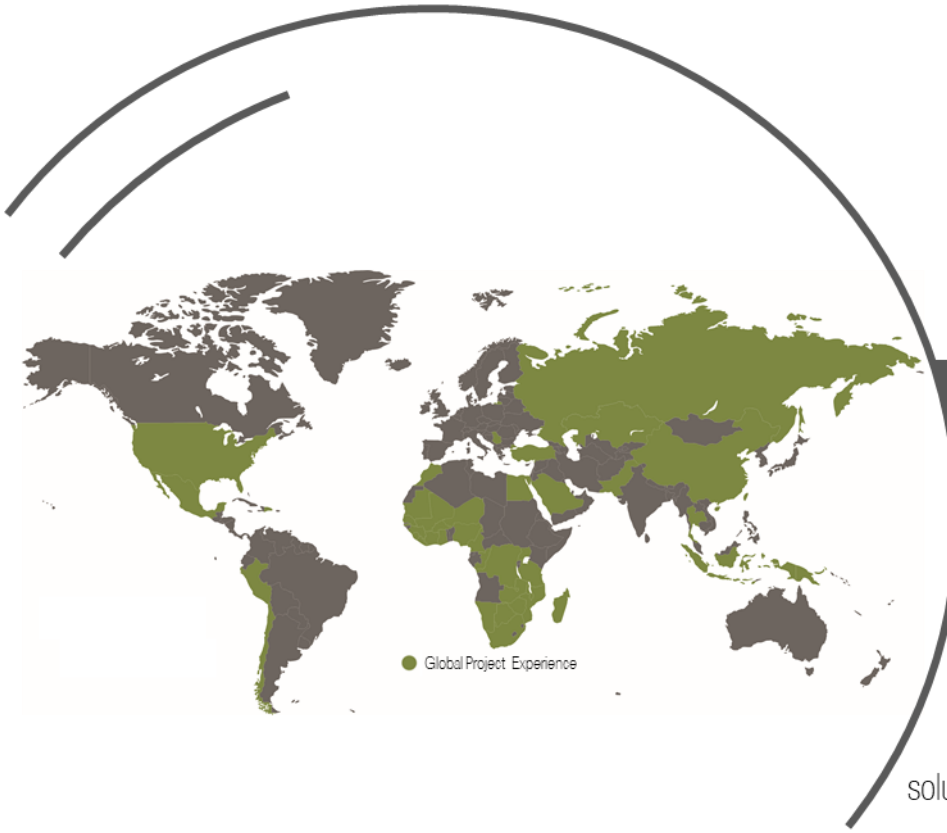

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Environmental Authorisation Process for the Expansion of the Copper Sunset Mining Right Area

Heritage Impact Assessment

Prepared for:
Copper Sunset Sands (Pty) Ltd

Project Number:
COP6679

May 2021

Digby Wells and Associates
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Project Name:	Environmental Authorisation Process for the Expansion of the Copper Sunset Mining Right Area
Project Code:	COP6679

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DETAILS AND DECLARATION OF THE SPECIALIST

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Title/ Position:	Heritage Resources Management Consultant
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Experience (years):	3 years
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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.

May 2021

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

Copper Sunset (Pty) Ltd (hereinafter Copper Sunset) holds an approved Mining Right (MR) and Environmental Management Programme (EMPr) in terms of the Mineral and Petroleum Resources Development Act, 2002 (Act No. 28 of 2002) (MPRDA). This MR was approved in 2008 and has subsequently been amended to incorporate additional areas. Copper Sunset is authorised to mine sand on several properties in Viljoensdrift in the Free State Province. Copper Sunset now intends to expand the Mining Right Area (MRA) to incorporate additional properties totalling approximately 2795.7 ha into the sand mining area (the Project).

This proposed expansion triggers activities listed in Listing Notice 1 and Listing Notice 2 of the Environmental Impact Assessment (EIA) Regulations, 2014, (Government Notice Regulations [GN R] 982 of 04 December 2014 as amended) (EIA Regulations, 2014, as amended) promulgated under the National Environmental Management Act, 1998 (Act No. 107 of 1998) (NEMA). To this end, Copper Sunset appointed Digby Wells Environmental (hereinafter Digby Wells) to undertake the Scoping and EIA required to authorise the extension areas. Additionally, as part of this application, Digby Wells also wishes to consolidate all existing EAs and EMPrs previously approved into one EMPr that is applicable to the approved MR and the extension area.

The EIA process includes a specialist Heritage Resources Management (HRM) process in compliance with 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).

During the HRM process, Digby Wells identified 3 heritage resources within the proposed Project area that may be negatively impacted by the proposed Project. These heritage impacts comprise two burial grounds (BGG-001 and BGG-002) and one historical artefact (H-Ft-001). The table below presents a summary of the assessment of the Cultural Significance (CS) of the identified heritage resources and the table below includes a summary of the assessment of the impacts posed by Project activities.

Summary of the CS of Identified Heritage Resources

Resource ID	Description	INTEGRITY	CS
Vryheid Formation	Palaeontological Feature	4	Very High
BGG-001 and BGG-002	Burial grounds and graves	4	Very High
H-Ft-001	Historical Artefact	2	Negligible

Summary of the Impact Assessment

Impact	Duration	Extent	Intensity	Consequence	Probability	Significance
	Pre-mitigation:					
Direct impact to BGG	Permanent	International	Extremely high - negative	Extremely detrimental	Certain	Major - negative
Impact	**Post-mitigation:**					
Direct impact to BGG	Beyond project life	Local	High - positive	Highly beneficial	High Probability	Moderate - positive

The South African Heritage Resources Agency (SAHRA) Minimum Standards for an HIA (2007) recommends that heritage resources with negligible CS require no additional mitigation and Digby Wells have therefore not assessed the potential impact to H-Ft-001.

The proposed Project additionally 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 Copper Sunset implements the following:

- The avoidance of impacts to BGG-001 and BGG-002 through amending the Project design to avoid the heritage resources and implement a 100 m no-go buffer zone around each of the identified graves:

- Where this option is implemented and the impact to these resources is avoided, Copper Sunset must develop and implement a Heritage Site Management Plan (HSMP) or amend an existing HSMP to include these resources for *in situ* conservation; or
- Where Project design amendments are not feasible, Copper Sunset will need to embark on a consultation process to assess whether a Grave Relocation Process (GRP) is feasible; and
- The mitigation of potential direct impacts against previously unidentified heritage resources and where Copper Sunset has not done so already, Copper Sunset must develop and implement a Chance Finds Procedure (CFP) prior to the commencement of Project activities. This CFP must be approved by the HRAs prior to implementation.

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 DEFINITION

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
CS	Cultural Significance
Digby Wells	Digby Wells Environmental
EA	Environmental Authorisation
EAP	Environmental Assessment Practitioner
EFC	Early Farming Community (*also known as Early Iron Age, 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
HFS	Heritage Free State
HIA	Heritage Impact Assessment
Hons	Honours degree
HRAs	Heritage Resources Authorities
HRM	Heritage Resources Management
HSMP	Heritage Site Management Plan

Abbreviation	Meaning
ICOMOS	International Council on Monuments and Sites
Kya	Thousand years ago
LED	Local Economic Development
LFC	Late Farming Community also known as Late Iron Age
LSA	Late Stone Age
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
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
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)	-	1.1 1.2
Details of the person who prepared the report and their expertise to carry out the specialist study.	1(a)	-	1.3
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
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 CS 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)-	7.2 7.3 7.4
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)	
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

Description	App. 6	NHRA	Section
Considers the development context to assess the socio-economic benefits of the project in relation to the presented impacts and risks.	-	38(3)(d)	6.3 12.1
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)	10
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)		8 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)	12
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)	13
Lists the source material used in the development of the report.	1(cA)	-	14
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

Copper Sunset (Pty) Ltd (hereinafter Copper Sunset) holds an approved Mining Right[1] (MR) and Environmental Management Programme (EMPr) in terms of the Mineral and Petroleum Resources Development Act, 2002 (Act No. 28 of 2002) (MPRDA) for the mining of sand on a portion of the farm Bankfontein No. 9 in Viljoensdrift in the Free State Province. The MR was approved in 2008 and was subsequently amended to incorporate additional areas.

Copper Sunset now intends to expand the Mining Right Area (MRA) to incorporate an approximate additional 2795.7 ha on adjacent properties (the extension area) for sand mining activities to extend the Life of Mine (LoM) (the Project). This proposed expansion triggers activities listed in Listing Notice 1 and Listing Notice 2 of the Environmental Impact Assessment (EIA) Regulations, 2014, (Government Notice Regulations [GN R] 982 of 04 December 2014 as) (EIA Regulations, 2014, as amended) promulgated under the National Environmental Management Act, 1998 (Act No. 107 of 1998) (NEMA).

To this end, Copper Sunset appointed Digby Wells Environmental (hereinafter Digby Wells) to undertake the EIA required for Environmental Authorisation (EA). As part of this application, Digby Wells will consolidate all existing EAs and EMPrs into one EMPr that is applicable to the approved MR and the extension area.

The EIA process includes a specialist Heritage Resources Management (HRM) process in compliance with 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 Heritage Free State (HFS).

