; and
- To comply with the legal requirements.

A summary of the SEP undertaken during the Scoping Phase of the Project is presented in Table 14-1.

Table 14-1: Summary of SEP Activities during the Scoping Phase

Activity	Details
Identification of stakeholders	Stakeholder database which includes I&APs from various sectors of society, including directly affected and adjacent landowners in and around the project area.
Distribution of proposed project announcement materials	An announcement letter with comment and registration sheet was emailed and posted to stakeholders on 14 April 2016. <i>SMSs were also distributed to stakeholders on the database on 14 April 2016.</i> The Background Information Document was also available on www.digbywells.com .
	A Notification of Intent to Develop (NID) was submitted to SAHRA and MPRHA on 20 April 2016. This was available at the following link: http://www.sahra.org.za/sahris/cases/umcebo-hendrina-underground-coal-mine-mining-right-application
Placement of Advertisement	An English advertisement was placed in the Middelburg Observer on 15 April 2016.
Placement of site notices	Site notices were placed at various public places within and around the proposed Project area on 19 April 2016. These include, but isn't limited to, the following places: <ul style="list-style-type: none"> ■ Hendrina Public Library; and ■ Breyten Public Library.



Activity	Details
	A site notice placement map and report is provided.
Placement of Scoping Report	<p>Copies of the Scoping Report were available at the following Libraries for:</p> <ul style="list-style-type: none"> ▪ Hendrina Public Library; and ▪ Breyten Public Library. <p>The Scoping Report was also available on the Digby Wells Website www.digbywells.com (Public Documents) and at the stakeholder meetings. CDs containing the Scoping Report were also made available at the various stakeholder meetings.</p> <p>The HSR was submitted to SAHRA and MPRHA on 20 April 2016. This was available at the following link: http://www.sahra.org.za/sahris/cases/umcebo-hendrina-underground-coal-mine-mining-right-application</p>
Announcement of the Scoping Report	<p>Announcement of availability of the Scoping Report was emailed and posted to the database together with announcement of the Project on 14 April 2016.</p> <p><i>SMSs were also sent to the full database on 14 April 2016 indicating availability of the Scoping Report.</i></p> <p><i>(Public comment period: 20 April to 22 May 2016)</i></p>
Stakeholder Meetings	<p>The following stakeholder meetings were held during the 30-day public comment period:</p> <ul style="list-style-type: none"> ▪ Landowner Focus Group Meeting: 5 May 2016 from 11:00 to 13:00 at the Kosmos Hall, Hendrina; and ▪ Public Meeting: 5 May 2016 from 14:00 to 16:00 at the Kosmos Hall, Hendrina. <p>Comments received at these meetings were captured in the Comments and Response Report (CRR) and responded to by the various specialists and project team members.</p>
Announcement of the updated Scoping Report availability	<p>Announcement of availability of the updated Scoping Report has been emailed and posted to the database.</p> <p><i>SMSs to notify stakeholders that the updated Scoping Report will be available for comment have been sent to the database.</i></p> <p>These reports have been made available on www.digbywells.com (Public Documents).</p>
Obtained comments from stakeholders	Comments, issues of concern and suggestions received from stakeholders are captured in the CRR.

14.1 Comments and Response

On 24 May 2016 the SAHRA APM unit issued Interim Statutory Comment (dated 19 May 2016) to Digby Wells.

The SAHRA APM in principle agreed with the recommendations made in HSR, with the exception of the Request for Exemption (RfE) from further palaeontological studies.

Specific conditions contained in the Interim Comment are summarised as follows:

- A HIA must be completed during the EIA phase of the EA process;
- A Palaeontological Desktop Assessment must be conducted for the project area; and
- A Fossil Chance Finds Procedure must be developed for the mine.

These comments were considered as part of this report.

15 Conclusion and Recommendations

Digby Wells completed a HIA as part of the EA process of the Project to promote compliance with Section 38(8) of the NHRA. This assessment considered the baseline cultural landscape at local, site specific and development footprint study area level to define the cultural landscape and identify any tangible heritage resources that may be impacted upon by the proposed Project.

A total of 542 sites were identified within the local study area, ranging from palaeontological resources through to the historic period. The identification of these resources supported by the baseline environment described in the HSR and summarised under Section 7 above indicated that the Project is situated in an historic agrarian landscape with a palaeontological and archaeological component that is sensitive.

No heritage resources were identified within the development footprint of surface infrastructure, and no direct impacts are envisaged for this component of the Project. Potential impacts to heritage resources occurring outside of the development have been identified and assessed. To reduce the identified impacts, it is recommended that a CMP for the Project be developed and implemented during the pre-construction phase as a condition of authorisation. The CMP must at a minimum include the following:

- All identified heritage resources within the site-specific study area;
- Identify all heritage resources within a 100 m buffer of proposed infrastructure and 500 m blasting radius during the construction phase;
- Identify all heritage resources that fall within the underground mining development footprint;
- Have a detailed baseline record of the condition of identified heritage resources;
- Establish a roles and responsibilities matrix;
- Establish a monitoring process and schedule;

- Define conditions and protocols for access; and
- Define the project specific management and monitoring protocol.



16 References

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Heritage Impact Assessment

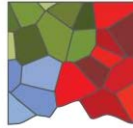
Proposed Development of an Underground Coal Mine and Associated Infrastructure near
Hendrina, Mpumalanga

XST3791



DIGBY WELLS
ENVIRONMENTAL

Appendix A: Specialist CV



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, Section 10, 359 Pretoria Ave Randburg Private Bag X10046, Randburg, 2125, South Africa
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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@randgoldreources.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@atkinglobal.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	Orientele 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



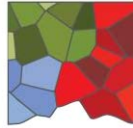
Project Title	Project Location	Date:	Description of the Project	Role of Firm in the Project	Own Role in the Project	Time involved (man months)	Name of Client	Contract Outcomes	Reference
Klipspruit Extension: Weltevreden Project	Ogies, Mpumalanga, South Africa	2014 2014	NID and Heritage Statement for 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
Yzermite PIA	Wakkerstroom, Mpumalanga, South Africa	2014 2014	Palaeontological Assessment for the Yzermite 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 greg.ovens@drdgold.com
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 Kamantha.Veerasamy@bigenafrica.com
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 Taka.Sande@bigenafrica.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
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	



DIGBY WELLS

ENVIRONMENTAL

Mr Johan Nel

Unit manager: Heritage Resources Management

Social Sciences

Digby Wells Environmental

1 Education

Date	Degree(s) or Diploma(s) obtained	Institution
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

Language	Speaking	Writing	Reading
English	Excellent	Excellent	Excellent
Afrikaans	Excellent	Excellent	Excellent

3 Employment

Period	Company	Title/position
2009/2011 to present	Digby Wells Environmental	Manager: Heritage Resources Management unit
2005/2010-2011	Digby Wells Environmental	Archaeologist
2010/2005-2005/2010	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 Project Experience

5.1 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.

5.2 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.

5.3 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. Slypsteen 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. Nooitgedacht 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.

5.4 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.

5.5 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.

6 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)	13839
Member	Society for Africanist Archaeologists (SAfA)	N/A

7 Publications

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.
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Gaborone, Botswana.

Heritage Impact Assessment

Proposed Development of an Underground Coal Mine and Associated Infrastructure near
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Appendix B: Detailed Impact Assessment Methodology



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Heritage Cultural Significance, Field Rating and Impact Assessment Methodology

Assessment Methodology Statement

Project Number:

ZZZ9999

Prepared for:

Internal Document

June 2016

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This document has been prepared by Digby Wells Environmental.

Document:	Assessment Methodology Statement
Description:	Heritage Cultural Significance, Field Rating and Impact Assessment Methodology
Project Code:	ZZZ9999

Revision History

Name	Responsibility	Version	Date
Johan Nel ASAPA Member 095	HRM Unit Manager	Ver 1	May 2014
		Ver 2	October 2014
		Ver 3	May 2015
Justin du Piesanie ASAPA Member 270	HRM Consultant	Ver 4	January 2016
		Ver 5	June 2016

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1 Introduction

Assessment of impacts include several steps aimed to evaluate the way in which environmental aspects will / may interact with the cultural landscape (*the environment*) resulting in environmental impacts to heritage resources. Environmental aspects and impacts are defined as:

- Environmental aspects: an element of an organisation’s activities or products or services that can interact with the environment’ (ISO 14001: 2004 - 3.6); and
- Environmental impacts: any change to the environment, whether adverse or beneficial, wholly or partially resulting from an organization's environmental aspects (ISO 14001: 2004 - 3.7).

However, in terms of cultural heritage resources, environmental impacts should be assessed relative to the heritage value or cultural significance of a resource. The methodology employed in the various stages of the impact assessment process is described in more detail below.

2 Evaluation of Cultural Significance

The significance rating process is designed to provide a numerical rating of the cultural significance¹ 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.

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

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

¹ 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.



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.

$$\text{Value} = \text{Importance} \times \text{Integrity}$$

where

$$\text{Importance} = \text{average sum}$$

of

$$\text{Aesthetic} + \text{Historic} + \text{Scientific} + \text{Social}$$

Box 2: CS formula

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 3-1.

3 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 3-1.

$$\text{Field Rating} = \text{average sum}$$

of

$$\text{Aesthetic} + \text{Historic} + \text{Scientific} + \text{Social}$$

Box 3: Field rating formula

Table 3-1: Ratings and descriptions used in determining CS and field ratings

Rating	IMPORTANCE <i>A heritage resource's contribution to aesthetic, historic, scientific and social value.</i>	INTEGRITY <i>The undivided or unbroken state, material wholeness, completeness or entirety of a resource or site</i>	FIELD RATING <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 Impact Assessment

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.

