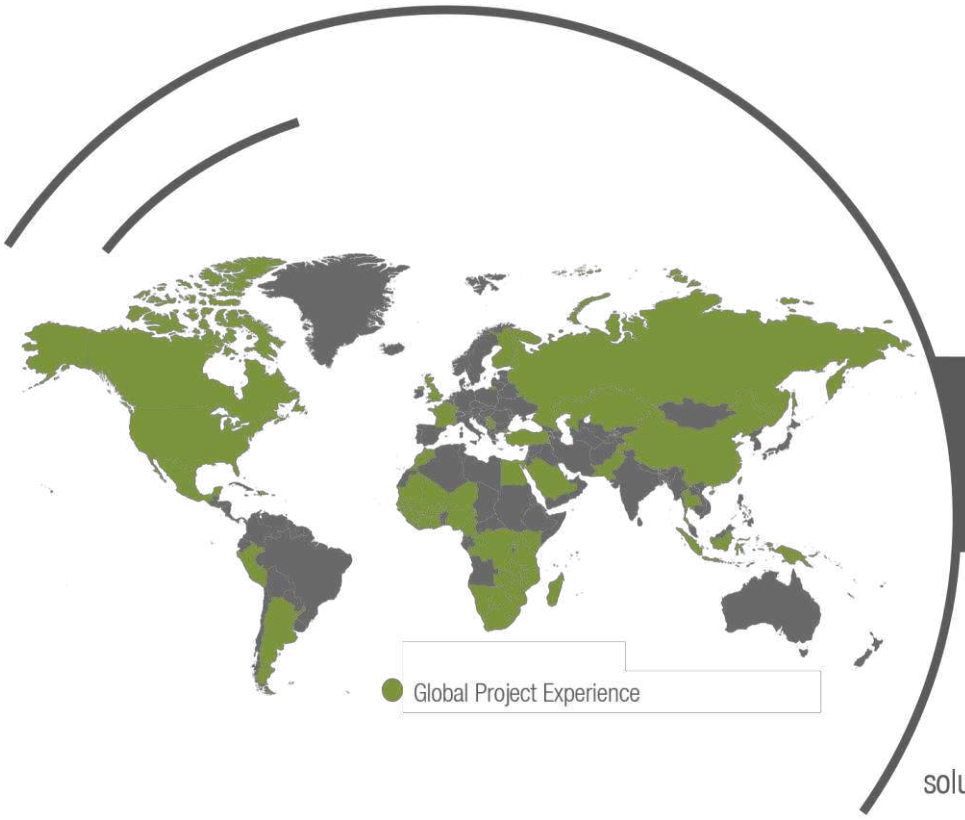

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Pan African Resources PLC (PAR) Environmental Application Process

Heritage Impact Assessment

Prepared for:
Pan African Resources PLC

Project Number:
PAR7273

August 2022

Digby Wells and Associates (South Africa) (Pty) Ltd
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This document has been prepared by Digby Wells Environmental.

Report Type:	Heritage Impact Assessment
Project Name:	Pan African Resources PLC (PAR) Environmental Application Process
Project Code:	PAR7273

Name	Responsibility	Signature	Date
Shannon Hardwick HRM Consultant ASAPA Member: 451	Report Compilation Pre-disturbance Survey		December 2021
Johan Nel Manager: Heritage Services ASAPA Member 095	Technical Review		December 2021
Brett Coutts	Project Manager Review		July 2022

DETAILS AND DECLARATION OF THE SPECIALIST

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

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Title/ Position:	Heritage Resources Management Consultant
Qualification(s):	Master of Science (MSc) Archaeology
Experience (years):	5 years
Registration(s):	ASAPA, ICOMOS

I, Shannon Hardwick, declare that: –

- I act as the independent specialist in this application;
- I will perform the work relating to the application in an objective manner, even if this results in views and findings that are not favourable to the applicant;
    - I declare that there are no circumstances that may compromise my objectivity in performing such work;
    - I have expertise in conducting the specialist report relevant to this application, including knowledge of the Act, Regulations and any guidelines that have relevance to the proposed activity;
- I will comply with the Act, Regulations and all other applicable legislation;
- I have no, and will not engage in, conflicting interests in the undertaking of the activity;
- I undertake to disclose to the applicant and the competent authority all material information in my possession that reasonably has or may have the potential of influencing - any decision to be taken with respect to the application by the competent authority; and - the objectivity of any report, plan or document to be prepared by myself for submission to the competent authority;
- All the particulars furnished by me in this form are true and correct; and
- I realise that a false declaration is an offence in terms of regulation 48 and is punishable in terms of section 24F of the Act.

July 2022

Signature of the Specialist *Date*

Findings, recommendations, and conclusions provided in this report are based on the best available scientific methods and the author's professional knowledge and information at the time of compilation. Digby Wells employees involved in the compilation of this report, however, accepts no liability for any actions, claims, demands, losses, liabilities, costs, damages, and expenses arising from or in connection with services rendered, and by the use of the information contained in this document.

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Any recommendations, statements or conclusions drawn from or based on this report must clearly cite or make reference to this report. Whenever such recommendations, statements or conclusions form part of a main report relating to the current investigation, this report must be included in its entirety.

EXECUTIVE SUMMARY

Digby Wells Environmental (hereafter Digby Wells) has been appointed to undertake an Environmental Application Process and associated specialist studies for the Mogale Cluster - Mining Right (GP) 30/5/1/2/2 (206) Mining Right (MR) and, more specifically for the proposed construction of a large-scale gold tailings retreatment operation. Pan African Resources PLC (PAR) has entered into a Sale and Purchase Agreement for the acquisition of the shares in and claims against Mogale Gold (Pty) Ltd (Mogale Gold). The agreement was entered into between PAR and the liquidators of Mintails Mining SA (Pty) Ltd (in liquidation) (MMSA). MMSA is the holding company of Mogale Gold. The intended transaction is subject to a due diligence investigation which is in the process of being concluded.

The Project includes six dumps which will be reprocessed. The tailings will be deposited in the West Wits Pit after being reprocessed. Once capacity has been reached at the West Wits Pit, PAR will deposit the tailings at a new Tailings Storage Facility (TSF) to be constructed in the footprint of one of the TSFs, after it is reclaimed. Alternatively, tailings may be deposited in other existing pits included in MR 206, including Monarch and Emerald.

To obtain the necessary EA and associated licences, PAR appointed Digby Wells Environmental (hereinafter Digby Wells) to undertake the necessary Environmental Impact Assessment (EIA) process in support of the Environmental Authorisation (EA) required for the Project in compliance with the National Environmental Management Act, 1998 (Act No. 107 of 1998) (NEMA) and the NEMA EIA Regulations, 2014 (Government Notice Regulation [GN R] 982 as amended by GN R 326).

The EIA process includes a Heritage Resources Management (HRM) process required in support of the EIA process and in compliance with the National Heritage Resources Act, 1999 (Act No. 25 of 1999) (NHRA). This document constitutes the Heritage Impact Assessment (HIA) report and included the completion of the following activities:

- Description of the predominant cultural landscape supported through primary and secondary data collection;
- Assessment of the Cultural Significance of the identified heritage resources;
- Identification of potential impacts to heritage resources based on the Project description and Project activities;
- An evaluation of the potential impacts to heritage resources relative to the sustainable socio-economic benefits that may result from the Project;
- Recommending feasible management measures and/or mitigation strategies to avoid and/or minimise negative impacts and enhance potential benefits resulting from the Project; and
- Submission of the HIA report to the Heritage Resource Authorities (HRAs) for Statutory Comment as required under Section 38(8) of the NHRA.

Digby Wells undertook a pre-disturbance survey on 13 and 15 October 2021. During this assessment, Digby Wells identified five heritage resources within the proposed Project area – two burial grounds and graves, one layer of historical material which may comprise a historical landfill (or similar dump), one historical structure and one historical *werf*. These heritage resources have negligible to very high Cultural Significance. The table below presents a summary of the Cultural Significance of the identified heritage resources.

Summary of the Cultural Significance of Identified Heritage Resources

Resource ID	Description	INTEGRITY	Cultural Significance
BGG01 and BGG02	Burial grounds and graves	4	Very High
Historical Landfill	Concentrated layer of historical material that may represent a landfill	2	Low
STE01	Historical Structure	1	Negligible
Wf01	Historical werf	1	Negligible

Given their location relative to the proposed infrastructure and the preferred plant location, no heritage impacts are envisaged. However, there is the potential that the proposed Eskom and Plant Switch Yards and pipeline routes could impact on the Historical Landfill Site. The table below presents a summary of this assessment.

Summary of the Impact Assessment

	Duration	Extent	Intensity	Consequence	Probability	Significance
Impact	**Pre-mitigation:**					
Direct impact to Landfill	Permanent	Limited	Very low - Negative	Moderately detrimental	Likely	Minor - negative
Direct impact to BGG01	Permanent	International	Extremely high - Negative	Extremely detrimental	Probable	Moderate-negative
Impact	**Post-mitigation:**					
Direct impact to Landfill	Beyond project life	Local	Very low - positive	Moderately beneficial	Highly probable	Minor - positive
Direct impact to BGG01	Beyond project life	Local	High - positive	Highly beneficial	Likely	Minor - positive

Additionally, the proposed Project presents a risk of direct negative impact to heritage resources that may exist within the Project area and which have not been identified to date. The table below summarises the risk to these resources.

Summary of the potential risk to heritage resources

Unplanned event	Potential impact
Accidental exposure of fossil bearing material implementation of the Project.	Damage or destruction of heritage resources generally protected under Section 35 of the NHRA.
Accidental exposure of *in situ* archaeological material during the implementation of the Project.	
Accidental exposure of *in situ* historical built environment sites during the implementation of the Project.	Damage or destruction of heritage resources generally protected under Section 34 of the NHRA
Accidental exposure of *in situ* burial grounds or graves during the implementation of the Project.	Damage or destruction of heritage resources generally protected under Section 36 of the NHRA.
Accidental exposure of human remains during the construction phase of the Project.	

Considering the nature, location and scope of the Project, Digby Wells recommends the following:

- PAR must develop and implement a Chance Find Procedure (CFP) as part of the Environmental Management Program (EMPr);
- Direct negative impacts to BGG01 must be avoided or managed. Digby Wells recommends that a 100 m no-go buffer zone be implemented around BGG01 to avoid heritage resource impacts. Should this not be feasible, Digby Wells recommends that PAR undertake consultations to explore whether a Grave Relocation Process (GRP) will be feasible. The GRP, should it go ahead, will be subject to a permit issued in terms of Section 36 of the NHRA; and
- Direct negative impacts to the Historical Landfill must be avoided or managed. Digby Wells recommends that a 50 m no-go buffer zone around the Historical Landfill Site be implemented to avoid heritage resource impacts. Should this not be feasible, Digby Wells recommends that PAR appoint a suitably-qualified archaeologist to undertake test pits or excavations of this resource. This will be subject to a permit issued in terms of Section 35 of the NHRA.

Where these recommendations are implemented, Digby Wells does not object to the Project going forward from a heritage perspective.

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ACRONYMS, ABBREVIATIONS AND DEFINITIONS

Abbreviation	Meaning
ASAPA	Association of Southern African Professional Archaeologists
BA	Bachelor of Arts, or Basic Assessment (*the applicable term will be defined in the report*)
BCE	Before Common Era (also: Before Christ or BC)
BID	Background Information Document
BSc	Bachelor of Science
c.	Circa, meaning approximately
CE	Common Era (also: *Anno Domini* or AD)
CFP	Chance Find Protocol
CRR	Comments and Response Report
Digby Wells	Digby Wells Environmental
EA	Environmental Authorisation
EAP	Environmental Assessment Practitioner
EFC	Early Farming Community (*also known as Early Iron Age, see below*)
EIA	Environmental Impact Assessment. *Please note that EIA can also refer to the 'Early Iron Age'; however, in this document, this time period is referred to as 'Early Farming Community'.*
EMP	Environmental Management Plan
EMPr	Environmental Management Programme
ESA	Early Stone Age
GIS	Geographical Information System
GN R	Government Notice Regulation
GPS	Global Positioning System
HIA	Heritage Impact Assessment
Hons	Honours degree
HRAs	Heritage Resources Authorities
HRM	Heritage Resources Management
HSMP	Heritage Site Management Plan
ICOMOS	International Council on Monuments and Sites
ktpm	thousand tonnes per month

Abbreviation	Meaning
Kya	Thousand years ago
LED	Local Economic Development
LFC	Late Farming Community also known as Late Iron Age
LSA	Late Stone Age
MIA	Middle Iron Age
MPRDA	Mineral and Petroleum Resources Development Act, 2002 (Act No. 28 of 2002)
MR	Mining Right (boundary)
MRA	Mining Right Application
MSA	Middle Stone Age
MSc	Master of Science
Mt	Million tonnes
Mtpa	Million tonnes per annum
Mya	Million years ago
NEMA	National Environmental Management Act, 1998 (Act No. 107 of 1998)
NHRA	National Heritage Resources Act, 1999 (Act No. 25 of 1999)
NID	Notification of Intent to Develop
PCD	Pollution Control Dam
PHRA	Provincial Heritage Resources Authority
PHRA-G	Provincial Heritage Resources Authority Gauteng
RoD	Record of Decision
SAHRA	South African Heritage Resources Agency
SAHRIS	South African Heritage Resources Information System
SCF	Statutory Comment Feedback
SEP	Stakeholder Engagement Process
SoW	Scope of Work
ToR	Terms of Reference
Wits	University of the Witwatersrand
Werf	A farmstead or multiple outbuildings associated with a farmhouse or agricultural activities. Plural: *werwe* (Afrikaans).

Refer to Appendix A for a Glossary of Terms.

NHRA and GN R 326 Appendix 6 Legislated Requirements

Description	App. 6	NHRA	Section
Declaration that the report author(s) is (are) independent.	1(b)	-	Page iii-iv
An indication of the scope of, and the purpose for which, the report was prepared.	1(c)	-	1.2 2.1
Details of the person who prepared the report and their expertise to carry out the specialist study.	1(a)	-	Refer to Appendix B
Outlines the legislative framework relevant to the specialist heritage study.	-	-	3
Identifies the specific constraints and limitations of the HIA, including any assumptions made and any uncertainties or gaps in knowledge.	1(i)	-	4
Describes the methodology employed in the compilation of this HIA.	1(e)	-	5
An indication of the quality and age of base data used for the specialist report.	1(cA)	-	5.4 15
The duration, date and season of the site investigation and the relevance of the season to the outcome of the assessment.	1(d)	-	5.5
Provides the baseline cultural landscape.	-	38(3)(a)	6
Motivates for the defined Cultural Significance of the identified heritage resources and landscape.	-	38(3)(b)	7.1
A description of the potential impacts to heritage resources by project related activities, including: - Existing impacts on the site; - Possible risks to heritage resources; - Cumulative impacts of the proposed development; - Acceptable levels of change; and - Heritage-related risks to the project.	1(cB)	38(3)(c)-	7
A description of the findings and potential implications of such findings on the impact of the proposed activity or activities.	1(j)	38(3)(c)	

Description	App. 6	NHRA	Section
Details of an assessment of the specific identified sensitivity of the site related to the proposed activity or activities and its associated structures and infrastructure, inclusive of a site plan identifying site alternatives.	1(f)	-	7 Plan 4
Considers the development context to assess the socio-economic benefits of the project in relation to the presented impacts and risks.	-	38(3)(d)	6.4
A description of any consultation process that was undertaken during the course of preparing the specialist report and the results of such consultation.	1(o)	38(3)(e)	Refer to Appendix C in the Draft EIA
A summary and copies of any comments received during any consultation process and where applicable all responses thereto.	1(p)	38(3)(e)	
Details the specific recommendations based on the contents of the HIA.	-	38(3)(g)	11
An identification of any areas to be avoided, including buffers.	1(g)		
Any mitigation measures for inclusion in the Environmental Management Programme (EMPr)	1(k)		8
Any conditions for inclusion in the environmental authorisation.	1(l)		11
Any monitoring requirements for inclusion in the EMPr or environmental authorisation.	1(m)		9
A reasoned opinion— (i) whether the proposed activity, activities or portions thereof should be authorised; (iA) regarding the acceptability of the proposed activity or activities; and (ii) if the opinion is that the proposed activity, activities or portions thereof should be authorised, any avoidance, management and mitigation measures that should be included in the EMPr, and where applicable, the closure plan	1(n)	38(3)(g)	13
Collates the most salient points of the HIA and concludes with the specific outcomes and recommendations of the study.	-	38(3)(f) 38(3)(g)	14
Lists the source material used in the development of the report.	1(cA)	-	15

Description	App. 6	NHRA	Section
A map superimposing the activity including the associated structures and infrastructure on the environmental sensitivities of the site including areas to be avoided, including buffers	1(h)	-	Plan 4
Any other information requested by the competent authority.	1(q)	-	N/A

1. Introduction

Digby Wells Environmental (hereafter Digby Wells) has been appointed to undertake an Environmental Application Process and associated specialist studies for the Mogale Cluster - Mining Right (GP) 30/5/1/2/2 (206) Mining Right (MR) and, more specifically for the proposed construction of a large-scale gold tailings retreatment operation. Pan African Resources PLC (PAR) has entered into a Sale and Purchase Agreement for the acquisition of the shares in and claims against Mogale Gold (Pty) Ltd (Mogale Gold). The agreement was entered into between PAR and the liquidators of Mintails Mining SA (Pty) Ltd (in liquidation) (MMSA). MMSA is the holding company of Mogale Gold. The intended transaction is subject to a due diligence investigation which is in the process of being concluded.

Mogale Gold owns the right to extract and process gold from tailings recourses by reprocessing old gold mine slimes dams and sandy mine dumps left by the extensive historic mining activities that have taken place in the area since 1888. PAR is only interested in the surface operations associated with Mining Right (MR) 206 (i.e., Tailings Storage Facilities (TSFs) for reclamation, processing and deposition), and therefore the focus of this application process.

1.1. Project Background

The project consists of 120 Mt of tailings to be reprocessed and firstly deposited into the West Wits Pit (current authorisation in place for in-pit deposition) and then undertake deposition of the footprint of 1L23-1L25 footprint (New Tailings Facility) once capacity has been reached within the West Wits Pit. Eventually there will be two TSFs: one at the current WWP and the other at the current 1L23-1L25 TSF.

Alternatives are being considered for potential deposition of tailings material into the other pits associated, such as Monarch and Emerald Pits.