1.1. Terms of Reference

Copper Sunset appointed Digby Wells as the Independent Environmental Assessment Practitioner (EAP) to complete the following processes in support of the Project:

- A Section 102 amendment application process to amend the MRA as per the MPRDA;
- A Scoping and EIA process to authorise the new Listed Activities triggered by the proposed Project; and
- A Regulation 31 amendment process to consolidate the existing EAs and EMPrs.

The EIA process includes a HIA in support of the EA applications and in compliance with the NHRA.

[1] Reference Number: FS30/5/1/1/2/164 MR

1.2. Scope of Work

The Scope of Work (SoW) for the specialist HRM process included the compilation of an HIA report to comply with the requirements encapsulated in Section 38(3) of the NHRA. Digby Wells completed the following activities as part of the SoW:

- Description of the predominant cultural landscape supported through primary and secondary data collection;
- Assessment of the Cultural Significance (CS) 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 (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.

1.3. Expertise of the Specialist

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

Table 1-1: Expertise of the Specialists

Team Member	Bio Sketch
Shannon Hardwick ASAPA Member: 451 ICOMOS Member 38048 Years' Experience: 3	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 fieldwork in Malawi.

Team Member	Bio Sketch
Justin du Piesanie ASAPA Member 270 ASAPA CRM Unit ICOMOS Member 14274 IAIAsa Member Years' Experience: 13	Justin is the Divisional Manager for Social and Heritage Services at Digby Wells. Justin joined the company in August 2011 as an archaeologist and was subsequently made HRM Manager in 2016 and Divisional Manager in 2018. He obtained his Master of Science (MSc) degree in Archaeology from the University of the Witwatersrand in 2008, specialising in the Southern African Iron Age. Justin also attended courses in architectural and urban conservation through the University of Cape Town's Faculty of Engineering and the Built Environment Continuing Professional Development Programme in 2013. Justin is a professional member of the Association of Southern African Professional Archaeologists (ASAPA) and accredited by the association's Cultural Resources Management (CRM) section. He is also a member of the International Council on Monuments and Sites (ICOMOS), an advisory body to the UNESCO World Heritage Convention. He has over 13 years combined experience in HRM in South Africa, including heritage assessments, archaeological mitigation, grave relocation, NHRA Section 34 application processes, and Conservation Management Plans (CMPs). Justin has gained further generalist experience since his appointment at Digby Wells in Botswana, Burkina Faso, Cameroon, the Democratic Republic of Congo, Liberia, Malawi, Mali, and Senegal on projects that have required compliance with IFC requirements such as Performance Standard 8: Cultural Heritage. Furthermore, Justin has acted as a technical expert reviewer of HRM projects undertaken in Cameroon, Malawi, and Senegal. Justin's current focus at Digby Wells is to develop the HRM process as an integrated discipline following international HRM principles and standards. This approach aims to provide clients with comprehensive, project-specific solutions that promote ethical heritage management and assist in achieving strategic objectives.

2. Project Description and Background

Copper Sunset's MRA was approved in 2008 for part of the farm Bankfontein No. 9. Copper Sunset began mining in 2009. The mine subsequently amended their MRA in 2015, 2016 and 2018. The MRA now includes the Remaining Extent (RE) of the farm Zandfontein No. 259, a portion of the RE of the farm Bankfontein No. 9, a portion of the farm Rietfontein No. 152 and the farm Bankfontien No. 1849. Table 2-1 presents a summary of the authorisations held by Copper Sunset to date.

Table 2-1: Summary of Authorisations for the Copper Sunset Sand Mining Operation

Authorisation	Description	Reference	Date
EMPr	MR Application on the farm Bankfontein No. 9	FS30/5/1/1/2/164 MR	28/04/2009
EA and EMPr	Construction of a washing plant, a Return Water Dam (RWD), a settling dam and a brick building.	FS30/5/1/2/3/2/1 (164) EM	19/09/2011
EA and EMPr	Incorporation of additional areas into the MRA (2015 and 2016)	FS30/5/1/2/3/2/1 (164) EM	08/03/2016 and 20/12/2016
EA and EMPr	Incorporation of additional areas into the MRA (2017)	FS30/5/1/2/2 (164) MR	30/05/2018

The properties within the MRA are located within the Metsimaholo Local Municipality (MLM) within the Fezile Dabi District Municipality (FDDM) in the Free State Province. The Project area is located approximately 8 km south of Vereeniging, 10 km southeast of Vanderbijlpark and 13 km northeast of Sasolburg. The Project is located near the Vaal River and the Lethabo Power Station. Plan 1 presents an overview of the location of the Project.

There is presently about 9 months left in the LoM. Copper Sunset intends therefore to extend the MRA to include additional portions of the RE of Portion 9 of the Farm Bankfontein No. 1849 (1 642 ha) and a portion of the RE of the farm Zandfontein No. 259 (1 179 ha). This will extend the LoM by approximately 20 years. Section 2.1 presents a summary of the proposed infrastructure and the activities to be included in the Project.

2.1. Proposed Infrastructure and Activities

Copper Sunset will utilise infrastructure currently being used in the existing operation, with the exception of establishing a mobile office at the entrance to the new mining areas, hydrocarbon storage tanks and refuelling area within the MRA. The operation will mine sand which comprises 90% plaster sand and 10% building sand at depths between 0.4 and 5 m below the surface. Clay will also be mined. Copper Sunset will recover the sand resource through utilising the strip-mining method as discussed below:

- Stripping and stockpiling of topsoil;
- Construction of a temporary haul road (approximately 20 m wide and 6 km long), which will move as the mine progresses;
- Mining of the sand resource;
- Screening of the sand resource;
- Backfilling of the mined excavations using the stockpiled topsoil; and

- Concurrent rehabilitation.

No permanent infrastructure will be constructed for the Project and all machinery will be mobile. Table 2-2 presents a summary of the Project-related activities expected within each phase of the Project lifecycle. Plan 2 presents the proposed infrastructure layout design.

Table 2-2: Project Phases and Associated Activities

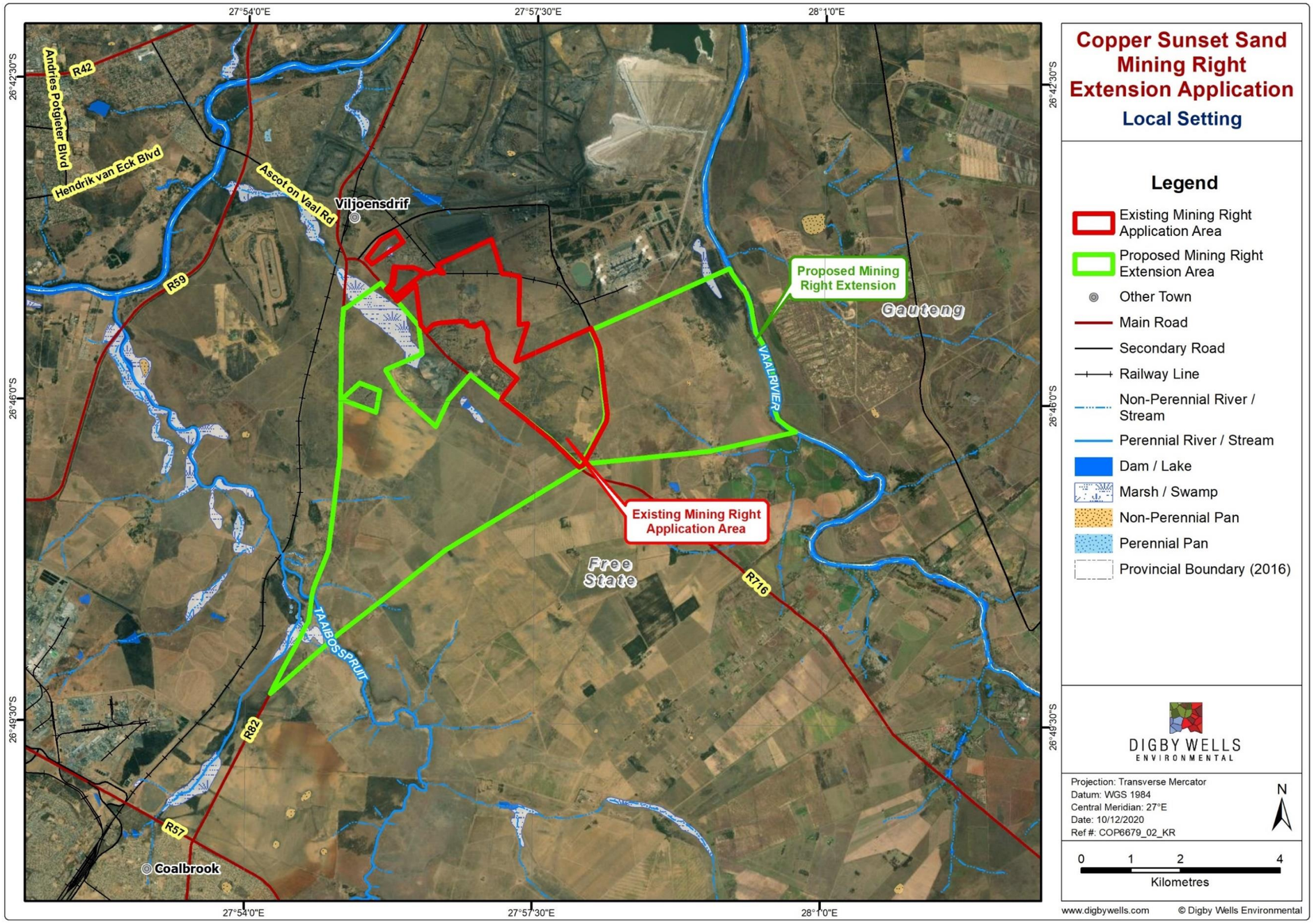
Project Phase	Project Activities
Construction Phase	Site Clearance: removal of vegetation and topsoil using a bulldozer and stockpiling topsoil along the mined-out strip.
	Construction of a haul road to gain access to the sand mining area.
	Establishment of the mobile office, which will include portable toilets, a portable diesel bowser, a water bowser, and mobile screening plants. Space will be made available to park mobile equipment when not in use.
	Establishment of the hydrocarbon storage tank and refuelling area.
Operational Phase	Operation of a fleet of tipper trucks, front-end loaders, excavators, water trucks, tractors and bulldozers to recover the resource.
	Operation of two mobile screening plants within the areas disturbed through the mining process. These mobile screens will be used when required, should sand become contaminated with unusable material. The sand will be separated out into separate stockpiles, depending on particle sizes.
	Customer trucks entering the MRA through the haul road to collect mined-out sand directly from extraction.
Decommissioning Phase	Concurrent rehabilitation: mined-out areas will be backfilled with stockpiled topsoil and waste material from the screening plant.
	Backfilled material will be levelled and contoured to avoid ponding of water.
	Revegetation: either naturally or through use of an indigenous seed mix where vegetation is not suitably established.

