



DIGBY WELLS  
ENVIRONMENTAL



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## De Grooteboom Mining Permit Application and Associated Environmental Management Plan

### Heritage Impact Assessment

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**Project Number:**

UAR2967

**Prepared for:**

De Groote Boom Minerals (Pty) Ltd

April 2015

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<b>Project Name:</b>	<b>De Grooteboom Mining Permit Application and Associated Environmental Management Plan</b>
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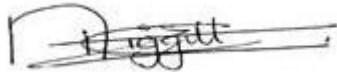
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I, Natasha Higgitt as duly authorised representative of Digby Wells and Associates (South Africa) (Pty) Ltd., hereby confirm my independence (as well as that of Digby Wells and Associates (South Africa) (Pty) Ltd.) and declare that neither I nor Digby 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 De Grootboom Minerals (Pty) Ltd, other than fair remuneration for work performed, specifically in connection with the Heritage Resources Management (HRM) Process for the proposed De Grootboom Mining Permit Application, Limpopo Province. .



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## ACRONYMS AND ABBREVIATIONS

<b>Abbreviation</b>	<b>Definition</b>
<b>AIA</b>	Archaeological Impact Assessment
<b>ASAPA</b>	Association of Southern African Professional Archaeologists
<b>BID</b>	Background Information Document
<b>Bsc</b>	Bachelor of Science
<b>Digby Wells</b>	Digby Wells Environmental
<b>DMR</b>	Department of Mineral Resources
<b>EIA</b>	Environmental Impact Assessment
<b>EMP</b>	Environmental Management Programme
<b>ESA</b>	Early Stone Age
<b>GIS</b>	Geographical Information System
<b>GPS</b>	Global Positioning System
<b>GSDM</b>	Greater Sekhukhune District Municipality
<b>GTLM</b>	Greater Tubatse Local Municipality
<b>HIA</b>	Heritage Impact Assessment
<b>Hons</b>	Honours degree
<b>HRM</b>	Heritage Resources Management
<b>HSR</b>	Heritage Scoping Report
<b>ICOMOS</b>	International Council on Monuments and Sites
<b>IDP</b>	Integrated Development Plan
<b>LFC</b>	Late Farming Community also known as Late Iron Age
<b>LIHRA</b>	Limpopo Heritage Resources Authority

<b>LoM</b>	Life of Mine
<b>LSA</b>	Late Stone Age
<b>MA</b>	Master of Arts
<b>MIA</b>	Middle Iron Age
<b>MPA</b>	Mining Permit Application
<b>MPRDA</b>	Minerals and Petroleum Resources Development Act, 2002 (Act No. 28 of 2002)
<b>MSA</b>	Middle Stone Age
<b>Msc</b>	Master of Science
<b>Mt</b>	Monument
<b>NASA</b>	National Archives of South Africa
<b>NEMA</b>	National Environmental Management Act, 1998 (Act No. 107 of 1998)
<b>NHRA</b>	National Heritage Resources Act, 1999 (Act No. 25 of 1999)
<b>NID</b>	Notification of Intent to Develop
<b>NWA</b>	National Water Act, 1998 (Act No. 36 of 1998)
<b>PCD</b>	Pollution Control Dam
<b>PGM</b>	Platinum Group Metals
<b>SAHRA</b>	South African Heritage Resources Agency
<b>SAHRIS</b>	South African Heritage Resources Information System
<b>SAMA</b>	South African Museum Association
<b>SDP</b>	Spatial Development Plan
<b>SoW</b>	Scope of Work
<b>Ste</b>	Structure
<b>STP</b>	Shovel Test Pit



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<b>UNESCO</b>	United Nations Education, Scientific and Cultural Organisation
<b>UP</b>	University of Pretoria
<b>Wits</b>	University of the Witwatersrand



## GLOSSARY OF TERMS

Term	Definition
<b>Archaeological</b>	Material remains resulting from human activity that are in a state of disuse and older than 100 years, including artefacts, human and hominid remains and artificial features and structures. Rock art created through human agency older than 100 years, including any area within 10 m of such representation. Wrecks older than 60 years - either vessels or aircraft - or any part thereof that was wrecked in South Africa on land, internal or territorial waters, and any cargo, debris or artefacts found or associated therewith. Features, structures and artefacts associated with military history that are older than 75 years and the sites on which they are found, e.g. battlefields.
<b>Archaeologist</b>	A trained professional who uses scientific methods to excavate record and study archaeological sites and deposits.
<b>Artefact</b>	Any object manufactured or modified by human beings.
<b>Ceramic (syn. pottery)</b>	In an archaeological context any vessel or other object produced from natural clay that has been fired. Indigenous ceramics associated with Farming Communities are low-fired wares, typically found as potsherds. Imported and more historic ceramics generally include high-fired wares such as porcelain, stoneware, etc.
<b>Ceramic facies / facies</b>	Subgroups of a primary ceramic tradition or sequence. Typically used in ceramic analyses. Various facies are attributed to different temporal periods based of radiometric dates obtained from archaeological contexts. Facies are often used to infer cultural identity of archaeological groups. However, in context of this study identified ceramic facies merely provide a relative temporal context for archaeological sites in the landscape.
<b>Ceramic tradition</b>	The sequence of ceramic styles that develop out of each other and form a continuum. A tradition is the primary group to which subsequent ceramic facies belong. A ceramic tradition can be broadly associated with various linguistic and cultural groups, but do not represent any given ethnic identity, especially during the LFC period.
<b>Cultural significance (CS)</b>	<p>The aesthetic, architectural, historical, scientific, social, spiritual, linguistic or technological value or significance. A heritage may have cultural significance or other special value because of its:</p> <ul style="list-style-type: none"> <li>- Importance in the community, or pattern of South Africa's history.</li> <li>- Possession of uncommon, rare or endangered aspects of South Africa's natural or cultural heritage</li> <li>- Potential to yield information that will contribute to an understanding of South Africa's natural or cultural heritage.</li> <li>- Importance in demonstrating the principal characteristic of a particular class of South Africa's natural or cultural places or objects.</li> <li>- Importance in exhibiting particular aesthetic characteristics valued by a community or cultural group.</li> <li>- Importance in demonstrating a high degree of creative or technical achievement at a particular period.</li> <li>- Strong or special association with a particular community or cultural group for social, cultural or spiritual reasons.</li> <li>- Strong or special association with the life or work of a person, group or organisation of importance in the history of South Africa.</li> <li>- Significance relating to the history of slavery in South Africa.</li> </ul>
<b>Development</b>	<p>Any physical intervention, excavation, or action, other than those caused by natural forces, which may in the opinion of a heritage authority in any way result in a change to the nature, appearance or physical nature of a place, or influence its stability and future well-being, including:</p> <ul style="list-style-type: none"> <li>- Construction, alteration, demolition, removal or change of use of a place or a structure at a place.</li> <li>- Carrying out any works on or over or under a place.</li> <li>- Subdivision or consolidation of land comprising, a place, including the structures or airspace of a place.</li> <li>- Constructing or putting up for display signs or hoardings.</li> <li>- Any change to the natural or existing condition or topography of land.</li> </ul>



	-Any removal or destruction of trees, or removal of vegetation or topsoil.
<b>Early Stone Age</b>	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 hand axes and cleavers.
<b>Excavation</b>	The scientific excavation, recording and retrieval of archaeological deposit and objects through the use of accepted archaeological procedures and methods, and excavate has a corresponding meaning.
<b>Field Rating</b>	SAHRA requires heritage resources to be provisionally rated in accordance with Section 7 of the NHRA that provides a three tier grading system of resources that form part of the national estate. The rating system distinguishes between four categories: -Grade I: Heritage resources with qualities so exceptional that they are of special national significance. -Grade II: Heritage resources which, although forming part of the national estate, can be considered to have special qualities which make them significant within the context of a province or a region. -Grade III: Other heritage resources worthy of conservation. -General Protected: i.e. generally protected in terms of Sections 33 to 37 of the NHRA.
<b>Formal protection</b>	Places with qualities so exceptional that they are of special national significance as national heritage sites or that have special qualities as provincial heritage sites.
<b>General protection</b>	General protections are afforded to: -Objects protected in terms of laws of foreign states. -Structures older than 60 years. -Archaeological and palaeontological sites and material and meteorites. -Burial grounds and graves. -Public monuments and memorials.
<b>Heritage Impact Assessment (HIA)</b>	An assessment of the cultural significance of, and possible impacts on, diverse heritage resources that may be affected by a proposed development. A HIA may include several specialist elements such as archaeological, built environment and palaeontological studies. The HIA must supply the heritage authority with sufficient information about the sites to assess, with confidence, whether or not it has any objection to a development, indicate the conditions upon which such development might proceed and assess which sites require permits for destruction, which sites require mitigation and what measures should be put in place to protect sites that should be conserved. The content of HIA reports are clearly outlined in Section 38(3) of the NHRA and SAHRA Minimum Standards.
<b>Heritage resource</b>	Any place or object of cultural significance.
<b>Heritage resources management</b>	Process required when development is intended categorised as: -Any linear development exceeding 300m in length. -Construction of a bridge or similar structure exceeding 50 m in length. -Any activity which will change the character of a site exceeding 0.5 hectares in extent or involving three or more existing erven or subdivisions thereof or that have been consolidated within the past five years or costs of which will exceed a sum set in terms of regulations by SAHRA or a provincial heritage resources authority. -Re-zoning of a site exceeding one hectare in extent. -Any other category of development provided for in regulations by SAHRA or a provincial heritage resources authority.
<b>Heritage site</b>	Any place declared to be a national heritage site by SAHRA or a place declared to be a provincial heritage site by a provincial heritage resources authority.
<b>Late Farming Community/ies</b>	Farming Communities who either developed / evolved from EFC groups, or who migrated into southern African from the late first millennium / early second millennium CE. The LFC period evidences distinct changes in socio-political organisation, settlement patterns, trade and economic activities, including extensive trade routes. The LFC period is generally dated from c. 1000 CE well into the modern historical period of the nineteenth century.