It must be noted that once the West Wits Pits reaches capacity the surface deposition will extend in a northern direction from the pit onto surface, expanding the deposition footprint associated with West Wits Pit.

There are six dumps being considered to be reprocessed, the largest of which amounts to 57.9 Mt, while the smallest contains 0.57 Mt. The primary location of processed tailings storage has been earmarked for deposition in the West Wits Pit. There are three smaller dumps which could also be included and reprocessed as part of the project namely 1L4, 1L5 and 1L6.

1.2. Project Locality

MR 206 is located on Portions 66 and 99 of the farm Waterval 174 IQ and portions 136 and 209 of the farm Luipaardsvlei 246 IQ. MR 206 and associated infrastructure covers an aerial extent of 2,923.3 ha.

The Project is located about 4 km south of Krugersdorp and 4 km northeast of Randfontein. The Project area is situated in the Mogale City Local Municipality (MCLM) and Rand West City Local Municipality (RWCLM), which is located within the West Rand District Municipality (WRDM) in the Gauteng Province. The Project area falls under the jurisdiction of the Krugersdorp Magisterial District. Table 1-1 provides a summary of these details and Plan 1 (Regional Setting) presents the geographical location within which the Project is located.

The area within which the Project is located has been transformed by past gold mining activities and much of the infrastructure for these operations remains.

Table 1-1: Summary of the PAR Project Location Details

Province	Gauteng
District Municipality	WRDM
Local Municipality	MCLM and RWCLM
Nearest Town	Krugersdorp (4 km), Randfontein (4 km)
GPS Co-ordinates (relative centre point of study area)	26°07'45.54"S
	27°45'40.85"E

2. Project Description

2.1. Terms of Reference and Scope of Work

PAR appointed Digby Wells and Associates (South Africa) (Pty) Ltd (hereinafter Digby Wells) as the independent Environmental Assessment Practitioner (EAP) to undertake an Environmental Application Process to obtain Environmental Authorisation (EA) as outline above in respect of MR 2060.

PAR appointed Digby Wells to undertake the EIA process required through the triggering of activities listed in the EIA Regulations, 2014, as amended.

The Environmental Application Process includes a specialist Heritage Resources Management (HRM) process that complies with section 38 of the National Heritage Resources Act, 1999 (Act No. 25 of 1999) (NHRA). This document comprises the specialist Heritage Impact Assessment (HIA) report in support of the EIA process for submission to the Heritage Resources Authorities (HRAs). In this case, the applicable HRAs include the South African Heritage Resources Agency (SAHRA) and the Provincial Heritage Resources Authority Gauteng (PHRA-G).

Table 2-1 presents a summary of the expertise of the specialists involved in the compilation of this report. Appendix B includes the full curriculum vitae (CVs) of these specialists.

Table 2-1: Expertise of the Specialists

Team Member	Bio Sketch
Shannon Hardwick ASAPA Member: 451 ICOMOS Member 38048 Years' Experience: 4	Shannon joined the Digby Wells team in May 2017 as a Heritage Management Intern and has most recently been appointed as a Heritage Resources Management Consultant. Shannon is an archaeologist who obtained a Master of Science (MSc) degree from the University of the Witwatersrand in 2013, specialising in historical archaeobotany in the Limpopo Province. She is a published co-author of one paper in *Journal of Ethnobiology*. Since joining Digby Wells, Shannon has gained generalist experience through the compilation of various heritage assessments, including Heritage Scoping Reports (HSRs), HIAs, Heritage Basic Assessment Reports (HBARs) and Section 34 permit applications. Her other experience includes compiling a Community Health, Safety and Security Management Plan (CHSSMP) and various social baselines. Shannon's experience in the field includes pre-disturbance surveys in South Africa, Malawi and the Democratic Republic of the Congo and other fieldwork in Malawi.
Johan Nel ASAPA Member 095 ICOMOS Member Years' Experience: >20	Johan is a qualified archaeologist, heritage specialist and Manager of the Heritage Services department in Digby Wells. He obtained a BA Honours degree in Archaeology from the University of Pretoria in 2001. He also completed a Professional Development Certificate in Integrated Heritage Resources Management through Rhodes University in 2016. Johan is a professional and accredited member of the Association of Southern African Professional Archaeologists (ASAPA) and a member of the International Council on Monuments and Sites (ICOMOS) South Africa. He has more than 20 years' extensive and diverse experience in heritage resource management. Johan has worked in numerous African settings including South Africa, Botswana, the Democratic Republic of Congo, Liberia, and Sierra Leone. His current interests include ways to empower local communities to use, conserve, and manage heritage resources themselves, as well as integrating living and intangible heritage practices with the more traditional heritage approaches to heritage management. Key concepts he is exploring include cultural humility and so-called People-centred Approaches to conservation of both natural and cultural heritage.

The Scope of Work (SoW) for the specialist HRM process was to compile an HIA report to comply Section 38(3) of the NHRA. Findings from the following activities informed the HIA:

- Primary and secondary data collection to develop a baseline that describes the predominant cultural landscape and identify cultural heritage within the Project area of influence (AoI).
- A Statement of Cultural Significance of identified heritage resources, itself informed by the cultural heritage baseline referred to above.

- Review of the Project description and associated activities to identify potential sources of cultural heritage impacts.
- Assessment of potential impacts on identified cultural heritage in the AoI relative to the sustainable socio-economic benefits that may result from the Project;
- Recommendations to manage and mitigate possible cultural heritage impacts based on the Cultural Significance and impact assessment results, to avoid and/or minimise negative impacts and enhance potential benefits resulting from the Project; and
- Submission of the HIA (as well as the EIA report and supporting specialist reports) to the HRAs for Statutory Comment as required under Section 38(8) of the NHRA.

2.2. Proposed Infrastructure and Activities

Mintails currently owns the rights to extract and process gold from sub surface and tailings resources in respect of the underground resources, slimes, and sand tailings material. Commercially, Mintails holds three mining rights where it produces gold by reprocessing old gold mine slimes dams and mine sand dumps, and by opencast hard rock mining of historically unmined shallow gold-bearing reefs, left unexploited by extensive historic mining activities since 1888.

PAR intends to acquire the surface operations associated with Mining Right (MR) 206 (i.e., the TSFs) for reclamation, processing and deposition. MR 206 is presented in Plan 1(Regional Setting) and Plan 2 (Local Setting) and comprises the following existing infrastructure:

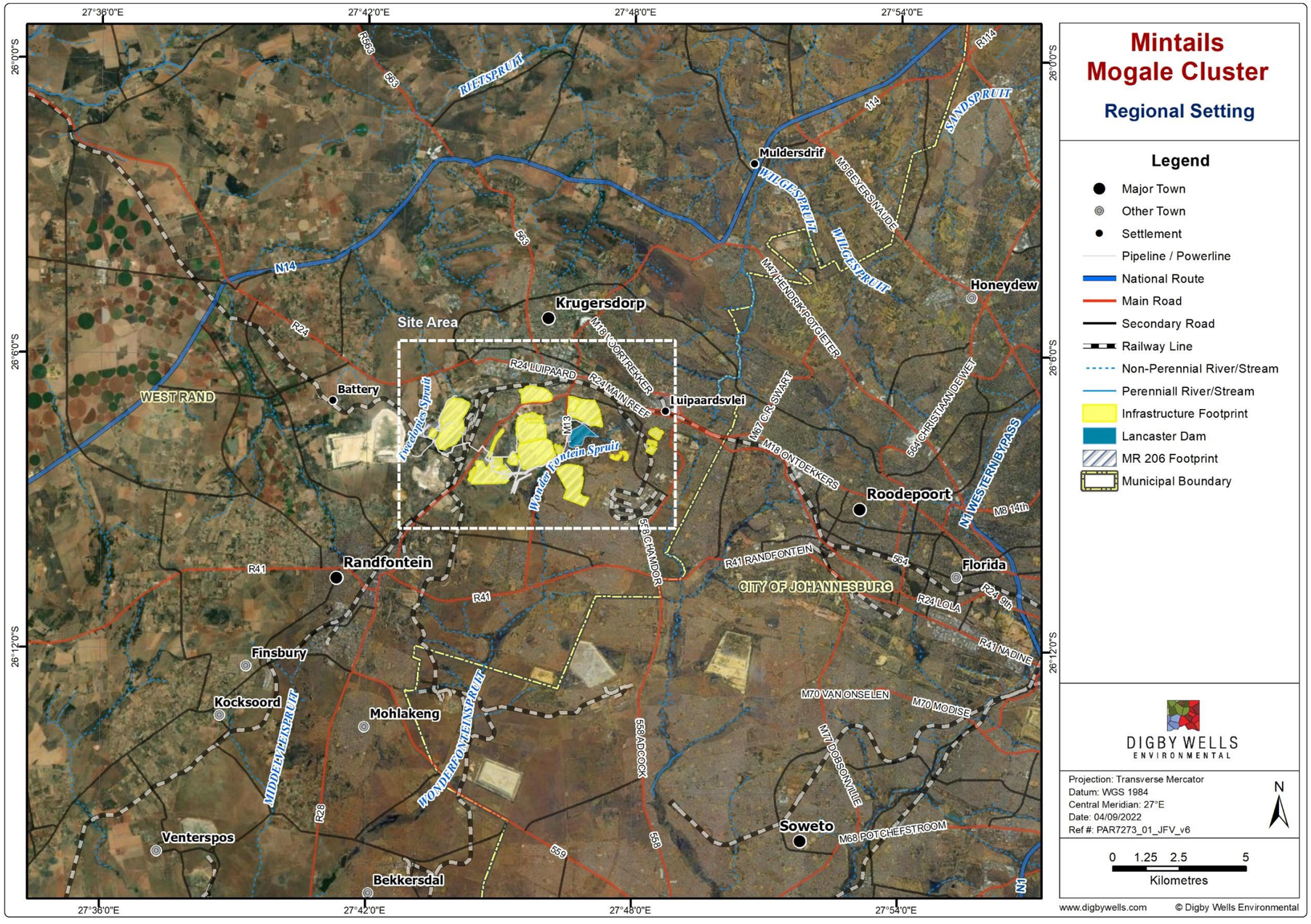
- The existing TSFs (IL8, ILl0, IL13-IL15, IL23-IL25 and IL28);
- Sand dumps (Cams North Sand and South Sand);
- Lancaster Dam; and
- An open pit (West Wits Pit) that will be used for the deposition of tailings materials.

PAR plan to reclaim gold-bearing tailings within the Mintails Mogale Cluster through hydraulic reclamation. PAR will require additional infrastructure to do so. A process plant, overland pumps, pipelines, and powerlines as well as the associated water management infrastructure will form part of the proposed infrastructure that will require an authorisation. Once the open pit is filled to capacity, a new TSF will potentially be constructed on the footprint area of IL23-IL25 once this has been reclaimed.

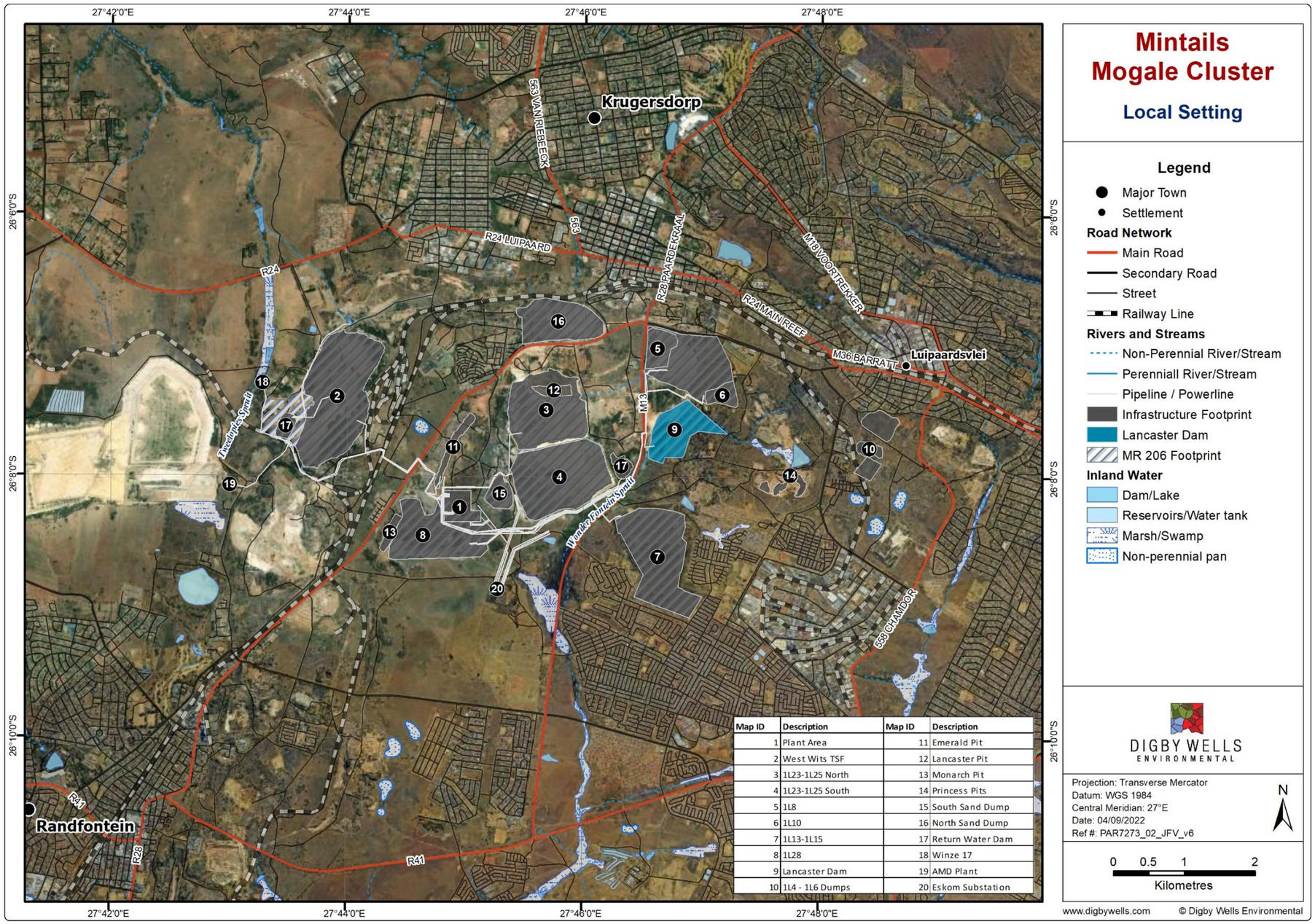
Table 2-2 presents the activities expected within the construction, operation and decommissioning phases of the Project. These Project activities will be used for the impact assessment. Plan 2 presents the proposed Project design and infrastructure layout.

Table 2-2: Project Phases and Associated Activities

Project Phase	Associated Activities
Construction Phase	Site clearing for the construction of the new processing plant facility and ancillary infrastructure described above.
	Construction of the new processing plant and ancillary infrastructure described above.
	Employment and procurement for construction-related activities.
Operational Phase	Hydraulic reclamation of the abovementioned existing TSFs and sand dumps.
	Operation of pump stations during the operational phase.
	Maintenance of pipeline routes during the operational activities.
	In-filling of processed tailings material into the West Pits Pit and other potential pits.
	Surface tailings deposition within the West Wits Pit.
	Tailings deposition onto the footprint of 1L23-1L25 following its reclamation.
	Production of Gold.
	Progressive rehabilitation of the new TSFs (in the West Wits Pit and potentially 1L23-1L25 TSF).
	Employment and procurement for operation-related activities.
Decommissioning Phase	Removal, decommissioning and rehabilitation of surface infrastructure.
	Removal, decommissioning and rehabilitation of the processing plant footprint.
	Rehabilitation of the old TSF footprints.
	Rehabilitation of the old Mintails Processing Plant footprint.
	Final rehabilitation of the facility.
	General rehabilitation of the surrounding area, including wetland rehabilitation.



Plan 1: Regional Setting of the Project



Map ID	Description	Map ID	Description
1	Plant Area	11	Emerald Pit
2	West Wits TSF	12	Lancaster Pit
3	1L23-1L25 North	13	Monarch Pit
4	1L23-1L25 South	14	Princess Pits
5	1L8	15	South Sand Dump
6	1L10	16	North Sand Dump
7	1L13-1L15	17	Return Water Dam
8	1L28	18	Winze 17
9	Lancaster Dam	19	AMD Plant
10	1L4 - 1L6 Dumps	20	Eskom Substation

Plan 2: Local Setting

2.3. Alternatives Considered

Table 2-3 presents a summary of the alternatives considered for the proposed Project and describes the consequences of the various alternatives on the assessment of impacts posed to cultural heritage resources within the Project Area. The EIA report includes a more detailed discussion on the Project alternatives.

Table 2-3: Project Alternatives considered in this Assessment

Alternative	Description	Consequence for HRM Process
Technology Alternatives	The Project includes the hydraulic reprocessing of the existing TSFs. The tailings will be processed at a rate of 800 thousand tonnes per month (ktpm). PAR have developed a tailings deposition strategy and associated transportation strategy which combines pipelines and road transport. These components are subject to review during the Feasibility and EA studies and may be amended as these processes continue.	Changes to the preferred technology and/or transport alternatives may result in changes to the infrastructure layout. Only the layout shown in Plan 2 and alternatives have been considered. Where layout changes are proposed in areas not considered in the pre-disturbance survey, additional in-field assessments may be required.
'No-go' Alternative	Should the Project not obtain approval, or not go ahead for any reason, the potential negative environmental and social (including heritage) impacts associated with the development of the proposed Project would not occur. However, the potential socioeconomic benefits associated with the Project (described in Section ●) would also not occur.	The no-go alternative has been considered in this assessment.

3. Relevant Legislation, Standards and Guidelines

This section describes the international, national, and local legislative documents and policy documents that inform the legislative and policy framework of the HRM process. The objective is to ensure that the assessments meet all stipulated requirements to ensure legal compliance and successful integration into the regional planning context.

3.1. National Legislation and Policy

Table 3-1 presents a summary of the national legislation applicable to this HRM process and illustrates how it will be considered in the HIA. Table 3-2 below presents the applicable policies considered in the HRM process.