2.2. Alternatives Considered

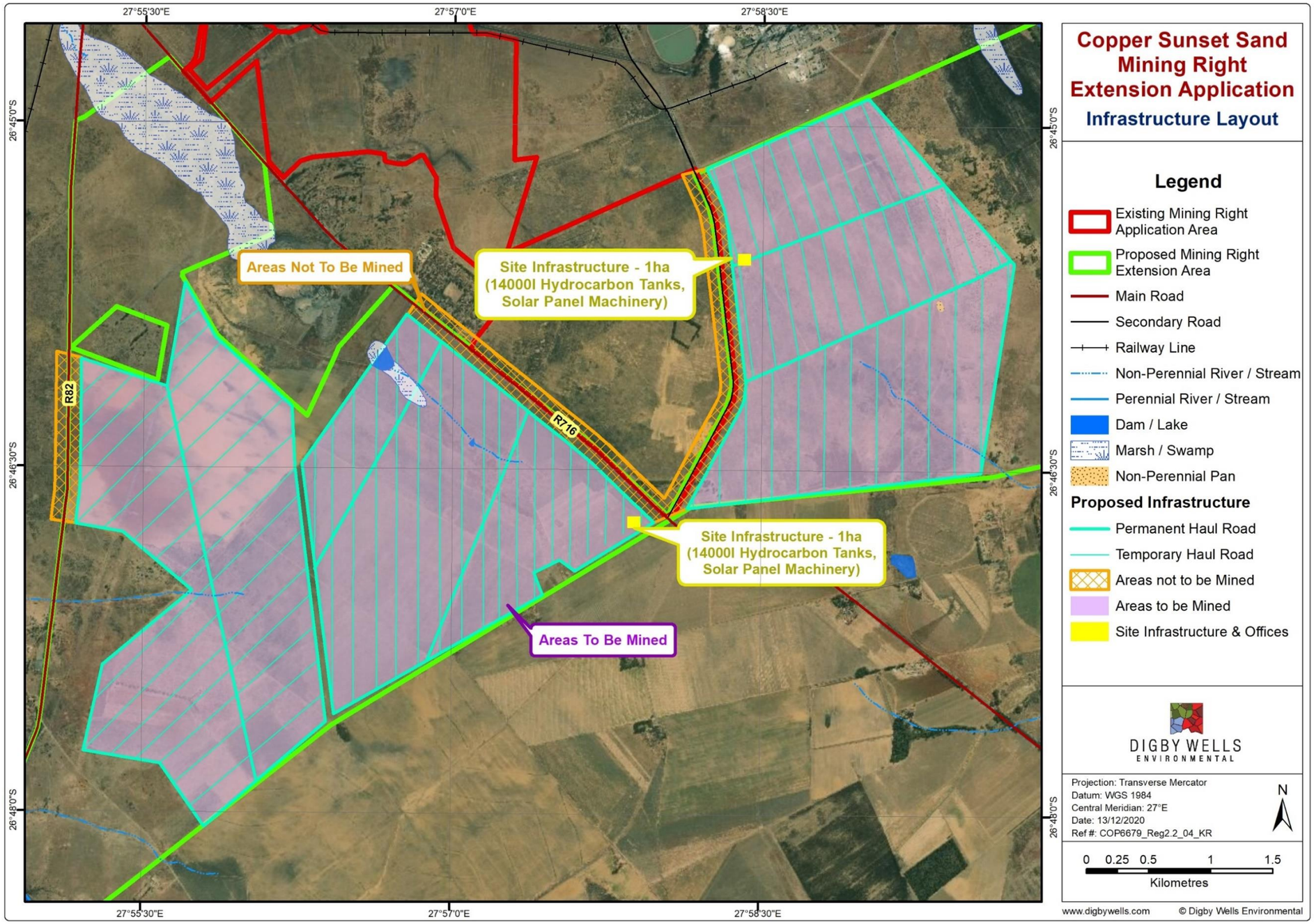
The Draft Scoping Report and the EIA report present the potential alternatives considered in the Project. Table 2-3 highlights the types of alternatives considered and describes the consequences of these alternatives for the assessment of the impacts on the heritage resources within the Project area.

Table 2-3: Alternatives Considered for the Project

Alternative Considered	Consequence for the HIA
Location Alternatives – no location alternatives have been investigated as the location is dependent on the location of the resource.	There is no change to the Project area as was provided at the time of the pre-disturbance survey.
Design or Layout Alternatives	The proposed infrastructure layout has been determined by the location and occurrence of the resource. None of the infrastructure will be permanent. No changes to the Project design are envisaged at this time.
Options regarding wetlands in the area	The preferred alternative would be to mine severely damaged wetlands and conserve wetlands with high ecological importance and sensitivity. The mine layout has considered this alternative. Should this alternative no longer be feasible and should the Project design or infrastructure change and affect areas that have not been included in the field surveys, Copper Sunset must appoint a suitably qualified archaeologist and/or palaeontologist to complete a walk-down of the proposed infrastructure design prior to the commencement of the construction of such infrastructure.
Alternative mining methods	There is no change to the Project description as underground mining is not a feasible alternative to extract the resource.
The ‘no-go’ alternative - the Project does not obtain approval or does not go ahead for any reason.	The potential environmental impacts associated with the Project will not occur. This includes the potential impacts to heritage resources as described in Sections 7.2 to 7.4. However, the potential benefits associated with the Project (as described in Section 12.1) will also not occur.



Plan 1: Local Setting of the Project



Plan 2: Proposed Infrastructure Layout and Mining Sequence

3. Relevant Legislation, Standards and Guidelines

This section describes the national and regional 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
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.
National Environmental Management Act, 1998 (Act No. 107 of 1998) 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*	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
implementation and reported to the organ of state charged by law with authorizing, permitting, or otherwise allowing the implementation of an activity. 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.	
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. 327 (as amended) - 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. 325(as amended) – 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. 324 (as amended)) – 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 EIA report 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 the EA application. This HIA report was completed to inform the EIA process to comply with Section 24 of the NEMA.

Applicable legislation used to compile the report	Reference where applied
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.	The HIA 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 HFS.
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; • 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.	The HRM process was undertaken with cognisance of the applicable regulations. The proposed mitigation strategies and management measures must comply with these requirements.

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.	The HIA report was compiled to adhere to the minimum standards as defined by Chapter II of the SAHRA Minimum Standards (2007).

3.2. Regional 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

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 6.1 below is considered accurate but may not include new data or information which may not have been made available to the public.
At the time of the pre-disturbance survey, details as to the proposed mining areas were provided but the information provided did not include the proposed layout of the ancillary infrastructure (e.g., office, parking and diesel storage).	The proposed infrastructure will be mobile, and Digby Wells assumes that the infrastructure will be relocated should the planned location present the risk of negative impact to a heritage resource. Where the proposed infrastructure occurs in an area not assessed in the field, Copper Sunset must appoint a suitably qualified heritage specialist or palaeontologist to assess the footprint.
Whilst every attempt was made to survey the extent of the site-specific study area[2], 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, Copper Sunset must alert the HRAs of the find and may need to enlist the services of a suitably qualified archaeologist 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, Copper Sunset 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.

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 HRM process methodologies.

5.1. Defining the Study Areas

Heritage resources do not exist in isolation to the greater natural and social environment, including the socio-cultural, socio-economic and socio-political environments. In addition, the NHRA requires the grading of heritage resources in terms of national, provincial and local

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

concern based on their importance and consequent official (i.e., State) management effort required. The type and level of baseline information required to adequately predict heritage impacts varies between these categories. Digby Wells defined four nested study areas for the purposes of this study:

- The *site-specific* study area: the farm portions extent associated with the proposed MRA extensions, 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 *MR area*: the farm portions associated with the approved Copper Sunset sand mining operation;
- 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. Defined as the area bounded by the local municipality, in this instance MLM, with particular reference to the immediate surrounding properties and/or farms. The local study area was specifically examined to offer a backdrop to the socio-economic conditions within which the proposed development will occur. The local study area furthermore provided the local development and planning context that may contribute to cumulative impacts; and
- The *regional study area*: the area bounded by the district municipality, which here is the FDDM. Where necessary, the regional study area may be extended outside the boundaries of the district municipality to include much wider regional expressions of specific types of heritage resources and historical events. The regional study area also provided the regional development and planning context that may contribute to cumulative impacts.