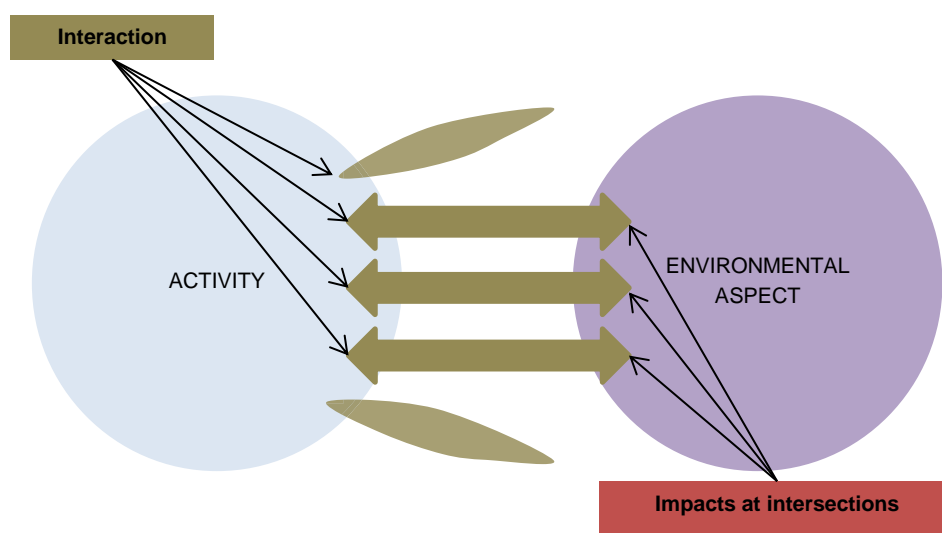


Figure 4-1: Graphical representation of impact assessment concept

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 4-2.

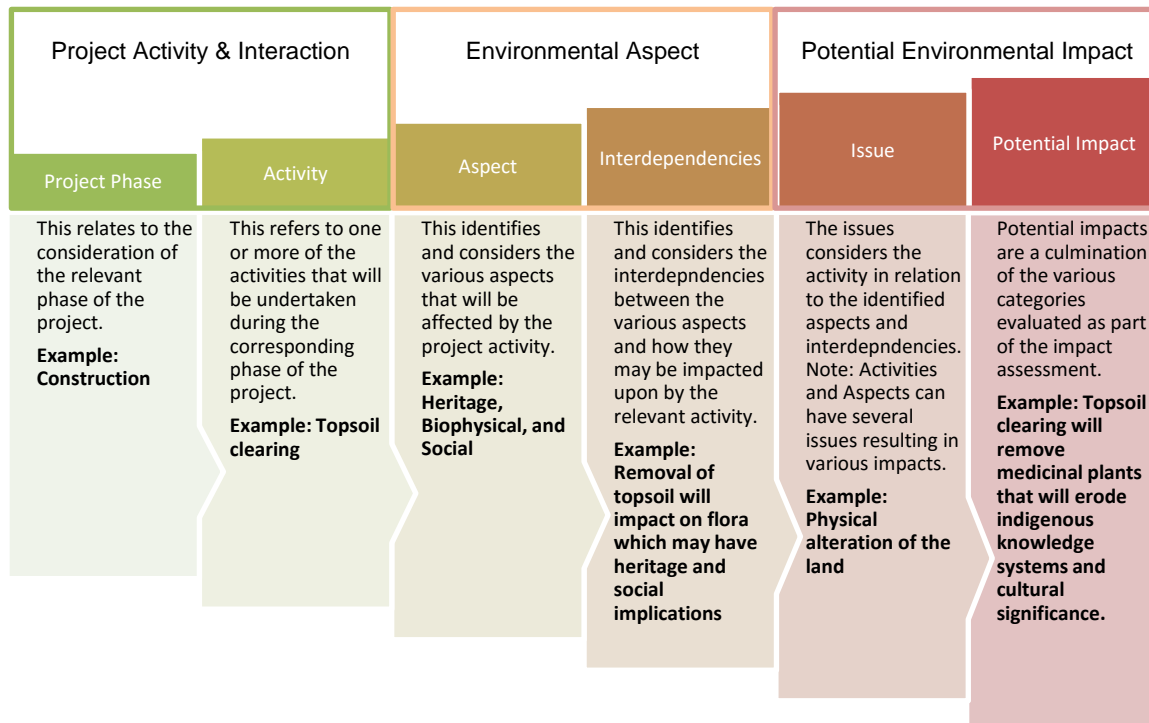


Figure 4-2: Example of how potential impacts were considered.

4.1 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.

4.2 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 4.



The weight assigned to the various parameters for positive and negative impacts in the formula is presented in Table 4-2 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.

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 4: Impact assessment formula

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 4-2. The relationship between the consequence, probability and significance ratings is also graphically depicted in Table 4-2.

Table 4-1: 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	Permanent	Impact will permanently alter or change the heritage resource and/or value (Complete loss of information)	International	Impacts on heritage resources will have international repercussions, issues or effects, i.e. in context of international cultural significance, legislation, associations, etc.	Extremely high	Major change to Heritage Resource with High-Very High Value	Certain/Definite	Happens frequently. The impact will occur regardless of the implementation of any preventative or corrective actions.
6	Beyond Project Life	Impact will reduce over time after project life (Mainly renewable resources and indirect impacts)	National	Impacts on heritage resources will have national repercussions, issues or effects, i.e. in context of national cultural significance, legislation, associations, etc.	Very high	Moderate change to Heritage Resource with High-Very High Value	High probability	Happens often. It is most likely that the impact will occur.
5	Project Life	The impact will cease after project life.	Region	Impacts on heritage resources will have provincial repercussions, issues or effects, i.e. in context of provincial cultural significance, legislation, associations, etc.	High	Minor change to Heritage Resource with High-Very High Value	Likely	Could easily happen. The impact may occur.
4	Long Term	Impact will remain for >50% - Project Life	Municipal area	Impacts on heritage resources will have regional repercussions, issues or effects, i.e. in context of the regional study area.	Moderately high	Major change to Heritage Resource with Medium-Medium High Value	Probable	Could happen. Has occurred here or elsewhere
3	Medium Term	Impact will remain for >10% - 50% of Project Life	Local	Impacts on heritage resources will have local repercussions, issues or effects, i.e. in context of the local study area.	Moderate	Moderate change to Heritage Resource with Medium - Medium High Value	Unlikely / Low probability	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	Short Term	Impact will remain for <10% of Project Life	Limited	Impacts on heritage resources will have site specific repercussions, issues or effects, i.e. in context of the site specific study area.	Low	Minor change to Heritage Resource with Medium - Medium High Value	Rare / Improbable	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	Transient	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.	Very Limited	Impacts on heritage resources will be limited to the identified resource and its immediate surroundings, i.e. in context of the specific heritage site.	Very low	No change to Heritage Resource with values medium or higher, or Any change to Heritage Resource with Low Value	Highly Unlikely /None	Expected never to happen. Impact will not occur.



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 5).

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 5: 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.

Heritage Impact Assessment

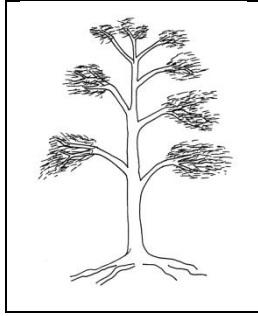
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Appendix C: Palaeontological Letter



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31 May 2016

Ms. Nokukhanya Khumalo
SAHRA: Archaeology, Palaeontology and Meteorites Unit
111 Harrington Street
Cape Town

Dear Ms. Khumalo

RE: Comments on Heritage Scoping Report submitted to SAHRA (Case ID: 9404)

Title: Statutory Comment issued in terms of Section 38(8) of the National Heritage Resources Act, 1999 (Act No. 25 of 1999) for the Proposed Development of an Underground Coal Mine and Associated Infrastructure near Hendrina, Mpumalanga

Authors: Justin du Piesanie and Johan Nel

I have read the Heritage Scoping Report (HSR) compiled by Digby Wells Environmental (Digby Wells) for the proposed underground coal mine near Hendrina, as well as the Statutory Comment which accompanies the response from SAHRA.

Summary of HSR: Although very poorly preserved fossils of the enigmatic seed *Breytenia* and vertebrate bones were found in surface deposits, the mine will be underground and therefore not affect further surface fossils, so exemption from further Palaeontological Impact Assessments (PIA) is recommended.

Summary of response from SAHRA: The recommendation is not accepted and a desktop study should be done by a palaeontologist, as well as a Chance Fossil Finds procedure / monitoring programme provided (extract copied at the end of this document).

Although a desktop assessment was not done by a palaeontologist, a site visit was done by two heritage specialists with some advice from me about the fossil plant *Breytenia* (email correspondence in 2013). The newly discovered fossils are very poorly preserved (compare Figure 8.5 within the HSR with a photograph of the original specimen of *Breytenia* below (Figure 1). There were no other fossils on the surface and no suitable outcrops or ridges where any more could be located.

Fossils forming the coal seams are compressed and distorted beyond recognition and *are of no scientific value*. Good leaf impressions can be found in the shale lenses between

the coal seams but these are deep underground with the coal seams. Neither a desktop study nor another site visit would reveal any more fossils until excavations have begun in the coal seams. *Therefore I support the recommendation given by du Piesanie and Nel.*

A Fossil Chance Find Procedure, however, *is strongly recommended*, and is outlined below for both potential surface finds and underground finds. The two key personnel are the mine geologist who would be present during early mining stages and throughout the life of the mine, and the palaeontologist contracted for the project. to visit the mine at pre-arranged times and to look at fossil material, or preferably photographs of fossil material, when fossils are uncovered. For visits to the mine by the palaeontologist all mine safety procedures must be strictly adhered to.

Fossil Chance Procedure

1. Early Phase (development of mine, access and surface infrastructure, box cut for mine entrances):

Surface excavations should be monitored by the geologist and any fossil material disturbed should be put aside and the palaeontologist called to inspect the material within a reasonable timeframe in order to minimise delays to the project. The geologist should also receive from the palaeontologist some photographs and descriptions of what palaeontological material to look out for.

The schedule of monitoring should be set up between the mine and palaeontologist and the agreement letter submitted to SAHRA.

If it is not feasible for the palaeontologist to visit the mine timeously then digital photographs of good quality and resolution should be sent to the palaeontologist to assess and make recommendations.

From visits or photographs supplied the palaeontologist must make the following recommendations:

- a. Material is of no value so development can proceed, or
- b. Fossil material is of some interest so a representative sample should be carefully collected and put aside for further study and incorporated into a recognised repository (Ditsong Museum, Council for Geosciences, Pretoria; Evolutionary Studies Institute, University of the Witwatersrand, Johannesburg) and a permit obtained from SAHRA for the removal of the fossils, then development may proceed, or
- c. Fossils are scientifically important and the palaeontologist must obtain a SAHRA permit to excavate the fossils and put them into a recognised repository, then development may proceed.

2. Later phase (mining operation):

Once the mine is operational and the coals and shales are exposed the palaeontologist should visit the mine to see what fossils are present. Then the above procedure, a-c, can be followed.

- d. At each stage a report should be sent to SAHRA by the palaeontologist detailing the fossil finds and where they are being kept.

