HERITAGE SCOPING REPORT, FOR INCLUSION IN THE BASIC ASSESSMENT REPORT FOR THE PROPOSED ANKER ELANDSFONTEIN COLLIERY PROJECT, WITBANK, EMALAHLENI LOCAL MUNICIPALITY, MPUMALANGA PROVINCE

Issue Date: 26 September 2019, revised 3 February 2020

Revision No.: 0.1

Project No.: 429HIA

PGS HERITAGE

+ 27 (0) 12 332 5305 | +27 (0) 86 675 8077 | contact@pgsheritage.co.za | PO Box 32542, Totiusdal, 0134

Offices in South Africa, Kingdom of Lesotho and Mozambique

Head Office:
906 Bergarend Streets
Waverley, Pretoria,
South Africa

Directors: HS Steyn, PD Birkholtz, W Fourie

Declaration of Independence

- I, Jennifer Kitto, declare that –
- General declaration:
- I act as the independent heritage practitioner 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 heritage impact assessments, 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 will take into account, to the extent possible, the matters listed in section 38 of the NHRA when preparing the application and any report relating to the application;
- 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;
- I will ensure that information containing all relevant facts in respect of the application is distributed or made available to interested and affected parties and the public and that participation by interested and affected parties is facilitated in such a manner that all interested and affected parties will be provided with a reasonable opportunity to participate and to provide comments on documents that are produced to support the application;
- I will provide the competent authority with access to all information at my disposal regarding the application, whether such information is favourable to the applicant or not
- All the particulars furnished by me in this form are true and correct;
- I will perform all other obligations as expected from a heritage practitioner in terms of the Act and the constitutions of my affiliated professional bodies; and
- I realise that a false declaration is an offence in terms of regulation 71 of the Regulations and is punishable in terms of section 24F of the NEMA.

Disclosure of Vested Interest

- I do not have and will not have any vested interest (either business, financial, personal or other) in the proposed activity proceeding other than remuneration for work performed in terms of the Regulations;

HERITAGE CONSULTANT: PGS Heritage (Pty) Ltd

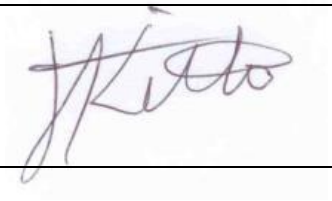
CONTACT PERSON: Project Manager – Heritage Specialist

Tel: +27 (0) 12 332 5305

Email: jennifer@pgsheritage.co.za

SIGNATURE: 

ACKNOWLEDGEMENT OF RECEIPT

Report Title	***Heritage Scoping Report for inclusion in the Basic Assessment report for the Proposed Anker Elandsfontein Colliery Project, Witbank, Emalahleni Local Municipality, Mpumalanga Province***		
Control	**Name**	**Signature**	**Designation**
Author	**J Kitto**		**PGS Heritage Specialist/ Principal Investigator**
Reviewed	**J von Mayer**		**EIMS**

CLIENT: Environmental Impact Assessment Services (EIMS) / Geo Soil & Water

CONTACT PERSON: John von Mayer
Tel: (011) 789 7170
Email: john@eims.co.za

SIGNATURE: _____

The heritage impact assessment report has been compiled considering the NEMA Appendix 6 requirements for specialist reports as indicated in the table below.

NEMA Regs (2014, amended 2017) - Appendix 6	Relevant section in report
Details of the specialist who prepared the report	Page 2 of Report – Contact details and company
The expertise of that person to compile a specialist report including a curriculum vita	Section 1.2
A declaration that the person is independent in a form as may be specified by the competent authority	Page ii of the report
An indication of the scope of, and the purpose for which, the report was prepared	Section 1.1
The date and season of the site investigation and the relevance of the season to the outcome of the assessment	Section 3.1
A description of the methodology adopted in preparing the report or carrying out the specialised process	Section 3.1
The specific identified sensitivity of the site related to the activity and its associated structures and infrastructure	Section 6
An identification of any areas to be avoided, including buffers	N/A at this stage
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;	N/A at this stage
A description of any assumptions made and any uncertainties or gaps in knowledge;	Section 1.3
A description of the findings and potential implications of such findings on the impact of the proposed activity, including identified alternatives, on the environment	Section 6
Any mitigation measures for inclusion in the EMPr	N/A at this stage
Any conditions for inclusion in the environmental authorisation	N/A at this stage
Any monitoring requirements for inclusion in the EMPr or environmental authorisation	N/A at this stage
A reasoned opinion as to whether the proposed activity or portions thereof should be authorised and	Section 8
If the opinion is that the proposed activity 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	
A description of any consultation process that was undertaken during the course of carrying out the study	Not applicable. A public consultation process will be handled as part of the EIA and EMP process.
A summary and copies if any comments that were received during any consultation process	Not applicable. To date no comments regarding heritage resources that require input from a specialist have been raised.
Any other information requested by the competent authority.	Not applicable.

Executive Summary

PGS Heritage (Pty) Ltd was appointed by Environmental Impact Management Services (Pty) Ltd, to undertake a Heritage Scoping Report (HSR) that forms part of the Basic Assessment for the proposed Anker Elandsfontein Colliery Project, situated close to Witbank within the Emalahleni Local Municipality, Mpumalanga Province.

The heritage scoping report has shown that the proposed project will have an impact on heritage resources within the expansion area.

The HIA identified various heritage resources within the study area of which the burial grounds and graves and the palaeontology could be rated as having a Moderate to High heritage significance and would require mitigation measures before the project can commence. Three sites comprising historical/recent structures were identified which could be rated as having a Low heritage significance and would not require mitigation measures.

Burial Grounds and Graves

If any of the eight burial grounds will be impacted directly by the planned mining activities, they. must be relocated after completion of a detailed grave relocation process, that includes a thorough stakeholder engagement component, adhering to the requirements of s36 of the NHRA and its regulations as well as the National Health Act ad its regulation. Any graves or burial grounds that will not be impacted must be avoided and retained in situ with a buffer zone of 100m.

Historical/Recent Structures

Three sites containing structures were identified. None of these structures is likely to be 60 years or older and therefore no mitigation measures are required.

Palaeontology

The geology of the proposed Elandsfontein Colliery, Emalahleni Local Municipality, Nkangala District Municipality, Mpumalanga Province is primarily underlain by the Vryheid Formation (Ecca Group), and a small portion in the Dwyka Group (Figure 3). According to the PalaeoMap of South African Heritage Resources Information System the Palaeontological Sensitivity of the Vryheid Formation is Very High, while the Dwyka Group has a Moderate Palaeontological Sensitivity (Almond and Pether 2008, SAHRIS website).

It is thus recommended that an EIA level palaeontology report should be conducted to assess the value and prominence of fossils in the development area and the effect of the proposed development on the palaeontological heritage. The purpose of the EIA Report is to elaborate on the issues and potential impacts identified during the scoping phase. A Phase 1 field-based assessment would be conducted with research in the site-specific study area as well as a comprehensive assessment of the impacts identified during the scoping phase.

General

The combined considered opinion of the heritage specialists is that the potential impacts on identified heritage resources could be mitigated sufficiently to allow the project to continue. However, this will require confirmation at the EIA level.

TABLE OF CONTENT

List of Figures

List of Appendices

TERMINOLOGY AND ABBREVIATIONS

Archaeological resources

This includes:

- material remains resulting from human activity which are in a state of disuse and are in or on land and which are older than 100 years including artefacts, human and hominid remains and artificial features and structures;
- rock art, being any form of painting, engraving or other graphic representation on a fixed rock surface or loose rock or stone, which was executed by human agency and which is older than 100 years, including any area within 10m of such representation;
- wrecks, being any vessel or aircraft, or any part thereof, which was wrecked in South Africa, whether on land, in the internal waters, the territorial waters or in the maritime culture zone of the republic as defined in the Maritimes Zones Act, and any cargo, debris or artefacts found or associated therewith, which is older than 60 years or which SAHRA considers to be worthy of conservation;
- features, structures and artefacts associated with military history which are older than 75 years and the site on which they are found.