<b>Late Stone Age</b>	The South African LSA dates from ~30 Kya. This period is associated with modern <i>Homo sapiens sapiens</i> and the complex hunter-gatherer societies, ancestral to the Bushmen / San and Khoi. The LSA lithic assemblage contains microlithic technology and composite tools such as arrows commonly produced from fine-grained cryptocrystalines, quartz and chert. The LSA is also associated with archaeological rock art including both paintings and engravings.
<b>Living / intangible heritage</b>	The intangible aspects of inherited culture that could include cultural tradition, oral history, performance, ritual, popular memory, skills and techniques, indigenous knowledge systems, the holistic approach to nature, society and social relationships.
<b>Management</b>	In relation to heritage resources, includes the conservation, presentation and improvement of a place protected in terms of the NHRA.
<b>Middle Stone Age</b>	The South African MSA dates from ~300 Kya to c. 30 Kya. This period is associated with the changing behavioural patterns and the emergence of modern cognitive abilities in early <i>Homo sapiens 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.
<b>National estate</b>	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: <ul style="list-style-type: none"> <li>-Places, buildings, structures and equipment of cultural significance.</li> <li>-Places to which oral traditions are attached or which are associated with living heritage.</li> <li>-Historical settlements and townscapes.</li> <li>-Landscapes and natural features of cultural significance.</li> <li>-Geological sites of scientific or cultural importance.</li> <li>-Archaeological and palaeontological sites.</li> <li>-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.</li> <li>-Sites of significance relating to the history of slavery in South Africa.</li> <li>-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.</li> <li>-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).</li> </ul>
<b>Object</b>	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.
<b>Palaeontological</b>	Any fossilised remains or fossil trace of animals or plants which lived in the geological past, other than fossil fuels or fossiliferous rock intended for industrial use, and any site which contains such fossilised remains or trances.
<b>Pedestrian survey</b>	A method of examining a site in which surveyors, spaced at regular intervals, systematically walk over the area being investigated.
<b>Phase 1 Archaeological Impact Assessment (AIA)</b>	Phase 1 AIAs generally involve the identification and assessment of sites during a field survey of a portion of land that is going to be affected by a potentially destructive or landscape-altering activity.



<b>Phase 2 Archaeological Impact Assessment (AIA)</b>	Phase 2 AIAs are primarily based on salvage or mitigation excavations preceding development that will destroy or impact on a site. This may involve collecting of artefacts from the surface and / or excavation of representative samples of the artefactual material to allow characterisation of the site and the collection of suitable materials for dating the sites. Phase 2 AIAs aim to obtain a general idea of the age, significance and meaning of the site that is to be lost and to store a sample that can be consulted at a later date for research purposes. Phase 2 excavations can only be done under a permit issued by SAHRA, or other appropriate heritage agency, to the appointed archaeologist.
<b>Phase 3 Management Plan / Conservation Management Plan (CMP)</b>	On occasion, a site may require a Phase 3 programme involving the modification of the site or the incorporation of the site into the development itself as a site museum, a special conservation area or a display. Alternatively it is often possible to relocate or plan the development in such a way as to conserve the archaeological site or any other special heritage significance the place may have. For example, in a wilderness area or open space when sites are of public interest the development of interpretative material is recommended and adds value to the development. Permission for the development to proceed can be given only once the heritage resources authority is satisfied that measures are in place to ensure that the archaeological sites will not be damaged by the impact of the development or that they have been adequately recorded and sampled. Careful planning can minimise the impact of archaeological surveys on development projects by selecting options that cause the least amount of inconvenience and delay. The process as explained above allows the rescue and preservation of information relating to our past heritage for future generations. It balances the requirements of developers and the conservation and protection of our cultural heritage as required of SAHRA and the provincial heritage resources authorities (ASAPA).
<b>Pre-disturbance survey (syn. reconnaissance)</b>	A survey to record a site as it exists, with all the topographical and other information that can be collected, without excavation or other disturbance of the site.
<b>Provisional protection</b>	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.
<b>Reconnaissance</b>	A broad range of techniques involved in the location of archaeological sites, e.g. surface survey and the recording of surface artefacts and features, the sampling of natural and mineral resources, and sometimes testing of an area to assess the number and extent of archaeological resources. However, in terms of South African practice, reconnaissance during a so-called Phase 1 AIA never includes sampling as this is a permitted activity, usually undertaken during so-called Phase 2 AIAs (ASAPA).
<b>Site</b>	Any area of land, including land covered by water, and including any structures or objects thereon.
<b>Structure</b>	Any building, works, device or other facility made by people and which is fixed to land, and includes any fixtures, fittings and equipment associated therewith.
<b>Tangible heritage</b>	Physical heritage resources such as archaeological sites, historical buildings, burial grounds and graves, fossils, etc. Tangible heritage may be associated with intangible elements, e.g. the living cultural traditions, rituals and performances associated with burial grounds and graves and deceased persons.



## EXECUTIVE SUMMARY

Digby Wells Environmental (hereafter Digby Wells) has been contracted by De Groot Boom Minerals (Pty) Ltd (hereafter De Grootboom) to conduct studies and compile an Environmental Management Plan (EMP) for the pending Mining Permit Application (MPA) phase of the De Grootboom Project (DGP). The EMP and MPA are requirements in terms of the Mineral and Petroleum Resources Development Act, 2002 (Act No. 28 of 2002) (MPRDA) (*as amended*) which will be submitted to the Limpopo Department of Mineral Resources (DMR).

The project is located on the farm De Grootboom 373 KT, within the Greater Tubatse Local Municipality (GTLM), Limpopo Province. A mine, haul road, power line, Pollution Control Dam (PCD) and other associated infrastructure are proposed for the DGP. The proposed power line does not form part of this MPRDA application, and should it be considered, a separate application will be applied for.

A Notification of Intent to Develop (NID) was submitted to the South African Heritage Resources Agency (SAHRA) and the Limpopo Provincial Heritage Resources Authority (LIHRA) on 22 April 2014 (Case ID: 7560). The NID was submitted in accordance with Section 38(1) of the National Heritage Resources Act, 1999 (Act No. 25 of 1999) (NHRA). A Heritage Scoping Report (HSR) was submitted to SAHRA and LIHRA via SAHRIS on 23 April 2014.

At the time that this Heritage Impact Assessment was finalised, neither SAHRA nor LIHRA issued Statutory Comment on either the NID or the HSR. The Scope of Work (SoW) for the HIA was based on Digby Wells' recommendations contained in the NID and HSR, in lieu of Statutory Comment issued by SAHRA and / or LIHRA.

A total of six heritage resources were identified during the field survey. These, with the significance rating and designation are summarised in the table below.

Resource ID	Type	Description	CS	Field Rating	Latitude	Longitude
UAR/2967/SA/001	Occurrence	Stone Age lithic scatter	Negligible	General Protection IV C	-24.926788	30.134758
UAR2967/IA/002	Occurrence	Iron Age potsherd scatter	Negligible	General Protection IV C	-24.923997	30.133677
UAR2967/IA/003	Occurrence	Iron Age potsherd scatter	Negligible	General Protection IV C	-24.927510	30.135510
UAR2967/IA/004	Occurrence	Iron Age potsherd and Stone Age lithic scatter	Negligible	General Protection IV C	-24.927315	30.135534
UAR2967/IA/005	Feature	Activity area	Negligible	General Protection IV C	-24.922952	30.139413
UAR2967/SI/006	Site	Iron Age potsherd scatter and possible gong rock	Negligible	General Protection IV C	-24.921606	30.141130

The findings from the impact assessment are summarised in the following table.