3. Final phase and decommissioning:

A palaeontologist should search through the dumps and exposed shales and seams, rescue any fossil material of scientific interest, store it in a recognised repository so it is available for future research, and then the land must be re-habilitated.

If you need any clarification please do not hesitate to contact me.

Yours sincerely



Prof Marion Bamford
Palaeobotanist

SAHRA CaseID: 9404

Interim Comment

SAHRA Archaeology, Palaeontology and Meteorites Unit agrees with the recommendations made in the Heritage Scoping Report for conducting a Heritage Impact Assessment in the Environmental Impact Assessment phase of the environmental authorisation process.

SAHRA APM Unit does not accept the recommendation for exemption for further palaeontological studies as the underground coal mining operations will impact the underground fossil heritage resources in and surrounding the coal. As such the following should be submitted:

- A Palaeontological Desktop Assessment for the project area should be conducted and submitted to SAHRA. The assessment should be done by a suitably qualified palaeontologist.
- A Chance Fossil Finds procedure for the mine should to be developed and submitted to SAHRA, the procedure of which will be used during construction operation and decommissioning of the mine. The procedure should include monitoring by a suitably qualified palaeontologist during construction of surface infrastructure and box cut for the entrances to the mine shaft.
- Monitoring intervals should be agreed upon between the developer or ECO and a qualified palaeontologist. The mine geologist should monitor during the periods when the palaeontologist is not on site. This should be a procedure to be followed throughout the life of the mine.
- The schedule of monitoring should be set up between the mine and palaeontologist and the agreement letter submitted to SAHRA.

SAHRA will make further comment about this proposed mine once the HIA and PIA and Chance Fossil Finds procedure is submitted to the case.



Figure 1: Photograph of the original specimen of *Breytenia* from the Breyten Colliery, formerly in the Eastern Transvaal, as described by Plumstead (1962, 1969). Photograph shows the two halves of the fructification and they are about 40mm in length. The fossil is housed in the Palaeobotany Herbarium of the Evolutionary Studies Institute (formerly Bernard Price Institute), University of the Witwatersrand, Johannesburg.

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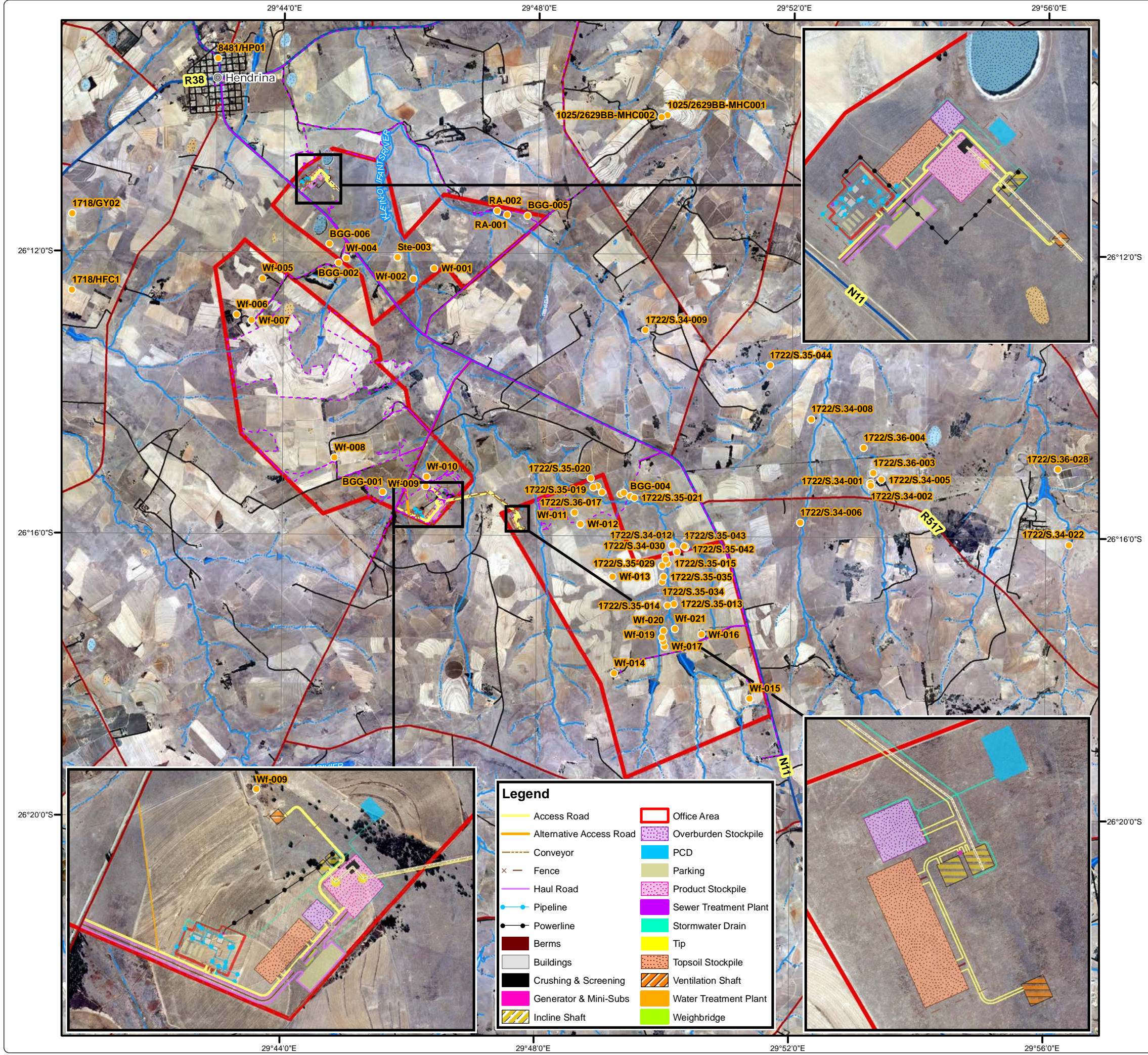
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Appendix D: Plans and Site Table

Umcebo Mining Hendrina Underground Coal Mine EIA Identified Heritage Resources




Legend

- Project Area
- Other Town
- Identified Heritage Resources
- Track Log
- Arterial/National Route
- Main Road
- Minor Road
- Railway Line
- Non-Perennial Stream
- Perennial Stream
- Dam Wall
- Dam/Lake
- Non-Perennial Pan
- Perennial Pan
- Wetland

Legend

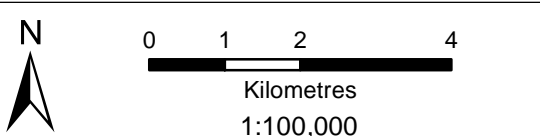
 Access Road	 Office Area
 Alternative Access Road	 Overburden Stockpile
 Conveyor	 PCD
 Fence	 Parking
 Haul Road	 Product Stockpile
 Pipeline	 Sewer Treatment Plant
 Powerline	 Stormwater Drain
 Berms	 Tip
 Buildings	 Topsoil Stockpile
 Crushing & Screening	 Ventilation Shaft
 Generator & Mini-Subs	 Water Treatment Plant
 Incline Shaft	 Weighbridge



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Projection: Transverse Mercator	Ref #: kam.XST3791.201606.095
Datum: WGS 1984	Revision Number: 1
Central Meridian: 29°E	Date: 29/06/2016



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Umcebo Mining Hendrina Underground Coal Mine EIA Heritage Sensitivity Analysis



- ### Legend
- Project Area
 - Identified Heritage Resources
 - Arterial/National Route
 - Main Road
 - Minor Road
 - Non-Perennial Stream
 - Perennial Stream
 - Dam Wall
 - Dam/Lake
 - Non-Perennial Pan
 - Perennial Pan
 - Wetland

- ### Infrastructure
- Overland Conveyor
 - Crushing and Screening Plant
 - Offices, Change House and Workshop
 - Plant Area
 - PCD
 - Shaft
 - Shaft Site Office
 - Silo Bin



- ### Infrastructure
- | | | |
|---|--|--|
| Access Road | Buildings | Product Stockpile |
| Alternative Access Road | Crushing & Screening | Sewer Treatment Plant |
| Conveyor | Generator & Mini-Subs | Stormwater Drain |
| Fence | Incline Shaft | Tip |
| Haul Road | Office Area | Topsoil Stockpile |
| Pipeline | Overburden Stockpile | Ventilation Shaft |
| Powerline | PCD | Water Treatment Plant |
| Berms | Parking | Weighbridge |



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Projection: Transverse Mercator	Ref #: kam.XST3791.201606.096
Datum: WGS 1984	Revision Number: 1
Central Meridian: 29°E	Date: 30/06/2016

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Study Area	Heritage Resource Type	Site Name	Latitude	Longitude	Distance from Development Footprint
Local study area	Archaeological - LFC	1121/Site26	-26.046440000	29.6995760	10-20 km
Local study area	Archaeological - LFC	1121/Site27	-26.046570000	29.7003570	10-20 km
Local study area	Archaeological - LFC	1165/TAV1	-26.129722222	29.2633333	20-50 km
Local study area	Archaeological - LFC	1165/TAV2	-26.105277778	29.1508333	50-100km
Local study area	Archaeological - LFC	1165/TAV4	-26.060833333	29.2497222	20-50 km
Local study area	Archaeological - LFC	1179/FIG01	-25.431111111	29.9986111	50-100km
Local study area	Archaeological - LFC	1722/S.35-023	-26.264747600	29.9480593	5-10 km
Local study area	Archaeological - LFC	1722/S.35-025	-26.265118100	29.9491450	5-10 km
Local study area	Archaeological - LFC	1724/S.35-045	-25.838416667	30.2133472	50-100km
Local study area	Archaeological - LFC	1724/S.35-051	-25.792222222	30.1796056	50-100km
Local study area	Archaeological - LFC	1724/S.35-055	-25.690797222	30.2165250	50-100km
Local study area	Archaeological - LFC	2179/Site3	-26.028610000	29.2664500	20-50 km
Local study area	Archaeological - LFC	5472/2530CC/S.35-004	-25.782620000	30.0137100	50-100km
Local study area	Archaeological - LFC	5472/2530CC/S.35-005	-25.778990000	30.0180500	50-100km
Local study area	Archaeological - LFC	672/2629AD104	-26.456555556	29.3653889	20-50 km
Local study area	Archaeological - LFC	672/2629AD105	-26.453111111	29.3753611	20-50 km
Local study area	Archaeological - LSA	1121/Site25	-26.045110000	29.6993210	10-20 km
Local study area	Archaeological - LSA	1165/TAV6	-26.063055556	29.2486111	20-50 km
Local study area	Archaeological - LSA	1722/S.35-016	-26.256778100	29.8219027	100-500 m
Local study area	Archaeological - LSA	1722/S.35-021	-26.257593500	29.8255654	500-1000 m
Local study area	Archaeological - LSA	1724/S.35-057	-25.681730556	30.2163444	50-100km
Local study area	Archaeological - LSA	659/2630AA3	-26.200000000	30.1166667	20-50 km
Local study area	Archaeological - MSA	1165/TAV3	-26.062777778	29.2483333	20-50 km
Local study area	Archaeological - MSA	1165/TAV5	-26.062222222	29.2483333	20-50 km
Local study area	Burial Grounds & Graves	1025/2629BB-MHC001	-26.167182000	29.8335320	1-5km
Local study area	Burial Grounds & Graves	1121/Site1	-26.029050000	29.7085800	10-20 km
Local study area	Burial Grounds & Graves	1121/Site11	-26.061650000	29.7318700	10-20 km
Local study area	Burial Grounds & Graves	1121/Site12	-26.053460000	29.7079400	10-20 km