Cultural significance

This means aesthetic, architectural, historical, scientific, social, spiritual, linguistic or technological value or significance

Development

This means any physical intervention, excavation, or action, other than those caused by natural forces, which may in the opinion of the 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 in 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 boards;
- any change to the natural or existing condition or topography of land; and
- any removal or destruction of trees, or removal of vegetation or topsoil

Early Stone Age

The archaeology of the Stone Age between 700 000 and 2 500 000 years ago.

Fossil

Mineralised bones of animals, shellfish, plants and marine animals. A trace fossil is the track or footprint of a fossil animal that is preserved in stone or consolidated sediment.

Heritage

That which is inherited and forms part of the National Estate (historical places, objects, fossils as defined by the National Heritage Resources Act 25 of 1999).

Heritage resources

This means any place or object of cultural significance and can include (but not limited to) as stated under Section 3 of the NHRA,

- 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, and
- sites of significance relating to the history of slavery in South Africa;

Holocene

The most recent geological time period which commenced 20 000 years ago.

Late Stone Age

The archaeology of the last 30 000 years associated with fully modern people.

Late Iron Age (Early Farming Communities)

The archaeology of the last 1000 years up to the 1800's, associated with iron-working and farming activities such as herding and agriculture.

Middle Stone Age

The archaeology of the Stone Age between 20 000-300 000 years ago, associated with early modern humans.

Palaeontology

Any fossilised remains or fossil trace of animals or plants which lived in the geological past, other than fossil fuels or fossiliferous rock intended for industrial use, and any site which contains such fossilised remains or trace.

Abbreviations	Description
AIA	Archaeological Impact Assessment
ASAPA	Association of South African Professional Archaeologists
CRM	Cultural Resource Management
DEA	Department of Environmental Affairs
DWS	Department of Water and Sanitation
ECO	Environmental Control Officer
EIA practitioner	Environmental Impact Assessment Practitioner
EIA	Environmental Impact Assessment
ESA	Early Stone Age
GPS	Global Positioning System
HIA	Heritage Impact Assessment
HSR	Heritage Scoping Report
I&AP	Interested & Affected Party
LSA	Late Stone Age
LIA	Late Iron Age
MSA	Middle Stone Age
MIA	Middle Iron Age
NEMA	National Environmental Management Act
NHRA	National Heritage Resources Act
PHRA	Provincial Heritage Resources Authority
PSSA	Palaeontological Society of South Africa
SADC	Southern African Development Community
SAHRA	South African Heritage Resources Agency

1. Introduction

PGS Heritage (Pty) Ltd (PGS) was appointed by Environmental Impact Management Services (Pty) Ltd (EIMS), to undertake a Heritage Scoping report (HSR) that forms part of the Basic Assessment process for the proposed Anker Elandsfontein Colliery project.

This report constitutes the Scoping study component for the Heritage Impact Assessment (HIA) to inform the EIA and EMPr to be completed in terms of the MPRDA and Section 24 of the National Environmental Management Act, 1999 (Act No. 107 of 1999) (NEMA).

The aim of the study is to identify possible heritage sites and finds that may occur in the proposed development area. The HIA aims to assist the developer in managing the discovered heritage resources in a responsible manner, in order to protect, preserve, and develop them within the framework provided by the National Heritage Resources Act (Act 25 of 1999) (NHRA).

1.1 Project Background

Fraser Alexander established the Elandsfontein Colliery during the early 1980s. During this period, there were no legislative requirements for the application of a Mining Licence or Right in terms of the national regulatory framework as the Mining Rights Act of 1967 did not apply to base minerals. All mining activities during this period, up to the promulgation of the Minerals Act, 1991 (Act No. 51 of 1991) (Minerals Act), were unregulated particularly as far as environmental measures were concerned. Subsequent to the declaring the Minerals Act the government required the owners of mines to obtain authorisations and prepare an EMPr for their operation.

Fraser Alexander sold the Elandsfontein Colliery to Anker Coal in 1997. The Department of Mineral Resources (DMR) approved the Elandsfontein Operations EMPr in terms of the Minerals Act, 1991 (Act No. 51 of 1991) on 11 October 1999. Subsequent to this authorisation, the DMR issued two new order mining rights for various portions of the farm Elandsfontein 309 JS. This comprised MP314MR and MP63MR.

2. Document Structure

This report has been compiled in accordance with the EIA Regulations, 2014 (Government Notice (GN) R982). A summary of the report structure, and the specific sections that correspond to the applicable regulations, is provided in Table 1 below.

Table 1: Report Structure

Environmental Regulation	Description	Section in Report
NEMA EIA Regulations 2014 (as amended)		
Appendix 6 (1)(a):	Details of – (i) the specialist who prepared the report; and (ii) the expertise of that specialist to compile a specialist report including a curriculum vitae;	Section 3 Appendix A
Appendix 6 (1)(b):	a declaration that the specialist is independent in a form as may be specified by the competent authority;	

Environmental Regulation	Description	Section in Report
Appendix 6 (1)(c):	an indication of the scope of, and the purpose for which, the report was prepared;	Section 4
Appendix 6 (1)(cA):	an indication of the quality and age of base data used for the specialist report;	N/A
Appendix 6 (1)(cB):	a description of existing impacts on the site, cumulative impacts of the proposed development and levels of acceptable change;	Section 10
Appendix 6 (1)(d):	the duration, date and season of the site investigation and the relevance of the season to the outcome of the assessment;	Section 8.4
Appendix 6 (1)(e):	a description of the methodology adopted in preparing the report or carrying out the specialised process inclusive of equipment and modelling used;	Section 7
Appendix 6(1)(f):	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;	Section 9
Appendix 6(1)(g):	an identification of any areas to be avoided, including buffers;	
Appendix 6(1)(h):	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;	Section 9
Appendix 6(1)(i):	a description of any assumptions made and any uncertainties or gaps in knowledge;	Section 14
Appendix 6(1)(j):	a description of the findings and potential implications of such findings on the impact of the proposed activity or activities;	Sections 8.2, 8.3, 8.4
Appendix 6(1)(k):	any mitigation measures for inclusion in the EMPr;	Section 10 and 11
Appendix 6(1)(l):	any conditions for inclusion in the environmental authorisation;	N/A, scoping phase
Appendix 6(1)(m):	any monitoring requirements for inclusion in the EMPr or environmental authorisation;	N/A, scoping phase
Appendix 6(1)(n):	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;	N/A, scoping phase

Environmental Regulation	Description	Section in Report
Appendix 6(1)(o):	a description of any consultation process that was undertaken during the course of preparing the specialist report;	N/A, scoping phase
Appendix 6(1)(p):	a summary and copies of any comments received during any consultation process and where applicable all responses thereto; and	N/A at this stage
Appendix 6(1)(q):	any other information requested by the competent authority.	Not applicable

3 Specialist Details

The staff at PGS has a combined experience of nearly 70 years in the heritage consulting industry. PGS and its staff have extensive experience in managing HIA processes. PGS will only undertake heritage assessment work where they have the relevant expertise and experience to undertake that work competently.

Wouter Fourie, the Project Coordinator, is registered with the Association of Southern African Professional Archaeologists (ASAPA) as a Professional Archaeologist and is accredited as a Principal Investigator; he is further an Accredited Professional Heritage Practitioner with the Association of Professional Heritage Practitioners (APHP).

Jennifer Kitto, author of this report and Heritage Specialist, has 18 years' experience in the heritage sector, a large part of which involved working for a government department responsible for administering the National Heritage Resources Act, No 25 of 1999. She is therefore well-versed in the legislative requirements of heritage management. She holds a BA in Archaeology and Social Anthropology and a BA (Hons) in Social Anthropology.