Code	Impact	Pre-mitigation:						Post-mitigation:					
		Duration	Extent	Intensity	Consequence	Probability	Significance	Duration	Extent	Intensity	Consequence	Probability	Significance
Activity 1	Direct impact to heritage resources with negligible CS	Permanent	Limited	Very low - negative	Moderately detrimental	Likely	Minor - negative	Short term	Very limited	Low - positive	Negligible	Likely	Negligible - positive
Activity 2	Direct impact to heritage resources with negligible CS	Permanent	Limited	Very low - negative	Moderately detrimental	Likely	Minor - negative	Short term	Very limited	Low - positive	Negligible	Likely	Negligible - positive
Activity 5&6	Direct impact to heritage resources with negligible CS	Permanent	Limited	Very low - negative	Moderately detrimental	Likely	Minor - negative	Short term	Very limited	Low - positive	Negligible	Likely	Negligible - positive

Based on the findings of the HSR and this report, Digby Wells recommend the following:

- A Watching Brief should be conducted during the construction of the roads and infrastructure areas. The Watching Brief will entail a qualified archaeologist to be present on site during site clearance to identify and investigate possible heritage resources that may be uncovered during construction;
- It is recommended that Chance Find Protocols be developed and included within the EMP for the mining area and the general DGP area. The CFPs must clearly define the reporting structure and action items required in the discovery or accidental exposure of possible heritage resources during construction and operational activities.
- Additionally, should the mining operation prove to be successful and a Mining Right be applied for, Environmental Authorisation will be applied for which must include a full HRM process, inclusive of a Heritage Impact Assessment (HIA) which should consist of the following:
  - Archaeological Impact Assessment (AIA); and
  - Stakeholder consultation to identify potential ancestral sites and/or burial grounds.



## TABLE OF CONTENTS

1	Introduction .....	1
1.1	Scope of Work.....	1
1.2	Expertise of the Specialists.....	1
2	Project Description .....	2
3	HIA Methodology .....	3
3.1	Field Based Data Collection .....	3
3.2	Determining Cultural Significance.....	3
3.3	Field Ratings .....	7
3.4	Assessment of Impacts .....	9
3.5	Mitigation Measures and Recommendations .....	17
3.6	Constraints and Limitations .....	18
4	Summary of the Cultural Heritage Baseline .....	18
4.1	Geology and Palaeontological Sensitivity .....	18
4.2	Stone Age .....	19
4.3	Farming Community .....	19
5	Identified Heritage Resources .....	19
6	Statement of Significance and Field Rating .....	24
7	Impact Assessment and Mitigation.....	25
7.1	Impact Assessment.....	25
7.1.1	<i>Direct Impact on identified heritage resources .....</i>	<i>25</i>
7.1.2	<i>Cumulative impacts .....</i>	<i>29</i>
8	Discussion.....	29
9	Abbreviated Watching Brief and Chance Find Procedures.....	30
10	Conclusion .....	31



## LIST OF FIGURES

Figure 3-1: Relationship between consequence, probability and significance ratings .....	13
Figure 5-1: Results of the HIA reconnaissance .....	20
Figure 5-2: MSA stone tools identified (left) within a heavily eroded area (right).....	21
Figure 5-3: A single potsherd (left and middle) found near the proposed haul road route (right) .....	21
Figure 5-4: Decorated potsherds (left) and area in which they were identified (right).....	22
Figure 5-5: Identified ceramic potsherds and MSA flakes (left) and the erosion gully in which they were identified .....	22
Figure 5-6: Communal activity area (left) and close up of activity area (right).....	23
Figure 5-7: Five percussion areas on the possible gong rock (top left), gong rock showing the top rock (top right), potsherds identified downslope of the gong rock (bottom left) and close up of possible decorated Doornkop/Eiland potsherd .....	24

## LIST OF TABLES

Table 3-1: Summary of dimensions and attributes used to determine cultural significance....	4
Table 3-2: Rating options: Importance .....	5
Table 3-3: Rating options: Integrity.....	6
Table 3-4: Significance ratings .....	6
Table 3-5: Recommended minimum level of required mitigation .....	7
Table 3-6: Rating options: Field Ratings.....	8
Table 3-7: Field ratings .....	8
Table 3-8: Rating options: Duration.....	11
Table 3-9: Rating options: Spatial scale .....	11
Table 3-10: Rating options: Intensity .....	12
Table 3-11: Rating options: Probability.....	12
Table 3-12: Impact significance ratings .....	13
Table 3-13: Relationship of significance of negative impacts to specific categories of heritage .....	15
Table 5-1: Identified heritage resources .....	21
Table 6-1: Summary of Statements of Significance for identified heritage resources.....	25

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Table 7-1: Summary of impact assessment in regards to activity 1 .....	26
Table 7-2: Summary of impact assessment in regards to activity 2 and 6 .....	27
Table 7-3: Summary of impact assessment in regards to activity 5 .....	28

## LIST OF APPENDICES

Appendix A: Specialist CV



## 1 Introduction

Digby Wells Environmental (hereafter Digby Wells) was appointed by De Groot Boom Minerals (Pty) Ltd (hereafter De Groot Boom), to compile and submit an Environmental Management Plan (EMP), pursuant to an application for a mining permit for the De Grootboom Project (DGP). The EMP and Mining Permit Application (MPA) are requirements in terms of the Mineral and Petroleum Resources Development Act, 2002 (Act No. 28 of 2002) (MPRDA) (*as amended*) which will be submitted to the Limpopo Department of Mineral Resources (DMR).

A Notification of Intent to Develop (NID) was submitted to the South African Heritage Resources Agency (SAHRA) and the Limpopo Provincial Heritage Resources Authority (LIHRA) on 22 April 2014 (Case ID: 7560). The NID was submitted in accordance with Section 38(1) of the National Heritage Resources Act, 1999 (Act No. 25 of 1999) (NHRA). A Heritage Scoping Report (HSR) was submitted to SAHRA and LIHRA via SAHRIS on 23 April 2014.

At the time that this Heritage Impact Assessment was finalised, neither SAHRA nor LIHRA issued Statutory Comment on either the NID or the HSR.

### 1.1 Scope of Work

The Scope of Work (SoW) for the HIA was based on Digby Wells' recommendations contained in the NID and HSR, in lieu of Statutory Comment issued by SAHRA and / or LIHRA. This included the following:

- A field reconnaissance that identified, recorded and documented tangible heritage resources in the project area;
- An assessment of all identified heritage resources within the project area, and
- Recommended mitigation measures to avoid negative and enhance positive heritage impacts.

### 1.2 Expertise of the Specialists<sup>1</sup>

**Natasha Higgitt undertook a site visit and compiled the HIA.** She obtained her Bachelor of Arts (BA) with majors in Archaeology and Geography in 2008, and a BA Honours degree in Archaeology in 2010 from the University of Pretoria. She currently holds the position of Assistant Heritage Consultant: Archaeology Specialist at Digby Wells. She has more than three years' experience in archaeological survey's and gained further generalist heritage experience since her appointment at Digby Wells in South Africa and Liberia. Natasha is a professional member of the Association of Southern African Archaeologists (ASAPA) (*Member No: 335*) and accredited Cultural Resources Management (CRM) practitioner.

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<sup>1</sup> The curricula vitas of the specialists are attached as Appendix A.



**Justin du Piesanie undertook the first technical review of this HIA.** 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. Subsequently he has also completed a CPDP course in architectural and urban conservation through the University of Cape Town. He currently holds the position of Heritage Management Consultant: Archaeologist at Digby Wells. He has over 6 years combined experience in Heritage Resources Management (HRM) including archaeological and heritage assessments, grave relocation, social consultation and mitigation of archaeological sites. Justin has worked throughout South Africa in both urban and rural settings, and has gained further generalist experience since his appointment at Digby Wells in Botswana, Burkina Faso, the Democratic Republic of Congo, Liberia and Mali.

Justin is a professional member of the Association of Southern African Archaeologists (ASAPA) (*Member No. 270*), accredited Cultural Resources Management (CRM) practitioner and a member of the International Council on Monuments and Sites (ICOMOS) South Africa (*Member No. 14274*).

**Johan Nel undertook the second technical review of this HIA.** He has more than 13 years of combined experience in the field of HRM including archaeological and heritage assessments, grave relocation, social consultation and mitigation of archaeological sites. He has gained experience both within urban settings and remote rural landscapes. Since 2010 he has been actively involved in environmental management that has allowed me to investigate and implement the integration of heritage resources management into EIA's. Many of the projects since have required compliance with IFC requirements such as Performance Standard 8: Cultural Heritage. This exposure has allowed Johan to develop and implement a HRM approach that is founded on international best practice, leading international conservation bodies such as the United Nations Educational, Scientific and Cultural Organisation (UNESCO) and ICOMOS and aligned to the South African legislation. Johan has worked in most South African Provinces, as well as Swaziland, the Democratic Republic of the Congo, Liberia and Sierra Leone.