5.2. Statement of Cultural Significance

Digby Wells designed the significance rating process to provide a numerical rating of the CS 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 CS 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 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 CS 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 TSF 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. • 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 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 surveyed included the South African Heritage Resources Information System (SAHRIS), online/electronic journals and platforms and select internet sources. This HIA includes a summary and discussion of the most relevant findings. Table 5-2 lists the sources consulted in the literature review (refer to Section 14 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: 01217 Map ID: 01606 Map ID: 01681	Map ID: 02335 Case ID: 5035 Case ID: 6525	Case ID: 11167 Case ID: 12401
Cited Text		
Bamford, 2012, 2014, 2016	Behrens & Swanepoel, 2008	Brodie, 2008
Clark, 1982	Deacon & Deacon, 1999	Delius & Cope, 2007
Esterhuysen & Smith, 2007	FDDM, 2020	Groenewald & Groenewald, 2014
Landau, 2010	MLM, 2020	Maggs, 1976
Mitchell, 2002	Mucina & Rutherford, 2010	Swanepoel, et al., 2008
Voortrekkers, 2014	Winter & Baumann, 2005	

5.5. Primary Data Collection

Shannon Hardwick undertook a pre-disturbance survey of the site-specific study area on 21 September 2020, 20 January 2021 and 27 to 28 January 2021. The pre-disturbance survey focused on areas intended for sand mining activities and was a mix of pedestrian and vehicular travel amongst areas under investigation. The pedestrian survey focused on less disturbed areas within the Project area and the vehicular survey on the more disturbed areas.

The pre-disturbance survey was non-intrusive (i.e., no sampling was undertaken) with the aim 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. The heritage resources were also recorded through written and photographic records. Plan 4 includes the results of the pre-disturbance survey.

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., 5520/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 5-3 presents a list of the period and feature codes relevant to this area (refer to Section 6.1 for an explanation of what these terms mean).

Table 5-3: Feature and period codes relevant to this HIA

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

Heritage resources identified through secondary data collection were 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., 1681/Site 1).

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 12.1.

6.1. Cultural Heritage Baseline Description

The site-specific Project area is underlain by geological features within the Karoo Supergroup, specifically the *Vryheid Formation*. The *Vryheid Formation* is the basal layer of the Ecca Group and dates to approximately 280 million years ago (mya). These layers were deposited in a deltaic[3] environment (Bamford, 2016). The *Vryheid Formation* includes shales, mudstones, sandstones and coal. This unit is considered of very-high palaeontological sensitivity (SAHRA, 2013).

Fossil plants are usually preserved in the shales between the coal horizons and, to a lesser extent, within the sandstone surface outcrops (Bamford, 2012; 2014; 2016). Common fossil plants within the *Vryheid Formation* include *Glossopteris* leaves, roots and inflorescences, and *Calamites* stems. Coal deposits can potentially also include fossils of mammal-like reptiles and amphibians. These are however, rarely, if ever, preserved with plant fossils.

Table 6-1 provides a general breakdown of the timeframes within the archaeological and cultural past in South Africa. Figure 6-1 below provides a breakdown of the previously identified heritage resources representing each of these periods. Plan 3 presents the spatial relationship between these resources.

Table 6-1: Archaeological periods in South Africa

The Stone Age	Early Stone Age (ESA)	2 mya to 250 thousand years ago (kya)
	Middle Stone Age (MSA)	250 kya to 20 kya
	Later Stone Age (LSA)	20 kya to 500 CE (Common Era[4])
Farming Communities	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)

Adapted from Esterhuysen & Smith (2007)

[3] When lithologies are deposited onto an alluvial plain through river action.

[4] 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).

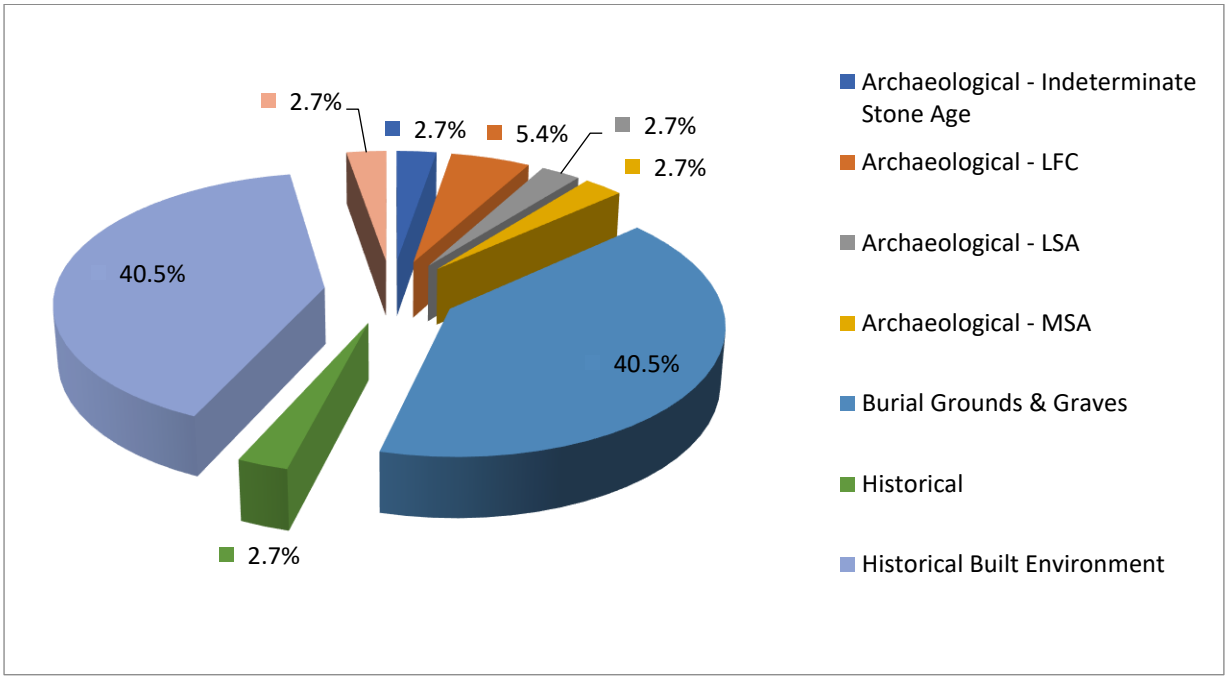


Figure 6-1: Heritage resources identified within the regional study area

The cultural heritage landscape is dominated by the historical built environment and burial grounds and graves, although there are expressions of the MSA, LSA and LFC periods. The section that follows will present a brief overview of the archaeological periods present within the regional study area. The reviewed literature included no reports of archaeological material representing the ESA or EFC periods and, as such, these will not be described further in this report.

The Stone Age is divided into three phases defined by the production of stone tools by various hominid species: the ESA, the MSA and the LSA. The MSA dates from approximately 250 to 20 kya. High proportions of blades that are created through the Levallois technique and which are minimally modified characterise the early MSA (Clark, 1982). The MSA is further defined by blades and points which were produced from good-quality raw materials and the use of bone tools, ochre, beads and pendants (Deacon & Deacon, 1999). A low-density scatter of MSA tools exposed by transmission lines represents the period in this area (Du Piesanie & Nel, 2014). An additional stone tool scatter was recorded but the period was not established (Du Piesanie & Nel, 2014).

The LSA started approximately 40 kya and continued up to the historical period, overlapping in some areas with the Farming Community period. LSA stone tools are specialised and specific tools are created for specific functions (Mitchell, 2002). The inclusion of bone tools into the archaeological record further characterises this period. LSA sites commonly include diagnostic artefacts, such as microlithic scrapers and segments.

In southern Africa, the LSA is closely associated with hunter-gatherer groups, including the San (Mitchell, 2002). Due to the nomadic nature of the LSA peoples, open-air sites are generally poorly preserved and difficult to identify. The LSA is further characterised by

evidence of ritual practises and complex societies (Deacon & Deacon, 1999). This can be expressed through rock art. No rock art was identified within the study area. The LSA was represented by a low-density scatter of lithics (Van Schalkwyk, et al., 1996).

The Farming Community period correlates to the movements of Bantu-speaking agro-pastoralists into southern Africa. The results of the literature review demonstrate heritage resources associated only with the LFC. The LFC is represented by stonewalling or through secondary tangible indicators such as ceramics and evidence for domestic animals, including dung deposits and faunal remains.

Stonewalling is the most visible indicator of LFC settlements. Several types of stonewalling have been described through decades of research and, within the larger study area, the most common is Type V. Maggs (1976) first described these settlements, which consist of many primary enclosures grouped around a ring. The enclosures may be contiguous or linked by secondary walling to form a secondary enclosure. There is no surrounding perimeter wall, although there may be additional free-standing structures around the periphery of the settlement.