Table 3-1: Applicable Legislation considered in the HRM Process

Applicable legislation used to compile the report	Reference where applied
Commonwealth War Graves Act, 1992 (Act No. 8 of 1992) (CWGA) The CWGA seeks to prevent the desecration, damaging or destruction of Commonwealth war graves (CWG), regulate the disinterment, removal, reinterment or cremation of Commonwealth war burials, and the removal, alteration, repair or maintenance of Commonwealth war graves. This Act defines "Commonwealth war burial" as "a burial of any member of the naval, military or air forces of the Commonwealth who died as a result of injuries sustained or illnesses contracted in the course of active duty during the First World War (1914 to 1921) or the Second World War 15 (1939 to 1947)" and a "Commonwealth war grave" as "any grave, tombstone, monument or memorial connected with a Commonwealth war burial".	Burial grounds and graves that contain any grave that are or may be considered a CWG).
Constitution of the Republic of South Africa, 1996 (Act No. 108 of 1996) Section 24 of the Constitution states that everyone has the right to an environment that is not harmful to their health or well-being and to have the environment protected, for the benefit of present and future generations, through reasonable legislative and other measures, that – i. Prevent pollution and ecological degradation; ii. Promote conservation; and iii. Secure ecologically sustainable development and use of natural resources while promoting justifiable economic and social development	The HRM process was undertaken to identify heritage resources and determine heritage impacts associated with the Project. As part of the HRM process, applicable mitigation measures, monitoring plans and/or remediation were recommended to ensure that any potential impacts are managed to acceptable levels to support the rights as enshrined in the Constitution.

Applicable legislation used to compile the report	Reference where applied
GN R. 982: Environmental Impact Assessment Regulations, 2014 (as amended by GN R 326 of 7 April 2017) These three listing notices set out a list of identified activities which may not commence without an Environmental Authorisation from the relevant Competent Authority through one of the following processes: • Regulation GN R. 983 (as amended by GN R 327) - Listing Notice 1: This listing notice provides a list of various activities which require environmental authorisation, and which must follow a basic assessment process. • Regulation GN R. 984 (as amended by GN R 325) – Listing Notice 2: This listing notice provides a list of various activities which require environmental authorisation, and which must follow an environmental impact assessment process. • Regulation GN R. 985 (as amended by GN R 324) – Listing Notice 3: This notice provides a list of various environmental activities which have been identified by provincial governmental bodies which if undertaken within the stipulated provincial boundaries will require environmental authorisation. The basic assessment process will need to be followed.	Refer to the Draft Scoping Report (DSR) for a full description of the Listed Activities triggered by the proposed Project. To comply with the regulations, an EIA process must be completed in support of EA in terms of the applicable Listing Notice. This HIA was completed to inform the EIA process to comply with Section 24 of the NEMA.
National Environmental Management Act, 1998 (Act No. 107 of 1998) (NEMA) The NEMA, as amended, was set in place in accordance with Section 24 of the Constitution of the Republic of South Africa. Certain environmental principles under NEMA have to be adhered to, to inform decision making on issues affecting the environment. Section 24 (1)(a), (b) and (c) of NEMA state that: *The potential impact on the environment, socio-economic conditions and cultural heritage of activities that require authorisation or permission by law and which may significantly affect the environment, must be considered, investigated and assessed prior to their implementation and reported to the organ of state charged by law with authorizing, permitting, or otherwise allowing the implementation of an activity.*	The application process was undertaken in accordance with the principles of Section 24 of NEMA as well as with the EIA Regulations 2014 (as amended), promulgated in terms of NEMA.

Applicable legislation used to compile the report	Reference where applied
The Environmental Impact Assessment (EIA) Regulations, Government Notice Regulation (GN) R.982 were published on 04 December 2014 and promulgated on 08 December 2014. Together with the EIA Regulations, the Minister also published GN R.983 (Listing Notice No. 1), GN R.984 (Listing Notice No. 2) and GN R.985 (Listing Notice No. 3) in terms of Sections 24(2) and 24D of the NEMA, as amended.	
National Heritage Resources Act, 1999 (Act No. 25 of 1999) (NHRA) The NHRA is the overarching legislation that protects and regulates the management of heritage resources in South Africa, with specific reference to the following Sections: • 5. General principles for HRM • 6. Principles for management of heritage resources • 7. Heritage assessment criteria and grading • 38. Heritage resources management The Act requires that Heritage Resources Authorities (HRAs), be notified as early as possible of any developments that may exceed certain minimum thresholds in terms of Section 38(1), or when assessments of impacts on heritage resources are required by other legislation in terms of Section 38(8) of the Act.	This report was compiled to comply with Section 5, 38(3), (4) and (8) of the NHRA. This report was submitted to the responsible HRAs, which in this instance is SAHRA and PHRA-G.
NHRA Regulations, 2000 (GN R 548) The NHRA Regulations regulate the general provisions and permit application process in respect of heritage resources included in the national estate. Applications must be made in accordance with these regulations. The following Chapters are applicable to this assessment: • II. Permit Applications and General Provisions for Permits; • III: Application for Permit: National Heritage Site, Provincial Heritage Site, Provisionally Protected Place or Structure older than 60 years; • IV: Application for Permit: Archaeological or Palaeontological or Meteorite;	The HRM process was undertaken with cognisance of the applicable regulations. The proposed mitigation strategies and management measures must comply with these requirements.

Applicable legislation used to compile the report	Reference where applied
• IX: Application for Permit: Burial Grounds and Graves; • X: Procedure for Consultation regarding Protected Area; • XI: Procedure for Consultation regarding Burial Grounds and Graves; and XII: Discovery of Previously Unknown Graves.	

Table 3-2: Applicable policies considered in the HRM process

Applicable policies used to compile the report	Reference where applied
SAHRA Archaeology, Palaeontology and Meteorites (APM) Guidelines: Minimum Standards for the Archaeological and Palaeontological Components of Impact Assessment Reports (2007) The guidelines provide the minimum standards that must be adhered to for the compilation of a HIA (2007). Chapter II Section 7 outlines the minimum requirements for inclusion in the heritage assessment as follows: • Background information on the Project; • Background information on the cultural baseline; • Description of the properties or affected environs; • Description of identified sites or resources; • Recommended field rating of the identified sites to comply with Section 38 of the NHRA; • A statement of Cultural Significance in terms of Section 3(3) of the NHRA; and • Recommendations for mitigation or management of identified heritage resources.	This report and the PIA report were compiled to adhere to the minimum standards as defined by Chapter II of the SAHRA Minimum Standards (2007 and 2012)

3.2. Local Regulatory Context

The HRM process was completed to comply with the requirements of the South African national legislative framework as described above. Provincial legislation and municipal by-laws are applicable to graves and cemeteries and are considered in our recommendations where a Grave Relocation Process (GRP) may be required.

4. Assumptions, Limitations and Exclusions

Digby Wells encountered constraints and limitations during the compilation of this report. Table 4-1 presents an overview of these limitations and the consequences.

Table 4-1: Constraints and Limitations

Constraint / Limitation Description	Consequence
Whilst every attempt was made to obtain the latest available information, the reviewed literature does not represent an exhaustive list of information sources for the various study areas.	The cultural heritage baseline presented in Section 6 below is considered accurate but may not include new data or information which may not have been made available to the public.
The infrastructure design layout available at the time of the pre-disturbance survey has been altered during the EIA process lifecycle and remains subject to minor changes during such processes.	Every effort was made to cover the extent of the study area[1]. The survey was focused on the proposed infrastructure layout current at the time of the survey; however, this has been altered since. Some heritage resources in the Project may therefore not have been identified. The infrastructure layout will be informed in part by the results of the heritage assessment.
Whilst every attempt was made to survey the extent of the site-specific study area, this report does not present an exhaustive list of identified heritage resources. Overgrown vegetation limited visibility at the time of the pre-disturbance survey.	Previously unidentified heritage resources may be encountered. Should this occur, PAR must alert the HRAs of the find and may need to enlist the services of a suitably qualified archaeologist or palaeontologist to advise them on the way forward.
Archaeological and palaeontological resources commonly occur at subsurface levels. These types of resources cannot be adequately recorded or documented by assessors without destructive and intrusive methodologies and without the correct permits issued in terms of Section 35 of the NHRA.	The reviewed literature, previously-completed heritage assessments and the results of the field survey are in themselves limited to surface observations. Subsurface tangible heritage may be exposed during Project activities. Should this occur, PAR must alert the HRAs of the find and may need to enlist the services of a suitably qualified archaeologist or palaeontologist to advise them on the way forward.

[1] Refer to Section 5.1 for a description of the study area.

5. Methodology

The following section presents a summary of the methodologies employed in the HRM process. Appendix C includes a more detailed description of the methodologies employed during the HRM process.

5.1. Defining the Study Areas

Heritage resources do not exist in isolation to the greater natural and social environment (which includes the socio-economic, socio-political, and socio-cultural aspects). To develop an applicable cultural heritage baseline for the Project, Digby Wells defined three nested study areas to be considered. These include:

- The *site-specific study area*: the farm portions extent associated with the proposed Project and proposed infrastructure, including a 500 m buffer area. The site-specific study area may extend linearly, in which case the site-specific study area will include the linear development and a 200 m buffer on either side of the footprint;
- The *local study area:* the area most likely to be influenced by any changes to heritage resources in the Project area, or where project development could cause heritage impacts. The local study area is defined as the area bounded by the local municipality and includes particular reference to the immediate surrounding properties or farms. The local study area is specifically examined to offer a backdrop to the socio-economic conditions within which the proposed development will occur. The local study area furthermore provides the local development and planning context that may contribute to cumulative impacts. The Project area is situated within the MCLM; and
- The *regional study area:* the area bounded by the district municipality demarcation. In this case, the Project is located in the WRDM. Where necessary, the regional study area may be extended outside the boundaries of the district municipality to include areas closest to the Project area. The aim of this is to include much wider expressions of specific types of heritage resources and historical events. The regional study area also provides the regional development and planning context that may contribute to cumulative impacts.

5.2. Statement of Significance

Digby Wells designed the significance rating process to provide a numerical rating of the Cultural Significance of identified heritage resources. This process considers 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 representativity or uniqueness (i.e., known examples of similar resources to exist).

The rationale behind the heritage value matrix takes into account that a heritage resource's value is a direct indication of its sensitivity to change (i.e., impacts). Value, therefore, was determined prior to completing any assessment of impacts.

The matrix rated the potential, or importance, of an identified resource relative to its contribution to certain values – aesthetic, historical, scientific and social. Resource significance is directly related to the impact on it that could result from Project activities, as it provided minimum accepted levels of change to the resource.

5.3. Definition of Heritage Impacts

Potential impacts to heritage resources may manifest differently across geographical areas or diverse communities when one considers the simultaneous effect to the tangible resource and social repercussions associated with the intangible aspects. Furthermore, potential impacts may concurrently influence the Cultural Significance of heritage resources. This assessment therefore considers three broad categories adapted from Winter & Baumann (2005, p. 36). Table 5-1 presents a summary of these impact categories.

Table 5-1: Impact Definition

Category	Description
Direct Impact	Affect the fabric or physical integrity of the heritage resource, for example destruction of an archaeological site or historical building. Direct 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 Impact	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 direct impact, its significance is affected to the extent that it can ultimately result in the loss of the resource itself.
Cumulative Impact	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 reclamation of a historical TSFs will minimise the sense of the historic mining landscape. • Synergistic: effects interact to produce a total effect greater than the sum of the individual effects, e.g., the removal of all historical TSFs will sterilise the historic mining landscape. • Time crowding: frequent, repetitive impacts on a particular resource at the same time, e.g., the effect of regular blasting activities on a nearby rock art site or protected historical building could be high.

Category	Description
	• Neutralizing: where the effects may counteract each other to reduce the overall effect, e.g., the effect of changes from a historic to modern mining landscape could reduce the overall impact on the sense-of-place of the study area. • Space crowding: high spatial density of impacts on a heritage resource, e.g., density of new buildings resulting in suburbanisation of a historical rural landscape.

5.4. Secondary Data Collection

Data collection assists in the development of a cultural heritage baseline profile of the study area under consideration. Qualitative data was collected to inform this HIA report and was primarily obtained through secondary information sources, i.e., desktop literature review and historical layering.

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

- Gaining an understanding of the cultural landscape within which the proposed Project is located; and
- Identify any potential fatal flaws, sensitive areas, current social complexities and issues and known or possible tangible heritage.

Repositories that were consulted included the South African Heritage Resources Information System (SAHRIS), online/electronic journals and platforms and select internet sources. This report includes a summary and discussion of the most relevant findings. Table 5-2 lists the sources consulted in the literature review (refer to Section 15 for more detailed references).

Table 5-2: Qualitative Data Sources

Reviewed Qualitative Data		
Databases		
Genealogical Society of South Africa (GSSA) database (2011)	SAHRIS Palaeosensitivity Map (PSM)	
Statistics South Africa (2011)	Wazimap (2017)	
SAHRIS Cases		
Map ID: 00543 Case ID: 871	Case ID: 4700 Case ID: 6854	Case ID: 8430

Reviewed Qualitative Data		
Cited Text		
Clark, 1982	Deacon & Deacon, 1999	Esterhuysen & Smith, 2007
Fairbridge, 1918	Garstang, et al., 2014	Huffman, 2007
Maggs, 1974	Makhura, 2007	Mitchell, 2002
Mucina & Rutherford, 2010	Shorten, 1970	UNESCO, 2018
Winter & Baumann, 2005		

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

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

Table 5-3 below lists the sources of historical imagery.

Table 5-3: Aerial imagery considered

Aerial photographs							
Job no.	**Flight plan**	**Row/s**	**Photo no.**	**Map ref.**	**Area**	**Date**	**Ref.**
158	158_1 of 1	6; 7; 8	71 - 75	2627	Krugersdorp/Roodepoort	1941	CD: NGI
498/27	498_27_1 of 1	3	16 - 24	2627	Roodepoort	1973	CD: NGI
498/235	498_235_ 1 of 2	16	13 - 21	2627	Randfontein	1987	CD: NGI

5.5. Primary Data Collection

Shannon Hardwick undertook a pre-disturbance survey of the Project area on 13 and 15 October 2021. The survey was a combination of a vehicular and pedestrian survey, which was

adapted to the terrain and the likelihood of heritage resources occurring in the area. The survey was non-intrusive (i.e., no sampling was undertaken).

The aim of the survey was to:

- Visually record the current state of the cultural landscape; and
- Record a representative sample of the visible, tangible heritage resources present within the development footprint area, site-specific study area and greater study area.

Identified heritage resources were recorded as waypoints using a handheld GPS device (see Plan 4). These heritage resources were also recorded through written notes and photographs.

5.6. Site Naming Convention

Heritage resources identified by Digby Wells during the field survey are prefixed by the SAHRIS case identification generated for this Project. Information on the relevant period or feature code and site number follows (e.g., 11829/BGG-001). The site name may be shortened on plans or figures to the period/feature code and site number (e.g., BGG-001). Table 5-4 presents a list of the relevant period and feature codes.

Table 5-4: Relevant Feature and Period Codes

Feature or Period Code	Reference
BGG	Burial Grounds and Graves
HLP	Historical Layering Point
HST	Historical Structure

Heritage resources identified through secondary data collection are prefixed by the relevant SAHRIS case or map identification number (*where applicable*) and the original site name as used by the author of that assessment (e.g., 00543/Structure 5).

6. Findings and Discussion

This section presents a description of the cultural heritage baseline informed through primary and secondary data collection. The section also includes a summary of the developmental context within which the Project is located and presents the potential socio-economic benefits anticipated to arise from the Project. As required by Section 38(3)(d) of the NHRA, the socio-economic benefits are compared to the heritage impacts is considered in Section ●.

6.1. Cultural Heritage Baseline Description

The cultural heritage landscape includes, but is not limited to palaeontology, archaeology, the built environment, history, burial grounds and graves, a sense of place and intangible heritage. Archaeological and built environmental resources, burial grounds and graves have been

recorded in heritage assessments completed within the regional study area (refer to Section 5.1). Table 6-1 presents a summary of the various archaeological periods of South Africa.

Table 6-1: Archaeological periods in South Africa (adapted from Esterhuysen & Smith, 2007)

The Stone Age	Early Stone Age (ESA)	2 million years ago (mya) to 250 thousand years ago (kya)
	Middle Stone Age (MSA)	250 kya to 20 kya
	Later Stone Age (LSA)	20 kya to 500 Common Era (CE)[2]
Farming Communities[3]	Early Farming Communities (EFC)	500 to 1400 CE
	Late Farming Communities (LFC)	1100 to 1800 CE
Historical Period	-	1500 CE to 1994 (Behrens & Swanepoel, 2008)

Figure 6-1 presents a breakdown of the heritage resources identified within the regional study area, grouped into these periods. The cultural heritage landscape is predominantly characterised by the historical period through the built environment and burial grounds and graves. This notwithstanding, archaeological materials representing the Stone Age and the Farming Community periods have been identified within the regional study area.

[2] Common Era (CE) refers to the same period as *Anno Domini* ("In the year of our Lord", referred to as AD): i.e. the time after the accepted year of the birth of Jesus Christ and which forms the basis of the Julian and Gregorian calendars. Years before this time are referred to as 'Before Christ' (BC) or, here, BCE (Before Common Era).

[3] The Farming Community Period is the more recent term used to refer to the Iron Age. These terms can be used interchangeably.