Johan is a professional member of ASAPA (*Member No. 095*), accredited Cultural Resources Management (CRM) practitioner, and a member of ICOMOS South Africa (*Member No. 13839*).

## 2 Project Description

De Groot Boom is conducting prospecting activities on the farm De Grootboom 373 KT, within the Greater Tubatse Local Municipality (GTLM), Limpopo Province. The prospecting rights include exploration of Chrome ore, Platinum Group Metals (PGM), Gold Ore and all minerals.

De Groot Boom now proposes to mine primarily Chrome and associated PGMs. The proposed area will cover an extent of not more than 5 ha on the Remaining Extent and portion 1 of the farm De Grootboom 373 KT. Mining will be undertaken by open cut methods and the ore will be transported to a portable plant for crushing and screening. The

ore will be stockpiled until transported off site by truck. The proposed power line does not form part of this MPRDA application, and should it be considered, a separate application will be applied for.

The project entails a construction phase, sampling phase and possibly a decommissioning phase. The decommissioning phase will only be applicable if the project does not prove to be viable. It is possible that after completing work under the mining permit, De Groot Boom will apply for a mining right to commence with full scale mining of Chrome and PGMs.

A more comprehensive project description is contained in the HSR and environmental Scoping Report, available from <http://www.sahra.org.za/sahris/cases/de-grooteboom-mining-permit-application>.

### 3 HIA Methodology

#### 3.1 Field Based Data Collection

Field based data collection was undertaken by Natasha Higgitt, a qualified and CRM accredited archaeologist, and assisted by Lloyd McFarlane, a Junior Social Scientist, on 15 and 16 April 2015.

The reconnaissance comprised a pedestrian pre-disturbance survey of the infrastructure footprint within the site specific study. The survey was unstructured, following the impact footprint and was assessed through pedestrian survey methodologies. The survey was recorded as a GPS track log.

Identified heritage resources were recorded as GPS waypoints and documented by means of photographs and detailed site notes.

#### 3.2 Determining Cultural Significance

Heritage resources are intrinsic to the history and beliefs of communities. They characterise community identity and cultures, are finite, non-renewable and irreplaceable. Considering the innate value of heritage resources, the foundation of HRM is the acknowledgment that heritage resources have lasting worth as evidence of the origins of life, humanity and society. Notwithstanding the inherent value ascribed to heritage, significance of resources needs to be determined to allow implementation of appropriate management. This is achieved through assessing heritage resources value relative to certain prescribed criteria encapsulated in policies and legal frameworks as discussed in the NID.

The importance of a heritage resource is determined on four dimensions – aesthetic, historic, scientific and social which in turn are measured against one or more descriptive attributes. This aims to guide whether a resource should be included in the national estate as defined in the NHRA.

The significance rating process is designed to provide a numerical rating of the cultural significance 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, which determines the intrinsic, comparative and contextual significance of identified heritage resources.

A resource's importance rating is based on information obtained through review of available credible sources and representivity or uniqueness (i.e. known examples of similar resources to exist). The final significance attributed to a resource furthermore takes into account the physical integrity of the fabric of the resource. The formula used to determine significance can therefore be summarised as:

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

where

$$\text{Importance} = \text{average sum of Aesthetic} + \text{Historic} + \text{Scientific} + \text{Social Significance}$$

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. These values are based on, and summarised from, the criteria for inclusion into the national estate as outlined in subsection 3(3) of the NHRA, listed in Table 3-1.

**Table 3-1: Summary of dimensions and attributes used to determine cultural significance**

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)

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 3-2 to Table 3-5.

**Table 3-2: Rating options: Importance**

Rating	Description / guideline
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.
1	Common, well represented throughout diverse cultural landscapes
2	Generally well represented but exhibits superior qualities in comparison to other similar examples
3	The resource exhibits attributes that are rare and uncommon within a region. It is important to specific communities.
4	Rare and uncommon, value of national importance
5	The resource exhibits attributes that are considered singular, unique and/or irreplaceable to the degree that its significance can be universally accepted.
-	Not assessed - dimension and/or attribute not considered in determining value.

**Table 3-3: Rating options: Integrity**

Rating	Description / guideline
0	No information potential, complete loss of meaning, Fabric completely degraded, original setting lost
1	Fabric poorly preserved, limited information, little meaning ascribed, extensive encroachment on setting
2	Fabric is preserved, some information potential (quality questionable) and meaning evident, some encroachment on setting
3	Fabric well preserved, good quality information and meaning evident, limited encroachment
4	Excellent preservation of fabric, high information potential of high quality, meaning is well established, no encroachment on setting

**Table 3-4: Significance ratings**

Score	Description	Rating
0-5	Resource of negligible heritage value	Negligible
6-10	Resource of low heritage value; change to resource not significant	Low
11-12	Resource of medium heritage value: project mitigation must aim to reduce negative change	Medium
13-14	Resource of medium high heritage value: heritage mitigation to reduce negative change	Medium High
15-17	Resource of high heritage value: resource must be partly conserved and heritage mitigation implemented to reduce negative change	High
17-20	Resource of very high heritage value: resource must be preserved/conserved and included in a management plan	Very High

**Table 3-5: Recommended minimum level of required mitigation**

<b>Designation</b>	<b>Recommended mitigation</b>
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

### 3.3 Field Ratings

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 recommend 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 can be summarised as:

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

The weight assigned to the various field rating parameters in the formula and the sum of the average ratings are presented in Table 3-6 and Table 3-7.

**Table 3-6: Rating options: Field Ratings**

Rating	Description
7	Mainly of national significance
6	Mainly of provincial significance
5	Mainly local with very high significance
4	Mainly local with high significance
3	Generally protected resource with Medium to Medium-High significance
2	Generally protected resource with Low significance
1	Generally protected resource with Negligible significance

**Table 3-7: Field ratings**

Score	Description	Rating
<b>6,5 to 7,0</b>	Heritage resources with qualities so exceptional that they are of special national significance	<b>Grade I</b>
<b>5,5 to 6,4</b>	Heritage resources which, although forming part of the national estate, can be considered to have special qualities which make them significant within the context of a province or a region	<b>Grade II</b>
<b>4,5 to 5,4</b>	Heritage resources which, although forming part of the national estate, can be considered to have special qualities which make them significant within a more localised context - very high significance rating	<b>Grade III A</b>
<b>3,5 to 4,4</b>	Heritage resources which, although forming part of the national estate, can be considered to have special qualities which make them significant within a more localised context - high significance rating	<b>Grade III B</b>
<b>2,5 to 3,4</b>	Resources under general protection in terms of NHRA Sections 34 to 37 with Medium to Medium-High significance	<b>General Protected IV A</b>
<b>1,5 to 2,4</b>	Resources under general protection in terms of NHRA Sections 34 to 37 with Low significance	<b>General Protected IV B</b>





Score	Description	Rating
1,0 to 1,4	Resources under general protection in terms of NHRA Sections 34 to 37 with Negligible significance	General Protected IV C

### 3.4 Assessment of Impacts

Heritage impacts can 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 to the extent that it 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 increased mining activity within the Dwars Rivier Valley will encroach on heritage resources within the area;
  - **Synergistic:** effects interact to produce a total effect greater than the sum of the individual effects, e.g. the construction of additional mining infrastructure and other activities will impact on the sense of place of the 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 geological site.
  - **Neutralizing:** where the effects may counteract each other to reduce the overall effect, e.g. the presence of a bulk sample within the landscape will neutralize the sense-of-place of the study area and the relationship the local communities have with the 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 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, as shown below:

***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 (for positive impacts) or -1 (for negative impacts)***

The weight assigned to the various parameters for positive and negative impacts in the formula is presented in Table 3-2 to Table 3-12 below.

Project-related impacts on heritage resources have taken into account the inherent value of heritage resources, described above. As a result, the impact assessment did not consider individual resources, but was applied to diverse resources grouped in terms of similar values. It must be re-iterated that the proposed power line does not form part of this MPRDA application, and should it be considered, a separate application will be applied for. As such, any heritage resources identified near the power line will not be assessed as part of this report.

The magnitude will then be applied to pre- and post-mitigation scenarios with the intention of removing all impacts on heritage resources. Where project related mitigation does not avoid or sufficiently reduce negative changes/impacts on heritage resources with high values, mitigation of these resources may be required. This may include alteration, restoration or demolition of structures under a permit issued by LIHRA and/or SAHRA.