Heritage resources associated with the LFC account for 5.4% of the identified heritage resources. Two instances of stonewalling have been identified in the area (Van Schalkwyk, et al., 1996). Van Schalkwyk *et al* (1996) did not describe the type of walling, but given its location it is most likely Type V.

The historical period[5] 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 a large amount of overlap between the two.

The period of approximately 1817 to 1826 AD is generally referred to as the *Mfecane* or, north of the Orange River, the *Difaqane*. Many aspects of the *Mfecane/Difaqane* have been debated and challenged (Landau, 2010). The traditional understanding of the period is that 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, as multiple groups were subsequently displaced to the north and the west. A drought during this time exacerbated the instability and increased the pressure on food supplies, which were already running low. European settlers, traders, missionaries and travellers moving into the interior further added to instability and resulting power struggles. The *Mfecane/Difaqane* was characterised by unprecedented (at least within the records of the Europeans travelling within southern Africa) social and political mobilisation and violence across the Highveld as individuals sought personal and food security.

As a result of social and political upheaval, the Highveld was vulnerable to intrusive groups including the Swazi and the *Voortrekkers*. Groups of Afrikaaners initiated a move from the

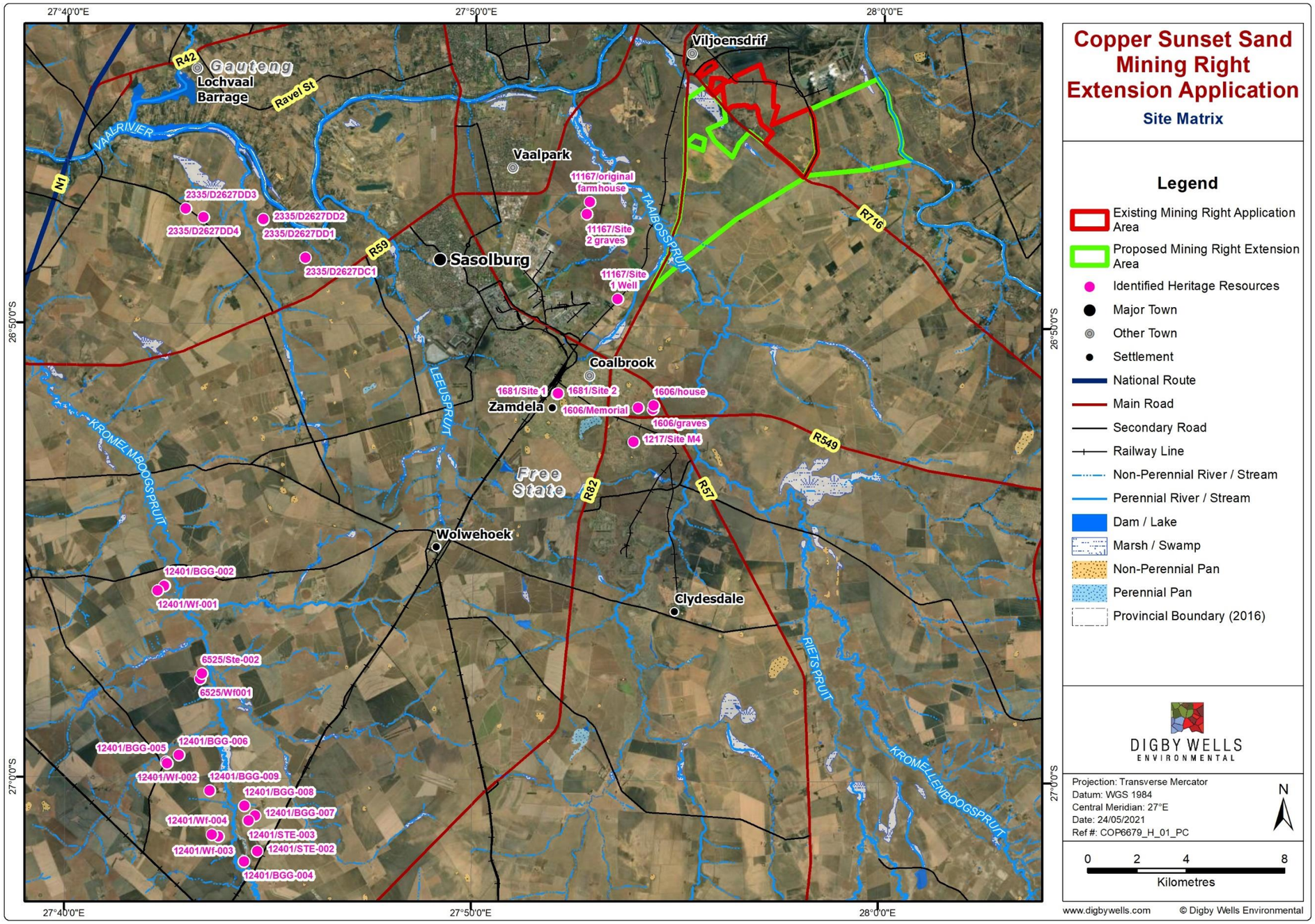
[5] In southern Africa, the last 500 years represents a formative period that is marked by enormous internal economic invention and political experimentation that shaped the cultural contours and categories of modern identities outside of European contact. This period is currently not well documented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

Cape to the interior to establish an independent state in approximately 1835. The migration of these *Voortrekkers* is commonly referred to as the Great Trek (or *Groot Trek*) (Delius & Cope, 2007; Voortrekkers, 2014).

Soon after settling in the Highveld area, the Trekboers (now farmers) discovered and exploited the Highveld Coalfields. The coal was initially used by the Boers as a domestic resource; however, the discovery of gold in the Witwatersrand in 1886 created an enormous demand for coal (Brodie, 2008). This increase in the demand for coal drove the commercial exploitation of the coal, until the industry was put on hold by the outbreak of the South African War of 1899-1902 (previously referred to as the Second Anglo-Boer War), which officially started on October 9th, 1899.

Heritage resources representing the historical period include the historical built environment (15 records or 40.5% of the total records), a historical place of significance (one record or 2.7% of all records), a memorial (one record or 2.7% of all records) and burial grounds and graves (15 records or 40.5% of all records). These have been recorded as:

- Burial grounds and graves, which range in size from single graves to more than fifty but less than one hundred graves (Van Schalkwyk, et al., 1996; Dreyer, 2005; Birkholtz & James, 2008; Beater, 2017; Hardwick & Du Piesanie, 2019);
- The historical place of significance is the site of the Coalbrook Mine Disaster of 21 January 1960 (Birkholtz & James, 2008);
- The memorial was constructed in the memory of Frits Pistorius, a young boy who had been murdered in 1952 (Dreyer, 2005); and
- Historical buildings which include buildings, structural remains, remains of functional structures and the remains of *werwe* (farmsteads) (Dreyer, 2005; Van Ryneveld, 2007; Du Piesanie & Nel, 2014; Higgitt & Du Piesanie, 2015; Beater, 2017; Hardwick & Du Piesanie, 2019).



Plan 3: Previously Identified Heritage Resources 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 21 September 2020, 20 January 2021 and 27 to 28 January 2021. The pre-disturbance survey focused on areas intended for sand mining activities and was a mix of pedestrian and vehicular travel amongst areas under investigation, depending on the disturbances observed within the Project area. 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 GPS data are provided in Plan 4.

The following sections describe the observations made during the survey and the outcomes of the survey.

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. Burrowing animals were present within the Project area and cattle and game (including ostriches and blesbok) graze the area. Burrows were inspected for the presence of any archaeological materials.

Anthropogenic disturbances included cultivation, including maize and extensive soybean fields. Additional farming infrastructure (including cattle kraals, water tanks, boreholes and modern structures), electrical infrastructure (including pylons and powerlines) and formal and informal roads have been established within the Project area. During the September survey, part of the area had recently been burned, which improved visibility. In other areas and especially during the January 2021 survey, the natural grass was overgrown, limiting ground visibility.

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

Biome	Bio-region	Vegetation Type
Grassland	Dry Highveld Grassland	Central Free State Grassland (Gh 6) Vegetation in this type is characterised by tall, dense grassland on slightly undulating bottomland alternating with patches of karroid scrub especially occurring on calcrete. This unit is associated with the sedimentary mudstones and sandstones of the Adelaide Subgroup of the Beaufort Group (Karoo Supergroup). This type is characterised by a thicker sandy layer overlying the calcrete subsoils (compared to neighbouring types). This limits the distribution of dwarf karroid shrub species. This vegetation unit is considered endangered and more than 40% has been transformed through cultivation and urban (and related) development. Where the unit occurs on shallow gravelly soils or on clay soils in low-lying areas, the unit is prone to encroachment of karoo bush vegetation when overgrazed. Erosion in this unit ranges from very low to moderate.
Savanna	Central Bushveld	Andesite Mountain Bushveld (SVcb 11) This vegetation type is characterised by dense, medium-tall thorny bushveld with a well-developed grass layer. This unit typically occurs on hill slopes and some undulating valleys. This type is underlain by basalts from the Klipriviersberg Group (Ventersdorp Supergroup), the shales, sandstones, siltstones and thin coal seams of the *Vryheid Formation* (Karoo Supergroup) and andesite conglomerate of the Pretoria Group (Transvaal Supergroup). This vegetation type is considered least threatened. Approximately 15% of the unit has been transformed, primarily through cultivation and urban build-up. Erosion within this type is generally very low.