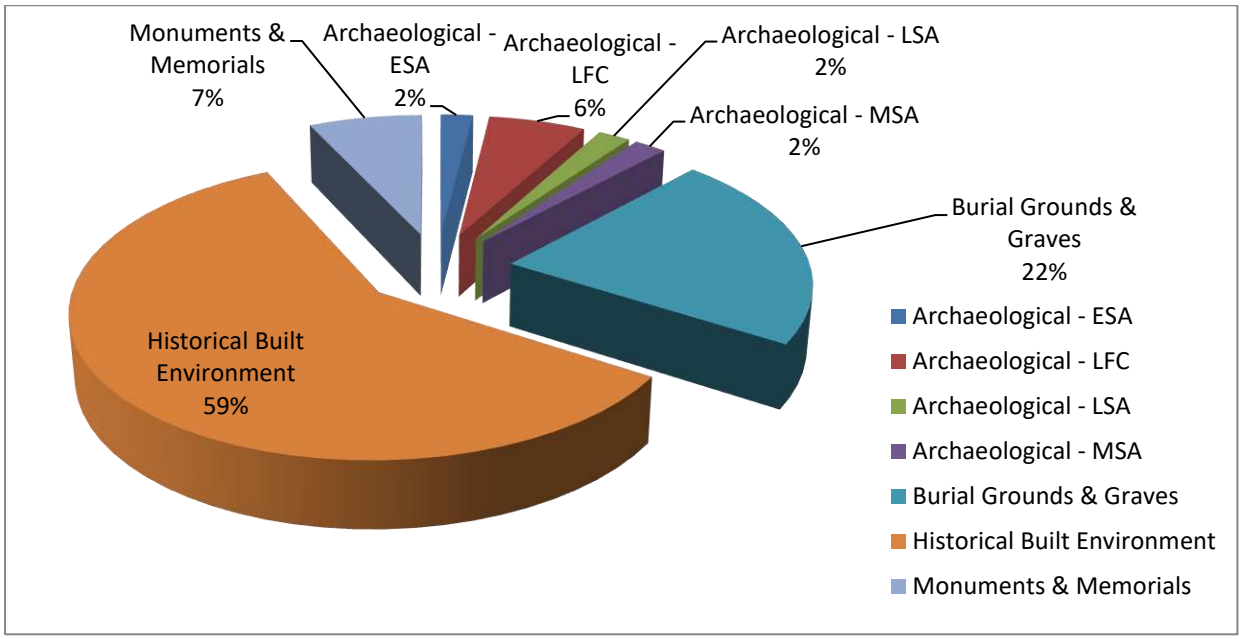


Figure 6-1: Breakdown of Identified Heritage Resources within the Regional Study Area

The Fossil Hominid Sites of South Africa World Heritage Site, which includes the colloquially known Cradle of Humankind (Sterkfontein, Swartkrans, Kromdraai and Environs), have contributed significantly to the fossil heritage of South Africa (UNESCO, 2018). The fossils found in these cave sites provide evidence for the occupation of the area for at least the last 2.3 mya. The fossils of the Cradle of Humankind represent some of the earliest hominid species of southern Africa, including *Australopithecus africanus*, *Paranthropus* species and *Homo habilis*. New species recently identified include *A. prometheus*, *A. sediba* and *H. naledi*. The Cradle of Humankind is located within the MCLM (UNESCO, 2018), less than 5 km from the Project area.

The Stone Age in southern Africa is divided into three broad phases, namely the ESA, the MSA and the LSA. These phases are determined according to the stone (lithic) tools and material cultural produced by the various hominid species through time (Deacon & Deacon, 1999; Mitchell, 2002). ESA stone tools are predominantly large handaxes and cleavers made of coarse-grained materials (Esterhuysen & Smith, 2007). This period from 2 mya to 250 kya and is associated with *Australopithecus* and early *Homo* species.

The MSA dates between approximately 300 kya and 20 kya. High proportions of minimally-modified blades, created using the Levallois technique, the use of good quality raw material and the use of bone tools, ochre and pendants characterise the early MSA stone tool industries (Clark, 1982; Deacon & Deacon, 1999). These tools were made and used by archaic *Homo sapiens.*

LSA lithics are specialised – specific tools were created for specific purposes (Mitchell, 2002). LSA assemblages commonly include diagnostic tools, such as scrapers and segments, and may also include bone points. The LSA is further defined by evidence of ritual practices and

complex societies (Deacon & Deacon, 1999). This can be seen through rock art. Three rock art painting traditions occur within South Africa, each associated with specific groups.

In southern Africa, the LSA is commonly associated with hunter-gatherers. The San (including Basarwa, Bathwa and other hunter-gatherer groups) are generally accepted as the first inhabitants of present-day South Africa (Makhura, 2007). Later, various Farming Community groups, including the ancestors of the modern Sotho-Tswana and Nguni peoples, settled across the Highveld.

The Farming Community or Iron Age period correlates to the movements of Bantu-speaking agro-pastoralists into southern Africa. This period ranges from 500 to 1800 CE and is divided into Early and Late Farming Community periods (Early and Late Iron Age). Secondary tangible indicators such as ceramics and evidence for domestic animals, including dung deposits and faunal remains, are characteristic of both the EFC and LFC. The LFC is further characterised by stonewalling (Maggs, 1974; Huffman, 2007).

The historical period[4] is commonly regarded as the period characterised by contact between Europeans and Bantu-speaking African groups and the written records associated with this interaction. However, the division between the LFC and historical period is artificial, as there is generally a large amount of overlap between the two.

The *Mfecane* (or the SeSotho equivalent term *Difaqane* used north of the Orange River) characterised much of the history of the regional study area. This was the period of approximately 1817 to 1826 AD that was characterised by unprecedented social and political upheaval as Mzilikazi and his Ndebele group were pushed out of their territory by the Zulu group led by Shaka. This displacement had a knock-on effect, which was exacerbated by a drought at the same time. As a result of social and political upheaval, the Highveld region was vulnerable to intrusive groups including the Swazi and the *Voortrekkers* (Fairbridge, 1918; Garstang, et al., 2014).

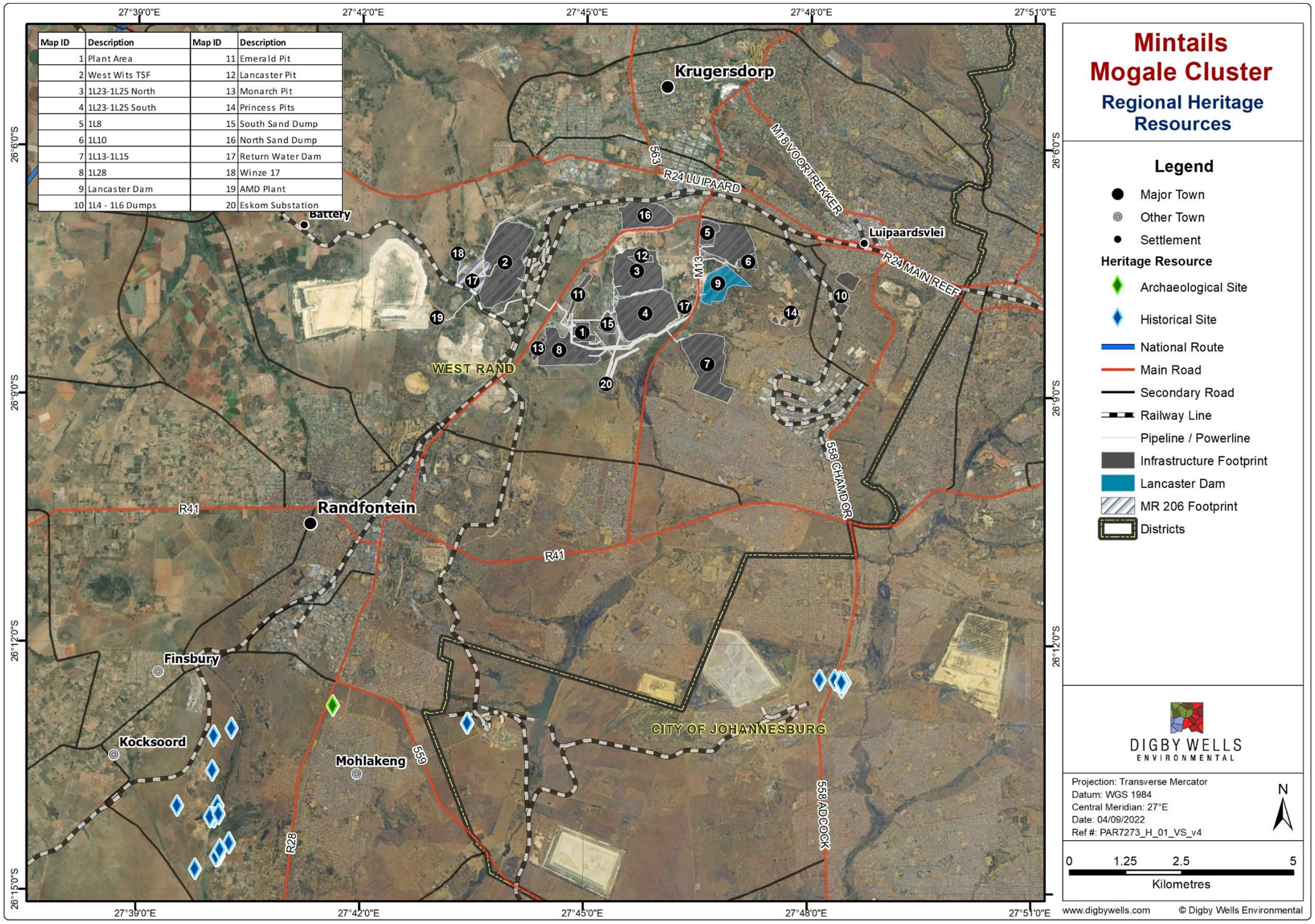
Some of the 'empty lands' left behind from the Mfecane became host to the early white migrants who claimed large tracts of land and founded settlements and towns as they moved northwards during the 1830s. The Voortrekkers, who later became concretised as the so-called *Boers*, encountered resistance from inhabitants of these 'empty lands'. The British followed these early migrants into the South African interior almost immediately, from as early as the 1860s. They sought to establish British Imperial rule over the Boer republics which had recently been established. These building tensions culminated in the Transvaal War (also known as the First Anglo-Boer War and the First War of Independence) of 1880 to 1881.

Lieutenant Lys recovered a small amount of gold in 1856 from crushed conglomerate on the farm Driefontein (Shorten, 1970). The gold reef on the Witwatersrand was discovered in 1886, when George Harrison discovered gold on the farms Wilgespruit and Langlaagte in present-

[4] In southern Africa, the last 500 years represents a formative period that is marked by enormous internal economic invention and political experimentation that shaped the cultural contours and categories of modern identities outside of European contact. This period is currently not well documented but is being explored through the 500 year initiative (Swanepoel, et al., 2008).

day Johannesburg. This discovery triggered the Transvaal gold rush. Shortly thereafter, Paul Kruger, the then president of the *Zuid Afrikaansche Republiek* (ZAR), declared the area around the informal tented mining settlement known as Ferreira's Camp as public diggings, exacerbating the rush. The gold rush led to the establishment of several large mining companies and towns, including Johannesburg (1886), Krugersdorp (1886) and Randfontein (1890).

The discovery of gold again exacerbated unresolved tensions between the British and the Boers following the Transvaal War. The British sought to bring the gold fields under their control, along with the ZAR settlements established there. These heightened tensions resulted in the Jameson Raid of 1895. Leander Jameson, a close ally of Cecil John Rhodes, led the raid, which was intended to cause an uprising amongst the British residents of the Witwatersrand. The Boers were warned of British plans and captured Jameson and his men at Doornkop, near Krugersdorp. The Jameson Raid was an important catalyst for the South African War (also known as the Second Anglo-Boer War) of 1899 to 1902.



Plan 3: Heritage Resources Identified Previously within the Regional Study Area

6.2. Results from the Pre-disturbance Survey

Shannon Hardwick undertook a pre-disturbance survey of the site-specific study area on 13 and 15 October 2021. This survey focused on areas covered by the proposed infrastructure as current at the time of the in-field assessment. The survey was recorded as GPS tracks and identified heritage resources were marked as waypoints. Identified heritage resources were also recorded through written notes and photographs.

The following sections discuss the survey findings.

6.2.1. Existing Environment

The natural vegetation of the site-specific study area has been disturbed in varying degrees by human activities. Table 6-2 presents a summary description of the natural environment within which the Project is situated. Figure 6-2 below presents an overview of the environment at the time of the pre-disturbance survey.

The environment at the time of the verification survey was disturbed through anthropogenic and animal activities. There is evidence that cattle graze on the land and burrowing animals were present within the Project area. Where noted, burrows were inspected for the presence of any archaeological materials.

Anthropogenic disturbances included the current infrastructure associated with the Mintails operations, and other mining and industrial. This infrastructure includes, but is not limited to, housing and dormitories, offices and other structures as well as formal roads. Other existing infrastructure includes informal roads, a sewage treatment plant, an old hospital that was operated by a previous mining operation, railway infrastructure and the Transnet depot, electrical infrastructure and underground pipelines, marked by warning signs. Parts of the Project area are located in an urban environment, characterised by business, residential and commercial areas.

The area is currently exploited by illegal miners (known colloquially as *zama-zamas*) and has been used for illegal dumping. Refuse dumped here includes building rubble and domestic or general waste. Figure 6-3 highlights the existing modern infrastructure present within the study area.

Table 6-2: Summary of the Vegetation Setting of the Project

Biome	Bio-region	Vegetation Type
Grassland	Mesic Highveld Grassland	Soweto Highveld Grassland (Gm8) Short to medium-high dense tufted grassland on gently to moderately undulating landscape on the Highveld plateau. In undisturbed areas, the continuous grass cover is broken only by small, scattered wetlands, narrow stream alluvia, plans and occasional ridges or rocky outcrops. This vegetation unit occurs on the shales, sandstones or mudstones of the Vryheid formation of the Karoo Supergroup, the lithologies of the Volksrust Formation or the intrusive Karoo Suite dolerites. This vegetation type is considered endangered and almost half of the area has been transformed by cultivation, urban sprawl, mining, roads and dams. Erosion is generally very low.

Adapted from Mucina & Rutherford (2010)

Figure 6-2: State of the Environment during the Pre-disturbance Survey

Figure 6-3: Existing Modern Infrastructure observed during the Pre-disturbance Survey

6.2.2. Identified Heritage Resources

During the pre-disturbance survey undertaken for the current HRM process, five additional heritage resource were identified. Table 6-3 includes a summary of these heritage resource and Figure 6-4 includes select photographs of the heritage resources. Table 6-3 includes the results of the pre-disturbance survey.

Table 6-3: Heritage Resources identified during the Survey

Heritage Resource	Description
BGG01	Burial ground containing approximately 20 visible graves. Of these graves, two are marked with crosses and one is marked by an upright stone. An additional two graves are marked by buried stones. The other graves are marked by stone and soil heaps. Two of the headstones have partially legible inscriptions and both belong to the Fakani family. The one grave might date to 1913 and the other does not have a visible date. The burial ground is not demarcated or fenced off.
BGG02	Burial ground with of three grounds, marked by one headstone and two white crosses. The headstone has a legible inscription which states that the grave is “sacred to the memory of troopers Beatty-Powell and Davies who fell in action”. There is no date on this inscription. There is no date included in the inscription, but there is a date of 1896 in the burial ground. The two white crosses do not have inscriptions, and it is unclear if the inscription on the headstone refers to these white crosses, or if the white crosses indicate additional soldiers who fell in battle. The burial ground is demarcated by a raised platform of brick and cement bounded by a white fence. Important to note is that the graves of soldiers who were subjects of the British Empire at the time of their death are protected as Commonwealth War Graves (CWGs) under the Commonwealth War Graves Act, 1992 (Act No. 8 of 1992) (CWGA) in addition to the NHRA.
Historical Landfill	A concentration of historical cultural material which occurs in a distinct subsurface layer observed in the areas disturbed by illegal mining activities. Material culture observed in the disturbed areas included a brick (potentially historical), a ceramic shard (potentially historical) and historical glass in clear, brown and green. One observed glass bottle appears to be an ink bottle and a broken bottle had writing on it which reads […] & Co. This style of writing is typical of the late 1800s and early 1900s. It is likely that this site represents a historical landfill.
STE01	Remains of a structure which appears to be older that 60 years. The fixtures and roof of the structure have been removed. Some window and door lintels are still in place. The structure appears to have three rooms or internal divisions. The structure appears to have multiple phases of construction and is made of stone with a thick mortar in places and brick, some of which is plastered. One section of the plaster is painted blue. The walls are in various stages of collapse.

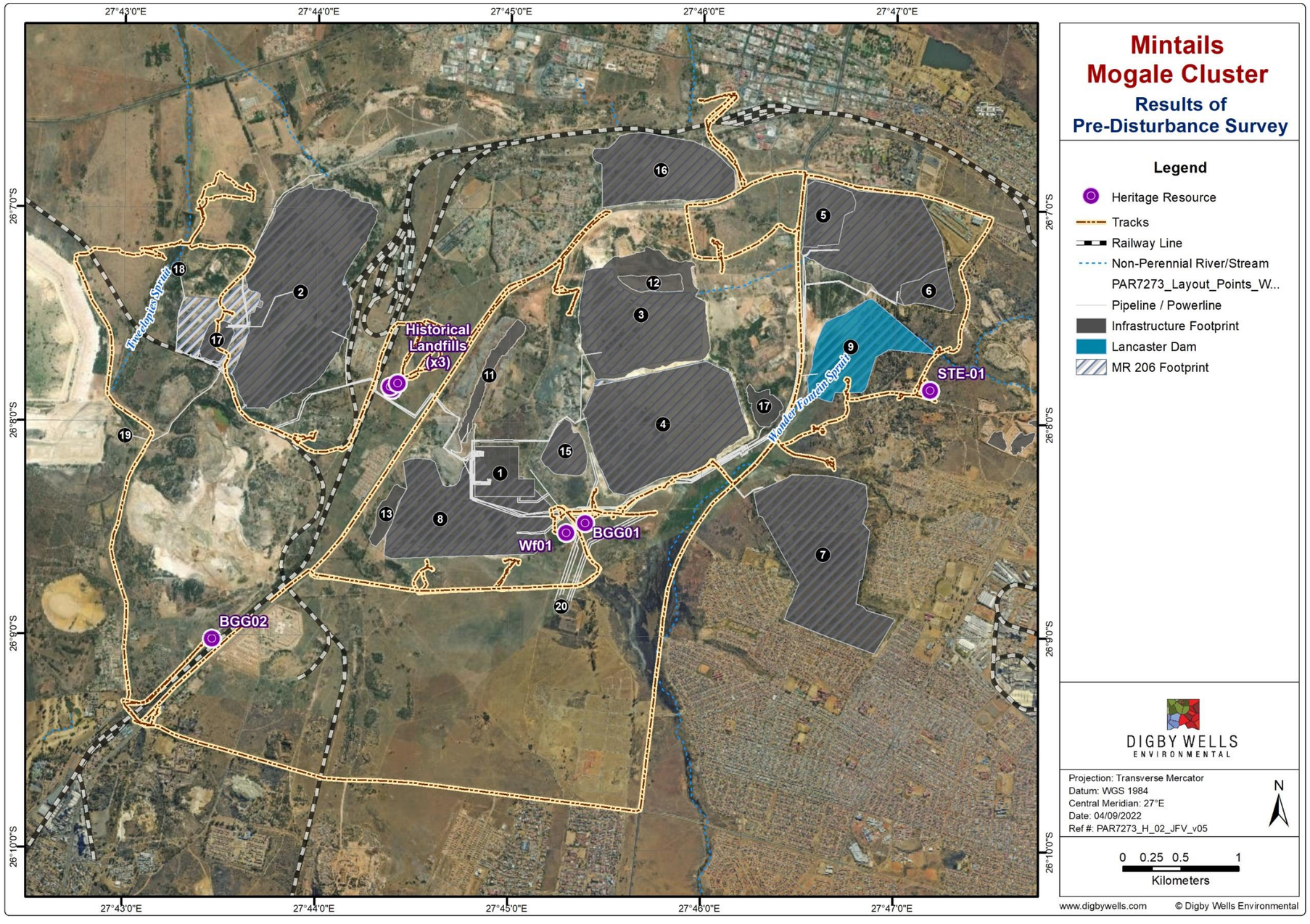
Heritage Resource	Description
Wf01	Three structures located in proximity to each other in a dense stand of trees. The layout of these structures is unclear and the purpose of these structures is equally unclear due to the dense vegetation. One set of steps was visible during the survey. On the historical imagery, potential structures are visible in 1941 but is not visible in later imagery due to dense vegetation. It is assumed these structures are those visible on the 1941 imagery. Photographs are not included in this report due to the thick vegetation.