**Table 3-8: Rating options: Duration**

Value	Probability	Description
7	Permanent	Impact will permanently alter or change the heritage resource and/or value (Complete loss of information)
6	Beyond Project Life	Impact will reduce over time after project life (Mainly renewable resources and indirect impacts)
5	Project Life	The impact will cease after project life.
4	Long Term	Impact will remain for >50% - Project Life
3	Medium Term	Impact will remain for >10% - 50% of Project Life
2	Short Term	Impact will remain for <10% of Project Life
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.

**Table 3-9: Rating options: Spatial scale**

Value	Exposure	Description
7	International	Impacts on heritage resources will have international repercussions, issues or effects, i.e. in context of international cultural significance, legislation, associations, etc.
6	National	Impacts on heritage resources will have national repercussions, issues or effects, i.e. in context of national cultural significance, legislation, associations, etc.
5	Provincial	Impacts on heritage resources will have provincial repercussions, issues or effects, i.e. in context of provincial cultural significance, legislation, associations, etc.
4	Regional	Impacts on heritage resources will have regional repercussions, issues or effects, i.e. in context of the regional study area.
3	Local	Impacts on heritage resources will have local repercussions, issues or effects, i.e. in context of the local study area.
2	Limited	Impacts on heritage resources will have site specific repercussions, issues or effects, i.e. in context of the site specific study area.
1	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.


**Table 3-10: Rating options: Intensity**

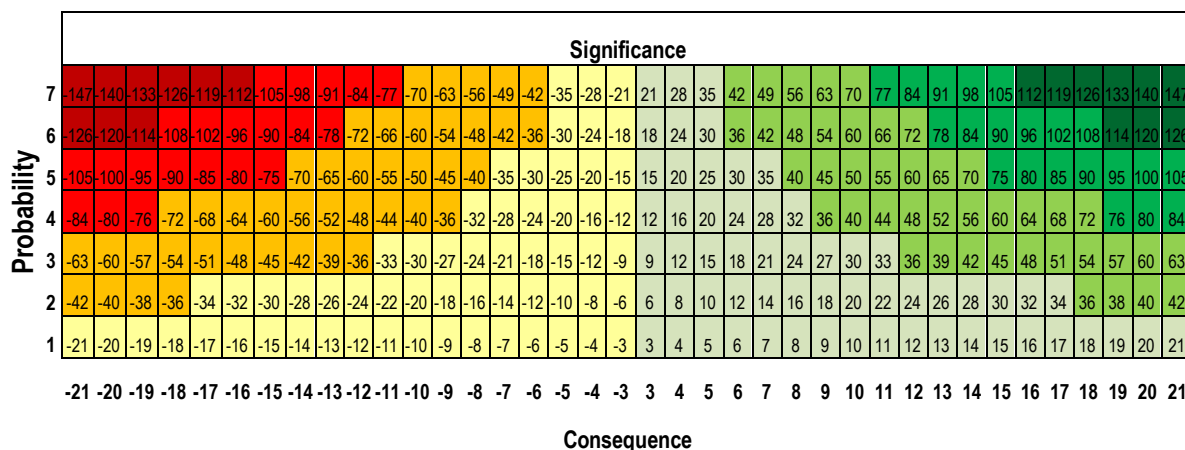
Rating	Type of impact
+/- 7	Major change to Heritage Resource with High-Very High Value
+/- 6	Moderate change to Heritage Resource with High-Very High Value
+/- 5	Minor change to Heritage Resource with High-Very High Value
+/- 4	Major change to Heritage Resource with Medium-Medium High Value
+/- 3	Moderate change to Heritage Resource with Medium - Medium High Value
+/- 2	Minor change to Heritage Resource with Medium - Medium High Value
+/- 1	No change to Heritage Resource with values medium or higher, or Any change to Heritage Resource with Low Value or negligible value

**Table 3-11: Rating options: Probability**

Value	Probability	Description
7	Certain/Definite	Happens frequently.
		The impact will occur regardless of the implementation of any preventative or corrective actions.
6	High probability	Happens often.
		It is most likely that the impact will occur.
5	Likely	Could easily happen.
		The impact may occur.
4	Probable	Could happen.
		Has occurred here or elsewhere.
3	Unlikely / Low probability	Has not happened yet but could happen once in the lifetime of the project.
		There is a possibility that the impact will occur.
2	Rare / Improbable	Conceivable, but only in extreme circumstances.
		Have not happened during lifetime of the project but has happened elsewhere. The possibility of the impact materialising is very low as a result

Value	Probability	Description
		of design, historic experience or implementation of adequate mitigation measures
1	Highly Unlikely /None	Expected never to happen.
		Impact will not occur.

Impacts are rated prior to mitigation and again after consideration of the proposed mitigation measures. The impact is then determined and categorised into one of eight categories, as indicated in Table 3-12 and Table 3-13 below. The relationship between the consequence, probability and significance ratings is graphically depicted in Figure 3-1 below.



**Figure 3-1: Relationship between consequence, probability and significance ratings**

**Table 3-12: Impact significance ratings**

Score	Description	Rating
109 to 147	A very beneficial impact which may be sufficient by itself to justify implementation of the project. The impact may result in permanent positive change.	Major (positive)
73 to 108	A beneficial impact which may help to justify the implementation of the project. These impacts would be considered by society as constituting a major and usually a long-term positive change to the heritage resources.	Moderate (positive)



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

**Table 3-13: Relationship of significance of negative impacts to specific categories of heritage**

Score	Archaeological attributes	Built heritage or Historic Urban Landscape attributes	Historic landscape attributes	Intangible Cultural Heritage attributes or Associations	Rating
-3 to -35	No change.	No change to fabric or setting.	No change to elements, parcels or components; no visual or audible changes; no changes in amenity or community factors.	No change	Negligible
-36 to -72	Very minor changes to key archaeological materials, or setting.	Slight changes to historic building elements or setting that hardly affect it.	Very minor changes to key historic landscape elements, parcels or components; virtually unchanged visual effects; very slight changes in noise levels or sound quality; very slight changes to use or access; resulting in a very small change to historic landscape character.	Very minor changes to area that affect the ICH activities or associations or visual links and cultural appreciation.	Minor
-73 to -108	Changes to key archaeological materials, such that the resource is slightly altered. Slight changes to setting.	Change to key historic building elements, such that the asset is slightly different. Change to setting of an historic building, such that it is noticeably changed.	Change to few key historic landscape elements, parcels or components; slight visual changes to few key aspects of historic landscape; limited changes to noise levels or sound quality; slight changes to use or access; resulting in limited change to historic landscape character.	Changes to area that affect the ICH activities or associations or visual links and cultural appreciation.	Moderate



-109 to -147	<p>Changes to many key archaeological materials, such that the resource is clearly modified.</p> <p>Considerable changes to setting that affect the character of the asset.</p> <p>Changes to attributes that convey outstanding value of national estate.</p> <p>Most or all key archaeological materials, including those that contribute to outstanding value of national estate such that the resource is totally altered.</p> <p>Comprehensive changes to setting</p>	<p>Changes to many key historic building elements, such that the resource is significantly modified.</p> <p>Changes to the setting of an historic building, such that it is significantly modified.</p> <p>Change to key historic building elements that contribute to outstanding value of national estate, such that the resource is totally altered.</p> <p>Comprehensive changes to the setting.</p>	<p>Change to many key historic landscape elements, parcels or components; visual change to many key aspects of the historic landscape; noticeable differences in noise or sound quality; considerable changes to use or access; resulting in moderate changes to historic landscape character.</p> <p>Change to most or all key historic landscape elements, parcels or components; extreme visual effects; gross change of noise or change to sound quality; fundamental changes to use or access; resulting in total change to historic landscape character unit and loss of outstanding value of national estate.</p>	<p>Considerable changes to area that affect the ICH activities or associations or visual links and cultural appreciation.</p> <p>Major changes to area that affect the ICH activities or associations or visual links and cultural appreciation.</p>	Major
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### 3.5 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 the recommended minimum level of mitigation as published in the SAHRA Minimum Standards. Recommended mitigation is therefore divided into 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 conserve or preserve heritage resources, 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 mitigation 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.

### 3.6 Constraints and Limitations

The following constraints and limitations were experienced as part of this study:

- Due to budget and consequently time constraints, the pre-disturbance survey focussed on the infrastructure footprint only. The site-specific area (i.e. project area) was not surveyed;
- At the time of completing this HIA report, Stakeholder Engagement was not finalised. Comments from Interested and Affected Parties (I&IAPs) were therefore not included. Budgetary constraints also did not allow focused heritage consultation to take place;
- The HIA did not assess intangible or living heritage that may be associated with the project area and identified sites. However, it is acknowledged that various elements of living heritage may be associated, for example by land claimants, among other communities;
- Heritage resources such as archaeological and palaeontological resources commonly occur below surface, with little or no surface indicators. A so-called Phase 1 Archaeological Impact Assessment or Palaeontological Impact Assessment is precluded from intrusive sampling by the NHRA and permitting regulations. This assessment, while as comprehensive as possible, therefore did not attempt to identify heritage resources beyond what was visible and accessible.