Study Area	Heritage Resource Type	Site Name	Latitude	Longitude	Distance from Development Footprint
Local study area	Burial Grounds & Graves	1121/Site13	-26.057930000	29.7092400	10-20 km
Local study area	Burial Grounds & Graves	1121/Site14	-26.056170000	29.7086600	10-20 km
Local study area	Burial Grounds & Graves	1121/Site17	-26.043450000	29.7035800	10-20 km
Local study area	Burial Grounds & Graves	1121/Site18	-26.043990000	29.7052300	10-20 km
Local study area	Burial Grounds & Graves	1121/Site23	-26.044960000	29.6953900	10-20 km
Local study area	Burial Grounds & Graves	1121/Site24	-26.047300000	29.6955000	10-20 km
Local study area	Burial Grounds & Graves	1121/Site28	-26.079680000	29.7225100	10-20 km
Local study area	Burial Grounds & Graves	1121/Site29	-26.087600000	29.7350460	5-10 km
Local study area	Burial Grounds & Graves	1121/Site3	-26.037990000	29.7176900	10-20 km
Local study area	Burial Grounds & Graves	1121/Site30	-26.091630000	29.7306700	5-10 km
Local study area	Burial Grounds & Graves	1121/Site31	-26.088950000	29.7363580	5-10 km
Local study area	Burial Grounds & Graves	1121/Site34	-26.096100000	29.7083900	5-10 km
Local study area	Burial Grounds & Graves	1121/Site35	-26.094040000	29.7099600	5-10 km
Local study area	Burial Grounds & Graves	1121/Site37	-26.101180000	29.7224700	5-10 km
Local study area	Burial Grounds & Graves	1121/Site38	-26.090440000	29.7151300	5-10 km
Local study area	Burial Grounds & Graves	1121/Site39	-26.114690000	29.7169600	5-10 km
Local study area	Burial Grounds & Graves	1121/Site4	-26.037890000	29.7170800	10-20 km
Local study area	Burial Grounds & Graves	1121/Site41	-26.121800000	29.7267200	5-10 km
Local study area	Burial Grounds & Graves	1121/Site42	-26.122040000	29.7263800	5-10 km
Local study area	Burial Grounds & Graves	1121/Site43	-26.019720000	29.7263800	10-20 km
Local study area	Burial Grounds & Graves	1121/Site44	-26.023890000	29.7652800	10-20 km
Local study area	Burial Grounds & Graves	1121/Site45	-26.024720000	29.7700000	10-20 km
Local study area	Burial Grounds & Graves	1121/Site48	-26.127490000	29.7239400	5-10 km
Local study area	Burial Grounds & Graves	1121/Site7	-26.068870000	29.7424600	10-20 km
Local study area	Burial Grounds & Graves	1121/Site9	-26.069630000	29.7354900	10-20 km
Local study area	Burial Grounds & Graves	11253/GY01	-26.019722222	29.7991667	10-20 km
Local study area	Burial Grounds & Graves	11253/GY02	-26.057777778	29.2825000	20-50 km
Local study area	Burial Grounds & Graves	11253/GY03	-26.000000000	29.0000000	50-100km

Study Area	Heritage Resource Type	Site Name	Latitude	Longitude	Distance from Development Footprint
Local study area	Burial Grounds & Graves	11253/GY04	-26.046666667	29.2661111	20-50 km
Local study area	Burial Grounds & Graves	11253/GY05	-26.039722222	29.2680556	20-50 km
Local study area	Burial Grounds & Graves	11253/GY06	-26.083055556	29.2761111	20-50 km
Local study area	Burial Grounds & Graves	1164/2629AA21	-26.128888889	29.0235278	50-100km
Local study area	Burial Grounds & Graves	1164/2629AA22	-26.007000000	29.0223889	50-100km
Local study area	Burial Grounds & Graves	1164/2629AA24	-26.038944444	29.0510833	50-100km
Local study area	Burial Grounds & Graves	1164/2629AA25	-26.068916667	29.0258056	50-100km
Local study area	Burial Grounds & Graves	1164/2629AA26	-26.077000000	29.0282778	50-100km
Local study area	Burial Grounds & Graves	1164/2629AA28	-26.055333333	29.0122500	50-100km
Local study area	Burial Grounds & Graves	1164/2629AA29	-26.050694444	28.9986944	50-100km
Local study area	Burial Grounds & Graves	1164/2629AA30	-26.034166667	29.0129167	50-100km
Local study area	Burial Grounds & Graves	1164/2629AA31	-26.034166667	29.0256667	50-100km
Local study area	Burial Grounds & Graves	1164/2629AA32	-26.028388889	29.0303333	50-100km
Local study area	Burial Grounds & Graves	1165/TAV10	-26.105277778	29.1508333	50-100km
Local study area	Burial Grounds & Graves	1165/TAV11	-26.105277778	29.1702778	50-100km
Local study area	Burial Grounds & Graves	1165/TAV12	-26.104444444	29.1777778	50-100km
Local study area	Burial Grounds & Graves	1165/TAV13	-26.113611111	29.1755556	50-100km
Local study area	Burial Grounds & Graves	1165/TAV14	-26.122500000	29.1913889	50-100km
Local study area	Burial Grounds & Graves	1165/TAV15	-26.079166667	29.2319444	50-100km
Local study area	Burial Grounds & Graves	1165/TAV16	-26.078888889	29.2305556	50-100km
Local study area	Burial Grounds & Graves	1165/TAV17	-26.072500000	29.2341667	50-100km
Local study area	Burial Grounds & Graves	1165/TAV18	-26.066944444	29.2441667	20-50 km
Local study area	Burial Grounds & Graves	1165/TAV19	-26.061944444	29.2444444	20-50 km
Local study area	Burial Grounds & Graves	1165/TAV20	-26.054444444	29.2225000	50-100km
Local study area	Burial Grounds & Graves	1165/TAV21	-26.058333333	29.2172222	50-100km
Local study area	Burial Grounds & Graves	1165/TAV22	-26.101388889	29.1533333	50-100km
Local study area	Burial Grounds & Graves	1165/TAV7	-26.118888889	29.1319444	50-100km
Local study area	Burial Grounds & Graves	1165/TAV8	-26.116666667	29.1658333	50-100km

Study Area	Heritage Resource Type	Site Name	Latitude	Longitude	Distance from Development Footprint
Local study area	Burial Grounds & Graves	1165/TAV9	-26.143055556	29.1619444	50-100km
Local study area	Burial Grounds & Graves	138/Site Ramp 9/1	-25.731916667	30.0908333	50-100km
Local study area	Burial Grounds & Graves	1487/GN1	-25.848166667	29.8735167	20-50 km
Local study area	Burial Grounds & Graves	1487/GN5	-25.837000000	29.8974000	20-50 km
Local study area	Burial Grounds & Graves	1487/GN6	-25.837716667	29.8932833	20-50 km
Local study area	Burial Grounds & Graves	1487/GN7	-25.841266667	29.9120500	20-50 km
Local study area	Burial Grounds & Graves	1487/GY01	-25.887000000	29.8793500	20-50 km
Local study area	Burial Grounds & Graves	1487/GY02	-25.887533333	29.6954948	20-50 km
Local study area	Burial Grounds & Graves	1487/GY03	-25.880083333	29.8789167	20-50 km
Local study area	Burial Grounds & Graves	1487/GY04	-25.877616667	29.6954948	20-50 km
Local study area	Burial Grounds & Graves	1487/GY05	-25.884166667	29.6954948	20-50 km
Local study area	Burial Grounds & Graves	1487/GY06	-25.859300000	29.8733667	20-50 km
Local study area	Burial Grounds & Graves	1487/GY07	-25.858433333	29.8702667	20-50 km
Local study area	Burial Grounds & Graves	1487/GY08	-25.835083333	29.8790500	20-50 km
Local study area	Burial Grounds & Graves	1487/GY09	-25.839733333	29.8723667	20-50 km
Local study area	Burial Grounds & Graves	1487/GY10	-25.830816667	29.8924667	20-50 km
Local study area	Burial Grounds & Graves	166/Site 1	-26.229306782	29.1716000	50-100km
Local study area	Burial Grounds & Graves	1665/TAV23	-26.033888889	29.0388889	50-100km
Local study area	Burial Grounds & Graves	1668/Site2	-26.203980500	29.0352237	50-100km
Local study area	Burial Grounds & Graves	1668/Site3	-26.202162000	29.0268606	50-100km
Local study area	Burial Grounds & Graves	1718/GY01	-26.210050000	29.3591500	20-50 km
Local study area	Burial Grounds & Graves	1718/GY02	-26.191166667	29.6779272	1-5km
Local study area	Burial Grounds & Graves	1718/GY02	-26.191166667	29.6779272	20-50 km
Local study area	Burial Grounds & Graves	1722/S.36-003	-26.251479800	29.8880871	1-5km
Local study area	Burial Grounds & Graves	1722/S.36-004	-26.245514300	29.8854878	1-5km
Local study area	Burial Grounds & Graves	1722/S.36-010	-26.270301200	29.8367239	<50 m
Local study area	Burial Grounds & Graves	1722/S.36-028	-26.250316700	29.9363396	5-10 km
Local study area	Burial Grounds & Graves	1724/S.36-047	-25.842750000	30.2325861	50-100km