Adapted from Mucina & Rutherford (2010)

Figure 6-2: Results of the Pre-disturbance Survey showing the Existing Environment

6.2.2. Newly Identified Heritage Resources

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

A preliminary assessment of the Genealogical Society of South Africa (2011) database did not indicate additional burial grounds are known to exist within the Project area.

Table 6-3: Heritage Resources identified within the Project Area

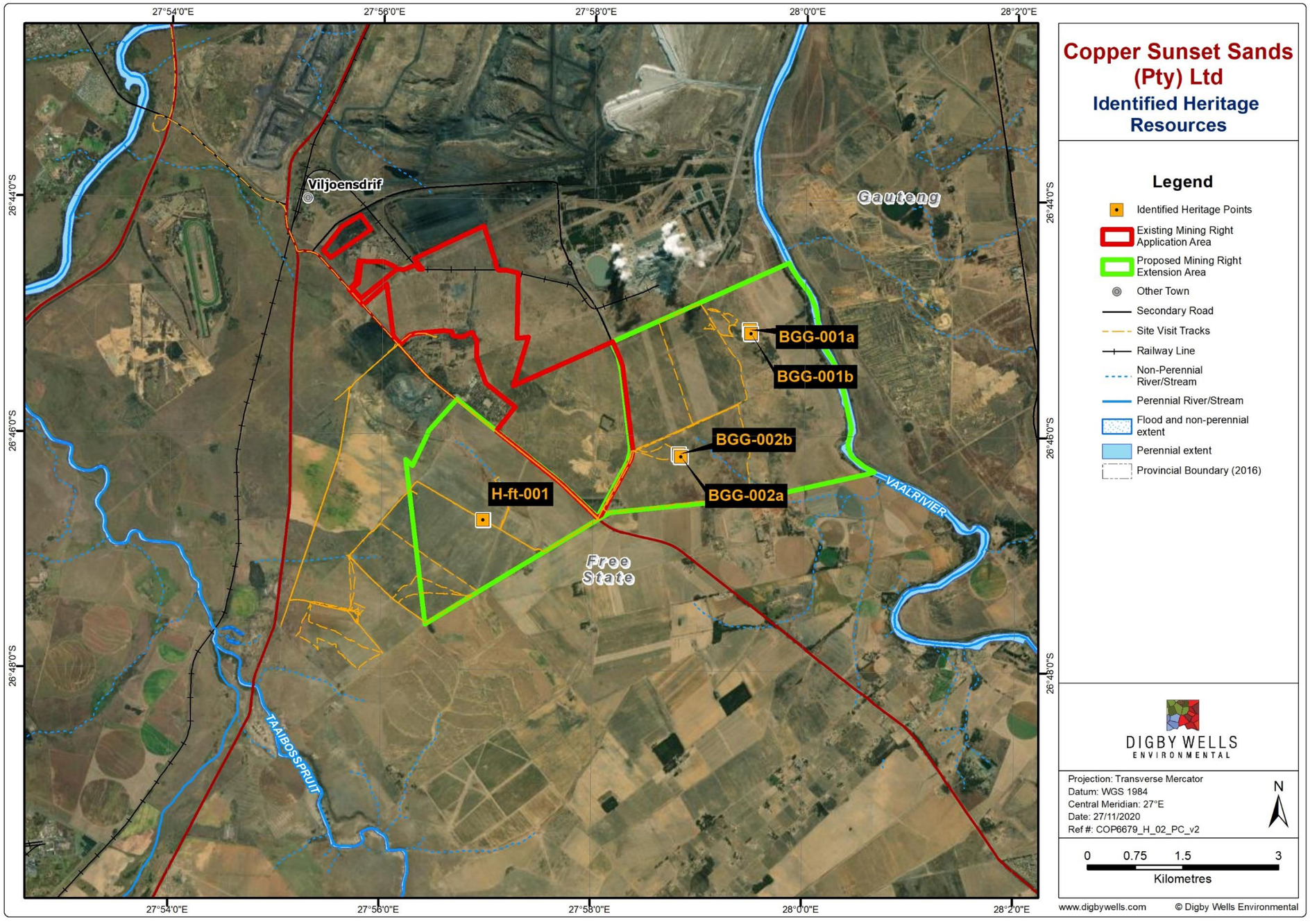
Heritage Resource	Description
BGG-001	Burial ground of 65 identified graves. The graves within the burial ground are marked by sand heaps with upright stone headstones, brick or cement headstones or no headstones, stone and brick heaps with no headstone, cement dressings (with and without individual fences), granite dressings with headstones and brick borders with headstones. Most of the headstones that have inscriptions are illegible and in poor condition. Grave goods are present on some graves. The burial ground is currently not fenced, but parts have been fenced off in the past, as there are dilapidated remains of fencing.
BGG-002	Burial ground of approximately 52 visible graves. The graves are marked by stone and soil heaps, no or brick dressings with cement headstones and brick dressings with a brick headstone with an inscribed granite plate. The legible gravestones include a mix of languages. The families represented include: Kheswa, Mahlase, Mokoena, Morobi, Motolo and Nlhapo and the legible graves date between 1931 and 1987. There is an additional grave dated to “13” which could refer to 1913 or 2013. The burial ground is currently not fenced, but parts have been fenced off in the past, as there are dilapidated remains of fencing. It appears that the burial ground was fenced in two phases or two sections. Most of the graves are not in good condition – many of the headstones have fallen over or have subsided, some of the graves and headstones are broken and many inscriptions have faded away and are illegible. The burial ground has been affected by erosion and animal burrows and there are cattle tracks crossing the burial ground.
H-ft-001	An old round of artillery. The round has rusted, and no markings were visible on the object. A pen is included in the photograph below for scale.


Photographs of BGG-001


Photographs of BGG-002


Photographs of H-Ft-001

Figure 6-3: Results of the Pre-disturbance Survey showing Newly Identified Heritage Resources



Plan 4: Results of the Pre-disturbance Survey

6.3. Socio-economic Setting

This section provides a brief overview of the socio-economic context[6] within which the Project is located to enable an assessment of the potential social benefits arising from the Project and to compare identified benefits again the heritage impacts (refer to Section 12.1) in compliance with the requirements of the SAHRA Minimum Standards. This section is informed by data from Wazimap[7] (2017) and the Integrated Development Plan (IDP) from the MLM (2020) and FDDM (2020).

As of the 2011 Census, the Free State Province had a population of 2 745 590 people, which accounts for approximately 5.3% of the population of South Africa (Wazimap, 2017). In terms of population size, the Free State is the second smallest province and the fourth largest in terms of land area. The Free State includes four district municipalities and one additional metropolitan municipality. Of these municipalities, FDDM is the second largest in terms of population size. The FDDM includes 488 035 people and accounts for 17.8% of the population of the province. The FDDM includes four local municipalities, of which the MLM is the second smallest in terms of population. This population includes 149 107 people, or 30.6% of the population of the district municipality.

The MLM includes 21 wards. The Project is located in Wards 18 and 19 of the MLM. Ward 18 comprises a mix of urban and rural land. The ward includes part of the Vaalpark community, the Vaal racecourse and farming land. Ward 19 is rural and is predominantly made of farming land. The ward includes mining operations (coal and sand) and includes the Lethabo Power Station.

Table 6-4 presents an overview of the employment status within the regional study area.

[6] For a more detailed description of the socio-economic baseline condition and analysis of the positive and negative social impacts arising from the Project, refer to the Social Impact Assessment (SIA) compiled in support of the EIA.

[7] These data were used because Wazimap realigns the 2011 data captured and presented by Statistics South Africa (2011) with new municipal boundaries used in the 2016 Municipal Elections (Open Up, 2017). This report uses the Census 2011 data as data from the 2016 Community Survey are not yet available at ward level.

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

Statistics (Census 2011)	Ward 18		Ward 19		MLM		FDDM	
	No.	%	No.	%	No.	%	No.	%
Total Population	4 570	-	7 553	-	149 107	-	488 035	-
Working Age (18-64)	3 197	70	4 909	65	96 166	64.5	295 524	60.6
Employed	2 404	52.6	2 166	28.7	44 261	29.7	117 732	24.1
Discouraged Work Seeker	23	0.5	85	1.1	3 008	2	13 687	2.8
Unemployed	144	3.2	1 594	21.1	20 948	14	60 344	12.4
Other not economically active	820	17.9	1 466	19.4	35 146	23.6	129 445	26.5

Adapted from Wazimap (2017)

As per the MLM IDP (2020), the unemployment rate for the working population is 32.1% and 41.6% for the youth. In FDDM (2020), the unemployment rate is 34% and 44.6% respectively. Unemployment and for the reduction thereof were highlighted as an issue by several communities in the public consultations undertaken as part of the IDP consultation process. (FDDM, 2020; MLM, 2020)

The rate of unemployment may be increased as a result of the Coronavirus Disease 2019 (COVID-19) global pandemic and associated restrictions implemented by the South African Government in response from March 2020, despite the implementation of grants by the South African Government aimed to counter the loss of income and/or employment (FDDM, 2020; MLM, 2020).

Within the FDDM, the sectors contributing the largest proportions of unemployment include private households (17.6%), community and social (17.1%) and primary industry (agriculture, hunting and forestry) (16.2%) (FDDM, 2020). The FDDM IDP indicates the main economic sectors within the MLM are manufacturing, retail and community services. Mining is significant within other local municipalities in the FDDM, specifically the Moqhaka and Ngwathe Local Municipalities.