## 4 Summary of the Cultural Heritage Baseline<sup>2</sup>

The cultural baseline conducted during the HSR considered the regional and local context of the DGP. The key findings of that baseline that provided context to the identified heritage resources are summarised in below. No references to sources are included in this section for the sake of brevity and ease of reading. A full reference list is, however, included in the HSR.

### 4.1 Geology and Palaeontological Sensitivity

The geology underlying the DGP the regional and local study areas is the Bushveld Complex. The project area lies within the eastern limb of the Rustenburg Layered Suite that

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<sup>2</sup> For the full Cultural Heritage Baseline, please refer to the HSR: <http://www.sahra.org.za/sahris/cases/de-grooteboom-mining-permit-application>

date from c. 2 050 Ma to around 2 000 Ma of the Eoproterozoic Era. The predominant rocks that comprise the Rustenburg Layered Suite include gabbro and gabbro-norite – both igneous in origin and hence usually devoid of fossils.

## 4.2 Stone Age

Surface scatters of MSA and LSA lithics have been recorded throughout the region, however, these finds are commonly not found *in situ* and provide limited contextual information. Three MSA surface occurrences were recorded within the local study area, approximately 1.5 km south from the project area. These lithics were identified in eroded areas as isolated surface scatters and outside of discernible context, therefore providing limited scientific information beyond form, function and technique of manufacture.

Resounding rocks or “rock gongs” are features that are often associated with the San/Bushmen culture. These are natural occurring ironstone boulders that either rest on top of ironstone rocks or other rocks that have natural resonating qualities. While these features are natural and occur all over the country, not all show signs of human interaction and use.

The areas of the rock which were constantly beaten to produce sound show a distinct difference in surface patina to the surrounding cortex of the rock. The rocks were either beaten by hand or by using other rocks and pieces of wood. The “rock gongs” were often used in rain-making rituals and medicine dances in which the concussive and resonating sound helps the shaman enter a trance like state in which he/she enters the “Spirit World” to conduct ritual activities.

## 4.3 Farming Community

A concentration of *Doornkop* type ceramics was recorded 2.5 km south from the site specific study area. These ceramics were not found *in situ* and no other deposit or archaeological features were identified. Undiagnostic potsherds, lower grinding stones and collapsed stone walls have been recorded within 6.5 km of the project area. Several communal grinding areas have also been recorded in the surrounding area, the closest can be found 14 km south.

## 5 Identified Heritage Resources

Through the HIA reconnaissance, a total of four heritage resources were identified within the site specific study area, described in Table 5-1. The two heritage resources identified as part of the HSR are also included in Table 5-1 below and in the impact assessment in Section 6.

It must be noted that the proposed power line does not form part of this MPRDA application, and any heritage resources identified near the power line will not be assessed as part of this application.

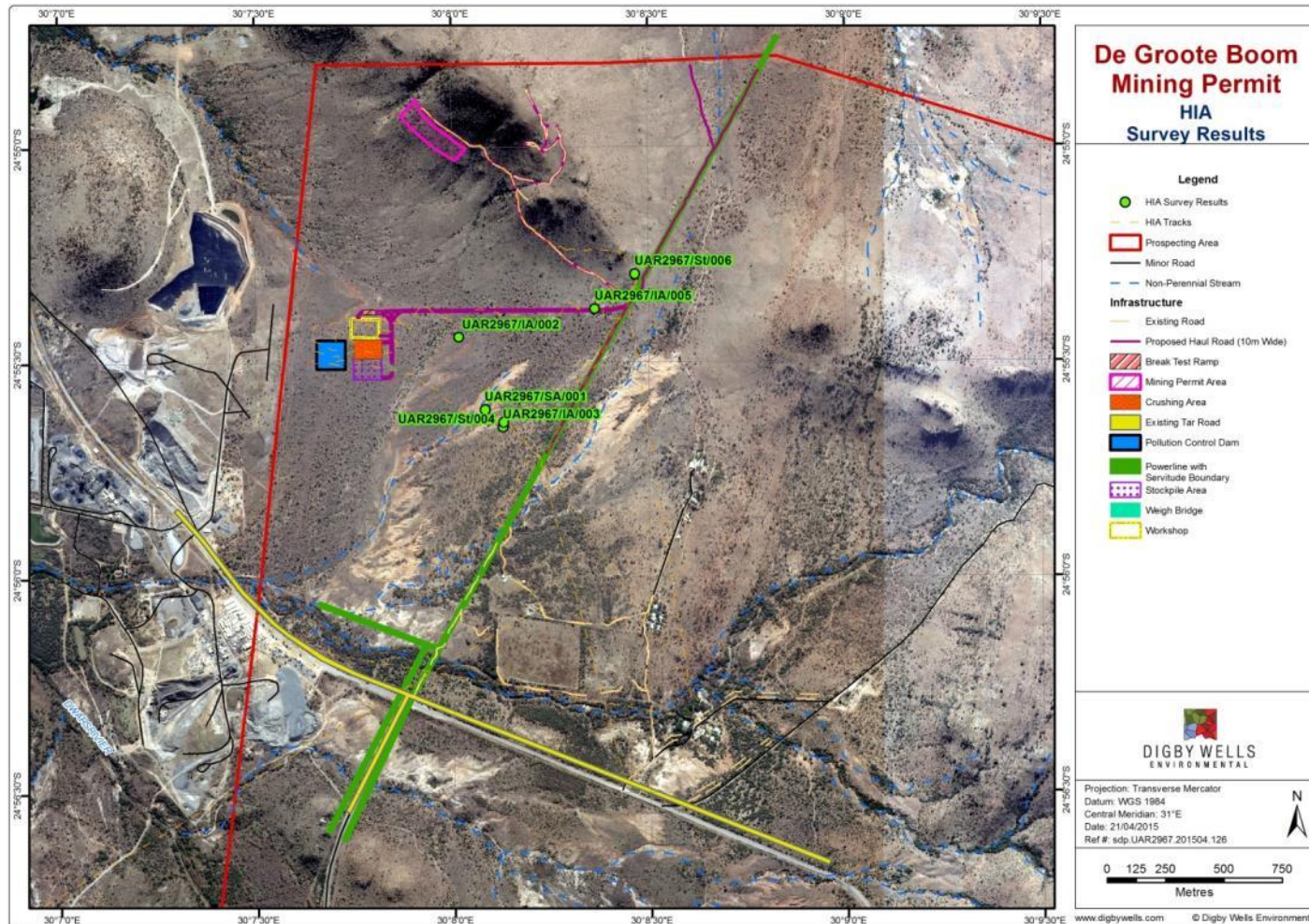


Figure 5-1: Results of the HIA reconnaissance

**Table 5-1: Identified heritage resources**

<p><b>Site Name: UAR2967/SA/001</b></p>	<p><b>Co-ordinates: -24.926788/ 30.134758</b></p>	<p><b>Statement of Significance: Negligible</b></p>
<p><b>Description:</b> MSA stone flakes (Figure 5-2) were identified on the surface in a large, extensively eroded area. Many of the tools show some signs of retouch and were made from rhyolite. There is an approximate density of one lithic per m<sup>2</sup> of the MSA tools over an area of approximately 100 m x 100 m. There may be potential deposit within un-eroded areas as the lithics appear to have washed out of the walls of the erosion gully and washed from a higher elevation.</p> <p>This eroded area is located to the west of a non-perennial stream. The MSA flakes are located 80 m from the proposed power line route.</p> <div data-bbox="197 808 1399 1232"> </div> <p><b>Figure 5-2: MSA stone tools identified (left) within a heavily eroded area (right)</b></p>		
<p><b>Site Name: UAR2967/IA/002</b></p>	<p><b>Co-ordinates: -24.923997/ 30.133677</b></p>	<p><b>Statement of Significance: Negligible</b></p>
<p><b>Description:</b> A single potsherd was identified within an eroded area located within 50 m the route of the proposed haul road (See Figure 5-3). The potsherd has a pronounced curve with no decoration.</p> <p>No other archaeological remains or deposit could be identified.</p> <div data-bbox="188 1612 1415 1919"> </div> <p><b>Figure 5-3: A single potsherd (left and middle) found near the proposed haul road route (right)</b></p>		



<b>Site Name: UAR2967/IA/003</b>	<b>Co-ordinates: -24.927510/ 30.135510</b>	<b>Statement of Significance: Negligible</b>
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**Description:** Two decorated ceramic potsherds recorded 10 m from erosion gully as shown in Figure 5-4 below. The decorations included a single line across a potsherd, while the other had a herringbone design. Dense grass cover was present and no other archaeological remains or deposit could be identified.