Linereè de Jager, the Archaeologist, is a qualified archaeologist and anthropologist. She holds a BA (Hons) degree in Archaeology from the University of South Africa (Unisa) Since working for PGS she has specialised in the relocation of numerous informal burial grounds in South Africa and Mozambique and she has conducted various archaeological surveys, monitoring and mitigations. She is a registered Professional Archaeologist with the Association of Southern African Professional Archaeologists (ASAPA) with CRM accreditation as Field Supervisor in Stone Age, Iron Age and Grave Relocation and Field Director in Grave Relocation.

See Appendix B for the curriculum vitae of the specialist team.

4 Terms of Reference

i. Heritage and Paleontology Scoping and EIA specialist reports.

   The scope of work and report contents will be in line with the proposal submitted by PGS to EIMS on 6 August 2019 (Ref QU-14049).

ii. The Sub-Contracted Services shall be rendered at the following Site(s): New areas for the Elandsfontein Coal Mine project, Mpumalanga Province, Mining Rights: MR314 and MR63.

5 Project Description

5.1 Site Location and Description

The proposed project is located on a portion of the remaining extent of portion 8; remaining extent of portion 1; a portion of the remaining extent of portion 6; portion 44; portion 14 and the remaining extent of portion 7 of the Farm Elandsfontein 309 JS, located in Emalahleni Local Municipality, Nkangala District Municipality, Mpumalanga Province. The site is ~4km south of Kwa-Guqa and ~16k west of Emalahleni. The centre point of the site is 25°53'05.01"S and 29°05'36.57"E.

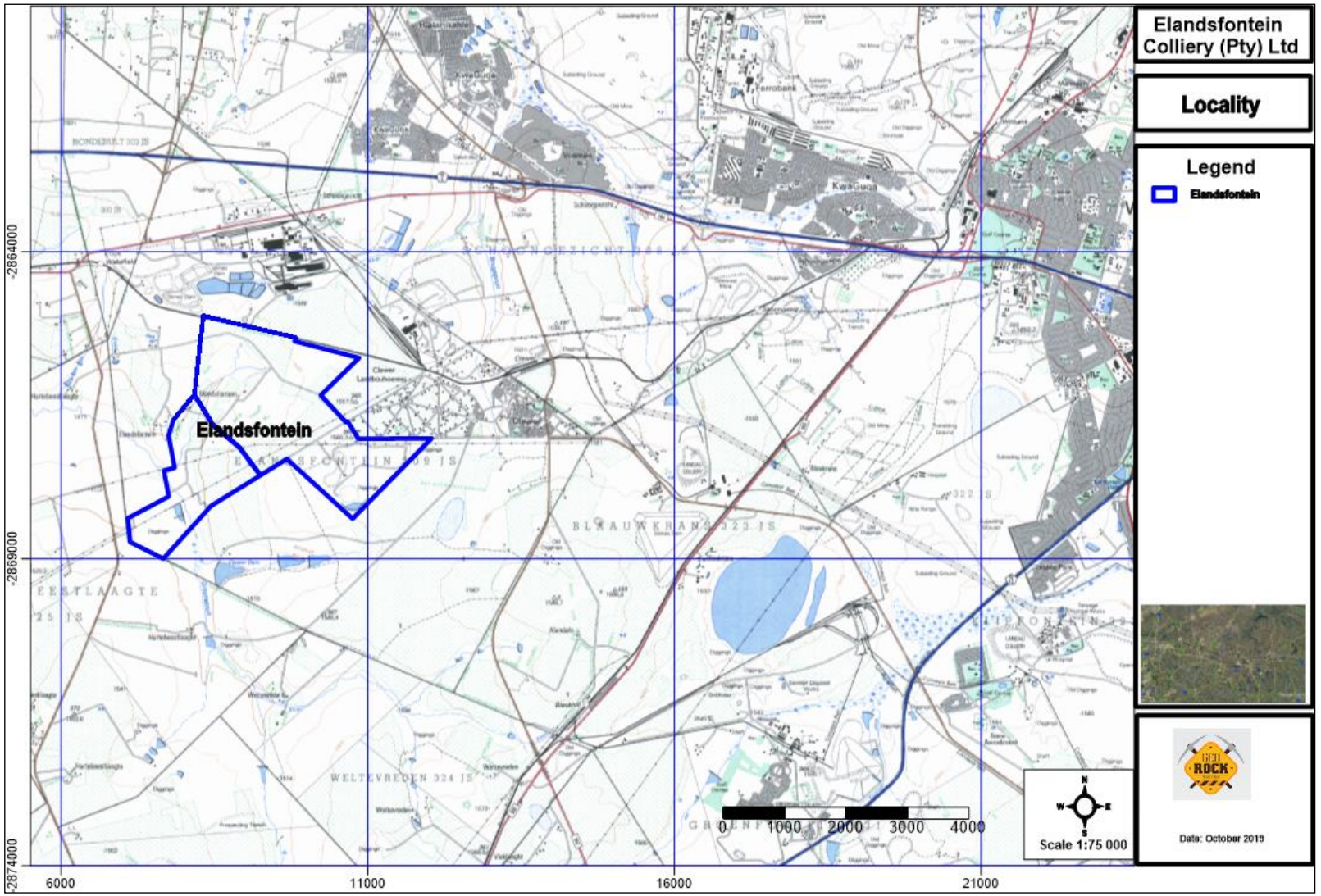


Figure 1: Study area location (provided by EIMS/ GeoSoil and Water)

5.2 Project History

Elandsfontein Colliery is an existing mine with opencast and underground sections. It produces coal for the local and the export market, at a rate of 500 000 t/annum. Coal has been produced from the No. 1 Seam (underground bord and pillar operation) and an opencast operation on the No. 4 Seam and on the No. 2 Seam.

During the last quarter of 1997 Anker Coal and Mineral Holdings South Africa (Pty) Ltd (ACMHSA) acquired the mine from Fraser Alexander and operated it under the name of Elandsfontein Colliery (Pty) Ltd. A second inclined shaft was developed into the No. 1 Seam and an additional washing plant was commissioned to handle the increased production. Later the first plant was decommissioned. Since then ACMHSA has been taken over by Namane Resources (Pty) Ltd (Section 11 process underway).

The open pit on the No. 2 Seam is currently being mined.

The open pit on the No. 4 Seam is mined out. This Pit is approximately 64 ha in extent and between 7 and 30 m deep. Permission has been granted (Department of Water Affairs and Sanitation, Licence Number 04/B20G/CGI/3843) to fill the pit with discards. This back-filling is currently ongoing as part of the rehabilitation programme conducted by the mine.

The ROM is upgraded in the beneficiation plant.

5.3 Proposed Activities

The Elandsfontein Colliery comprises of 2 distinct mining rights (MR314 and MR63). The applicant plans to consolidate the two mining right areas into a single mining right with associated consolidated EMPR. In addition, the applicant wishes to expand their existing mining operations to include additional mineral resource areas (i.e.: new open cast & underground areas within the consolidated mining right boundary).

Elandsfontein Colliery's coal rights, which have been granted are:

MP 314 MR

- The Remaining Extent of Portion 7
- Portion of the Remaining Extent of Portion 8
- Portion 44
- Portion 14

of the farm ELANDSFONTEIN No. 309 JS and

MP 63 MR

- The Remaining Extent of Portion 1
- Portion of the Remaining Extent of Portion 8
- Portion of the Remaining Extent of Portion 6

of the farm ELANDSFONTEIN No. 309 JS.

The proposed project includes inter alia the following application processes with associated activities:

- New Integrated Environmental Authorisation and Waste Management Licence (Scoping and Environmental Impact Report (S&EIR));
- New Integrated Water Use Licence (IWUL);

- Section 102 consolidation of mining rights as well as consolidation of EMPR's into one holistic EMPR.