Study Area	Heritage Resource Type	Site Name	Latitude	Longitude	Distance from Development Footprint
Local study area	Burial Grounds & Graves	1724/S.36-048	-25.836163889	30.2227306	50-100km
Local study area	Burial Grounds & Graves	1724/S.36-052	-25.779413889	30.1796056	50-100km
Local study area	Burial Grounds & Graves	174/GY01	-26.125750000	29.7765870	5-10 km
Local study area	Burial Grounds & Graves	174/GY02	-26.125750000	28.8620833	50-100km
Local study area	Burial Grounds & Graves	174/GY03	-26.234333333	28.8548833	50-100km
Local study area	Burial Grounds & Graves	174/GY04	-26.243366667	28.8609833	50-100km
Local study area	Burial Grounds & Graves	1803/Site 1	-25.892470000	29.6842400	20-50 km
Local study area	Burial Grounds & Graves	1803/Site 10	-25.891340000	29.6839000	20-50 km
Local study area	Burial Grounds & Graves	1803/Site 11	-25.890740000	29.6828100	20-50 km
Local study area	Burial Grounds & Graves	1803/Site 12	-25.889770000	29.6832400	20-50 km
Local study area	Burial Grounds & Graves	1803/Site 13	-25.889500000	29.6841400	20-50 km
Local study area	Burial Grounds & Graves	1803/Site 16	-25.896900000	29.7357400	20-50 km
Local study area	Burial Grounds & Graves	1803/Site 17	-25.896040000	29.7294300	20-50 km
Local study area	Burial Grounds & Graves	1803/Site 18	-25.883380000	29.7411800	20-50 km
Local study area	Burial Grounds & Graves	1803/Site 19	-25.878690000	29.7444600	20-50 km
Local study area	Burial Grounds & Graves	1803/Site 2	-25.893980000	29.6880100	20-50 km
Local study area	Burial Grounds & Graves	1803/Site 20	-25.880040000	29.7456500	20-50 km
Local study area	Burial Grounds & Graves	1803/Site 21	-25.879730000	29.7455700	20-50 km
Local study area	Burial Grounds & Graves	1803/Site 22	-25.881210000	29.7455200	20-50 km
Local study area	Burial Grounds & Graves	1803/Site 23	-25.882090000	29.7438200	20-50 km
Local study area	Burial Grounds & Graves	1803/Site 24	-25.884420000	29.7422600	20-50 km
Local study area	Burial Grounds & Graves	1803/Site 25	-25.864950000	29.6843400	20-50 km
Local study area	Burial Grounds & Graves	1803/Site 27	-25.864770000	29.7237000	20-50 km
Local study area	Burial Grounds & Graves	1803/Site 29	-25.881410000	29.7195000	20-50 km
Local study area	Burial Grounds & Graves	1803/Site 3	-25.902610000	29.6900000	20-50 km
Local study area	Burial Grounds & Graves	1803/Site 30	-25.884290000	29.7147300	20-50 km
Local study area	Burial Grounds & Graves	1803/Site 31	-25.885860000	29.7175400	20-50 km
Local study area	Burial Grounds & Graves	1803/Site 32	-25.886630000	29.7172900	20-50 km

Study Area	Heritage Resource Type	Site Name	Latitude	Longitude	Distance from Development Footprint
Local study area	Burial Grounds & Graves	1803/Site 33	-25.889900000	29.7179400	20-50 km
Local study area	Burial Grounds & Graves	1803/Site 34	-25.891070000	29.7174100	20-50 km
Local study area	Burial Grounds & Graves	1803/Site 35	-25.892890000	29.7180400	20-50 km
Local study area	Burial Grounds & Graves	1803/Site 36	-25.907860000	29.7404100	20-50 km
Local study area	Burial Grounds & Graves	1803/Site 4	-25.905210000	29.6950400	20-50 km
Local study area	Burial Grounds & Graves	1803/Site 5	-25.907790000	29.6991800	20-50 km
Local study area	Burial Grounds & Graves	1803/Site 7	-25.903980000	29.7223900	20-50 km
Local study area	Burial Grounds & Graves	1803/Site 8	-25.892630000	29.6850800	20-50 km
Local study area	Burial Grounds & Graves	1803/Site 9	-25.891890000	29.6851100	20-50 km
Local study area	Burial Grounds & Graves	2179/Site2	-26.057250000	29.2821100	20-50 km
Local study area	Burial Grounds & Graves	2261/ADC1	-26.159840000	29.1632100	50-100km
Local study area	Burial Grounds & Graves	2261/ADC10	-26.146460000	29.1032600	50-100km
Local study area	Burial Grounds & Graves	2261/ADC12	-26.145930000	29.1309800	50-100km
Local study area	Burial Grounds & Graves	2261/ADC13	-26.140000000	29.1347100	50-100km
Local study area	Burial Grounds & Graves	2261/ADC14	-26.146660000	29.1228400	50-100km
Local study area	Burial Grounds & Graves	2261/ADC15	-26.152510000	29.1233200	50-100km
Local study area	Burial Grounds & Graves	2261/ADC16	-26.149690000	29.1168600	50-100km
Local study area	Burial Grounds & Graves	2261/ADC17	-26.156330000	29.1229300	50-100km
Local study area	Burial Grounds & Graves	2261/ADC18	-26.162280000	29.1170100	50-100km
Local study area	Burial Grounds & Graves	2261/ADC19	-26.165000000	29.1128900	50-100km
Local study area	Burial Grounds & Graves	2261/ADC2	-26.154380000	29.1511100	50-100km
Local study area	Burial Grounds & Graves	2261/ADC20	-26.170450000	29.1195500	50-100km
Local study area	Burial Grounds & Graves	2261/ADC21	-26.170110000	29.1219500	50-100km
Local study area	Burial Grounds & Graves	2261/ADC22	-26.157470000	29.1150500	50-100km
Local study area	Burial Grounds & Graves	2261/ADC25	-26.160660000	29.1327500	50-100km
Local study area	Burial Grounds & Graves	2261/ADC28	-26.168260000	29.1397200	50-100km
Local study area	Burial Grounds & Graves	2261/ADC3	-26.166770000	29.1569600	50-100km
Local study area	Burial Grounds & Graves	2261/ADC30	-26.178000000	29.1198600	50-100km

Study Area	Heritage Resource Type	Site Name	Latitude	Longitude	Distance from Development Footprint
Local study area	Burial Grounds & Graves	2261/ADC31	-26.167560000	29.1790300	50-100km
Local study area	Burial Grounds & Graves	2261/ADC32	-26.172000000	29.1785200	50-100km
Local study area	Burial Grounds & Graves	2261/ADC33	-26.171760000	29.1762600	50-100km
Local study area	Burial Grounds & Graves	2261/ADC36	-26.165830000	29.1694000	50-100km
Local study area	Burial Grounds & Graves	2261/ADC37	-26.151600000	29.1709400	50-100km
Local study area	Burial Grounds & Graves	2261/ADC38	-26.145070000	29.1778200	50-100km
Local study area	Burial Grounds & Graves	2261/ADC39	-26.154630000	29.1552200	50-100km
Local study area	Burial Grounds & Graves	2261/ADC4	-26.165180000	29.1530600	50-100km
Local study area	Burial Grounds & Graves	2261/ADC42	-26.144120000	29.1698900	50-100km
Local study area	Burial Grounds & Graves	2261/ADC46	-26.122780000	29.1910200	50-100km
Local study area	Burial Grounds & Graves	2261/ADC47	-26.121320000	29.1941100	50-100km
Local study area	Burial Grounds & Graves	2261/ADC48	-26.133200000	29.1723600	50-100km
Local study area	Burial Grounds & Graves	2261/ADC49	-26.143200000	29.1619300	50-100km
Local study area	Burial Grounds & Graves	2261/ADC5	-26.186820000	29.1231900	50-100km
Local study area	Burial Grounds & Graves	2261/ADC50	-26.135710000	29.1416900	50-100km
Local study area	Burial Grounds & Graves	2261/ADC51	-26.127300000	29.1468300	50-100km
Local study area	Burial Grounds & Graves	2261/ADC53	-26.154180000	29.1320500	50-100km
Local study area	Burial Grounds & Graves	2261/ADC6	-26.149730000	29.0958800	50-100km
Local study area	Burial Grounds & Graves	2261/ADC60	-26.127260000	29.1343800	50-100km
Local study area	Burial Grounds & Graves	2261/ADC61	-26.194210000	29.1314200	50-100km
Local study area	Burial Grounds & Graves	2261/ADC7	-26.145310000	29.0968900	50-100km
Local study area	Burial Grounds & Graves	2261/ADC8	-26.144360000	29.0978400	50-100km
Local study area	Burial Grounds & Graves	2859/Site9	-25.861666667	29.4022222	20-50 km
Local study area	Burial Grounds & Graves	3020/S.36-001	-26.063025000	29.2486080	20-50 km
Local study area	Burial Grounds & Graves	3020/S.36-002	-26.079160000	29.2319540	50-100km
Local study area	Burial Grounds & Graves	3020/S.36-003	-26.078884000	29.2305510	50-100km
Local study area	Burial Grounds & Graves	4249/GY01	-26.074850006	29.5414125	20-50 km
Local study area	Burial Grounds & Graves	4249/GY02	-25.957100000	29.5414125	20-50 km