The potsherds are located 60 m from the proposed power line route.



**Figure 5-4: Decorated potsherds (left) and area in which they were identified (right)**

<b>Site name: UAR2967/St/004</b>	<b>Co-ordinates: -24.927315/ 30.135534</b>	<b>Statement of Significance: Negligible</b>
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**Description:** Undiagnostic ceramic potsherds and MSA flakes identified within the erosion gully as shown in Figure 5-5. There may be potential deposit within un-eroded areas as the lithics appear to have washed out of the walls of the erosion gully and washed from a higher elevation. The MSA flakes were produced from rhyolite and had some signs of retouch.

The archaeological remains are located 80 m from the proposed power line route.



**Figure 5-5: Identified ceramic potsherds and MSA flakes (left) and the erosion gully in which they were identified**



<b>Site Name: UAR2967/IA/005</b>	<b>Co-ordinates: -24.922952/ 30.139413</b>	<b>Statement of Significance: Negligible</b>
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**Description:** A Communal activity area was located on a rocky outcrop approximately 50 m from a non-perennial stream (Figure 5-6). The activity area may have been the location of a washing or tanning area. Additionally, it may have been preliminary grinding area; however the areas are not very pronounced suggesting a short occupation. The site consists of three patches where an activity had occurred. No other features or archaeological remains or deposit were identified nearby.

This site is located 20 m from the proposed haul road.



**Figure 5-6: Communal activity area (left) and close up of activity area (right)**

<b>Site Name: UAR2967/St/006</b>	<b>Co-ordinates: -24.921606/ 30.141130</b>	<b>Statement of Significance: Negligible</b>
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**Description:** A site consisting of a gong rock with five percussion areas, shown in the top left image in Figure 5-7 below. The top rock may have been intentionally placed on top of the two split rocks in order to create a better sound. On the slope, 3 m below the gong rock, four ceramic potsherds were identified. Based on the *known* presence of *Doornkop / Eiland facies* in the surrounding area, the ceramics may be possibly associated with that facies however the pieces are too small to give a definitive facies. No other archaeological remains or deposit could be identified nearby.

The site is located 150 m from the proposed haul road.



**Figure 5-7: Five percussion areas on the possible gong rock (top left), gong rock showing the top rock (top right), potsherds identified downslope of the gong rock (bottom left) and close up of possible decorated Doornkop/Eiland potsherd**

## 6 Statement of Significance and Field Rating

The cultural significance of identified heritage resources located within and near the project area is presented in Table 6-1. The assigned values take into consideration the importance of individual resources in relation to scientific and social criteria, as well as the integrity of the resource. The heritage resources were not assessed in relation to the aesthetic criteria as they do not portray good examples of art or design.

All six identified heritage resources were given a field rating of General Protection IV C. In terms of the NHRA, these are resources protected under general protection in terms of Sections 34 to 37. The sites have a negligible value in historical, scientific and social criteria because these are undiagnostic finds that cannot be associated with a particular group of people. The rating was informed by credible information sources such as other impact assessment reports which indicate that isolated occurrences of ceramics, lithics, gong rocks and communal grinding area such as these are common in the Limpopo/Mpumalanga





region. No site context could be established as the resources were degraded to the extent where no information potential exists. Single occurrences such as these sites are inherently without site integrity. Taking these characteristics into account, the heritage resources were given a negligible heritage value.

**Table 6-1: Summary of Statements of Significance for identified heritage resources**

Resource ID	Type	Description	CS	Field Rating	Latitude	Longitude
UAR/2967/SA/001	Occurrence	Stone Age lithic scatter	Negligible	General Protection IV C	-24.926788	30.134758
UAR2967/IA/002	Occurrence	Iron Age potsherd scatter	Negligible	General Protection IV C	-24.923997	30.133677
UAR2967/IA/003	Occurrence	Iron Age potsherd scatter	Negligible	General Protection IV C	-24.927510	30.135510
UAR2967/IA/004	Occurrence	Iron Age potsherd and Stone Age lithic scatter	Negligible	General Protection IV C	-24.927315	30.135534
UAR2967/IA/005	Feature	Activity area	Negligible	General Protection IV C	-24.922952	30.139413
UAR2967/St/006	Site	Iron Age potsherd scatter and possible gong rock	Negligible	General Protection IV C	-24.921606	30.141130

## 7 Impact Assessment and Mitigation

In the following sections the discussion of each impact is structured as follows:

1. A table presenting the rating of the impact that summarises the recommended mitigation measures, and repeats the rating exercise after mitigation. The table also explains the motivation for assigning particular ratings to an impact; and
2. Discussion of mitigation measures to avoid and/or ameliorate negative impacts and enhance positive ones.

The impact assessment considered changes to identified heritage resources located within the impact footprint. The results of the impact assessment are summarised in below.

### 7.1 Impact Assessment

#### 7.1.1 Direct Impact on identified heritage resources

During the construction phase, the following activities may cause a direct impact to identified heritage resources:



- Activity 1: The construction and/or widening of roads will cause damage to or destroy any physical heritage resources that may be present in the impact footprint;
- Activity 2 and 6: Construction of facilities and infrastructure will cause damage to or destroy any physical heritage resources that may be present in the footprint areas; and
- Activity 5: Physical alteration of land in excess of 5 ha will change the character of the land and possibly destroy *in situ* heritage resources.

The impact assessment for the identified heritage resources is summarised in Table 7-1 to Table 7-3 below.

**Table 7-1: Summary of impact assessment in regards to activity 1**

<b>IMPACT DESCRIPTION: Direct impact caused by Activity 1 to heritage resources with negligible CS</b>				
<b>Predicted for project phase:</b>	Pre-construction	Construction	Operation	Decommissioning
<b>Dimension</b>	<b>Rating</b>	<b>Motivation</b>		
<b>PRE-MITIGATION</b>				
Duration	Permanent (7)	Where mitigations are not implemented, project related activities will destroy any possible heritage resources.	Consequence: Moderately detrimental (-10)	Significance: Minor - negative (-50)
Extent	Limited (2)	Possible heritage impacts will affect resources that are, or may be, present in the construction footprint area.		
Intensity x type of impact	Very low - negative (-1)	Given the CS of the <i>identified</i> heritage resources, the intensity will be very low.		
Probability	Likely (5)	Without appropriate mitigation, impacts on heritage resources are likely to occur.		
<b>MITIGATION:</b> Although the identified artefacts and sites were assigned a negligible Cultural Significance (CS) and are located outside the construction footprint areas, they are evidence of past occupation and therefore there is a likelihood that subsurface deposits, material and features may exist. A watching brief must be undertaken during road construction activities to monitor for any archaeological or historical heritage that may be exposed. It is important to note that in the event that any significant heritage is exposed, a permitted Phase 2 Archaeological Assessment may be required.				
<b>POST-MITIGATION</b>				
Duration	Short term (2)	Implementing a watching brief during construction activities will ensure that significant heritage resources are recorded and salvaged before destruction.	Consequence: Negligible (5)	Significance: Negligible - positive (25)
Extent	Very limited (1)	The watching brief will identify heritage sites, localising any possible impact to the site itself.		



Intensity x type of impact	Low - positive (2)	Recording heritage resources and sites if they are exposed during construction activities will contribute to the general heritage record of the area. However, should exposed sites be determined to have high CS, this contribution will increase.		
Probability	Likely (5)	It is likely that a qualified archaeologist will be able to identify exposed resources during construction and thereby reduce the negative impact, i.e. complete, unrecorded destruction.		

**Table 7-2: Summary of impact assessment in regards to activity 2 and 6**

<b>IMPACT DESCRIPTION: Direct impact caused by Activity 2&amp;6 to heritage resources with negligible CS</b>				
Predicted for project phase:	Pre-construction	Construction	Operation	Decommissioning
Dimension	Rating	Motivation		
<b>PRE-MITIGATION</b>				
Duration	Permanent (7)	Where mitigations are not implemented, construction of facilities and infrastructure will destroy any possible heritage resources.	Consequence: Moderately detrimental (-10)	Significance: Minor - negative (-50)
Extent	Limited (2)	Possible heritage impacts will affect resources that are, or may be, present in the construction footprint area.		
Intensity x type of impact	Very low - negative (-1)	Given the CS of the identified heritage resources, the intensity will be very low.		
Probability	Likely (5)	Without appropriate mitigation, impacts on heritage resources are likely to occur.		
<b>MITIGATION:</b> Although the identified artefacts and sites were assigned a negligible CS and are located outside the construction footprint areas, they are evidence of past occupation and therefore there is a likelihood that subsurface deposits, material and features may exist. A watching brief must be undertaken during infrastructure and facility construction activities to monitor for any archaeological or historical heritage that may be exposed. It is important to note that in the event that any significant heritage is exposed, a permitted Phase 2 Archaeological Assessment may be required.				
<b>POST-MITIGATION</b>				
Duration	Short term (2)	Where mitigations are implemented, construction of facilities and infrastructure will result in negligible impacts for a very short period of time.	Consequence: Negligible (5)	Significance: Negligible - positive (25)
Extent	Very limited (1)	The impact of the prospecting will be very limited		



Intensity x type of impact	Low - positive (2)	Recording heritage resources and sites if they are exposed during construction activities will contribute to the general heritage record of the area. However, should exposed sites be determined to have high CS, this contribution will increase.		
Probability	Likely (5)	It is likely that a qualified archaeologist will be able to identify exposed resources during construction and thereby reduce the negative impact, i.e. complete, unrecorded destruction.		