A revised Mine Works Programme (MWP) and supporting documents reflecting the proposed amendments will be submitted to the Department of Minerals and Energy (DME) for approval. In addition, it is proposed that the two mining rights associated with Elandsfontein Colliery will be consolidated into a single mining right and associated consolidated Environmental Management Programme (EMPR), Various water uses for existing and proposed infrastructure will be applied for through an Integrated Water Use Licence Application.

5.3.1 General Infrastructure

All infrastructure, i.e. rail siding (Oosbank), haul-roads, two inclined shafts (with relevant infrastructure), a coal washing-plant, water-control pollution measures, overhead electrical power supply to the workshop, workshop for mine equipment and an office block are in place.

5.3.2 Mining Method

The mining method will be a combination of opencast mining with a truck and shovel operation and underground mining using conventional drill and blast, board and pillar mining.

5.3.2.1 Open-Cast Mining

The following considerations are taken into account when sequencing the opencast reserve blocks:

- Access to the No. 2 Seam pits in Resource Blocks G and F is already established. Access to Block H will be developed in the north, where the historic discard dumps are.

The mine development strategy that is followed is to construct a box-cut in the north of the opencast reserve of Block H and develop cuts in a southerly direction, mining sequentially from east to west. The mining is done in a roll over operation (mining and backfilling concurrently).

5.3.2.2 Underground Mining

The following considerations are taken into account for sequencing the mining of the underground reserve:

- Access to the underground for the No. 1 Seam into Resource Block D and E will be gained from a decline to be developed from the final highwall of the opencast in Resource Block G.
- Access to the underground for the No. 1 Seam into Resource Block B and C will be gained from the old underground Hayford Shaft.
- Access to the underground for the No. 1 Seam in Resource Block A willl be gained from the existing shaft and underground workings.
- Access to the underground for the No. 1 Upper Seam in Resource Block A willl be gained from the existing No. 1 Seam workings by means of a inclined access to the No. 1 Upper Seam reserves.

The rationale for the underground mine design is to advance Section 1 to a point where mining/ventilation/transport infrastructure can be installed for Section 2 and 3.

5.3.2.3 Description of Mining Equipment and Activity

The opencast will be mined by truck and shovel operations and the underground will be mined by drill and blast sections. This mining fleet will be supported by ancillary equipment.

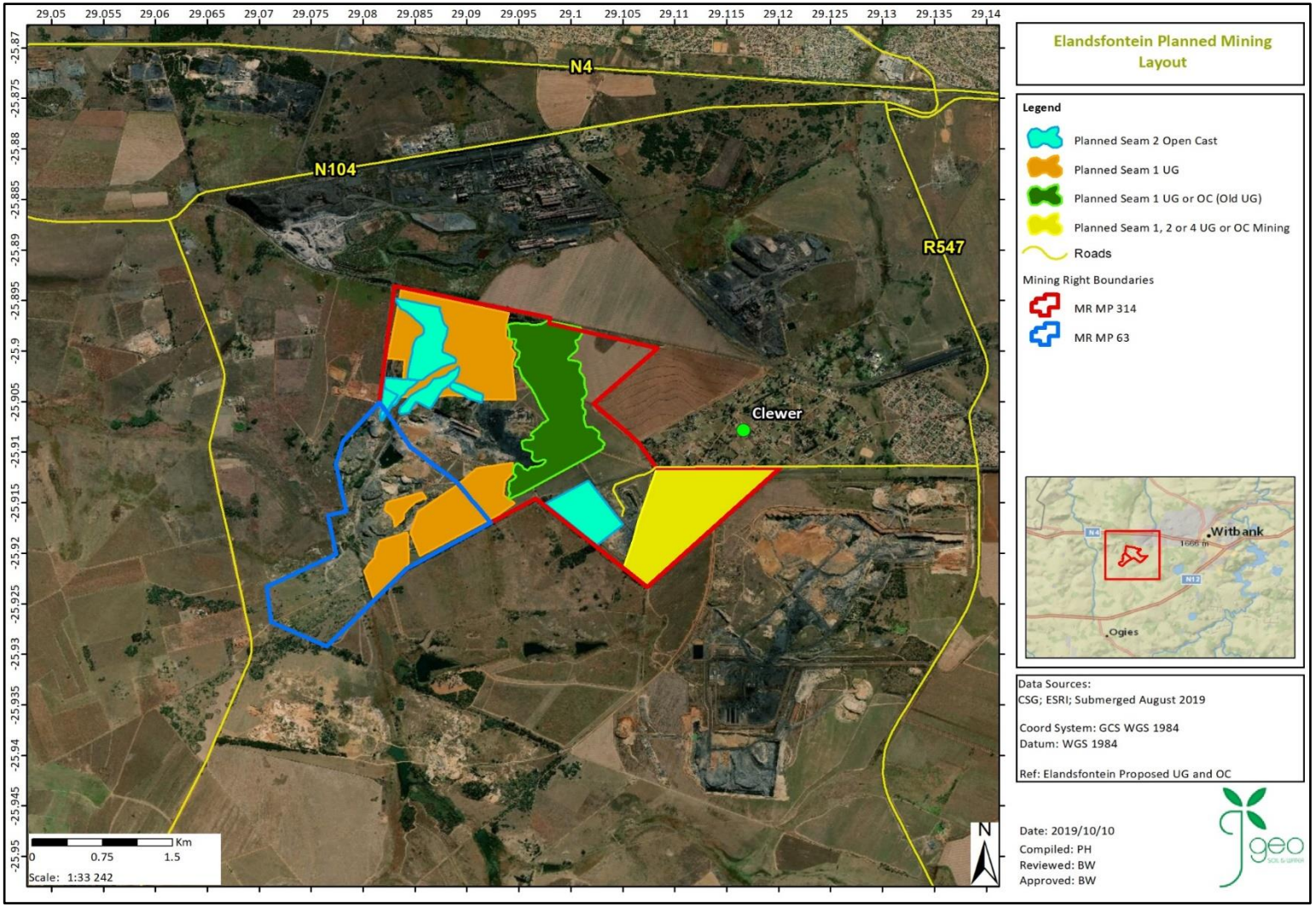


Figure 2 – Elandsfontein Planned Mining Layout, showing the two existing Mining Right boundaries (provided by EIMS/Geo Soil & Water)

6 Legislative and Policy Framework

The identification, evaluation and assessment of any cultural heritage site, artefact or find in the South African context is required and governed by the following legislation:

i. National Environmental Management Act (NEMA), Act 107 of 1998
ii. National Heritage Resources Act (NHRA), Act 25 of 1999
iii. Mineral and Petroleum Resources Development Act (MPRDA), Act 28 of 2002
iv. Development Facilitation Act (DFA), Act 67 of 1995

The following sections in each Act refer directly to the identification, evaluation and assessment of cultural heritage resources.

i. GNR 982 of 2014, as amended 2017 (Government Gazette 38282) promulgated under the (NEMA):
    a. Basic Assessment Report (BAR) – Regulations 19 and 23
    b. Environmental Scoping Report (ESR) – Regulation 21
    c. Environmental Impacts Report (EIR) – Regulation 23
    d. Environmental Management Programme (EMPr) – Regulations 19 and 23
ii. NHRA:
    a. Protection of Heritage Resources – Sections 34 to 36; and
    b. Heritage Resources Management – Section 38
iii. MPRDA Regulations of 2014:
    a. Environmental reports to be compiled for application of mining right – Regulation 48
    b. Contents of scoping report– Regulation 49
    c. Contents of environmental impact assessment report – Regulation 50
    d. Environmental management programme – Regulations 51
    e. Environmental management plan – Regulation 52
iv. The Regulations relating to the Management of Human Remains (GNR 363 of 2013 in Government Gazette 36473) promulgated under the National Health Act (Act No. 61 of 2003)
    a. Exhumation and Reburial of Human Remains - Regulations 26, 27 and 28

The NHRA stipulates that cultural heritage resources may not be disturbed without authorization from the relevant heritage authority, and that an HIA will be required if a development triggers any of the development types listed in section 38 of the NHRA. Sections 34-36 further stipulate the protections afforded to structures older than 60 years, archaeological and palaeontological sites and material and meteorites, and graves and burial grounds, as well as the process to be followed if these resources need to be disturbed.