Graves identified at BGG01 and BGG02 respectively (note the white crosses typically associated with CWGs)


Remains of the structure STE01


Material appearing in the historical landfill

Figure 6-4: Results of the Pre-disturbance Survey showing Newly Identified Heritage Resources



Plan 4: Results of the Pre-disturbance Survey

6.3. Results from Historical Layering

Figure 6-5 presents historical imagery showing the Project area in 1941. The landscape at that time is characterised by cultivated agricultural fields and established mining activities, including TSFs. Formal and informal roads have been established in the Project area at this time and the general layout of the West Village appears to have been established by 1941. The Project area has a long history of disturbance through mining and agricultural activities and associated settlement.

There are five points of interest highlighted in Figure 6-5. These represent structures which, if still remaining, would be older than 60 years and which will therefore be afforded general protection under Section 34 of the NHRA, as would structures original to the West Village layout. These points were not ground-truthed during the pre-disturbance survey.

In addition to the five highlighted points, existing mine dumps and tailings facilities date from at least 1941. Structures older than 60 years are, technically, protected in terms of Section 34 of the NHRA that defines a structure as “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”. Section 28 of the NHRA furthermore provides for “such area of land covered by a mine dump” to be designated as a protected area. The protection offered to structures by the these two sections, again technically, requires that dumps and tailings facilities are considered as tangible heritage resources in their own right. However, this report does not assess the reclamation of the dumps and tailings as heritage impacts as no precedent has yet been set to do so.

Figure 6-5: Historical Imagery showing the Project Area in 1941 with Points of Interest

6.4. Socio-economic Setting

The Project is located within Wards 14, 19 and 26 of the MCLM and Ward 9 of the RWLM both in the WRDM within the Gauteng Province. The Project area lies adjacent to several other wards. This section presents a brief summary of the demographic statistics relevant to the potential socio-economic benefit derived from the Project, informed by data collected during the 2011 Census (Statistics South Africa, 2011)[5]. These statistics include only those wards within which the Project is located.

As of the 2011 Census, the Gauteng province had a population of 12 272 263 people, which accounts for approximately 23.7% of the national population (Wazimap, 2017). The province includes five district municipalities, of which the WRDM is the smallest in terms of population. As of the 2011 census, the district included 820 994 residents (6.7% of the population of the province). WRDM is itself divided into three local municipalities. Of these, MCLM and RWCLM are the larger of the local municipalities in terms of population and they included 362 420 people (44.1% of the population in the WRDM) and 261 053 people (31.8%) respectively.

The MCLM includes 39 wards. Ward 14 includes a population of 8 806 people, Ward 19 has 6940 residents and Ward 26 includes a population of 13 442 (Wazimap, 2017). Ward 14 and Ward 26 are both characterised by a mix of rural and urban populations with a significant portion of the area covered by historic TSFs. Ward 14 covers a smaller aerial extent than Ward 26. Ward 19 covers a small aerial extent and is predominantly urban in nature. The area not settled by residents comprises the footprint for the 1L13-1L15 TSF.

The RWCLM includes 35 wards. Ward 9 includes a population of 9 450 residents and is characterised by a rural landscape, although it includes some urban settlement areas and some mining-related infrastructure, including TSFs. The land use appears to be predominantly agriculture and cultivated fields.

Unemployment is a challenge within the regional study area. Table 6-4 presents an overview of the employment status of the populations within the regional study area.

[5] Wazimap (2017) has adjusted these data to conform with the updated ward and municipality boundaries which were altered ahead of the 2016 Municipal Elections (Open Up, 2017).

Table 6-4: Employment Status of the Populations within the Study Area

Employment Statistics (Census 2011)	Ward 14		Ward 19		Ward 26		MCLM	
	No.	%	No.	%	No.	%	No.	%
Total Population	8 806	-	6 940	-	13 442	-	362 420	-
Working Age (18-64)	6 034	68.5	4 480	64.6	10 311	76.7	244 332	67.4
Employed	2 701	30.7	1 933	27.9	4 507	33.5	134 635	37.1
Discouraged Work Seeker	167	1.9	199	2.9	146	1.1	8 197	2.3
Unemployed	1 923	21.8	1 119	16.1	1 234	9.2	43 846	12.1
Other not economically active	1 637	18.6	1 532	22.1	4 816	35.	73 240	20.2
Employment Statistics (Census 2011)	**Ward 9**		**RWCLM**		**WRDM**		**Gauteng**	
	No.	**%**	**No.**	**%**	**No.**	**%**	**No.**	**%**
Total Population	9 450	-	261 053	-	820 994	-	12 272 263	-
Working Age (18-64)	6 460	68.4	175 171	67.1	554 176	67.5	8 316 444	67.8
Employed	3 816	40.4	92 065	35.3	293 335	35.7	4 467 370	36.4
Discouraged Work Seeker	78	0.8	6 378	2.4	19 542	2.4	296 450	2.4
Unemployed	699	7.4	36 162	13.9	104 894	12.8	1 598 044	13
Other not economically active	2 265	24	52 170	20	172 199	21	2 468 859	20.1

Adapted from Wazimap (2017)

7. Impact Assessment

This section presents a description of the Cultural Significance of identified heritage resources informed through primary and secondary data collection. The Cultural Significance of the heritage resources informs the minimum required mitigation encapsulated in the NHRA and the SAHRA Minimum Standards.

7.1. Cultural Significance of the Identified Landscape

Heritage resources are intrinsic to the history and beliefs of communities. They characterise community identity and cultures and are finite, non-renewable and irreplaceable. Considering the innate value of heritage resources, HRM acknowledges that these have lasting worth as evidence of the origins of life, humanity and society. Notwithstanding the inherent value ascribed to heritage, it is incumbent on the assessor to determine the significance of these resources to allow for the implementation of appropriate management. This is achieved through assessing the value of heritage resources relative to the prescribed criteria encapsulated in policies and legal frameworks.

This section presents a statement of Cultural Significance as is relevant to newly identified heritage resources and the greater cultural landscape of the site-specific study area. The statement of significance considers the importance or the contribution of the identified heritage resources and the landscape to four broad value categories: aesthetic, historical, scientific and social, to summarise the Cultural Significance and other values described in Section 3(3) of the NHRA.

During the pre-disturbance survey, four categories of heritage resources was recorded – two burial grounds, one historical structure, a historical landfill and a historical werf.

The assessment of the Cultural Significance and Field Ratings demonstrated that the identified resources have negligible to very high significance. Table 7-1 presents a summary of this assessment. Sites of the same type that share the same Cultural Significance have been grouped together in terms of the impact assessment (refer to Sections 7.2 to 7.4 below).

Table 7-1: Cultural Significance and Field Ratings of Newly Identified Heritage Resources within the Project Area

Resource ID	Description	Aesthetic	Historic	Scientific	Social	INTEGRITY	Designation	Recommended Field Rating	Field Rating Description	Minimum Mitigation[6]
BGG01 BGG02	Burial Grounds & Graves	- Burial grounds and graves were not assessed against aesthetic criteria as defined in Section 3(3) of the NHRA.	- Burial grounds and graves were not assessed against historic criteria as defined in Section 3(3) of the NHRA.	- Burial grounds and graves were not assessed against scientific criteria as defined in Section 3(3) of the NHRA.	5 Burial grounds and graves have specific connections to communities or groups for spiritual reasons. The significance is universally accepted.	4 The integrity of burial grounds is considered to be excellent with both tangible and intangible fabric preserved.	Very High 20	Grade I[7]	Heritage resources with qualities so exceptional that they are of special national significance.	Project design must change to avoid the resource completely and resources must be included in Heritage Site Management Plan (HSMP). A GRP may be necessary should the project design not be changed.
Historical Landfill	Concentrated layer of historical material that may represent a landfill	- The historical landfill was not assessed against aesthetic criteria as defined in Section 3(3) of the NHRA.	- The historical landfill was not assessed against historic criteria as defined in Section 3(3) of the NHRA.	4 The historical landfill represents a very rare potential for scientific information from a historical period.	- The historical landfill was not assessed against social criteria as defined in Section 3(3) of the NHRA.	2 The integrity and information potential is preserved, although there has been some encroachment on the setting.	Low 8	General Protection IV B	Resources under general protection in terms of NHRA sections 34 to 37 with Low significance.	Resource must be recorded before destruction, including detailed site mapping, surface sampling may be required
STE01	Historical structure	- The historical structure was not assessed against aesthetic criteria as defined in Section 3(3) of the NHRA.	- The historical structure was not assessed against historic criteria as defined in Section 3(3) of the NHRA.	1 The historical structure has information potential which is commonly represented in a variety of contexts.	- The historical structure was not assessed against social criteria as defined in Section 3(3) of the NHRA.	1 There is limited information potential from this heritage resource and the setting is heavily encroached upon.	Negligible 1	General Protection IV C	Resources under general protection in terms of NHRA sections 34 to 37 with Negligible significance.	Sufficiently recorded, no mitigation required.
Wf01	Historical *werf*	- The historical werf was not assessed against aesthetic criteria as defined in Section 3(3) of the NHRA.	- The historical werf was not assessed against historic criteria as defined in Section 3(3) of the NHRA.	1 The historical werf has information potential which is commonly represented in a variety of contexts.	- The historical werf was not assessed against social criteria as defined in Section 3(3) of the NHRA.	1 There is limited information potential from this heritage resource and the setting is heavily encroached upon.	Negligible 1	General Protection IV C	Resources under general protection in terms of NHRA sections 34 to 37 with Negligible significance.	Sufficiently recorded, no mitigation required.

[6] Please note, the recommended mitigation refers to the minimum mitigation requirements as encapsulated in the SAHRA Minimum Standards. Project-specific mitigation measures are presented in Section 11.

[7] The recommended field rating designates the level of governance associated with the resource. In this instance, the SAHRA Burial Grounds and Graves Unit is the designated competent authority responsible for the management of heritage resources contemplated in terms of Section 36 of the NHRA.

7.2. Construction Phase

Given their location relative to the proposed infrastructure and the preferred plant location, no heritage impacts are envisaged. However, there is the potential that the proposed Eskom and Plant Switch Yards and proposed pipelines could impact on the Historical Landfill Site.

Table 7-2 presents the activities expected to occur during the Construction Phase and the expected impacts to the cultural heritage landscape that may arise from these activities.

Table 7-2: Interactions and Impacts of Construction Phase Activities

Interaction	Impact
Site clearing for the construction of the new processing plant facility and ancillary infrastructure described in Section 2 above.	Potential negative impacts to the Historical Landfill site and BGG01.
Construction of the new processing plant and ancillary infrastructure described above.	
Employment and procurement for construction-related activities.	

The Historical Landfill is located in close proximity to the proposed footprint of one of the Eskom and Plant Switch Yards and proposed pipeline routes and, as such, it may be directly impacted through the clearing and construction within this area. Table 7-3 presents a summary of the potential direct impact to this heritage resource.

Table 7-3: Summary of the potential direct impact to Historical Landfill

IMPACT DESCRIPTION: Direct impact to Historical Landfill				
Dimension	**Rating**	**Motivation**		
PRE-MITIGATION				
Duration	Permanent (7)	Damage to or destruction of this resource will be permanent and cannot be undone.	Consequence: Moderately detrimental (-10)	Significance: Minor – negative (-50)
Extent	Limited (2)	This impact will affect the individual heritage resource.		
Intensity x type of impact	Very low - negative (-1)	Damage to or destruction of this heritage resource is considered a major change to a heritage resource of low significance.		

IMPACT DESCRIPTION: Direct impact to Historical Landfill				
Dimension	**Rating**	**Motivation**		
Probability	Likely (5)	Should this option be implemented, it may cause damage to this heritage resource.		
MITIGATION:				
Digby Wells recommends that a 50 m no-go buffer zone around the Historical Landfill Site be implemented to avoid heritage resource impacts. Should this not be feasible, Digby Wells recommends that PAR appoint a suitably-qualified archaeologist to undertake test pits or excavations of this resource. This will be subject to a permit issued in terms of Section 35 of the NHRA. Digby Wells assumes this is the more likely mitigation strategy should the other alternatives not be feasible. The post-mitigation assessment considers this mitigation strategy.				
POST-MITIGATION				
Duration	Beyond project life (6)	Should the heritage resource be excavated and conserved through the record, this will last beyond the Project lifetime.	Consequence: Moderately beneficial (10)	Significance: Minor – positive (60)
Extent	Local (3)	Should the heritage resource be excavated and conserved through the record, this will add to the local historical record and heritage.		
Intensity x type of impact	Very low - positive (1)	This impact will be considered a positive moderate change to a heritage resource of low significance.		
Probability	Highly probable (6)	Should this option be implemented, it is most likely to result in the positive impact described		

BGG01 is located approximately 80 m from the proposed pipeline route. As such, it may be directly impacted through the clearing and construction within this area. Table 7-4 presents a summary of the potential direct impact to this heritage resource.

Table 7-4: Summary of the potential direct impact to BGG01

IMPACT DESCRIPTION: Direct impact to PEC7505-006, PEC7505-008 and PEC7505-009				
Dimension	**Rating**	**Motivation**		
PRE-MITIGATION				
Duration	Permanent (7)	Unmitigated change will result in permanent damage to the heritage resource.	Consequence: Extremely detrimental (-21)	Significance: Moderate – negative (-84)
Extent	International (7)	Damage to these resources could potentially have an international effect in terms of the reputation for PAR, service providers and/or subcontractors working on the project. Next-of-Kin could potentially reside outside South Africa.		
Intensity x type of impact	Extremely high - negative (-7)	Destruction would constitute a major change to resource of Very High significance.		
Probability	Probable (4)	Given the location of these heritage resources in relation to the proposed Project footprint, it is possible that this risk will manifest during the construction phase.		
MITIGATION:				
The project related mitigation must aim to amend the project design to avoid the potential negative impact to the heritage resource and implement a 100 m no-go buffer zone around the heritage resource. Additionally, the heritage resource must be incorporated into an HSMP for implementation. Should PAR have an existing HSMP, the affected heritage resources must be incorporated into the existing HSMP and be subject to the same requirements encapsulated therein. Where Project design (or redesign) and *in situ* conservation is not feasible based on the Project design and layout requirements, heritage related mitigations must be employed. Heritage related mitigations will need to be undertaken in accordance with the requirements of the NHRA and the associated regulations will be required. Such mitigations may include a Burial Grounds and Graves Consultation process to assess whether a GRP is feasible. A GRP must be undertaken in accordance with Section 36 of the NHRA and Chapter IX and XI of the NHRA Regulations. Digby Wells assumes that Project design amendment to include a buffer is the preferred alternative, and the post-mitigation impact assessment considers this mitigation strategy.				

IMPACT DESCRIPTION: Direct impact to PEC7505-006, PEC7505-008 and PEC7505-009				
Dimension	**Rating**	**Motivation**		
POST-MITIGATION				
Duration	Beyond project life (6)	If the mitigation measures are put into place, specifically the *in situ* conservation and management of the resource through an HSMP, the benefits may continue after the Project is complete.	Consequence: Highly beneficial (14)	Significance: Minor – positive (70)
Extent	Local (3)	The proposed mitigation measures will apply to the specific heritage resources.		
Intensity x type of impact	High - positive (5)	*In situ* conservation and management would constitute a minor change to a resource of Very High significance.		
Probability	Likely (5)	Should PAR implement the mitigations effectively, it is highly probable that the anticipated positive impact will manifest.		

7.3. Operational Phase

Table 7-5 presents the activities expected to occur during the Operational Phase and the expected impacts to the cultural heritage landscape that may arise from these activities.

Table 7-5: Interactions and Impacts of Operational Phase Activities

Interaction	Impact
Hydraulic reclamation of the abovementioned existing TSFs and sand dumps.	Digby Wells envisages no impact to the cultural heritage landscape, given the nature of the proposed activities and the location of identified heritage resources in relation to the proposed Project infrastructure.
Operation of pump stations during the operational phase.	
Maintenance of pipeline routes during the operational activities.	
In-filling of processed tailings material into the West Pits Pit and other potential pits.	

Interaction	Impact
Surface tailings deposition within the West Wits Pit.	
Tailings deposition onto the footprint of 1L23-1L25 following its reclamation.	
Production of Gold.	
Progressive rehabilitation of the new TSFs (in the West Wits Pit and potentially 1L23-1L25 TSF).	
Employment and procurement for operation-related activities.	

Digby Wells does not envisage any impact to the identified heritage resources from the above-mentioned activities and has therefore not assessed these impacts further in this report.

7.4. Decommissioning Phase

Table 7-6 presents the activities expected to occur during the Decommissioning Phase and the expected impacts to the cultural heritage landscape that may arise from these activities.

Table 7-6: Interactions and Impacts of Decommissioning Phase Activities

Interaction	Impact
Removal, decommissioning and rehabilitation of surface infrastructure.	Digby Wells envisages no impact to the cultural heritage landscape, given the nature of the proposed activities and the location of identified heritage resources in relation to the proposed Project infrastructure.
Removal, decommissioning and rehabilitation of the processing plant footprint.	
Rehabilitation of the old TSF footprints.	
Rehabilitation of the old Mintails Processing Plant footprint.	
Final rehabilitation of the facility.	
General rehabilitation of the surrounding area, including wetland rehabilitation.	

Digby Wells does not envisage any impact to the identified heritage resources from the above-mentioned activities and has therefore not assessed these impacts further in this report.