Study Area	Heritage Resource Type	Site Name	Latitude	Longitude	Distance from Development Footprint
Local study area	Burial Grounds & Graves	4309/Site 1	-26.093150000	29.9887500	20-50 km
Local study area	Burial Grounds & Graves	4309/Site 3	-26.086216667	29.9910333	20-50 km
Local study area	Burial Grounds & Graves	4309/Site 4	-26.070900000	30.0012333	20-50 km
Local study area	Burial Grounds & Graves	466/Rood 1	-26.187040000	29.2339600	20-50 km
Local study area	Burial Grounds & Graves	4912/S.36-001	-26.369650000	29.0998111	50-100km
Local study area	Burial Grounds & Graves	4912/S.36-002	-26.389769444	29.1024083	50-100km
Local study area	Burial Grounds & Graves	4912/S.36-003	-26.407969444	29.0937306	50-100km
Local study area	Burial Grounds & Graves	4912/S.36-004	-26.425713889	29.1462333	50-100km
Local study area	Burial Grounds & Graves	5472/2530CC/S.36-006	-25.766380000	30.0207400	50-100km
Local study area	Burial Grounds & Graves	5472/2530CC/S.36-007	-25.769560000	30.0150250	50-100km
Local study area	Burial Grounds & Graves	5914/Site 1	-25.692694444	29.2341111	50-100km
Local study area	Burial Grounds & Graves	6251/G01	-25.884883333	29.7740333	20-50 km
Local study area	Burial Grounds & Graves	6251/G04	-25.880250000	29.7758333	20-50 km
Local study area	Burial Grounds & Graves	6251/G09	-25.873766667	29.8077500	20-50 km
Local study area	Burial Grounds & Graves	6251/G11	-25.885383333	29.8249833	20-50 km
Local study area	Burial Grounds & Graves	6251/G12	-25.897400000	29.8138500	20-50 km
Local study area	Burial Grounds & Graves	6251/G26	-25.995466667	29.7964833	20-50 km
Local study area	Burial Grounds & Graves	6251/GY02	-25.886166667	29.7726667	20-50 km
Local study area	Burial Grounds & Graves	6251/GY03	-25.879133333	29.7706500	20-50 km
Local study area	Burial Grounds & Graves	6251/GY05	-25.881650000	29.7831833	20-50 km
Local study area	Burial Grounds & Graves	6251/GY06	-25.859183333	29.7736333	20-50 km
Local study area	Burial Grounds & Graves	6251/GY07	-25.860766667	29.7752167	20-50 km
Local study area	Burial Grounds & Graves	6251/GY08	-25.856766667	29.7989500	20-50 km
Local study area	Burial Grounds & Graves	6251/GY10	-25.880133333	29.8240167	20-50 km
Local study area	Burial Grounds & Graves	6251/GY13	-25.896650000	29.8258333	20-50 km
Local study area	Burial Grounds & Graves	6251/GY14	-25.89665	29.8258333	20-50 km
Local study area	Burial Grounds & Graves	6251/GY15	-25.870150000	29.8291167	20-50 km
Local study area	Burial Grounds & Graves	6251/GY16	-25.858150000	29.8185500	20-50 km

Study Area	Heritage Resource Type	Site Name	Latitude	Longitude	Distance from Development Footprint
Local study area	Burial Grounds & Graves	6251/GY17	-25.875266667	29.8180167	20-50 km
Local study area	Burial Grounds & Graves	6251/GY18	-25.866100000	29.8513333	20-50 km
Local study area	Burial Grounds & Graves	6251/GY19	-25.932000000	29.8670333	20-50 km
Local study area	Burial Grounds & Graves	6251/GY20	-25.943833333	29.8689667	20-50 km
Local study area	Burial Grounds & Graves	6251/GY21	-25.940833333	29.8688167	20-50 km
Local study area	Burial Grounds & Graves	6251/GY22	-25.928200000	29.8712500	20-50 km
Local study area	Burial Grounds & Graves	6251/GY23	-25.924883333	29.8760500	20-50 km
Local study area	Burial Grounds & Graves	6251/GY24	-25.893916667	29.8594833	20-50 km
Local study area	Burial Grounds & Graves	6251/GY27	-26.001583333	29.7927167	10-20 km
Local study area	Burial Grounds & Graves	6251/GY28	-25.861150000	29.7546100	20-50 km
Local study area	Burial Grounds & Graves	6251/GY29	-25.884230000	29.7641300	20-50 km
Local study area	Burial Grounds & Graves	6251/GY30	-25.887910000	29.7691600	20-50 km
Local study area	Burial Grounds & Graves	6251/GY31	-25.899490000	29.7778000	20-50 km
Local study area	Burial Grounds & Graves	6251/GY32	-25.898880000	29.7647000	20-50 km
Local study area	Burial Grounds & Graves	6251/GY33	-25.921410000	29.7677900	20-50 km
Local study area	Burial Grounds & Graves	6357/2530CC/S.36-003	-25.867400000	30.0071500	20-50 km
Local study area	Burial Grounds & Graves	6357/Site 1	-25.867780000	30.0093056	20-50 km
Local study area	Burial Grounds & Graves	6391/AE6	-26.092540000	29.2704400	20-50 km
Local study area	Burial Grounds & Graves	6391/AR10	-26.099852780	29.2739056	20-50 km
Local study area	Burial Grounds & Graves	6391/AR16	-26.106700000	29.2682611	20-50 km
Local study area	Burial Grounds & Graves	6391/AR17	-26.098416670	29.2701556	20-50 km
Local study area	Burial Grounds & Graves	6391/AR18	-26.087191670	29.2393889	20-50 km
Local study area	Burial Grounds & Graves	6391/AR20	-26.106477780	29.2679194	20-50 km
Local study area	Burial Grounds & Graves	6391/AR9	-26.105844440	29.2670139	20-50 km
Local study area	Burial Grounds & Graves	6391/AS4	-26.096125000	29.2669583	20-50 km
Local study area	Burial Grounds & Graves	6391/AS5	-26.099783330	29.2734861	20-50 km
Local study area	Burial Grounds & Graves	6391/FR3	-26.105950000	29.2677139	20-50 km
Local study area	Burial Grounds & Graves	6391/FR4	-26.106708330	29.2686583	20-50 km

Study Area	Heritage Resource Type	Site Name	Latitude	Longitude	Distance from Development Footprint
Local study area	Burial Grounds & Graves	6391/Grave Site 1	-26.071297220	29.2515056	20-50 km
Local study area	Burial Grounds & Graves	6391/Grave Site 2	-26.072455560	29.2486306	20-50 km
Local study area	Burial Grounds & Graves	6391/Grave Site 3	-26.081133330	29.2495944	20-50 km
Local study area	Burial Grounds & Graves	6391/Grave Site 4	-26.099875000	29.2622139	20-50 km
Local study area	Burial Grounds & Graves	6391/Grave Site 5	-26.100741670	29.2899306	20-50 km
Local study area	Burial Grounds & Graves	6391/Grave Site 6	-26.107886110	29.2696667	20-50 km
Local study area	Burial Grounds & Graves	6391/Grave Site 7	-26.108694440	29.2685806	20-50 km
Local study area	Burial Grounds & Graves	6391/Grave Site 9	-26.121477780	29.2703528	20-50 km
Local study area	Burial Grounds & Graves	6391/K10	-26.105797220	29.2676139	20-50 km
Local study area	Burial Grounds & Graves	6391/K11	-26.105533330	29.2676139	20-50 km
Local study area	Burial Grounds & Graves	6391/K12	-26.106375000	29.2686278	20-50 km
Local study area	Burial Grounds & Graves	6391/K13	-26.105494440	29.2678111	20-50 km
Local study area	Burial Grounds & Graves	6391/K30	-26.098658330	29.2852917	20-50 km
Local study area	Burial Grounds & Graves	6391/K31	-26.106111110	29.2679861	20-50 km
Local study area	Burial Grounds & Graves	6391/K32	-26.088488890	29.2517500	20-50 km
Local study area	Burial Grounds & Graves	6391/K9	-26.105911110	29.2675278	20-50 km
Local study area	Burial Grounds & Graves	6391/KR1	-26.089188890	29.2522528	20-50 km
Local study area	Burial Grounds & Graves	6391/KR12	-26.092350000	29.2545917	20-50 km
Local study area	Burial Grounds & Graves	6391/KR13	-26.086997220	29.2512583	20-50 km
Local study area	Burial Grounds & Graves	6391/KR14	-26.081916670	29.2497444	20-50 km
Local study area	Burial Grounds & Graves	6391/KR16	-26.071150000	29.2513222	20-50 km
Local study area	Burial Grounds & Graves	6391/KR17	-26.070888890	29.2482278	20-50 km
Local study area	Burial Grounds & Graves	6391/KR18	-26.086508330	29.2511361	20-50 km
Local study area	Burial Grounds & Graves	6391/KR2	-26.090450000	29.2783333	20-50 km
Local study area	Burial Grounds & Graves	6391/KR3	-26.085780560	29.2509306	20-50 km
Local study area	Burial Grounds & Graves	6492/GY01	-25.985566667	29.5414125	20-50 km
Local study area	Burial Grounds & Graves	6492/GY02	-26.074850000	29.5414125	20-50 km
Local study area	Burial Grounds & Graves	6492/GY03	-25.972433333	29.6133742	20-50 km

Study Area	Heritage Resource Type	Site Name	Latitude	Longitude	Distance from Development Footprint
Local study area	Burial Grounds & Graves	6492/GY04	-25.998950000	29.6133742	20-50 km
Local study area	Burial Grounds & Graves	6492/GY05	-25.993016667	29.6133742	20-50 km
Local study area	Burial Grounds & Graves	6492/GY06	-25.993200000	29.6133742	20-50 km
Local study area	Burial Grounds & Graves	6492/GY07	-25.950783333	29.6779272	20-50 km
Local study area	Burial Grounds & Graves	6492/GY08	-25.950900000	29.6779272	20-50 km
Local study area	Burial Grounds & Graves	654/2629AA1	-26.198388889	29.1741389	50-100km
Local study area	Burial Grounds & Graves	654/2629AA13	-26.234888889	29.1381944	50-100km
Local study area	Burial Grounds & Graves	654/2629AA14	-26.212472222	29.1262222	50-100km
Local study area	Burial Grounds & Graves	654/2629AA15	-26.194222222	29.1539444	50-100km
Local study area	Burial Grounds & Graves	654/2629AA16	-26.209750000	29.1557778	50-100km
Local study area	Burial Grounds & Graves	654/2629AA18	-26.201222222	29.1755278	50-100km
Local study area	Burial Grounds & Graves	654/2629AA19	-26.176666667	29.1720833	50-100km
Local study area	Burial Grounds & Graves	654/2629AA2	-26.195416667	29.1756389	50-100km
Local study area	Burial Grounds & Graves	654/2629AA4	-26.195111111	29.1788056	50-100km
Local study area	Burial Grounds & Graves	654/2629AA7	-26.204583333	29.1567778	50-100km
Local study area	Burial Grounds & Graves	654/2629AA8	-26.203861111	29.1569167	50-100km
Local study area	Burial Grounds & Graves	659/2630AA5	-26.170666667	30.1521944	20-50 km
Local study area	Burial Grounds & Graves	659/2630AA7	-26.197166667	30.1090000	20-50 km
Local study area	Burial Grounds & Graves	659/2630AA8	-26.202055556	30.1016944	20-50 km
Local study area	Burial Grounds & Graves	662/2629BC2	-26.396944444	29.6150000	10-20 km
Local study area	Burial Grounds & Graves	662/2629BC3	-26.397500000	29.6155556	10-20 km
Local study area	Burial Grounds & Graves	662/2629BC4	-26.414444444	29.5652778	20-50 km
Local study area	Burial Grounds & Graves	662/2629BC5	-26.419166667	29.5030556	20-50 km
Local study area	Burial Grounds & Graves	672/2629AC16	-26.521833333	29.2370833	50-100km
Local study area	Burial Grounds & Graves	672/2629AD103	-26.436138889	29.4276111	20-50 km
Local study area	Burial Grounds & Graves	684/2629AB7	-26.163027778	29.4725556	20-50 km
Local study area	Burial Grounds & Graves	684/2629BA1	-26.155305556	29.5243889	10-20 km
Local study area	Burial Grounds & Graves	684/2629BA2	-26.157916667	29.5780556	10-20 km