NEMA states that an integrated EMP should, (23 -2 (b)) "…identify, predict and evaluate the actual and potential impact on the environment, socio-economic conditions and cultural heritage". In addition, the NEMA (No 107 of 1998) and the GNR 982 (Government Gazette 38282, 14 December 2014) state that, "the objective of an environmental impact assessment process is to, … identify the location of the development footprint within the preferred site … focussing on the geographical, physical, biological, social, economic, cultural and heritage aspects of the environment" (GNR 982, Appendix 3(2)(c), emphasis added). In accordance with legislative requirements and EIA rating criteria, the regulations of SAHRA and ASAPA have also been incorporated to ensure that a comprehensive legally compatible HIA report is compiled.

7 Methodology

7.1 Methodology for Assessing Heritage Site Significance

This Heritage Scoping Report (HSR) was compiled by PGS for the proposed Elandsfontein Mining Rights consolidation application. The applicable maps, tables and figures, are included as stipulated in the NHRA (no 25 of 1999), the NEMA (no 107 of 1998).

Site significance classification standards use is based on the heritage classification of s3 in the NHRA and developed for implementation keeping in mind the grading system approved by SAHRA for archaeological impact assessments.

The Heritage Scoping process consisted of three steps:

Step I – Literature Review: a high-level desktop study was undertaken to identify potential heritage resources and areas of potential heritage sensitivity.

Step II - Physical Survey: A physical survey was conducted by vehicle through the proposed project area by a team consisting of a qualified archaeologist, heritage specialist and field assistant. The survey was conducted over one day (20 November 2019) and was aimed at locating and documenting sites falling within and adjacent to the proposed mining rights footprint. The positions of the heritage resources identified were recorded by Garmin GPS and recorded photographically (Canon Powershot).

Step III – The final step involved the initial assessment of potential heritage resources in terms of the HIA criteria and report writing, as well as mapping and constructive recommendations.

The significance of heritage sites was based on four main criteria:

- Site integrity (i.e. primary vs. secondary context),
- Amount of deposit, range of features (e.g., stonewalling, stone tools and enclosures),
- Density of scatter (dispersed scatter)
    - Low - <10/50m2
    - Medium - 10-50/50m2
    - High - >50/50m2
- Uniqueness; and
- Potential to answer present research questions.

Management actions and recommended mitigation, which will result in a reduction in the impact on the sites, will be expressed as follows:
A - No further action necessary;
B - Mapping of the site and controlled sampling required;
C - No-go or relocate development activity position;
D - Preserve site, or extensive data collection and mapping of the site; and
E - Preserve site.

Impacts on these sites by the development will be evaluated as follows:

7.1.1 Site Significance

Site significance classification standards use is based on the heritage classification of s3 in the NHRA and developed for implementation keeping in mind the grading system approved by SAHRA for archaeological impact assessments. The update classification and rating system as developed by Heritage Western Cape (2016) is implemented in this report

Site significance classification standards prescribed by the Heritage Western Cape Guideline (2016), were used for the purpose of this report (**Table 2** and **Table 3**).

Table 2: Rating system for archaeological resources

Grading	Description of Resource	Examples of Possible Management Strategies	Heritage Significance
I	Heritage resources with qualities so exceptional that they are of special national significance. Current examples: Langebaanweg (West Coast Fossil Park), Cradle of Humankind	May be declared as a National Heritage Site managed by SAHRA. Specific mitigation and scientific investigation can be permitted in certain circumstances with sufficient motivation.	Highest Significance
II	Heritage resources with special qualities which make them significant, but do not fulfil the criteria for Grade I status. Current examples: Blombos, Paternoster Midden.	May be declared as a Provincial Heritage Site managed by HWC. Specific mitigation and scientific investigation can be permitted in certain circumstances with sufficient motivation.	Exceptionally High Significance
III	Heritage resources that contribute to the environmental quality or cultural significance of a larger area and fulfils one of the criteria set out in section 3(3) of the Act but that does not fulfil the criteria for Grade II status. Grade III sites may be formally protected by placement on the Heritage Register.		
IIIA	Such a resource must be an excellent example of its kind or must be sufficiently rare. Current examples: Varschedrift; Peers Cave; Brobartia Road Midden at Bettys Bay	Resource must be retained. Specific mitigation and scientific investigation can be permitted in certain circumstances with sufficient motivation.	High Significance
IIIB	Such a resource might have similar significances to those of a Grade III A resource, but to a lesser degree.	Resource must be retained where possible where not possible it must be fully investigated and/or mitigated.	Medium Significance
IIIC	Such a resource is of contributing significance.	Resource must be satisfactorily studied before impact. If the recording already done (such as in an HIA or permit application) is not sufficient, further recording or even mitigation may be required.	Low Significance
NCW	A resource that, after appropriate investigation, has been determined to not have enough heritage significance to be retained as part of the National Estate.	No further actions under the NHRA are required. This must be motivated by the applicant or the consultant and approved by the authority.	No research potential or other cultural significance

Table 3: Rating system for built environment resources

Grading	Description of Resource	Examples of Possible Management Strategies	Heritage Significance
I	Heritage resources with qualities so exceptional that they are of special national significance. Current examples: Robben Island	May be declared as a National Heritage Site managed by SAHRA.	Highest Significance
II	Heritage resources with special qualities which make them significant in the context of a province or region, but do not fulfil the criteria for Grade I status. Current examples: St George's Cathedral, Community House	May be declared as a Provincial Heritage Site managed by HWC.	Exceptionally High Significance
III	Such a resource contributes to the environmental quality or cultural significance of a larger area and fulfils one of the criteria set out in section 3(3) of the Act but that does not fulfil the criteria for Grade II status. Grade III sites may be formally protected by placement on the Heritage Register.		
IIIA	Such a resource must be an excellent example of its kind or must be sufficiently rare. These are heritage resources which are significant in the context of an area.	This grading is applied to buildings and sites that have sufficient intrinsic significance to be regarded as local heritage resources; and are significant enough to warrant that any alteration, both internal and external, is regulated. Such buildings and sites may be representative, being excellent examples of their kind, or may be rare. In either case, they should receive maximum protection at local level.	High Significance
IIIB	Such a resource might have similar significances to those of a Grade III A	Like Grade IIIA buildings and sites, such buildings and sites may be	Medium Significance

Grading	Description of Resource	Examples of Possible Management Strategies	Heritage Significance
	resource, but to a lesser degree. These are heritage resources which are significant in the context of a townscape, neighbourhood, settlement or community.	representative, being excellent examples of their kind, or may be rare, but less so than Grade IIIA examples. They would receive less stringent protection than Grade IIIA buildings and sites at local level.	
IIIC	Such a resource is of contributing significance to the environs These are heritage resources which are significant in the context of a streetscape or direct neighbourhood.	This grading is applied to buildings and/or sites whose significance is contextual, i.e. in large part due to its contribution to the character or significance of the environs. These buildings and sites should, as a consequence, only be regulated if the significance of the environs is sufficient to warrant protective measures, regardless of whether the site falls within a Conservation or Heritage Area. Internal alterations should not necessarily be regulated.	Low Significance
NCW	A resource that, after appropriate investigation, has been determined to not have enough heritage significance to be retained as part of the National Estate.	No further actions under the NHRA are required. This must be motivated by the applicant and approved by the authority. Section 34 can even be lifted by HWC for structures in this category if they are older than 60 years.	No research potential or other cultural significance

8 Receiving Environment

The proposed project is located on a portion of the remaining extent of portion 8; remaining extent of portion 1; a portion of the remaining extent of portion 6; portion 44; portion 14 and the remaining extent of portion 7 of the Farm Elandsfontein 309 JS, located in Emalahleni Local Municipality, Nkangala District Municipality, Mpumalanga Province. The site is ~4km south of Kwa-Guqa and ~16k west of Emalahleni.