**Table 7-3: Summary of impact assessment in regards to activity 5**

<b>IMPACT DESCRIPTION: Direct impact caused by Activity 5 to heritage resources with negligible CS</b>				
Predicted for project phase:	Pre-construction	Construction	Operation	Decommissioning
Dimension	Rating	Motivation		
<b>PRE-MITIGATION</b>				
Duration	Permanent (7)	Where mitigations are not implemented, construction of mining area and infrastructure will destroy any possible heritage resources.	Consequence: Moderately detrimental (-10)	Significance: Minor - negative (-50)
Extent	Limited (2)	Possible heritage impacts will affect resources that are, or may be, present in the mining footprint area.		
Intensity x type of impact	Very low - negative (-1)	Given the CS of the identified heritage resources, the intensity will be very low.		
Probability	Likely (5)	Without appropriate mitigation, impacts on heritage resources are likely to occur.		
<b>MITIGATION:</b> Although the identified artefacts and sites were assigned a negligible CS and are located outside the construction footprint areas, they are evidence of past occupation and therefore there is a likelihood that subsurface deposits, material and features may exist. As the hill has very steep slopes, in-situ deposit is unlikely; however structures such as stone walls may be present. Therefore chance finds procedures must be developed and implemented for the construction of the mining area. This will outline the process that must be followed should any archaeological or historical heritage be exposed or identified during the construction of the mining area. It is important to note that in the event that any significant heritage is exposed, a permitted Phase 2 Archaeological Assessment may be required.				
<b>POST-MITIGATION</b>				
Duration	Short term (2)	Implementing CFPs during construction will ensure that significant heritage resources are recorded and salvaged before destruction.	Consequence: Negligible (5)	Significance: Negligible - positive (20)
Extent	Very limited (1)	The CFP will identify heritage sites, localising any possible impact to the site itself.		



Intensity x type of impact	Low - positive (2)	Recording heritage resources and sites if they are exposed during construction activities will contribute to the general heritage record of the area. However, should exposed sites be determined to have high CS, this contribution will increase.	
Probability	Probable (4)	It is probably that a trained site foreman/ Environmental Officer will be able to identify exposed resources during construction and thereby reduce the negative impact, i.e. complete, unrecorded destruction.	

While there may be a direct impact on the identified heritage resources, they have a negligible cultural significance and therefore do not require any further mitigation. They have been sufficiently recorded and do not require any further investigation.

### 7.1.2 Cumulative impacts

Cumulative impacts that may occur as a result of the mining operation include:

- An additive cumulative impact may occur where the increase in mining activity in the area will may encroach on tangible heritage resources. This may be positive as it would allow for further heritage studies to identify additional heritage resources, increasing the knowledge on heritage in the area. However, it may also be negative as the heritage resources may be destroyed or damaged as mining activity expands in the area;
- A synergistic cumulative impact will occur with the increase of mining activity and other associated activities such as other forms of development in the area. This may impact the sense-of-place of the area, and result in a degradation of the significance value of the heritage in the area.

## 8 Discussion

A total of six heritage resources were recorded within the site specific study area. The Stone Age sites were not found *in situ* and do not offer any significant information other than form and function. Three other such occurrences were identified in the area during previous heritage impact assessments and therefore are commonly represented in the surrounding area. They were given a negligible significance value, based on the low score in relation to the historic and scientific criteria. The impact on these sites was negligible due to their negligible significance and no further mitigation measures were necessary.

The Iron Age sites are similar to other sites identified in the surrounding areas. Scatters of ceramic potsherds not found in context are common and well represented in the region, so they were given a negligible significance value. The same can be applied to the communal activity area. The activity areas are not well established suggesting a short occupation. If any

archaeological deposit is present, the stratigraphy of the deposit is likely to be shallow assuming a short occupation period. Several examples of these activity areas have been recorded in the region and were therefore given a negligible significance value.

While not many gong rocks have been found in the surrounding area, they are common occurrences all over the country, and this particular one was not an excellent example. It was given a negligible significance value. As for the Stone Age above, the impact on the above sites was negligible due to their negligible significance and no further mitigation measures were necessary.

## 9 Abbreviated Watching Brief and Chance Find Procedures

As the identified heritage resources are of negligible significance rating, there is no need for any further mitigation measures for the identified heritage. However, as stated in Section 3.6, the list of identified heritage resources in Table 5-1 does not represent an exhaustive list of all heritage resources that may occur within the project area. Some heritage resources may be present on a sub-surface level with no visible surface features to assist in their identification.

Taking the above into consideration, a Watching Brief and Chance Finds Procedures (CFPs) should be developed and included in the EMP for the DGP. The Watching Brief outlined below does not constitute a full detailed Watching Brief and a detailed project specific Watching Brief can be developed by Digby Wells on request

The Watching Brief should consist of the following:

- A qualified archaeologist walking down the area that is to be affected during ground clearance. The purpose of a site walk down is to identify and record any possible archaeological and other heritage resources in the development footprint;
- Any identified heritage and archaeological sites must be recorded with photographs, detailed site descriptions and GPS co-ordinates.

The CFPs must clearly define the process that must be followed should heritage resources be uncovered during construction and operational phases.

Listed below is a framework of a CFP. It does not constitute a full CFP and a detailed project specific CFP can be developed by Digby Wells on request.

The following list is typical chance finds that may be exposed during development:

- Human remains, possibly with associated material culture such as pottery;
- Animal bones, possible indication of a midden;
- Pieces of brick-like burnt or baked clay, indicating possible hut remains; and
- Distinct, localized changes in soil colour and texture.

Should any of the above be uncovered during construction, the CFP process should be followed. This CFP process includes:

- All work in the vicinity must be stopped when a chance find is made;
- The find must be examined and secured;
- Report the chance find to a supervisor;
- A qualified specialist, such as an accredited archaeologists, should be engaged to investigate the site further;
- The chance find should be recorded and a report written; and
- Permits, if applicable, should be applied for.

## 10 Conclusion

The proposed DGP is located on the property De Grootboom 373 KT, Greater Tubatse Local Municipality, Limpopo Province. The project is a MPA for mining operations on the De Grootboom property. An NID was submitted on the 22 April 2015 to SAHRA and LIHRA in terms of Section 38(8) of the NHRA. A HSR was completed and submitted to SAHRA/LIHRA on the 23 April 2015 which presented a baseline of the cultural landscape that informed this report.

A total of six heritage resources (See Table 6-1) were identified within the project boundaries during the field survey, all of which had a negligible significance rating.

An impact assessment was completed for the identified heritage resources and discussed under Section 7.1 above. Recommendation to the mitigation and management of this resource was presented and discussed under Section 9 above and summarised below.

Based on the findings of the HSR and this report, Digby Wells recommend the following:

- A Watching Brief should be conducted during the construction of the roads and infrastructure areas. The Watching Brief will entail a qualified archaeologist to be present on site during site clearance to identify and investigate possible heritage resources that may be uncovered during construction;
- It is recommended that CFPs be developed and included within the EMP for the mining area and the general DGP area. The CFPs must clearly define the reporting structure and action items required in the discovery or accidental exposure of possible heritage resources during construction and operational activities.
- Additionally, should the mining operation prove to be successful and a Mining Right be applied for, Environmental Authorisation will be applied for which must include a full HRM process, inclusive of a Heritage Impact Assessment (HIA) which should consist of the following:
  - Archaeological Impact Assessment (AIA); and
  - Stakeholder consultation to identify potential ancestral sites and/or burial grounds.

## **Appendix A: Specialist CV**





DIGBY WELLS  
ENVIRONMENTAL

## NATASHA HIGGITT

Ms Natasha Higgitt  
Assistant Heritage Consultant  
Social Department  
Digby Wells Environmental

### 1 EDUCATION

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

### 2 LANGUAGE SKILLS

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

### 3 EMPLOYMENT

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

### 4 FIELD EXPERIENCE

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

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

## 5 PROJECT EXPERIENCE

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

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



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

## **6 PROFESSIONAL AFFILIATIONS**

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