Study Area	Heritage Resource Type	Site Name	Latitude	Longitude	Distance from Development Footprint
Local study area	Burial Grounds & Graves	687/GY01	-26.019722222	29.7991667	10-20 km
Local study area	Burial Grounds & Graves	687/GY02	-26.023888889	29.7652778	10-20 km
Local study area	Burial Grounds & Graves	687/GY03	-26.024722222	29.7700000	10-20 km
Local study area	Burial Grounds & Graves	710/2628AA33	-26.208583333	29.0073056	50-100km
Local study area	Burial Grounds & Graves	710/2628AA34	-26.210694444	29.0498333	50-100km
Local study area	Burial Grounds & Graves	710/2628BB2	-26.232777778	28.9928889	50-100km
Local study area	Burial Grounds & Graves	710/2628BB3	-26.166638889	28.9957222	50-100km
Local study area	Burial Grounds & Graves	710/2628BB4	-26.120722222	28.9624722	50-100km
Local study area	Burial Grounds & Graves	710/2628BB5	-26.131805556	28.9656389	50-100km
Local study area	Burial Grounds & Graves	710/2628BB6	-26.131972222	28.9713889	50-100km
Local study area	Burial Grounds & Graves	710/2628BB7	-26.158777778	28.9652500	50-100km
Local study area	Burial Grounds & Graves	710/2628BB8	-26.167055556	28.9779167	50-100km
Local study area	Burial Grounds & Graves	710/2629AA35	-26.150250000	29.0037500	50-100km
Local study area	Burial Grounds & Graves	711/2629AA26	-26.077000000	29.0282778	50-100km
Local study area	Burial Grounds & Graves	711/2629AA36	-26.084055556	29.0297222	50-100km
Local study area	Burial Grounds & Graves	711/2629AA37	-26.088666667	29.0264444	50-100km
Local study area	Burial Grounds & Graves	711/2629AA41	-26.112444444	29.0197500	50-100km
Local study area	Burial Grounds & Graves	8410/Site 13	-26.122250000	29.4103611	20-50 km
Local study area	Burial Grounds & Graves	8410/Site 5	-26.123138889	29.4660556	20-50 km
Local study area	Burial Grounds & Graves	8410/Site 6	-26.138638889	29.4188333	20-50 km
Local study area	Historical Built Environment	1025/2629BB-MHC002	-26.167727400	29.8320380	1-5km
Local study area	Historical Built Environment	1121/Site10	-26.068190000	29.7309200	10-20 km
Local study area	Historical Built Environment	1121/Site15	-26.053860000	29.7114000	10-20 km
Local study area	Historical Built Environment	1121/Site16	-26.046870000	29.7043600	10-20 km
Local study area	Historical Built Environment	1121/Site19	-26.050460000	29.6987600	10-20 km
Local study area	Historical Built Environment	1121/Site2	-26.028330000	29.7085500	10-20 km
Local study area	Historical Built Environment	1121/Site20	-26.047240000	29.6912100	10-20 km
Local study area	Historical Built Environment	1121/Site21	-26.046930000	29.6930600	10-20 km

Study Area	Heritage Resource Type	Site Name	Latitude	Longitude	Distance from Development Footprint
Local study area	Historical Built Environment	1121/Site22	-26.047320000	29.6950200	10-20 km
Local study area	Historical Built Environment	1121/Site32	-26.086390000	29.6927700	10-20 km
Local study area	Historical Built Environment	1121/Site33	-26.092550000	29.7017800	10-20 km
Local study area	Historical Built Environment	1121/Site36	-26.105270000	29.7189200	5-10 km
Local study area	Historical Built Environment	1121/Site40	-26.117820000	29.7188400	5-10 km
Local study area	Historical Built Environment	1121/Site46	-26.024440000	29.7746700	10-20 km
Local study area	Historical Built Environment	1121/Site47	-26.025990000	29.7654900	10-20 km
Local study area	Historical Built Environment	1121/Site49	-26.065340000	29.6819500	10-20 km
Local study area	Historical Built Environment	1121/Site5	-26.038890000	29.7173100	10-20 km
Local study area	Historical Built Environment	1121/Site50	-26.071450000	29.6847300	10-20 km
Local study area	Historical Built Environment	1121/Site51	-26.087010000	29.7078370	10-20 km
Local study area	Historical Built Environment	1121/Site52	-26.097430000	29.7083700	5-10 km
Local study area	Historical Built Environment	1121/Site53	-26.123440000	29.7234500	5-10 km
Local study area	Historical Built Environment	1121/Site54	-26.117200000	29.7231100	5-10 km
Local study area	Historical Built Environment	1121/Site55	-26.031800000	29.7569400	10-20 km
Local study area	Historical Built Environment	1121/Site56	-26.028520000	29.7218100	10-20 km
Local study area	Historical Built Environment	1121/Site6	-26.044950000	29.7154500	10-20 km
Local study area	Historical Built Environment	1121/Site8	-26.065600000	29.7398200	10-20 km
Local study area	Historical Built Environment	1164/2629AA23	-26.026861111	29.0518611	50-100km
Local study area	Historical Built Environment	1164/2629AA27	-26.077861111	29.0272500	50-100km
Local study area	Historical Built Environment	138/Site Ramp 9/2	-25.729833333	30.0868611	50-100km
Local study area	Historical Built Environment	1487/HH01	-25.885783333	29.8775833	20-50 km
Local study area	Historical Built Environment	1487/HH02	-25.833533333	29.8774167	20-50 km
Local study area	Historical Built Environment	1668/Site1	-26.202768200	29.0292263	50-100km
Local study area	Historical Built Environment	1718/HFC1	-26.209233333	29.6779272	1-5km
Local study area	Historical Built Environment	1718/HFC1	-26.209233333	29.6779272	20-50 km
Local study area	Historical Built Environment	1718/HFC2	-26.196683333	29.3420333	20-50 km
Local study area	Historical Built Environment	1718/MH01	-26.204083333	29.3644833	20-50 km

Study Area	Heritage Resource Type	Site Name	Latitude	Longitude	Distance from Development Footprint
Local study area	Historical Built Environment	1722/S.34-001	-26.253816100	29.8873307	1-5km
Local study area	Historical Built Environment	1722/S.34-002	-26.254398000	29.8874342	1-5km
Local study area	Historical Built Environment	1722/S.34-005	-26.252993200	29.8902380	1-5km
Local study area	Historical Built Environment	1722/S.34-006	-26.263222100	29.8690339	1-5km
Local study area	Historical Built Environment	1722/S.34-008	-26.238844600	29.8716846	1-5km
Local study area	Historical Built Environment	1722/S.34-009	-26.217977800	29.8281673	1-5km
Local study area	Historical Built Environment	1722/S.34-011	-26.269217000	29.8390613	50-100 m
Local study area	Historical Built Environment	1722/S.34-012	-26.268828000	29.8355174	100-500 m
Local study area	Historical Built Environment	1722/S.34-022	-26.268145800	29.9393975	5-10 km
Local study area	Historical Built Environment	1722/S.34-026	-26.264465500	29.9491191	5-10 km
Local study area	Historical Built Environment	1722/S.34-027	-26.257482600	29.9508838	10-20 km
Local study area	Historical Built Environment	1722/S.35-020	-26.253126300	29.8140734	<50 m
Local study area	Historical Built Environment	1724/S.34-046	-25.842547222	30.2279417	50-100km
Local study area	Historical Built Environment	1724/S.34-050	-25.783141667	30.1856250	50-100km
Local study area	Historical Built Environment	1724/S.34-053	-25.783600000	30.1758111	50-100km
Local study area	Historical Built Environment	1724/S.34-054	-25.793041667	30.1697389	50-100km
Local study area	Historical Built Environment	1724/S.35-049	-25.841536111	30.2017972	50-100km
Local study area	Historical Built Environment	174/S01	-26.045029826	28.8612833	50-100km
Local study area	Historical Built Environment	1803/Site 14	-25.886170000	29.6725400	20-50 km
Local study area	Historical Built Environment	1803/Site 15	-25.893990000	29.6847800	20-50 km
Local study area	Historical Built Environment	1803/Site 26	-25.868650000	29.7335000	20-50 km
Local study area	Historical Built Environment	1803/Site 28	-25.871630000	29.7101600	20-50 km
Local study area	Historical Built Environment	1803/Site 6	-25.908970000	29.7010800	20-50 km
Local study area	Historical Built Environment	2179/Site1	-26.057900000	29.2843500	20-50 km
Local study area	Historical Built Environment	2179/Site4	-26.055880000	29.2715400	20-50 km
Local study area	Historical Built Environment	2261/ADC11	-26.145810000	29.1319200	50-100km
Local study area	Historical Built Environment	2261/ADC23	-26.155980000	29.1355200	50-100km
Local study area	Historical Built Environment	2261/ADC24	-26.147960000	29.1317300	50-100km