The Project is located between Ogies and eMalahleni in the eMalahleni Local Municipality (ELM), Mpumalanga Province. The area is predominantly characterised by mining activities, urban settlements, farmsteads, intensive agriculture and grazing.

8.1 Site Description

The topography on Elandsfontein comprises of flat ground. The land is situated on the watershed between the Grootspruit/Saalklapspruit/WilgeRiver- (in the west) and the Burgersspruit/Klipspruit drainage-system (in the east). Both river systems drain north. All Elandsfontein's operations are located on western and southern slopes, which drain into the Grootspruit. Stream gradients are low and wetlands are common. See **Figure 3** to *Figure 12*.

Figure 3: View showing existing disturbance in the centre of the combined mining right area

Figure 4: View showing existing disturbance in the centre of the combined mining right area

Figure 5: View of southern boundary of the MR 314 mining rights area

Figure 6: View of wetland in the southern most section of the MR 63 area

Figure 7: View of rehabilitated land in southern most section of the MR 63 area

Figure 8: View of ploughed field on the northern boundary of the MR 314 mining rights area

Figure 9: View looking south of the ploughed field in the northern section of the MR314 area

Figure 10: View the opencast mining in the north-western section of the MR 314 area

Figure 11: View of wetland in the western section of the MR 314 area

Figure 12: View of mining dumps in the western section of the MR 314 area

8.2 **Heritage Desktop Study**

The high-level archival research focused on available information sources that were used to compile a general background history of the study area and surrounds.

8.2.1 **Archaeological and Historical Background**

Table 4: Summary of archival data found on the general area

DATE	DESCRIPTION
2.5 million to 250 000 years ago	The Earlier Stone Age (ESA) is the first phase identified in South Africa's archaeological history and comprises two technological phases. The earliest of these is known as Oldowan and is associated with crude flakes and hammer stones. It dates to approximately 2 million years ago. The second technological phase is the Acheulian and comprises more refined and better made stone artefacts such as the cleaver and bifacial hand axe. The Acheulian dates to approximately 1.5 million years ago. No Early Stone Age sites are known in the vicinity of the study area. However, this is probably due more to a lack of research on the surroundings of the study area rather than a lack of sites.
250 000 to 40 000 years ago	The Middle Stone Age (MSA) is the second oldest phase identified in South Africa's archaeological history. This phase is associated with flakes, points and blades manufactured by means of the so-called 'prepared core' technique. However, no Middle Stone Age sites are known in the direct vicinity of the study area. However, this is probably due to a lack of research on the surroundings of the study area rather than a lack of sites. One rock painting site (which is also associated with the Later Stone Age) is mentioned by Bergh (1999) to be located on the eastern bank of the confluence of the Steenkoolspruit and the Olifants River.
40 000 years ago, to the historic past	The Later Stone Age (LSA) is the third archaeological phase identified and is associated with an abundance of very small artefacts known as microliths. No Stone Age sites are indicated on a map contained in a historical atlas of this area (Bergh 1999:
AD 1700 – AD 1840	The Buispoort facies of the Moloko branch of the Urewe Ceramic Tradition is the next phase to be identified within the study area's surroundings. It is most likely dated to between AD 1700 and AD 1840. The key features on the decorated ceramics include rim notching, broadly incised chevrons and white bands, all with red ochre (Huffman, 2007). It is believed that the Madikwe facies developed into the Buispoort facies. The Buispoort facies is associated with sites such as Boschhoek, Buffelshoek, Kaditshwene, Molokwane and Olifantspoort (Huffman, 2007). No sites associated with the Buispoort facies are known from the surroundings of the study area.

DATE	DESCRIPTION
AD 1821	At the beginning of the 19th century, the Phuthing, a South Sotho group, stayed to the east of Emalahleni. During the Difaquane they fled to the south from the impi of Mzilikazi (Bergh 1999: In this year the Matabele of Mzilikazi moved out of present-day KwaZulu Natal and encountered the Phuthing along the upper reaches of the Vaal and Olifants Rivers. After the Phuthing were attacked and defeated by the Matabele, they were forced to flee in a southern direction over the Vaal River. In turn, the Matabele moved to the banks of the Vaal River where they established themselves between 1823 and 1827 (Bergh, 1999). No sites associated with this period of the archaeological history of the surroundings of the study area are presently known.
1845	The district of Lydenburg was established in 1845 and the study area fell within this district (Bergh, 1999). It can be expected that the general surroundings of the study area would have increasingly being settled by Voortrekkers after the establishment of this district
Early 1860s	During the early 1860s the first Voortrekker families started establishing themselves in the present-day Witbank area (Erasmus 2014).
1872	The study area now fell within the district of Middelburg (Bergh, 1999). During this same year the general surroundings of the study area was visited by a geologist from Eastern Europe Woolf Harris. He visited the general vicinity of the study area in 1872 and identified coal in the Van Dyksdrift area. He is believed to have started the Maggie's Mine the following year (Falconer, 1990). Thomas Baines saw coal in the district in 1872, and mentioned that local farmers exploited the outcrops.
1872 - 1894	During this time a number of small coal mining operations were started in the general vicinity, but as no railway line connected this area with the coal markets further to the west, it proved a difficult commercial undertaking. By 1889 there were four coal mines in the Witbank area, namely Brugspruit Adit, Maggie's Mine, Steenkoolspruit and Douglas (Falconer, 1990).
20 October 1894	On this day the railway line between Pretoria and Delagoa Bay (present-day Maputo) was completed near Balmoral This event was very significant for the study area and surroundings as the completion of the line meant that the vast deposits of coal known to have existed in this area since the mid 19th century could now be commercially mined (Bulpin, 1989) and easily transported to the Witwatersrand gold mines and the populated centres of Pretoria and Johannesburg where they were most required.
1898	The study area now fell within the Bethal District. The town of Bethal had been established in 1880 (Bergh, 1999).
1899 – 1902	Although no evidence for battles or skirmishes within the study areas during the South African War could be found, it is known that a significant battle took place in the general vicinity. Known as the Battle of Bakenlaagte, it was one of the last significant battles of the war. On 30 October 1901 the combined forces of Generals Grobler, Brits, Viljoen and Louis Botha attacked the rear guard of Colonel G.E. Benson's No. 3 Flying

DATE	DESCRIPTION
	Column. Although the British soldiers were outnumbered almost four to one, they established themselves on a hill known as Gun Hill and fought heroically until they were almost annihilated. Of the original 210 troops, 73 were killed and 134 wounded. Colonel Benson, who was also wounded during the battle, succumbed to his wounds a few days later. The Boer losses amounted to approximately 14 killed (including General Opperman) and 48 wounded. The brave rear guard action of Colonel Benson's troops ensured that the main column under Lieutenant-Colonel Wools-Sampson had enough time to establish a defensive perimeter which deterred any further Boer attacks (http://alh-research.tripod.com/Light_Horse/index.blog/1889262/bakenlaagte-south-africa-october-30-1901/). While the events of the battle stretched over the farms Nooitgedacht 94 IS, Bakenlaagte 84 IS, Kruisementfontein 95 IS and Onverwacht 97 IS, the final action took place on the farm Nooitgedacht. (www.angloboerwar.com). The closest known site is a concentration camp that was established south of the Balmoral station to take the overflow of inmates from the overcrowded Middelburg and Belfast camps. The Balmoral camp was operative from July 1901 to December 1902. (http://www.angloboerwar.com/other-information/88-concentration-camps/1833-concentration-camps-locations).
1903	The town of Witbank was formally proclaimed (Erasmus, 2004).
1906	The town of Witbank received its first Health Board (Bulpin, 1989).
October 1907	The Tweefontein Colliery Limited was registered at the time (South African Mining Yearbook, 1941/2). The mine was located roughly 5km north of the study area.
1914	The town of Witbank became a municipality in this year (Bulpin, 1989).
1928	The town of Ogies was established (Erasmus, 2014).