7. Impact Assessment

This section presents a description of the CS of identified heritage resources informed through primary and secondary data collection. The CS 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 CS of the 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 CS and other values described in Section 3(3) of the NHRA.

During the pre-disturbance survey, two categories of heritage resources were recorded. These include two burial grounds and graves and a historical artefact.

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

Table 7-1: CS 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[8]
BGG-001 BGG-002	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[9]	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). Should Project redesign not be feasible, a Grave Relocation Process (GRP) may need to be considered.
H-ft-001	Historical feature	3 This resource represents a degree of technical skill that is uncommon within this region.	3 Although not linked directly to a specific event, this resource potentially represents events in the historical period not commonly represented in this region.	3 This resource presents information potential and demonstrates principles that are rarely encountered in the region.	2 This heritage resource is unlikely to be of importance to specific communities, although it represents a general period of time.	1 The fabric of the resource is preserved; however, there is limited information potential provided by the resource and extensive encroachment on the setting as this resource is unlikely to be *in situ*.	3 Negligible	General Protection IV C	Resources under general protection in terms of NHRA Sections 34 to 37 with negligible significance.	Sufficiently recorded, no mitigation required.

[8] Please note: this recommended mitigation refers to the minimum mitigation requirements as encapsulated in the NHRA. Project-specific mitigation measures are presented in Sections 7.2 to 7.4.

[9] The recommended field rating designates the level of governance associated with the resource. In this instance, the SAHRA Burial Grounds and Graves (BGG) 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 Impact Assessment

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 Clearance	Direct negative impacts to BGG-001, BGG-002 and H-ft-001.
Construction of haul road	The potential for impact will depend on the location and layout of the infrastructure. As the infrastructure will be mobile, Digby Wells assumes the proposed infrastructure layout is flexible and will therefore be placed so as to avoid impacts to heritage resources.
Establishment of the mobile office and associated infrastructure	
Establishment of the hydrocarbon storage tank and refuelling area.	

Section 7.2.1 presents these potential impacts in more detail.

7.2.1. Impact Description

The heritage resources BGG-001 and BGG-002 occur within the proposed mining footprint areas. As such, these resources may be directly impacted through the proposed sand mining activities. As indicated in Section 7.1 above, BGG-001 and BGG-002 are considered to have very high CS. This section groups the heritage resources according to their CS and, as such Table 7-3 presents a summary of the potential impact to the two identified burial grounds.

H-Ft-001 is afforded negligible CS. The SAHRA Minimum Standards recommend that heritage resources with negligible CS require no additional mitigation and their inclusion into an HIA is considered to be sufficient in terms of recording these resources. The inclusion of H-Ft-001 in this report in Figure 6-3 and Table 6-3 is adequate to meet these requirements. Digby Wells has therefore not assessed the impacts to this heritage resource.

Table 7-3: Summary of the potential direct impact to Resources of Very High CS

<table>
<tr><th colspan="5">IMPACT DESCRIPTION: Direct impact to Heritage Resource BGG-001 and BGG-002</th></tr>
<tr><th>Dimension</th><th>Rating</th><th colspan="3">Motivation</th></tr>
<tr><td colspan="5">PRE-MITIGATION</td></tr>
<tr><td>Duration</td><td>Permanent (7)</td><td>Unmitigated change will result in permanent damage to the heritage resources.</td><td rowspan="4">Consequence: Extremely detrimental (-21)</td><td rowspan="5">Significance: Major – negative (-147)</td></tr>
<tr><td>Extent</td><td>International (7)</td><td>Damage to these resources could potentially have an international effect in terms of Copper Sunset's reputation (which could have a knock-on effect in terms of investment) and NoK could potentially reside outside South Africa.</td></tr>
<tr><td>Intensity x type of impact</td><td>Extremely high - negative (-7)</td><td>Damage or destruction would constitute a major change to resources of very high CS.</td></tr>
<tr><td>Probability</td><td>Certain (7)</td><td colspan="2">Given the location of the heritage resource within the proposed sand mining footprint, it is certain that these heritage resources will be directly impacted without mitigation measures being implemented.</td></tr>
<tr><td colspan="5">MITIGATION:</td></tr>
<tr><td colspan="5">Copper Sunset must implement the following mitigations:
Amendment of the Project design to avoid the potential negative impact to the heritage resources;
This Project redesign must include a 100 m no-go buffer zone around the heritage resource; and
The development and implementation of an HSMP. Should Copper Sunset have an established HSMP for the existing operation, the current HSMP must be updated to include BGG-001 and BGG-002.
Digby Wells recommends Copper Sunset implements this option and the post-mitigation impact assessment considers this mitigation strategy.
Where Project redesign and in situ conservation is not feasible based on the current mining operations and location of the sand resources:</td></tr>
</table>

<table>
<tr><th colspan="5">IMPACT DESCRIPTION: Direct impact to Heritage Resource BGG-001 and BGG-002</th></tr>
<tr><th>Dimension</th><th colspan="2">Rating</th><th colspan="2">Motivation</th></tr>
<tr><td colspan="5">• Heritage mitigations must be undertaken in accordance with the requirements of the NHRA and the NHRA Regulations.
• Such mitigations may include a Burial Grounds and Graves Consultation (BGGC) process to assess whether a GRP (which must be undertaken in accordance with Section 36 of the NHRA and Chapters IX and XI of the NHRA Regulations) is feasible.</td></tr>
<tr><td colspan="5">POST-MITIGATION</td></tr>
<tr><td>Duration</td><td colspan="2">Beyond project life (6)</td><td>Should the recommended mitigation measures be put into place (i.e., the in situ conservation and management of the resources through an HSMP), the benefits may continue after the Project is complete.</td><td rowspan="4">Consequence: Highly beneficial (14)</td><td rowspan="4">Significance: Moderate – positive (84)</td></tr>
<tr><td>Extent</td><td colspan="2">Local (3)</td><td>The in situ conservation and management will affect most of the heritage resources within the Project area.</td></tr>
<tr><td>Intensity x type of impact</td><td colspan="2">High - positive (5)</td><td>In situ conservation and management would constitute a minor change to resources of Very High CS.</td></tr>
<tr><td>Probability</td><td colspan="2">High Probability (6)</td><td colspan="2">Should Copper Sunset implement the mitigations effectively, it is most likely that the anticipated benefits will manifest.</td></tr>
</table>

7.3. Operational Phase

Table 7-4 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 7-4: Interactions and Impacts of Operational Phase Activities

Interaction	Impact
Operation of mobile machinery to extract resources.	Digby Wells envisages no additional impact to the cultural heritage landscape, given the nature of the proposed activities and their intended location within the areas disturbed through clearing and mining activities.
Operation of mobile screening plants.	
Customer trucks collecting material	

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. Where applicable, the mitigation measures implemented in the construction phase must continue into this phase (for example, the implementation of the HSMP).

7.4. Decommissioning Phase

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

Interaction	Impact
Concurrent rehabilitation: mined-out areas will be backfilled with stockpiled topsoil and waste material from the screening plant.	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. Should any infrastructure intended for demolition increase in age to older than 60 years during the Project lifecycle, the structure must be considered a heritage structure. Any alterations to these structures will be subject to a NHRA Section 34 permit application process
Backfilled material will be levelled and contoured to avoid ponding of water.	
Revegetation: either naturally or through use of an indigenous seed mix where vegetation is not suitably established.	

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. Where any structures[10] within the MRA are older than 60 years old, these must not be destroyed or altered without the correct permit issued in terms of Section 34 of the NHRA.

[10] This includes an existing Anglo mining shaft within the MRA. This shaft does not appear on the historical imagery and is assumed to be currently less than 60 years old. Should the structure exceed 60 years of age during the Project lifecycle, this structure will be afforded general protection under Section 34 of the NHRA and cannot be altered or destroyed without the appropriate permit.

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 Free State province requires consideration to identify the possible in-combination effects of various impacts to known heritage resources. Table 7-6 presents a summary of the possible cumulative impacts of the Project.

Table 7-6: Summary of Potential Cumulative Impacts

Type	Cumulative Impact	Direction of Impact	Extent of Impact
Space-crowding	The proposed Project will add to the existing landscape associated with mining activities characterising the area immediately surrounding the proposed Project area and further afield. The implementation of the Project will result in a loss of the area within which heritage resources can exist.	Negative	Local

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 Copper Sunset in terms of implementation of the Project. These two aspects are discussed separately.

Section 6.1 describes the heritage resources identified by Digby Wells within the Project area. This list is, however, not an exhaustive list of all heritage resources within the Project area. If heritage resources are subsequently identified, and where Copper Sunset knowingly does not take proactive management measures, potential risks to Copper Sunset may include litigation in terms of Section 51 of the NHRA and social or reputational repercussions. Table 7-7 presents a summary of the primary risks that may arise for Copper Sunset.

Table 7-7: Identified Heritage Risks that may arise for Copper Sunset

Description	Primary Risk
Heritage resources with a high CS 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 HFS and/or SAHRA in terms of Section 38(8) of the NHRA.

Description	Primary Risk
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 HFS.	• Fines; • Penalties; • Seizure of Equipment; • Compulsory Repair / Cease Work Orders; and • Imprisonment.