Study Area	Heritage Resource Type	Site Name	Latitude	Longitude	Distance from Development Footprint
Local study area	Historical Built Environment	2261/ADC26	-26.165370000	29.1303900	50-100km
Local study area	Historical Built Environment	2261/ADC27	-26.164510000	29.1393100	50-100km
Local study area	Historical Built Environment	2261/ADC29	-26.174160000	29.1233200	50-100km
Local study area	Historical Built Environment	2261/ADC34	-26.169610000	29.1785800	50-100km
Local study area	Historical Built Environment	2261/ADC35	-26.168360000	29.1798500	50-100km
Local study area	Historical Built Environment	2261/ADC40	-26.158340000	29.1613400	50-100km
Local study area	Historical Built Environment	2261/ADC41	-26.160720000	29.1621700	50-100km
Local study area	Historical Built Environment	2261/ADC43	-26.136040000	29.1811100	50-100km
Local study area	Historical Built Environment	2261/ADC44	-26.135610000	29.1771500	50-100km
Local study area	Historical Built Environment	2261/ADC45	-26.149920000	29.1560100	50-100km
Local study area	Historical Built Environment	2261/ADC52	-26.152480000	29.1690700	50-100km
Local study area	Historical Built Environment	2261/ADC54	-26.144780000	29.1648200	50-100km
Local study area	Historical Built Environment	2261/ADC55	-26.140810000	29.1846200	50-100km
Local study area	Historical Built Environment	2261/ADC56	-26.135860000	29.1843000	50-100km
Local study area	Historical Built Environment	2261/ADC57	-26.150470000	29.1455700	50-100km
Local study area	Historical Built Environment	2261/ADC58	-26.165160000	29.1636000	50-100km
Local study area	Historical Built Environment	2261/ADC59	-26.134770000	29.0901800	50-100km
Local study area	Historical Built Environment	2261/ADC62	-26.166850000	29.1667800	50-100km
Local study area	Historical Built Environment	2261/ADC63	-26.161860000	29.1207300	50-100km
Local study area	Historical Built Environment	2261/ADC64	-26.160600000	29.1127200	50-100km
Local study area	Historical Built Environment	2261/ADC65	-26.170310000	29.1230320	50-100km
Local study area	Historical Built Environment	2261/ADC9	-26.145510000	29.1027200	50-100km
Local study area	Historical Built Environment	2859/Site10	-25.865000000	29.4027778	20-50 km
Local study area	Historical Built Environment	2859/Site4	-25.856944444	29.4066667	20-50 km
Local study area	Historical Built Environment	2859/Site5	-25.858333333	29.4075000	20-50 km
Local study area	Historical Built Environment	2859/Site6	-25.854444444	29.4161111	20-50 km
Local study area	Historical Built Environment	2859/Site7	-25.856111111	29.4019444	20-50 km
Local study area	Historical Built Environment	2859/Site8	-25.861111111	29.4125000	20-50 km

Study Area	Heritage Resource Type	Site Name	Latitude	Longitude	Distance from Development Footprint
Local study area	Historical Built Environment	2907/Site1	-26.226666667	29.2988889	20-50 km
Local study area	Historical Built Environment	2907/Site2	-26.233888889	29.3036111	20-50 km
Local study area	Historical Built Environment	3020/S.34-005	-26.072500000	29.2341670	50-100km
Local study area	Historical Built Environment	3020/S.34-006	-26.066944000	29.2441670	20-50 km
Local study area	Historical Built Environment	3020/S.34-007	-26.061914000	29.2445160	20-50 km
Local study area	Historical Built Environment	3020/S.34-008	-26.046016000	29.1952900	50-100km
Local study area	Historical Built Environment	4309/Site 2	-26.091716667	29.9882667	20-50 km
Local study area	Historical Built Environment	4912/S.34-001	-26.371086111	29.1010194	50-100km
Local study area	Historical Built Environment	4912/S.34-002	-26.428922222	29.1366722	50-100km
Local study area	Historical Built Environment	4912/S.34-003	-26.383397222	29.1672778	50-100km
Local study area	Historical Built Environment	4912/S.34-004	-26.441247222	29.1524861	50-100km
Local study area	Historical Built Environment	5472/2530CC/S.34-001	-25.777700000	30.0210600	50-100km
Local study area	Historical Built Environment	5472/2530CC/S.34-002	-25.766331000	30.0345070	50-100km
Local study area	Historical Built Environment	5472/2530CC/S.34-003	-25.787703000	30.0108180	20-50 km
Local study area	Historical Built Environment	6251/CE01	-25.876350000	29.7680667	20-50 km
Local study area	Historical Built Environment	6251/CE02	-25.862766667	29.8212833	20-50 km
Local study area	Historical Built Environment	6251/FC01	-25.856150000	29.7887500	20-50 km
Local study area	Historical Built Environment	6251/FC02	-25.885550000	29.8259333	20-50 km
Local study area	Historical Built Environment	6251/FC03	-25.888100000	29.8262833	20-50 km
Local study area	Historical Built Environment	6251/FC04	-25.851616667	29.8582667	20-50 km
Local study area	Historical Built Environment	6251/FC05	-25.898850000	29.8115833	20-50 km
Local study area	Historical Built Environment	6251/FC06	-25.917783333	29.8181333	20-50 km
Local study area	Historical Built Environment	6251/FC07	-25.905716667	29.8599667	20-50 km
Local study area	Historical Built Environment	6251/FC08	-25.991966667	29.8026167	20-50 km
Local study area	Historical Built Environment	6251/FC09	-25.866390000	29.7554800	20-50 km
Local study area	Historical Built Environment	6251/FC10	-25.913950000	29.7651600	20-50 km
Local study area	Historical Built Environment	6251/HH01	-25.855666667	29.7893333	20-50 km
Local study area	Historical Built Environment	6251/HH02	-25.883633333	29.8203333	20-50 km

Study Area	Heritage Resource Type	Site Name	Latitude	Longitude	Distance from Development Footprint
Local study area	Historical Built Environment	6251/HH04	-25.920166667	29.8592500	20-50 km
Local study area	Historical Built Environment	6251/HH05	-25.874572253	29.8676833	20-50 km
Local study area	Historical Built Environment	6251/HH06	-25.997683333	29.7970333	20-50 km
Local study area	Historical Built Environment	6251/SR01	-25.880066667	29.7839000	20-50 km
Local study area	Historical Built Environment	6357/Site 2	-25.865940000	30.0075278	20-50 km
Local study area	Historical Built Environment	6391/AR19	-26.092916670	29.2571833	20-50 km
Local study area	Historical Built Environment	6391/AR5	-26.092844440	29.2567278	20-50 km
Local study area	Historical Built Environment	6391/FH6	-26.092666670	29.2559194	20-50 km
Local study area	Historical Built Environment	6391/FH7	-26.091919440	29.2543194	20-50 km
Local study area	Historical Built Environment	654/2629AA10	-26.218944444	29.1437500	50-100km
Local study area	Historical Built Environment	654/2629AA11	-26.223972222	29.1434722	50-100km
Local study area	Historical Built Environment	654/2629AA12	-26.225694444	29.1405000	50-100km
Local study area	Historical Built Environment	654/2629AA17	-26.201222222	29.1709167	50-100km
Local study area	Historical Built Environment	654/2629AA3	-26.195527778	29.1763056	50-100km
Local study area	Historical Built Environment	654/2629AA5	-26.198388889	29.1778333	50-100km
Local study area	Historical Built Environment	654/2629AA6	-26.204583333	29.1567778	50-100km
Local study area	Historical Built Environment	654/2629AA9	-26.211222222	29.1319444	50-100km
Local study area	Historical Built Environment	684/2629AB6	-26.164083333	29.4645000	20-50 km
Local study area	Historical Built Environment	711/2629AA27	-26.077861111	29.0272500	50-100km
Local study area	Historical Built Environment	711/2629AA38	-26.089250000	29.0220000	50-100km
Local study area	Historical Built Environment	711/2629AA39	-26.103166667	29.0225556	50-100km
Local study area	Historical Built Environment	711/2629AA40	-26.111250000	29.0171667	50-100km
Local study area	Historical Built Environment	8410/Site 7	-26.115222222	29.4113611	20-50 km
Local study area	Historical Built Environment	8481/HP01	-26.154360000	29.7158900	1-5km
Local study area	Historical Built Environment	8481/HP02	-26.106910000	29.6959800	5-10 km
Local study area	Historical Built Environment	8481/HP03	-26.065650000	29.6819700	10-20 km
Local study area	Historical Built Environment	8481/HP04	-26.034080000	29.6618800	10-20 km
Local study area	Palaeontological	1722/S.35-042	-26.269080000	29.8390510	50-100 m

Study Area	Heritage Resource Type	Site Name	Latitude	Longitude	Distance from Development Footprint
Local study area	Palaeontological	1722/S.35-043	-26.268997000	29.8386860	100-500 m
Local study area	Palaeontological	1722/S.35-044	-26.226136000	29.8608240	1-5km
Local study area	Palaeontological	1724/S.35-056	-25.681116667	30.2167917	50-100km
Local study area	Recent heritage	1718/RP01	-26.201116667	29.3509500	20-50 km
Local study area	Recent heritage	1718/RP02	-26.202100000	29.3404500	20-50 km
Local study area	Recent heritage	687/RRP01	-26.020277778	29.7958333	10-20 km
Local study area	Recent heritage	8481/FT01	-26.077070000	29.6867900	10-20 km
Local study area	Recent heritage	8481/FT02	-26.055460000	29.6740700	10-20 km
Secondary study area	Archaeological - LFC	1722/S.35-013	-26.282716100	29.8360834	<50 m
Secondary study area	Archaeological - LSA	1722/S.35-015	-26.273056200	29.8343102	<50 m
Secondary study area	Archaeological - LSA	1722/S.35-019	-26.255244900	29.8147442	<50 m
Secondary study area	Archaeological - LSA	1722/S.35-029	-26.273691000	29.8329060	<50 m
Secondary study area	Archaeological - MSA	1722/S.35-014	-26.283057000	29.8343425	<50 m
Secondary study area	Burial Grounds & Graves	1722/S.36-017	-26.256355400	29.8170457	<50 m
Secondary study area	Historical Built Environment	1722/S.34-030	-26.271387000	29.8337570	<50 m
Secondary study area	Historical Built Environment	1722/S.35-018	-26.255014300	29.8158297	<50 m
Secondary study area	Palaeontological	1722/S.35-034	-26.277381000	29.8329920	<50 m
Secondary study area	Palaeontological	1722/S.35-035	-26.276266000	29.8333140	<50 m
Secondary study area	Palaeontological	1722/S.35-036	-26.273667000	29.8329950	<50 m
Secondary study area	Palaeontological	1722/S.35-040	-26.272183000	29.8338640	<50 m
Unknown	Burial Grounds & Graves	687/GY04	no coords		
Unknown	Burial Grounds & Graves	687/GY05	no coords		
Unknown	Burial Grounds & Graves	687/GY06	no coords		
Unknown	Burial Grounds & Graves	687/GY07	no coords		
Unknown	Historical Built Environment	687/HH01	no coords		
Unknown	Historical Built Environment	687/HH02	no coords		
Unknown	Historical Built Environment	687/HH03	no coords		
Unknown	Historical Built Environment	687/HH04	no coords		

Study Area	Heritage Resource Type	Site Name	Latitude	Longitude	Distance from Development Footprint
Unknown	Recent heritage	687/MFC01	no coords		
Unknown	Recent heritage	687/MFC02	no coords		
Unknown	Recent heritage	687/MFC03	no coords		
Unknown	Recent heritage	687/MFC04	no coords		