Coal Mining

The early coal mining activities in the surroundings of the Witbank area are associated with a geologist from Eastern Europe, Woolf Harris. He visited the general vicinity of the study area in 1872 and identified coal in the Van Dyksdrift area. He is believed to have started the Maggie's Mine as early as 1873. Although these early activities cannot be seen as real commercial mining activities, it was only 16 years later in 1889 that four commercial coal mines started mining activities in the Witbank area. These mines were Brugspruit Adit, Maggies Mine, Steenkoolspruit and Douglas Mine (near Balmoral) (Falconer, 1990).

Of these, the closest two historic mines to the present study area are Steenkoolspruit 18 IS (located on the farm Steenkoolspruit which is situated roughly 4km north-east of the study area) and Maggie's Mine (located on the farm Vaalkranz 29 IS some 11km east of the study area) With time more mining companies were established in the area, including Tweefontein Colliery (registered in October 1907) located roughly 5km north of the present study area. In terms of the study area, the earliest known coal mining activities are from the 1940s and associated with the South Witbank Mine and Tavistock and Uitspan Colliery.

The first certain commercial company record however dates only from 1895, when the Home Coal Estates Company was formed to take over the Maggies Mine. Mining in the vicinity of the town of Witbank also began in 1895 when the Cassel Coal Company opened Landau Colliery (Schalenkamp,

2006). The Witbank Coalfield has been the home to a number of firsts in South Africa, including the introduction of the first continuous miner (CM), in 1947 at the Klipfontein Colliery, and the first large dragline, which was introduced at Optimum Colliery in 1971. The Witbank Coalfield is also home to the first black owned and managed coal mine in South Africa (Scott, 1998). This occurred in March of 1997 when Kuyasa Mining (www.kuyasamining.co.za) began production from its Ikhwezi Colliery, situated approximately 25 km from the town of Delmas in the western part of the Witbank Coalfield.

Leading the way with innovations in the industry were Transvaal &Delagoa Bay Colliery, who in 1904 installed a belt in an inclined shaft. By 1915 coal was being cut by electric coalcutter. During the 1920s it was reported that all mines had installed ventilation fans. In 1947 Klipfontein Colliery saw the introduction at South Witbank of the first continuous miner. The first large dragline was introduced at Optimum Colliery in 1971 (Falconer, 1990).

The earliest known company to be associated with coal mining on Elandsfontein is the Anglo-French (Transvaal) Navigation Coal Estates, Limited. This company was registered in the Transvaal April 9th, 1897, to purchase the undertaking of the Anglo-French Collieries Syndicate, Ltd., for 80,000 fully-paid shares. The company owned various properties in the Middelburg district of the Transvaal: including two portions of farm Elandsfontein, No. 512. Four seams of coal were struck during shaft sinking down to a depth of 345ft. A railway siding connected the works with the Brakpan Witbank Railway. Output commenced December, 1906, and had increased to 90,111 tons by 1909 (Skinner 1911)

8.2.2 Previous HIA Studies

A search on the South African Heritage Resources Information System (SAHRIS) has identified a few Heritage Impact Assessments conducted in and around the study area:

- ***Pistorius, JCC. 2013. A Phase I Heritage Impact Assessment (HIA) Study For The Proposed Landau Colliery Life Extension Project Near Emahlaleni (Witbank) On The Eastern Highveld In The Mpumalanga Province*.** The study was undertaken for proposed expansion of the opencast operations in the Navigation Section to include the proposed Schoongezicht West Block and the proposed Navigation East Block. Ten heritage resources were recorded in this Project Area: two historical houses and two sandstone structures, five burial grounds and a single grave.

- ***Van der Walt, J. 2013. Archaeological Scoping Report For The Proposed Establishment Of The Transalloys Coal-Fired Power Plant Near Witbank, Mpumalanga Province***. Portions 25, 26, 33, 34, 35, 36 and 37 of the Farm Elandsfontein 309 JS Portions 20, 24 and 38 of the Farm Schoongezicht 308 JS. As this was a scoping level study, no fieldwork was undertaken and no specific heritage resources were identified.

- ***Van Vollenhoven, A & Collins, Z. 2014. A Report On A Cultural Heritage Impact Assessment For The Proposed Development At Transalloys On Portions 34 And 35 (Portion Of Portion 34) Of The Farm Elandsfontein 309 Js And Portions 20 And 24 Of The Farm Schoongezicht 308 Js, Close To Emalahleni, Mpumalanga Province.*** During the HIA survey one site of cultural heritage significance was identified; this was a large burial ground containing approx. 90 graves

- ***Kusel, U. 2016. Phase I Cultural Heritage Resources Impact Assessment For A Temporary Road For A Large Dragline To Be Moved From Kromdraai Coal Mine To Clewer In The Emalahleni District Mpumalanga Province.*** Two burial grounds and the Clewer municipal cemetery were identified along the proposed route of the dragline road.

- ***Van Vollenhoven, A. 2017. A Report On A Cultural Heritage Impact Assessment For The Proposed Relocation Of 3 X 400kv Power Lines At The Landau 3 Colliery, Close To Emalahleni, Mpumalanga Province***. No sites of cultural heritage significance were identified within the immediate project area.

- ***Du Pisanie, J. 2017. Heritage Impact Assessment: Environmental Regulatory Processes relating to the amendment of the Environmental Management Programme for its Elandsfontein Operations. F***ive heritage resources were identified within the site-specific study area. These were all informal burial grounds, which contained both European and African graves.

8.2.3 Archival/Historical Maps

Historical topographic maps dating between 1960 and 1996 were utilised in the background study. The maps were examined to identify structures or graves that could possibly be older than 60 years and thus protected under Section 34 and 36 of the NHRA. Several of the structures depicted are farmsteads or homesteads.

The following historical topographic maps were available for utilisation in the scoping study:

- Topographical map 2529CC First Edition 1960. The aerial photography on which the map was based dates to 1960 and its survey work was undertaken in 1963. It was drawn in 1964 by the Trigonometrical Survey Office;
- Topographical map 2529CC Second Edition 1974. This map was remapped in 1974 by the Director General of Surveys and printed and published by the Government Printer in 1977;
- Topographical map 2529CC Third Edition 1996. The map was published by the Chief Directorate Surveys and Mapping in 1997

The maps were utilised to identify structures that could possibly be older than 60 years and thus protected under Section 34 and 35 of the NHRA. Many of the structures identified are farmsteads and homesteads demarcated as “huts”. As discussed in the historical background of the area further on in this report, there is a dense cultural history in Mpumalanga.

In total, 17 possible heritage features were identified in the location of the study area as depicted on the topographical maps (Figure 13 to Figure 15). Three of these are depicted as grave sites, while the remainder are depicted as single structures or groups of structures or huts (African homesteads). Since the first edition of the topographic maps for the area date to 1960, the potential heritage features are likely to be 59-60 years or older.