There is potential for existing structures or proposed Project infrastructure to age past 60 years during the Construction and Operational stages of the Project lifecycle. Should this occur and, where these structures require demolition or alteration during the Decommissioning Phase,

such activities will be subject to one or more NHRA Section 34 permit application processes to acquire the correct permit(s) prior to implementing these activities.

7.5. Cumulative Impacts

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

This Project in conjunction with other planned developments in line with the strategic development plans for the Gauteng Province requires consideration to identify the possible in-combination effects of various impacts to known heritage resources. Table 7-7 presents a summary of the possible cumulative impacts of the Project.

Table 7-7: Summary of Potential Cumulative Impacts

Type	Cumulative Impact	Direction of Impact	Extent of Impact
Space-crowding	The proposed infrastructure will add to the existing infrastructure associated with activities characterising the area immediately surrounding the proposed Project area and further afield. Although the construction this infrastructure will result in a loss of the area within which heritage resources can exist, it adds to the existing mining-industrial cultural landscape. The area earmarked for the proposed infrastructure furthermore occurs within an area approved for mining activities.	Neutral	Site-specific study area

7.6. Unplanned and Low Risk Events

This section considers the potential risks to protected heritage resources, as well as the potential heritage risks that could arise for PAR in terms of implementation of the Project. These two aspects are discussed separately in this section.

Section 6.2.2 describes the heritage resources identified during the pre-disturbance survey. This list is, however, not an exhaustive list of all heritage resources within the Project area. If heritage resources are subsequently identified, and where PAR knowingly does not take proactive management measures, potential risks to PAR may include litigation in terms of Section 51 of the NHRA and social or reputational repercussions. Table 7-8 presents a summary of the primary risks that may arise for PAR.

Table 7-8: Identified Heritage Risks that may arise for PAR

Description	Primary Risk
Heritage resources with a high Cultural Significance rating are inherently sensitive to any development in so far that the continued survival of the resource could be threatened. In addition to this, certain heritage resources are formally protected thereby restricting various development activities.	Negative Record of Decision (RoD) and/or development restrictions issued by PHRA-G and/or SAHRA in terms of Section 38(8) of the NHRA.
Impacting on heritage resources formally and generally protected by the NHRA without following due process. Due process may include social consultations and/or permit application processes to SAHRA and/or PHRA-G.	• Fines; • Penalties; • Seizure of Equipment; • Compulsory Repair / Cease Work Orders; and • Imprisonment.

If additional heritage resources are identified during decommissioning and dismantling of the proposed infrastructure and/or activities undertaken during the rehabilitation processes, potential risks to those heritage resources will need to be assessed. Table 7-9 provides an overview of these potential unplanned events, the subsequent impact that may occur and mitigation measures and management strategies to remove or reduce these risks.

Table 7-9: Identified Unplanned Events and Associated Impacts

Unplanned event	Potential impact	Mitigation / Management / Monitoring
Encountering unidentified in situ remnants of historical built environment resources during the implementation of the Project.	Damage or destruction of heritage resources generally protected under Section 34 of the NHRA	Establish Project-specific Chance Find Procedures (CFPs) as a condition of authorisation. Refer to Section 11 for more detailed recommendations.
Accidental exposure of fossil bearing material implementation of the Project.	Damage or destruction of heritage resources generally protected under Section 35 of the NHRA	
Accidental exposure of *in situ* archaeological material during the implementation of the Project.		
Accidental exposure of *in situ* burial grounds or graves during the implementation of the Project.	Damage or destruction of heritage resources generally	

Unplanned event	Potential impact	Mitigation / Management / Monitoring
Accidental exposure of human remains during the decommissioning and rehabilitation and closure phases of the Project.	protected under Section 36 of the NHRA.	

8. Environmental Management Program

Table 8-1 below summarises the outcomes of the HRM process that must be included in the Environmental Management Program (EMPr).

Table 8-1: Environmental Management Program

Activity/Activities	Potential Impacts	Aspects Affected	Phase	Mitigation Measure	Mitigation Type	Time period for implementation
• All Activities outlined in Section 2.2 above	Damage to or destruction of Historical Landfill	Cultural Heritage	Construction	• Implement a 50 m buffer no-go buffer zone around the resource to avoid impacts to heritage resources. • Alternatively, PAR must appoint a suitably-qualified archaeologist to undertake test pits or excavations of the resource.	***Avoid*** ***Control***	Before the commencement of the Project
• All Activities outlined in Section 2.2 above	Damage to or destruction of BGG01	Cultural Heritage	Construction	• Implement a 100 m buffer no-go buffer zone around the resource to avoid impacts to heritage resources. • Develop and implement an HSMP to conserve the resource *in situ*. • Alternatively, PAR must undertake a Burial Grounds and Graves Consultation process to establish if a GRP is feasible.	***Avoid*** ***Control***	Before the commencement of the Project
• All Activities outlined in Section 2.2 above	Damage to or destruction of previously unidentified heritage resources.	Cultural Heritage	Construction	• Develop and implement CFP.	***Control***	Before the commencement of the Project

9. Monitoring Programme

Section 11 includes recommended mitigation measures and management strategies. These recommendations do not require a monitoring programme.

10. Consultation and Stakeholder Comments

The Public Participation Process (PPP) required in terms of the NEMA as a component of the EIA process has not been completed in part to date but will be completed as a process separate to the heritage specialist assessment. This consultation process affords Interested and Affected Parties (I&APs) opportunities to engage in the EIA process. The objectives of the PPP or Stakeholder Engagement Process (SEP) include the following:

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

No formal heritage-specific consultation was undertaken as part of the heritage assessment as this forms part of the PPP or SEP.

Please refer to the Comments and Response Report, attached as Appendix C of the EIA Report for comments raised and responses provided.

Site surveys can often present an opportunity for informal consultation with specific stakeholders (usually farm owners, managers, and employees). This consultation can result in the identification of burial grounds and graves – importantly, these could include formal burial grounds or graves, sometimes with no visible surface markers – or in the identification of sacred sites or other places of importance, which may not otherwise be identified. The in-field assessment team was accompanied by a security team. The security personnel present during the pre-disturbance survey were asked about their knowledge regarding heritage resources in the Project area and led the in-field assessment team to BGG01.

11. Recommendations

Considering the nature and the scope of the Project, Digby Wells recommends the following additional recommendations be implemented prior to the commencement of the Project:

- PAR must develop and implement a CFP as part of the EMPr;
- Direct negative impacts to the Historical Landfill must be avoided or managed. Digby Wells recommends that a 50 m no-go buffer zone around the Historical Landfill Site be

implemented to avoid heritage resource impacts. Should this not be feasible, Digby Wells recommends that PAR appoint a suitably-qualified archaeologist to undertake test pits or excavations of this resource. This will be subject to a permit issued in terms of Section 35 of the NHRA; and

- Direct negative impacts to BGG01 must be avoided or managed. Digby Wells recommends that a 100 m no-go buffer zone be implemented around BGG01 to avoid heritage resource impacts. Should this not be feasible, Digby Wells recommends that PAR undertake consultations to explore whether a GRP will be feasible. The GRP, should it go ahead, will be subject to a permit issued in terms of Section 36 of the NHRA.

12. Socio-economic Benefit versus Heritage Impacts

Based on a review of the available socio-economic data detailed in Section 6.4 above, the potential socio-economic benefits that will arise from the Project outweigh the identified risks and impacts to the known heritage resources within the site-specific study area. This statement is supported by the following statements:

- The identified impacts to the heritage resources can be mitigated through the recommendations included in Section 11;
- The construction of additional infrastructure will create short-term employment opportunities and will generate revenue which will feed into the local economy; and
- The operation of the Project will create long-term employment opportunities and generate revenue feeding into the regional and national economies; and
- It is anticipated that the Project will have overall positive environmental impact. These are detailed in the EIA report.

13. Reasoned Opinion Whether Project Should Proceed

Based on the understanding of the Project while considering the results of this assessment, Digby Wells does not object to the Project provided the recommendations detailed in Section 11 above are adopted

14. Conclusion

The aim of the HRM process was to comply with regulatory requirements contained within Section 38 of the NHRA through the following:

- Defining the cultural landscape within which the Project is situated;
- Identifying, as far as is feasible, heritage resources that may be impacted upon by the project as well as define the Cultural Significance;
- Assessing the possible impacts to the identified heritage resources;

- Considering the socio-economic benefits of the Project; and
- Providing feasible mitigation and management measures to avoid, remove or reduce perceived impacts and risks.

These objectives were met as presented in Sections 6 through 13 above. Based on the understanding of the Project while considering the results of this assessment, Digby Wells does not object to the Project provided the recommendations detailed above are adopted.

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DIGBY WELLS
ENVIRONMENTAL

Appendix A: Glossary of Terms

GLOSSARY OF TERMS

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

Term	Definition
Cultural significance	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: • Importance in the community, or pattern of South Africa's history; • Possession of uncommon, rare or endangered aspects of South Africa's natural or cultural heritage; • Potential to yield information that will contribute to an understanding of South Africa's natural or cultural heritage; • Importance in demonstrating the principal characteristics of a particular class of South Africa's natural or cultural places or objects: • Importance in exhibiting particular aesthetic characteristics valued by a community or cultural group; • Importance in demonstrating a high degree of creative or technical achievement at a particular period; • Strong or special association with a particular community or cultural group for social, cultural or spiritual reasons; • Strong or special association with the life or work of a person, group or organisation of importance in the history of South Africa; and • Significance relating to the history of slavery in South Africa.
Development	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: • Construction, alteration, demolition, removal or change of use of a place or a structure at a place; • Carrying out any works on or over or under a place; • Subdivision or consolidation of land comprising, a place, including the structures or airspace of a place; • Constructing or putting up for display signs or hoardings; • Any change to the natural or existing condition or topography of land; and • Any removal or destruction of trees, or removal of vegetation or topsoil.
Early Farming Community/ies	The first Farming Communities (also known as Early Iron Age) that appear in the southern archaeological record during the early first millennium CE. The EFC period is generally dated from c. 200 CE to 1000 CE.

Term	Definition
Early Stone Age	The South African ESA dates from ~3 Mya to c. 250 Kya. This period is associated with later *Australopithecus and* early *Homo* species. The lithic industries that characterise the ESA include Oldowan and Early Acheulian, typically as simple core tools, choppers handaxes and cleavers.
Excavation	The scientific excavation, recording and retrieval of archaeological deposit and objects through the use of accepted archaeological procedures and methods, and excavate has a corresponding meaning.
Farming Community/ies	Term signifying the appearance in the southern African archaeological of Bantu-speaking agriculturally based societies from the early first millennium CE. The term replaces the *Iron Age* as a more accurate description for groups who practiced agriculture and animal husbandry, extensive manufacture and use of ceramics, and metalworking. The Farming Community period is divided into an Early and Late phase. The use of Later Farming Communities especially removes the artificial boundary between archaeology and history.
Field Rating	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; and • General Protected: i.e., generally protected in terms of Sections 33 to 37 of the NHRA.
Formal protection	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.
General protection	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; and • Public monuments and memorials.

Term	Definition
Grave	A place of interment and includes the contents, headstone or other marker of such a place, and any other structure on or associated with such place.
Heritage Impact Assessment (HIA)	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.
Heritage resource	Any place or object of cultural significance.
Heritage resources management	Process required when development is intended categorised as: • Any linear development exceeding 300 m 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; and • Any other category of development provided for in regulations by SAHRA or a provincial heritage resources authority.
Heritage site	Any place declared to be a national heritage site by SAHRA or a place declared to be a provincial heritage site by a provincial heritage resources authority.
Late Farming Community/ies	Farming Communities who either developed / evolved from EFC groups, or who migrated into southern African from the late first millennium / early second millennium CE. The LFC period evidences distinct changes in socio-political organisation, settlement patterns, trade and economic activities, including extensive trade routes. The LFC period is generally dated from c. 1000 CE well into the modern historical period of the nineteenth century.

Term	Definition
Late Stone Age	The South African LSA dates from ~30 Kya. This period is associated with modern *Homo sapiens sapiens* 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, quarts and chert. The LSA is also associated with archaeological rock art including both paintings and engravings.
Living / intangible heritage	The intangible aspects of inherited culture that could include cultural tradition, oral history, performance, ritual, popular memory, skills and techniques, indigenous knowledge systems, the holistic approach to nature, society and social relationships.
Management	In relation to heritage resources, includes the conservation, presentation and improvement of a place protected in terms of the NHRA.
Middle Stone Age	The South African MSA dates from ~300 Kya to c. 30 Kya. This period is associated with the changing behavioural patterns and the emergence of modern cognitive abilities in early *Homo sapiens species.* The lithic industries that characterise the MSA are typically more complex tools with diagnostic identifiers, including convergent flake scars, multi-faceted platforms, retouch and backing. Assemblages are characterised as refined lithic technologies such as prepared core techniques, retouched blades and points manufactured from good quality raw material.

Term	Definition
National estate	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: • Places, buildings, structures and equipment of cultural significance; • Places to which oral traditions are attached or which are associated with living heritage; • Historical settlements and townscapes; • Landscapes and natural features of cultural significance; • Geological sites of scientific or cultural importance; • Archaeological and palaeontological sites; • Graves and burial grounds, 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; • Sites of significance relating to the history of slavery in South Africa; • Movable objects, including objects recovered from the soil or waters of South Africa, including archaeological and palaeontological objects and material, meteorites and rare geological specimens; objects to which oral traditions are attached or which are associated with living heritage; ethnographic art and objects; military objects; objects of decorative or fine art; objects of scientific or technological interest; and • 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).
Palaeontological	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 trance.
Palaeontologist	A trained professional who uses scientific methods to excavate, collect, record and study palaeontological sites and fossils.
Pedestrian survey	A method of examining a site in which surveyors, spaced at regular intervals, systematically walk over the area being investigated.

Term	Definition
Phase 1 Archaeological Impact Assessment (AIA)	Phase 1 AIAs generally involve the identification and assessment of sites during a field survey of a portion of land that is going to be affected by a potentially destructive or landscape-altering activity.
Phase 2 Archaeological Impact Assessment (AIA)	Phase 2 AIAs are primarily based on salvage or mitigation excavations preceding development that will destroy or impact on a site. This may involve collecting of artefacts from the surface and / or excavation of representative samples of the artefactual material to allow characterisation of the site and the collection of suitable materials for dating the sites. Phase 2 AIAs aim to obtain a general idea of the age, significance and meaning of the site that is to be lost and to store a sample that can be consulted at a later date for research purposes. Phase 2 excavations can only be done under a permit issued by SAHRA, or other appropriate heritage agency, to the appointed archaeologist.
Phase 3 Management Plan / Conservation Management Plan (CMP)	On occasion, a site may require a Phase 3 programme involving the modification of the site or the incorporation of the site into the development itself as a site museum, a special conservation area or a display. Alternatively it is often possible to relocate or plan the development in such a way as to conserve the archaeological site or any other special heritage significance the place may have. For example, in a wilderness area or open space when sites are of public interest the development of interpretative material is recommended and adds value to the development. Permission for the development to proceed can be given only once the heritage resources authority is satisfied that measures are in place to ensure that the archaeological sites will not be damaged by the impact of the development or that they have been adequately recorded and sampled. Careful planning can minimise the impact of archaeological surveys on development projects by selecting options that cause the least amount of inconvenience and delay. The process as explained above allows the rescue and preservation of information relating to our past heritage for future generations. It balances the requirements of developers and the conservation and protection of our cultural heritage as required of SAHRA and the provincial heritage resources authorities (ASAPA).
Pre-disturbance survey (syn. reconnaissance)	A survey to record a site as it exists, with all the topographical and other information that can be collected, without excavation or other disturbance of the site.

Term	Definition
Reconnaissance	A broad range of techniques involved in the location of archaeological sites, e.g. surface survey and the recording of surface artefacts and features, the sampling of natural and mineral resources, and sometimes testing of an area to assess the number and extent of archaeological resources. However, in terms of South African practice, reconnaissance during a so-called Phase 1 AIA never includes sampling as this is a permitted activity, usually undertaken during so-called Phase 2 AIAs (ASAPA).
Site	Any area of land, including land covered by water, and including any structures or objects thereon.
Structure	Any building, works, device or other facility made by people and which is fixed to land, and includes any fixtures, fittings and equipment associated therewith.
Tangible heritage	Physical heritage resources such as archaeological sites, historical buildings, burial grounds and graves, fossils, etc. Tangible heritage may be associated with intangible elements, e.g. the living cultural traditions, rituals and performances associated with burial grounds and graves and deceased persons.

DIGBY WELLS
ENVIRONMENTAL

Appendix B: Specialist CV

Name	Johan Nel
Profession	Manager: Heritage Resources
Department	Heritage Resources Management
Education	2012: Professional Development Certificate, Integrated Heritage Resources Management, Rhodes University 2002: BA (Honours) Archaeology, University of Pretoria 2001: BA, University of Pretoria
Registrations / Affiliations	International Council on Monuments and Sites (ICOMOS). ASAPA Cultural Resources Management (CRM) section (Registration Number - 095) IAIAsa

1 Overview

Specialisation

Heritage Resource Management

Expertise

Johan has more than 20 years' experience as an archaeologist and heritage specialist. He is currently Manager of the Heritage Resources Management department. He also served on the Council of the uMsunduzi Museum in Pietermaritzburg from December 2017 to November 2020. Johan has worked in both urban settings and remote rural landscapes throughout South Africa, as well as Botswana, the Democratic Republic of the Congo, Liberia Sierra Leone and Swaziland. In addition, I have also acted as a specialist reviewer of heritage studies undertaken by local specialists in countries such as Cameroon, Malawi, Mali, and Tanzania. His experience includes archaeological and heritage impact assessments, general research projects, grave relocations including consultation and permitting, and exhibition research and design.