If additional heritage resources are identified during the implementation of Project-related activities (with specific reference to the clearing of land and topsoil and the extraction of the sand resource), potential risks to those heritage resources will need to be assessed. Table 7-8 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 7-8: Identified Unplanned Events and Associated Impacts

Unplanned event	Potential impact	Mitigation Strategy
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 CFP 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 protected under Section 36 of the NHRA.	
Accidental exposure of human remains during the implementation of the Project.		

8. Environmental Management Programme

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 Plan

Activity/ies	Potential Impacts	Aspects Affected	Phase	Mitigation Measure	Mitigation Type	Time period for implementation
• Construction activities as described in Table 2-2	Damage to or destruction of BGG-001 and BGG-002	Cultural Heritage	Construction	• Project redesign to avoid the heritage resource and implement a 100 m no-go buffer zone around the resource. • Develop or update and implement HSMP.	***Avoid***	Before the commencement of the Project
• All Project activities as described in Table 2-2	Damage to or destruction of previously unidentified heritage resources.	Cultural Heritage	Construction and operation	• 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 include a monitoring programme.

10. Consultation and Results from Stakeholder Engagement

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 consultation was undertaken as part of this assessment. Should any I&AP comments be submitted in relevance to heritage resources during the PPP, these will be considered in the final HIA or EIA report.

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. No such informal consultation was undertaken as part of this assessment.

11. Recommendations

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

- The avoidance of impacts to BGG-001 and BGG-002 through amending the Project design to avoid the heritage resources and implement a 100 m no-go buffer zone around each of the identified graves:
- Where this option is implemented and the impact to these resources is avoided, Copper Sunset must develop and implement an HSMP or amend an existing HSMP to include these resources for *in situ* conservation; or

- Where Project design amendments are not feasible, Copper Sunset will need to embark on a consultation process to assess whether a GRP is feasible; and
- The mitigation of potential direct impacts against previously unidentified heritage resources and where Copper Sunset has not done so already, Copper Sunset must develop and implement a CFP prior to the commencement of Project activities. This CFP must be approved by the HRAs prior to implementation.

12. Reasoned Opinion Whether Project Should Proceed or Not

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.

12.1. Socio-economic Benefit versus Heritage Impacts

Based on a review of the applicable planning documents and available socio-economic data detailed in Section 6.3 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; and
- The Project will extend the LoM of the operation and will therefore increase the security of long-term employment of current employees (where no additional long-term employment opportunities are created) and the continued contribution to the local economy.

13. 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 CS;
- 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 12 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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Appendix A: Glossary

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 (CS)	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. 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. Any removal or destruction of trees, or removal of vegetation or topsoil.
Early Farming Community/ies	The first Farming Communities (also known as Early Iron Age) that appear in the southern archaeological record during the early first millennium CE. The EFC period is generally dated from c. 200 CE to 1000 CE.
Early Stone Age	The South African ESA dates from ~3 Mya to c. 250 Kya. This period is associated with later *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.

Term	Definition
Farming Community/ies	Term signifying the appearance in the southern African archaeological of Bantu-speaking agricultural based societies from the early first millennium CE. The term replaces the *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. 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. Public monuments and memorials.
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.

Term	Definition
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 300m in length. Construction of a bridge or similar structure exceeding 50 m in length. Any activity which will change the character of a site exceeding 0.5 hectares in extent or involving three or more existing erven or subdivisions thereof or that have been consolidated within the past five years or costs of which will exceed a sum set in terms of regulations by SAHRA or a provincial heritage resources authority. Re-zoning of a site exceeding one hectare in extent. Any other category of development provided for in regulations by SAHRA or a provincial heritage resources authority.
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 or Communities	Farming Communities who either developed / evolved from EFC groups, or who migrated into southern African from the late first millennium / early second millennium CE. The LFC period evidences distinct changes in socio-political organisation, settlement patterns, trade and economic activities, including extensive trade routes. The LFC period is generally dated from c. 1000 CE well into the modern historical period of the nineteenth century.
Late Stone Age	The South African LSA dates from ~30 Kya. This period is associated with modern *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.

Term	Definition
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.
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. 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).

Term	Definition
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.
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).

Term	Definition
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.
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.

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Appendix B: Specialist CV

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

DIGBY WELLS
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Cultural Significance, Field Rating and Impact Assessment

Methodology Statement

Project Number:

ZZZ9999

Prepared for:

Internal Document

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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.

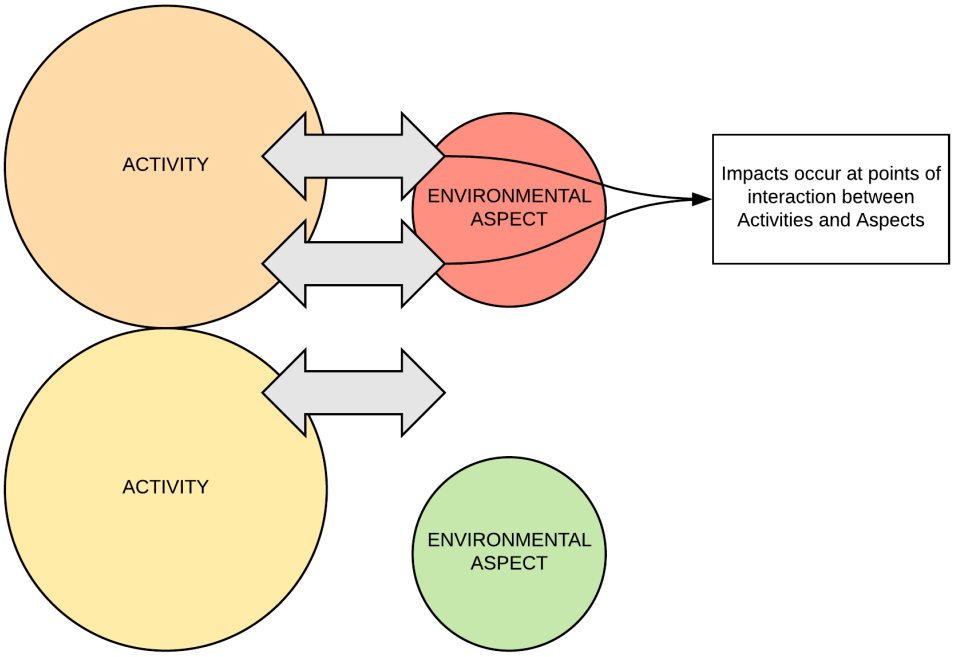

Figure 3-1: Graphical Representation of Impact Assessment Concept

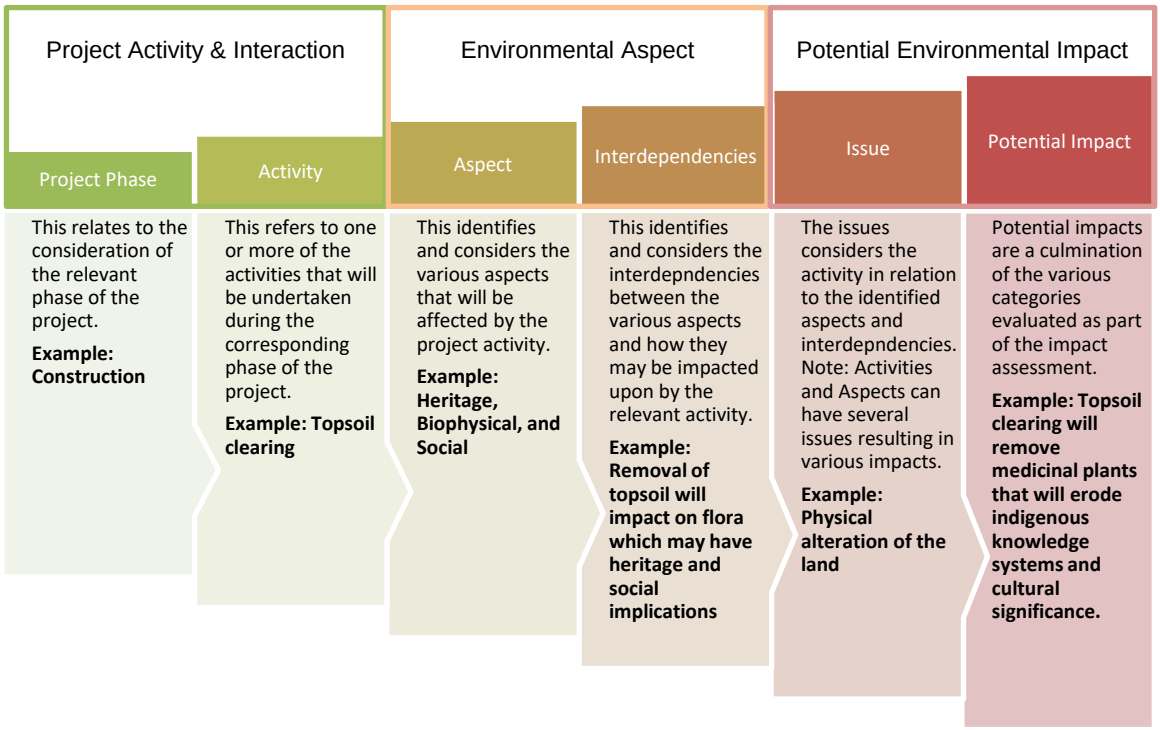

Figure 3-2: Example of how Potential Impacts are considered

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

Significance

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

Consequence

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.