Employment	2021 to present: Digby Wells Environmental; Manager: Heritage Resources Management 2019: Department of Anthropology and Archaeology, University of Pretoria; Part-time, contract lecturer 2016-2021: The Heritage Foundation; Head: Heritage Resources Management 2017-2020: uMsunduzi; Museum Council Member 2010-2016: Digby Wells Environmental; Unit Manager: Heritage Resources Management
Languages	English Afrikaans

2 Project Experience

Client	Lesotho Lowlands Water Development Project II
Location	Lesotho
Name of Project	LLWDP-II HRM Process
Year Completed	2021
Project Description	Heritage Impact Assessment

Client	South32 Group Operations Pty Ltd
Location	South African and Mozambique
Name of Project	Southern African Cultural Heritage Review
Year Completed	2022
Project Description	Review and recommendations concerning South32 cultural heritage policy implementation in southern Africa

Client	Exxaro Coal Mpumalanga (Pty) Ltd
Location	Kriel, Mpumalanga, South Africa
Name of Project	Matla Mine 1 GRP
Year Completed	2021
Project Description	Grave Relocation

Client	Exxaro Coal Mpumalanga (Pty) Ltd
Location	Belfast, Mpumalanga, South Africa
Name of Project	Belfast Coal Mine GRP

Year Completed	2022
Project Description	Grave Relocation

Client	Barrick Gold
Location	Kibali Gold Mine, Haute-Uele Province, DRC
Name of Project	Kalimva RAP GRP
Year Completed	Ongoing
Project Description	Grave Relocation

Client	Anglo American Platinum
Location	Mokopane, Limpopo, South Africa
Name of Project	Mogalakwena Platinum Mining Complex Cultural Heritage Management Plan
Year Completed	Ongoing
Project Description	Cultural Heritage Management Plan

Client	Anglo American Platinum
Location	Rustenburg, North-West, South Africa
Name of Project	Rustenburg Operations Cultural Heritage Study
Year Completed	Ongoing
Project Description	Cultural Heritage Management Plan

Client	Anglo American Platinum

Location	Limpopo and North-West, South Africa
Name of Project	Consolidated Cultural Heritage Studies
Year Completed	Ongoing
Project Description	Cultural Heritage Management Plans for Amandelbult, Der Brochen-Mototolo and Twickenham Platinum Mine Complexes

Client	Anglo American Platinum
Location	Der Brochen, Limpopo, South Africa
Name of Project	Dwars Rivier 372 KT Skeletal Remains C-14 and DNA Tests
Year Completed	Ongoing
Project Description	Specialist community participation, DNA and radiocarbon dating of archaeological human remains

Client	Exxaro Coal Mpumalanga (Pty) Ltd
Location	Belfast, Mpumalanga, South Africa
Name of Project	Exxaro Belfast GRP
Year Completed	2018
Project Description	Grave Relocation

Publications	Antonites, A. R. & Nel, J. 2018. The Voortrekker Monument as memory institution: mediating collective memory, tourism and educational programming for a local and global audience. In: Ngulube, P (ed.) *Handbook of Research on Advocacy, Promotion and Public Programming for Memory Institutions*. Pretoria: UNISA Press. Nel, J. 2011. Gods, Graves and Scholars: returning Mapungubwe human remains to their resting place. In: *Mapungubwe Remembered. University of Pretoria commemorative publication*. Johannesburg: Chris van Rensburg Publishers.

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

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

Miss Shannon Hardwick

Heritage Resources Management Consultant

Social and Heritage Services

Digby Wells Environmental

1 Education

Date	Degree(s) or Diploma(s) obtained	Institution
2019	Heritage Resources Management short course (Continued Professional Development Programme)	University of Cape Town
2013	MSc (Archaeology)	University of the Witwatersrand
2010	BSc (Honours) (Archaeology)	University of the Witwatersrand
2009	BSc	University of the Witwatersrand
2006	Matric	Rand Park High School

2 Language Skills

Language	Written	Spoken
English	Excellent	Excellent
Afrikaans	Fair	Basic

3 Employment

Period	Company	Title/position
2019 to Present	Digby Wells Environmental	Heritage Resources Management Consultant
2017 to 2019	Digby Wells Environmental	Assistant Heritage Resources Management Consultant
2017 to 2017	Digby Wells Environmental	Social and Heritage Services Intern
2016 to 2017	Tarsus Academy	Facilitator
2011 to 2016	University of the Witwatersrand	Teaching Assistant
2011	University of the Witwatersrand	Collections Assistant

4 Experience

I joined the Digby Wells team in May 2017 as a Heritage Management Intern and have most recently been appointed as a Heritage Resources Management Consultant. I am an archaeologist and obtained a Master of Science (MSc) degree from the University of the Witwatersrand in 2013, specialising in historical archaeobotany in the Limpopo Province. I am a published co-author of one paper in *Journal of Ethnobiology*.

Since joining Digby Wells, I have gained generalist experience through the compilation of various heritage assessments, including Notification of Intent to Develop (NIDs), Heritage Scoping Reports (HSRs), Heritage Impact Assessment (HIA) reports, Heritage Basic Assessment Reports (HBARs) and applications to undertake permitted activities in terms of Sections 34 and 35 of the National Heritage Resources Act, 1999 (Act No. 25 of 1999) (NHRA). I have undertaken heritage mitigations including those permitted under Section 35 of the NHRA and I am currently gaining experience in Grave Relocation Processes (GRPs).

Besides heritage experience, I have also obtained experience in compiling socio-economic documents, including a Community Health, Safety and Security Management Plan (CHSSMP) and social baselines and data analysis for projects in South Africa, Malawi, Mali and Sierra Leone. I have also had experience in terms of auditing clients according to their environmental commitments.

My fieldwork experience includes heritage pre-disturbance surveys and impact assessments in South Africa, Malawi and the Democratic Republic of the Congo and social fieldwork in Malawi. All but one of these international projects conformed to the requirements of the International Finance Corporation (IFC) Performance Standards on Environmental and Social Sustainability (PS) (2012).

I am a registered member of the Association of Southern African Professional Archaeologists (ASAPA) and the International Council on Monuments and Sites (ICOMOS).

5 Project Experience

The table below presents the Projects in which I have participated in Digby Wells throughout my employment.

Project Experience at Digby Wells

Project Title	Client	Project Location	Completed	Project Experience
Cultural Heritage Management and Grave Relocation Process in support of the North Eastern Waste Rock Dump Extension Readiness at the Mogalakwena Platinum Mining Complex	Anglo American Platinum	Mokopane, Limpopo	Ongoing	Section 35 Permit Application Process Section 36 Permit Application and Grave Relocation Processes
Mafube Resettlement Action Plan and Grave Relocation Process	Mafube Coal Mining (Pty) Ltd	Middelburg, Mpumalanga	Ongoing	Section 36 Permit Application and Grave Relocation Processes
Environmental and Social Impact Assessment for the Sanankora Gold Mine Project	Cora Gold Limited	Koulikoro Region, Mali	Ongoing	Heritage Impact Assessment Process In-country consultant support
Environmental Authorisation Process for the Expansion of the Copper Sunset Mining Right Area	Copper Sunset Sands (Pty) Ltd	Viljoensdrift, Free State	Ongoing	Heritage Impact Assessment Process
Amendments to Environmental Licences associated with the West Rand Tailings Retreatment Project	Far West Gold Recoveries (Pty) Ltd	West Rand District Municipality, Gauteng	Ongoing	Heritage Impact Assessment Process
Regional Tailings Storage Facility Heritage Mitigations	Ergo Mining (Pty) Ltd	Randfontein, Gauteng	Ongoing	Section 34 Permit Application Process
City Deep 4L2 Mine Dump Heritage Management	Ergo Mining (Pty) Ltd	Johannesburg, Gauteng	Ongoing	Rescue Permit Application Process

Project Title	Client	Project Location	Completed	Project Experience
Exxaro Dorstfontein East Coal Mine Expansion Project	Exxaro Coal Central (Pty) Ltd	Kriel, Mpumalanga	Ongoing	Heritage Impact Assessment Process
Grave Relocation Process at the Exxaro Matla Mine 1 Development Footprint	Exxaro Coal Mpumalanga (Pty) Ltd	Kriel, Mpumalanga	Ongoing	Section 36 Permit Application and Grave Relocation Processes
Environmental Authorisation for the proposed Musina-Makhado Special Economic Zone Development Project, Limpopo Province	Limpopo Economic Development Agency	Vhembe District Municipality, Limpopo	Ongoing	Heritage Impact Assessment Process Project Management
Lesotho Lowlands Water Development Project Phase II Heritage Impact Assessment	Lesotho Lowlands Water Development Project Phase II	Leribe and Berea Districts, Lesotho	Ongoing	Heritage Impact Assessment Process In-country consultant support Project Management
Songwe Hills Rare Earth Elements Project	Mkango Resources Limited	Phalombe District, Malawi	Ongoing	Heritage Impact Assessment Process
Environmental Authorisation Processes for the Blinkwater, Lisbon and Moorddrift Prospecting Right Applications	PalRho Exploration (Pty) Ltd	Mokopane, Limpopo	Ongoing	Heritage Basic Assessment Report (desktop)
Environmental and Social Impact Assessment for the Kalimva and Ikamva Satellite Pits and Updating of the Kibali Gold Project	Kibali Gold Mine	Orientale Province, Democratic Republic of the Congo	Ongoing	Heritage Impact Assessment Process In-country consultant support

Project Title	Client	Project Location	Completed	Project Experience
The South African Radio Astronomy Observatory Square Kilometre Array Phase 2 Heritage Mitigations	South African Radio Astronomy Observatory	Carnarvon, Northern Cape	Ongoing	Section 34 Permit Application Process Section 35 Permit Application Process and Mitigations Heritage Impact Assessment – Addendum Training Development and Implementation
Kroonstad Gas Exploration Project	Shango Solutions (Pty) Ltd	Kroonstad, Free State	Ongoing	Heritage Impact Assessment Process Project Management
Kroonstad South Section 102 Amendment Project	Shango Solutions (Pty) Ltd	Kroonstad, Free State	Ongoing	Heritage Impact Assessment Process Project Management
Rustenburg Base Metals Refinery Bulk Chemical Storage Facility Relocation Project	SRK Consulting (South Africa) Pty Ltd	Rustenburg, North West	Ongoing	Heritage Impact Assessment Process Project Management
Regulation 31 Amendment Report and Environmental Management Programme for Listed Activities and Amendment associated with the Sweet Sensation Sand Mine	Sweet Sensations Vaal Sand (Pty) Ltd	Vaal Eden, Free State	Ongoing	Heritage Site Management Plan Chance Finds Procedure

Project Title	Client	Project Location	Completed	Project Experience
Environmental Authorisation for the Proposed New Infrastructure at the Universal Coal Development III (Pty) Ltd Ubuntu Colliery	Universal Coal Development III (Pty) Ltd	Delmas, Mpumalanga	Ongoing	Heritage Impact Assessment Process
Proposed Dalyshope Coal Mining Project	Anglo Operations (Pty) Ltd	Lephalale, Limpopo	Ongoing	Heritage Impact Assessment Process
Proposed Environmental Regulatory Process for the Middeldrift Resources within the Existing New Clydesdale Colliery Mining Right	Universal Coal Development IV (Pty) Ltd	Kriel, Mpumalanga	Ongoing	Heritage Impact Assessment Process
Proposed Arnot South Coal Mining Project	Exxaro Coal Mpumalanga (Pty) Ltd	Hendrina, Mpumalanga	Ongoing	Heritage Impact Assessment Process
Basic Assessment Process for the Closure of the Cooke Underground Operations	Sibanye Gold Limited	Randfontein, Gauteng	March 2021	Heritage Impact Assessment Process
Weltervreden Mine Environmental Authorisation, Water Use Licence and Mining Right Application Project	Mbuyelo Group (Pty) Ltd	Belfast, Mpumalanga	March 2021	Heritage Impact Assessment Process
Basic Assessment and Regulation 31 Amendment Processes for the Authorisation of Listed Activities and Amendment of the Environmental Impact Assessment and Environmental Management Plan for the Ixia Coal (Pty) Ltd Imvula Mine	Ixia Coal (Pty) Ltd	Kriel, Mpumalanga	November 2020	Heritage Basic Assessment Report
Burial Ground Site Inspection adjacent to the Goedgevonden Colliery	Glencore Operations South Africa (Pty) Ltd	Ogies, Mpumalanga	November 2020	Site Inspection and Report

Project Title	Client	Project Location	Completed	Project Experience
Belfast Coal Mine Grave Inspection	Exxaro Coal Mpumalanga (Pty) Ltd	Belfast, Mpumalanga	September 2020	Site Inspection and Report
Basic Assessment and Regulation 31 Amendment / Consolidation for Sigma Colliery: Mooikraal and Sigma Colliery: 3 Shaft	Sasol Mining (Pty) Ltd	Sasolburg, Free State	September 2020	Notification of Intent to Develop and Request for Exemption
Mining Permit Applications to undertake Sand Mining at the New Vaal Colliery	Copper Sunset (Pty) Ltd	Vereeniging, Free State	July 2020	Heritage Basic Assessment Report
Environmental Impact Assessment for the Klipspruit Colliery Water Treatment Plant and associated pipeline, Mpumalanga	South32 SA Coal Holdings (Pty) Ltd	Ogies, Mpumalanga	May 2020	Notification of Intent to Develop and Request for Exemption Social baseline
Environmental Authorisation for the Dagsoom Coal Mining Project near Ermelo, Mpumalanga Province	Dagsoom Coal Mining (Pty) Ltd	Ermelo, Mpumalanga	April 2020	Heritage Impact Assessment Process
Proposed construction of a Water Treatment Plant and associated infrastructure for the Treatment of Mine-Affected Water at the Kilbarchan Colliery	Eskom Holdings SOC Limited	Newcastle, KwaZulu-Natal	March 2020	Heritage Impact Assessment Process
External Environmental Audits of the Sasol Retail Stations in the Limpopo, North West, Free State, Mpumalanga and Northern Cape Province	Sasol Limited's South African Energy Business	Thirteen locations in Mpumalanga, North West, Free State and Northern Cape	March 2020	Environmental Audit and Report

Project Title	Client	Project Location	Completed	Project Experience
Environmental Management Programme Performance Assessment for the Impumelelo Colliery near Greylingstad, Mpumalanga	Sasol Mining (Pty) Ltd	Greylingstad, Mpumalanga	January 2020	Environmental Performance Audit and Report
Environmental Authorisation for the Temo Mine proposed Rail, Road and Pipeline Development, Limpopo Province	Temo Coal Mining (Pty) Ltd	Lephalale, Limpopo	November 2019	Heritage Impact Assessment Process Social baseline
Heritage Resources Management Process for the Proposed Upgrade of the Dersley Outfall Sewer Line, Ekurhuleni, Gauteng	Information Decision Systems (Pty) Ltd	Ekurhuleni (Johannesburg), Gauteng	July 2019	Archaeological Impact Assessment Process Project Management
Environmental Authorisation for the proposed Lephalale Pipeline Project, Limpopo Province	MDT Environmental (Pty) Ltd	Lephalale, Limpopo	October 2019	Notification of Intent to Develop & Request for Exemption
Heritage Resources Management Process Update for the Exxaro Matla Mine	Exxaro Coal Mpumalanga (Pty) Ltd	Kriel, Mpumalanga	September 2019	Heritage Site Management Plan Update
Environmental Authorisation Process to Decommission a Conveyor Belt Servitude, Road and Quarry at Twistdraai East Colliery	Sasol Mining (Pty) Ltd	Secunda, Mpumalanga	August 2019	Notification of Intent to Develop and Request for Exemption
Environmental Impact Assessment for the proposed Future Developments within the Sun City Resort Complex	Sun International (Pty) Ltd	Rustenburg, North West	August 2019	Heritage Impact Assessment Process Conservation Management Plan Social Baseline

Project Title	Client	Project Location	Completed	Project Experience
Environmental Authorisation for the Nomalanga Estates Expansion Project, KwaZulu-Natal	Nomalanga Property Holdings (Pty) Ltd	Greytown. KwaZulu-Natal	July 2019	Heritage Impact Assessment Process
City Deep 4L2 Mine Dump Heritage Management Process	Ergo Mining (Pty) Ltd	Johannesburg, Gauteng	July 2019	Site Inspection and Report
Proposed John Dube Extension 3 Township situated on Portions of Remaining Extent 1 and 83 of the farm Grootfontein 165 IR, Gauteng Province	Envirolution Consulting (Pty) Ltd	Ekurhuleni (Johannesburg), Gauteng	July 2019	Desktop Social Assessment
Constructed Landfill Site for the Sierra Rutile Limited Mining Operation, Southern Province, Sierra Leone	Sierra Rutile Limited	Southern Province, Sierra Leone	May 2019	Social Impact Assessment
Environmental and Social Impact Assessment for the Bougouni Lithium Project, Mali	Kodal Minerals Limited	Sikasso region, Mali	May 2019	Heritage Impact Assessment Process In-country consultant support
Belfast Implementation Project	Exxaro Coal Mpumalanga (Pty) Ltd	Belfast, Mpumalanga	March 2019	Section 34 Permit Application
Newcastle Landfill Project	GCS Water and Environmental Consultants	Newcastle, KwaZulu-Natal	March 2019	Heritage Impact Assessment Process
Elandsfontein Colliery Burial Grounds and Graves Chance Finds	Anker Coal and Mineral Holdings SA (Pty) Ltd Elandsfontein Colliery (Pty) Ltd	Clewer, Emalahleni, Mpumalanga	December 2018	Site Inspection and Report Project Management

Project Title	Client	Project Location	Completed	Project Experience
Environmental Impact Assessment for the Blyvoor Gold Mining Project near Carletonville, Gauteng Province	Blyvoor Gold Capital (Pty) Ltd	Carletonville, Gauteng	December 2018	Notification of Intent to Develop and Request for Exemption Social Baseline
Gorumbwa RAP Audit	Randgold Resources Limited	Kibali Sector, Democratic Republic of the Congo	December 2018	Resettlement Action Plan Audit (data management)
Sasol Sigma Defunct Colliery Surface Mitigation Project: Proposed Rover Diversion and Flood Protection Berms	Sasol Mining (Pty) Ltd	Sasolburg, Free State	November 2018	Notification of Intent to Develop and Request for Exemption
Heritage Resources Management Process for the Exxaro Matla Mine	Exxaro Coal Mpumalanga (Pty) Ltd	Kriel, Mpumalanga	October 2018	Heritage Impact Assessment Process
Environmental and Social Input for the Pre-Feasibility Study	Birimium Gold	Bougouni, Mali	October 2018	Pre-Feasibility Study; Heritage Impact Assessment Process
Environmental and Social Impact Assessment for the Bougouni Lithium Project, Mali	Future Minerals S.A.R.L.	Bougouni, Mali	July 2018	Heritage Impact Assessment Process
The South African Radio Astronomy Observatory Square Kilometre Array Heritage Impact Assessment and Conservation Management Plan Project	The South African Radio Astronomy Observatory (SARAO)	Carnarvon, Northern Cape	July 2018	Heritage Impact Assessment Process Conservation Management Plan
Sasol Mining Sigma Colliery Ash Backfilling Project, Sasolburg, Free State Province	Sasol Mining (Pty) Ltd	Sasolburg, Free State	July 2018	Heritage Basic Assessment Report Update

Project Title	Client	Project Location	Completed	Project Experience
Liwonde Additional Studies	Mota-Engil Africa	Liwonde, Malawi	June 2018	Community Health, Safety and Security Management Plan Social Fieldwork
NHRA Section 34 Permit Application process for the Davin and Queens Court Buildings on Erf 173 and 174, West Germiston, Gauteng Province	IDC Architects	Johannesburg, Gauteng	May 2018	Section 34 Permit Application Process
Basic Assessment and Environmental Management Plan for the Proposed pipeline from the Mbali Colliery to the Tweefontein Water Reclamation Plant, Mpumalanga Province	HCI Coal (Pty) Ltd Mbali Colliery	Ogies, Mpumalanga	February 2018	Heritage Basic Assessment Report
Heritage Resources Management Process for the Exxaro Matla Mine	Exxaro Coal Mpumalanga (Pty) Ltd	Kriel, Mpumalanga	January 2018	Heritage Impact Assessment Process
Environmental Impact Assessment for the Millsite TSF Complex	Sibanye-Stillwater	Randfontein, Gauteng	December 2017	Heritage Baseline Compilation
Environmental Fatal Flaw Analysis for the Mabula Filling Station	Mr van den Bergh	Waterberg, Limpopo	November 2017	Fatal Flaw Analysis
NHRA Section 35 Archaeological Investigations, Lanxess Chrome Mine, North-West Province	Lanxess Chrome Mine (Pty) Ltd	Rustenburg, North West	August 2017	Archaeological Phase 2 Mitigation
Heritage Resources Management Process for the Portion 296 of the farm Zuurfontein 33 IR Proposed Residential Establishment Project	Shuma Africa Projects (Pty) Ltd	Ekurhuleni (Johannesburg), Gauteng	June 2017	Notification of Intent to Develop and Request for Exemption

6 Professional Affiliations and Registrations

Position	Professional Body	Member Number
Member	Association of Southern African Professional Archaeologists (ASAPA)	451
Member	International Council on Monuments and Sites (ICOMOS)	38048

7 Publications

Esterhuysen, A.B. & Hardwick, S.K. 2017. Plant remains recovered from the 1854 siege of the Kekana Ndebele, Historic Cave, Makapan Valley, South Africa. *Journal of Ethnobiology* 37(1): 97-119.

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Appendix C: HRM Methodology

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Cultural Significance, Field Rating and Impact Assessment

Methodology Statement

Project Number:

ZZZ9999

Prepared for:

Internal Document

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Report Type:	**Methodology Statement**
Project Name:	**Cultural Significance, Field Rating and Impact Assessment**
Project Code:	**ZZZ9999**

Revision History

Name	Responsibility	Version	Date
Johan Nel ASAPA Member 095	HRM Unit Manager	Ver. 1	May 2014
		Ver. 2	October 2014
		Ver. 3	May 2015
Justin du Piesanie ASAPA Member 270	Divisional Manager: Social and Heritage Services	Ver. 4	January 2016
		Ver. 5	June 2016
		Ver. 6	June 2019

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1 Introduction

Cultural 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 cultural heritage resources, Heritage Resources Management (HRM) acknowledges that these have lasting worth as evidence of the origins of life, humanity and society. It is incumbent of the assessor to determine the cultural significance[1] (CS) of cultural heritage resources to allow for the implementation of appropriate management. This is achieved through assessing cultural heritage resources' value relative to certain prescribed criteria encapsulated in policies and legal frameworks, such as the South African National Heritage Resources Act, 1999 (Act No. 25 of 1999) (NHRA).

Commensurate to the NHRA, with specific reference to Section 38, this methodology aims to ensure that clients protect cultural heritage during implementation of project activities by either avoiding, removing or reducing the intensity of adverse impacts to tangible[2] and intangible[3] cultural heritage resources within the defined area of influence.

The methodology to define CS and assess the potential effects of a project is discussed separately in the sections below.

2 Evaluation of Cultural Significance and Field Ratings

2.1 Cultural Significance Determination

Digby Wells developed a CS Determination Methodology to assign identified cultural heritage resources with a numerical CS rating in an objective as possible way and that can be independently reproduced provided that the same information sources are used, should this be required.

This methodology determines the intrinsic, comparative and contextual significance of identified cultural heritage resources by considering their:

1. Importance rated on a six-point scale against four criteria; and
2. Physical integrity rated on a five-point scale.

[1] Cultural significance is defined as the intrinsic "aesthetic, architectural, historical, scientific, social, spiritual, linguistic or technological value or significance" of a cultural heritage resource. These attributes are combined and reduced to four themes used in the Digby Wells significance matrix: aesthetic, historical, scientific and social.

[2] (i) Moveable or immovable objects, property, sites, structures, or groups of structures, having archaeological (prehistoric), paleontological, historical, cultural, artistic, and religious values; (ii) unique natural features or tangible objects that embody cultural values, such as sacred groves, rocks, lakes, and waterfalls.

[3] Cultural knowledge, innovations, and practices of communities embodying traditional lifestyles.

The assigned ratings consider information obtained through a review of available credible sources and representativity or uniqueness (i.e. known examples of similar resources to exist), as well as the current preservation *status-quo* as observed.

Figure 2-2 depicts the CS formula and importance criteria, and it describes ratings on the importance physical integrity scales

2.2 Field Rating Determination

Grading of heritage resources remains the responsibility of heritage resources authorities. However, the South African Heritage Resources Agency (SAHRA) Minimum Standards requires heritage reports include Field Ratings for identified resources to comply with section 38 of the NHRA. Section 7 of the NHRA provides for a system of grading of heritage resources that form part of the national estate and distinguishes between three categories.

The field rating process is designed to provide a numerical rating of the recommended grading of identified heritage resources. The evaluation is 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. Figure 2-1 presents the formula and the parameters used to determine the Field Ratings.

Field Rating = Average Sum of Aesthetic + Historic + Scientific + Social

rated against

Value	Field Rating	Designation	Authority
0	Resource not assessed	None	None
1	Resources afforded general protection in terms of Sections 34 to 37 of the NHRA and with negligible significance	Grade IV C	Local
2	Resources afforded general protection in terms of Sections 34 to 37 of the NHRA and with low significance	Grade IV B	
3	Resources afforded general protection in terms of Sections 34 to 37 of the NHRA and with medium-high significance	Grade IV A	
4	Resources afforded general protection in terms of Sections 34 to 37 of the NHRA and with high significance	Grade III B	
5	Resources afforded general protection in terms of Sections 34 to 37 of the NHRA and with very high significance	Grade II A	
6	Resources under formal protection that can be considered to have special qualities that make them significant within a province or region	Grade II	Provincial
7	Resources under formal protection that can be considered to have special qualities that make them significant within a national or international context	Grade I	National

Figure 2-1: Field Ratings Methodology

IMPORTANCE = AVERAGE SUM OF AESTHETIC + HISTORIC + SCIENTIFIC + SOCIAL

where

Aesthetic
Importance in aesthetic characteristics

Degree of technical / creative skill at a particular period

Historic
Importance to a community or pattern in the country's history

Site of significance relating to the history of slavery

Association with the life work of a person, group or organisation of importance in the history of the country

Scientific
Possession of uncommon, rare or endangered natural or cultural heritage aspects

Potential to yield information

Importance in demonstrating principle characteristics

Social
Association to a community or cultural group for social, cultural or spiritual reasons

rated against

IMPORTANCE: a site or heritage resource may be important in terms of one or more dimensions - aesthetic, historic, scientific and social. Each dimension consists of one or more attributes against which importance is determined. Importance of each dimension and subsequent attributes must be considered in relation to the resource's authenticity. Importance ratings must be informed and motivated by certain information sources. The credibility of information sources must therefore be evaluated and referred to when importance is discussed.	
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.

×

Integrity
Physical status quo of preservation from observation

rated against

INTEGRITY: the undivided or unbroken state, material wholeness, completeness or entirety of a resource or site	
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

Figure 2-2: CS Determination Methodology

3 Impact Assessment Methodology

The rationale behind CS determination recognises that the value of a cultural heritage resource is a direct indication of its sensitivity to change (impacts) as well as the maximum acceptable levels of change to the resource. Therefore, the assessor must determine CS prior to the completion of any impact assessment.

These requirements in terms of international best practice standards are integrated into the impact assessment methodology to guide both assessments of impacts and recommendations for mitigation and management of resources.

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

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

The assessment process identified potential issues and impacts through examination of:

- Project phases and activities,
- Interactions between activities and the environmental aspect; and
- The interdependencies between environmental aspects.

Figure 3-1 presents a graphical summary of this concept and Figure 3-2 provides an example of the process.

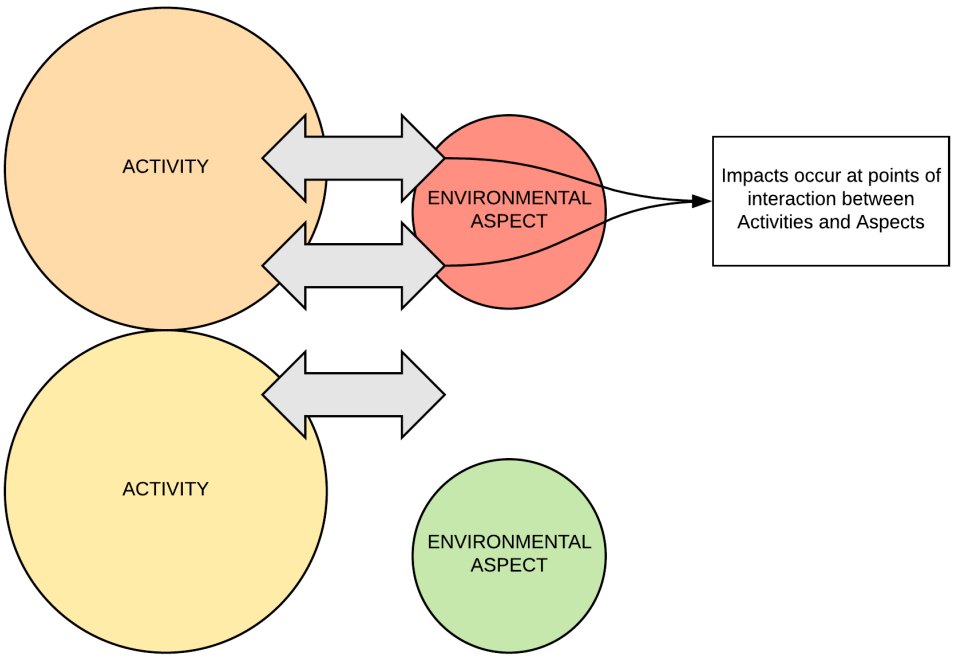

Figure 3-1: Graphical Representation of Impact Assessment Concept

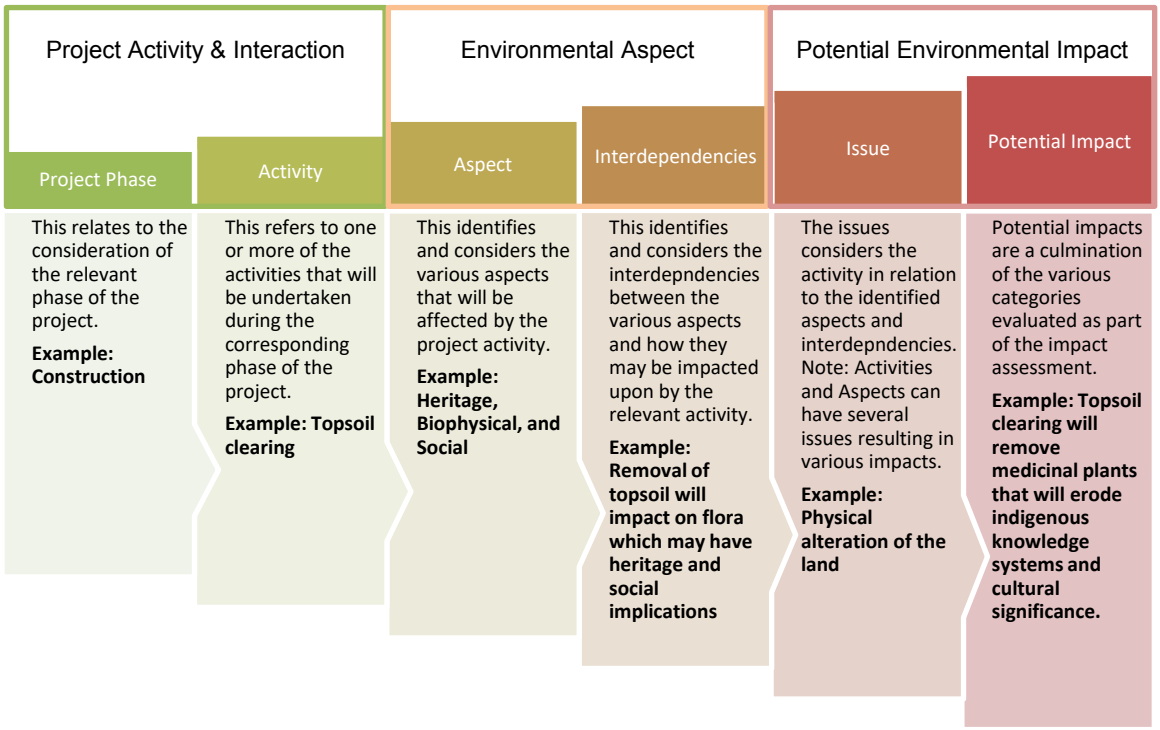

Figure 3-2: Example of how Potential Impacts are considered

3.1 Categorising Impacts to Cultural Heritage

Impacts may manifest differently among geographical areas and diverse communities. For instance, impacts to cultural heritage resources can simultaneously affect the tangible cultural heritage resource and have social repercussions. The severity of the impact is compounded when the intensity of physical impacts and social repercussions differ significantly, e.g. removal of a grave surface dressings results in a minor physical impact but has a significant social impact. In addition, impacts to cultural heritage resources can influence the determined CS without a physical impact taking place. Given this reasoning, impacts as considered here are generally placed into three broad categories (adapted from Winter & Bauman 2005: 36):

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

- **Space crowding**: high spatial density of impacts on a cultural heritage resource, e.g. density of new buildings resulting in suburbanisation of a historical rural landscape.

The fact that cultural heritage resources do not exist in isolation from the wider natural, social, cultural and heritage landscape demonstrates the relevance of the above distinctions: CS is therefore also linked to rarity / uniqueness, physical integrity and importance to diverse communities.

3.2 Impact Assessment

The impact assessment process is designed to provide a numerical rating of the identified potential impacts. This methodology follows the established impact assessment formula:

Impact = consequence of an event x probability of the event occurring

where:

Consequence = type of impact x (Duration + Extent + Intensity)

and

Probability = Likelihood of an impact occurring

In the formula for calculating consequence:

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

Table 3-1 presents a description of the duration, extent, intensity and probability ratings. The intensity rating definitions consider the determined CS of the identified cultural heritage resources. These criteria are used to determine the impact ratings as defined in Table 3-2 below. Table 3-3 represents the relationship between consequence, probability and significance.

The impact assessment process considers pre- and post-mitigation scenarios with the intention of managing and/or mitigating impacts in line with the EIA Mitigation Hierarchy, i.e. avoiding all impacts on cultural heritage resources. Where Project-related mitigation does not avoid or sufficiently minimise negative impacts on cultural heritage resources, mitigation of these resources may be required.

Table 3-1: Description of Duration, Extent, Intensity and Probability Ratings Used in the Impact Assessment

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

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

Table 3-2: Impact Significance Scores, Descriptions and 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)
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 3-3 Relationship between Consequence, Probability and Significance

Relationship between consequence, probability and significance ratings

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

Consequence

4 Recommended Management and Mitigation Measures

The CS of an identified heritage resource informs the level of the identified potential impact to that resource which in turn informs the recommended management and mitigation requirements. Table 4-1 presents an overview of the minimum recommended mitigation requirements considering the CS of the heritage resource.

Table 4-1: Minimum Recommended Management or Mitigation Requirements Considering CS

Determined CS	Minimum Management / Mitigation Requirements[4]
Negligible	Sufficiently recorded through assessment, no mitigation required
Low	Resource must be recorded before destruction, may include detailed mapping or surface sampling
Medium	Mitigation of the resource to include detailed recording and limited test excavations
Medium-High	Project design must aim to minimise impacts; Mitigation of resources to include extensive sampling through test excavations and analysis
High	Project design must aim to avoid impacts; Cultural heritage resource to be partially conserved, must be managed by way of Conservation Management Plan
Very High	Project design must be amended to avoid all impacts; Cultural heritage resources to be conserved in entirety and conserved and managed by way of Conservation Management Plan

The desired outcome of an impact assessment is the avoidance of all negative impacts and enhancement of positive ones. While this is not always possible, the recommended management or mitigation measures must be reasonable and feasible taking into consideration the determined CS and nature of the Project.

Two categories of impact management options are considered: avoidance and mitigation.

Avoidance requires changes or amendments to Project design, planning and siting of infrastructure to avoid physical impacts on heritage resources. It is the preferred option, especially where cultural heritage resources with high – very-high CS will be impacted.

[4] Based on minimum requirements encapsulated in guidelines developed by SAHRA

Mitigation of cultural heritage resources may be necessary where avoidance is not possible, thus resulting in partial or complete changes (including destruction) to a resource. Such resources need to be protected until they are fully recorded, documented and researched before any negative impact occurs. Options for mitigating a negative impact can include minimization, offsets, and compensation. Examples of mitigation measures specific to cultural heritage include:

- Intensive detailed recording of sites through various non-intrusive techniques to create a documentary record of the site – "preservation by record"; and
- 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 normally a regulated permitted activity for which permits[5] need to be issued by the Heritage Resource Authorities (HRAs). Such mitigation may result in a reassessment of the value of a cultural heritage 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.

Where resources have negligible CS, the specialist may recommend that no further mitigation is required, and the site may be destroyed where authorised.

Community consultation is an integral activity to all above-mentioned avoidance and mitigation measures.

[5] Permit application processes must comply with the relevant Section of the NHRA and applicable Chapter(s) of the NHRA Regulations, 2000 (Government Notice Regulation [GN R] 548) and must be issued by SAHRA or the Provincial Heritage Resources Authority (PHRA) as is applicable.