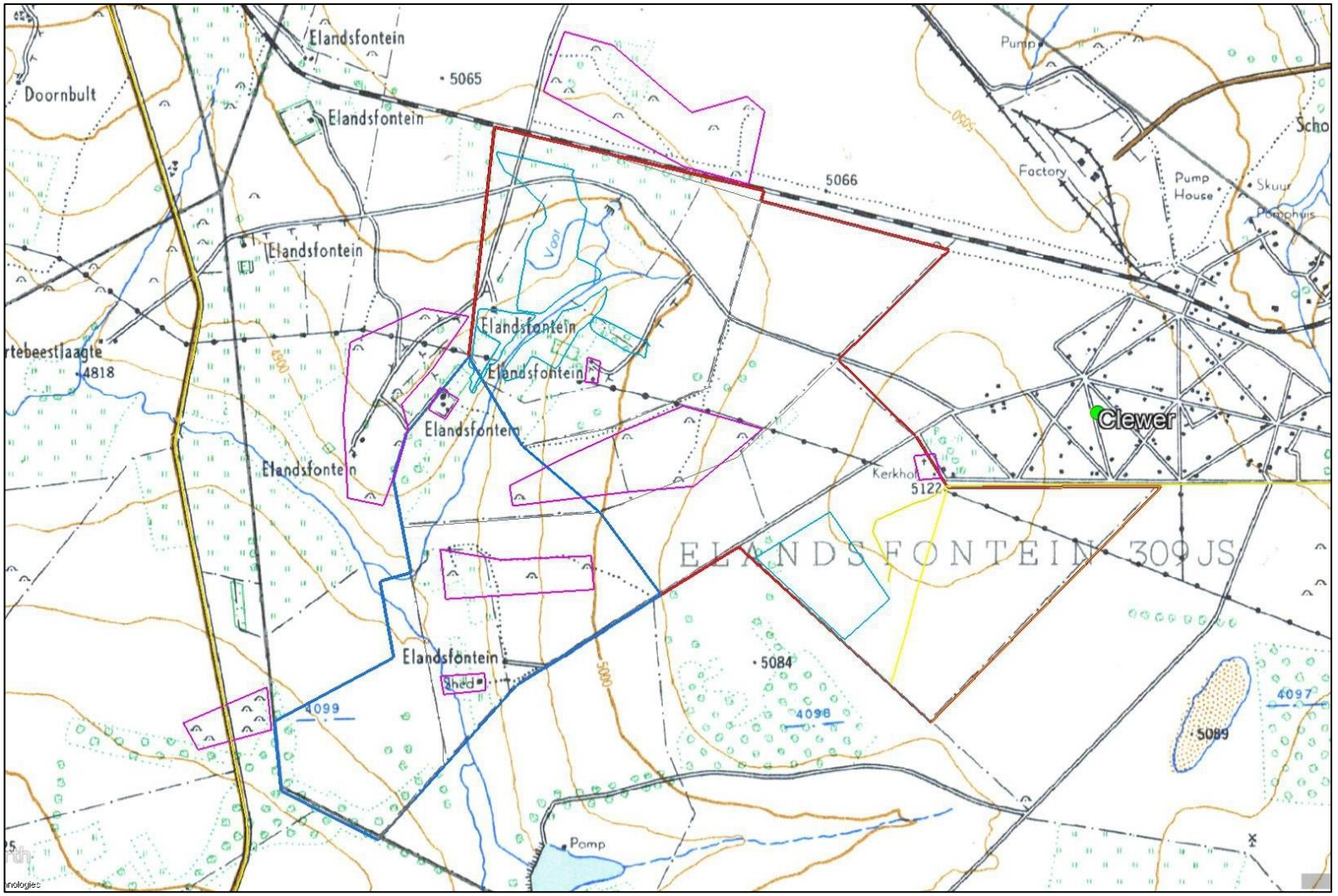


Figure 13: Section of topographical map 2529CC 1960 showing possible 6 heritage features within the study area (circled in pink) and 3 outside. These include structures or groups of structures (farmsteads), groups of African homesteads (huts) and a cemetery (kerkhof)

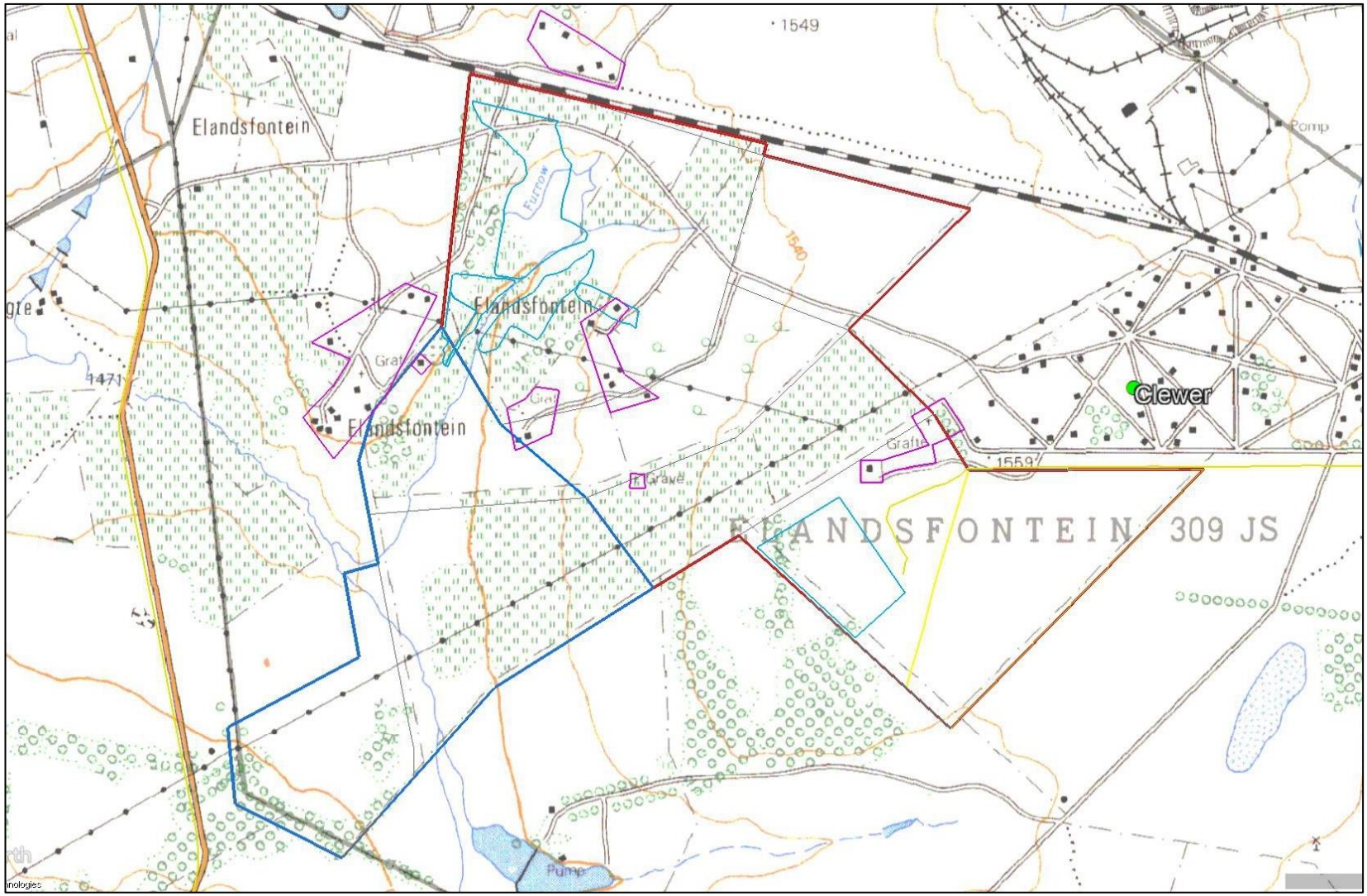


Figure 14: Section of topographical map 2529CC 1974 showing 6 heritage features within the study area (circled in pink) and 2 outside. These include structures or groups of structures (farmsteads), groups of African homesteads (huts) and 2 graves as well as the cemetery

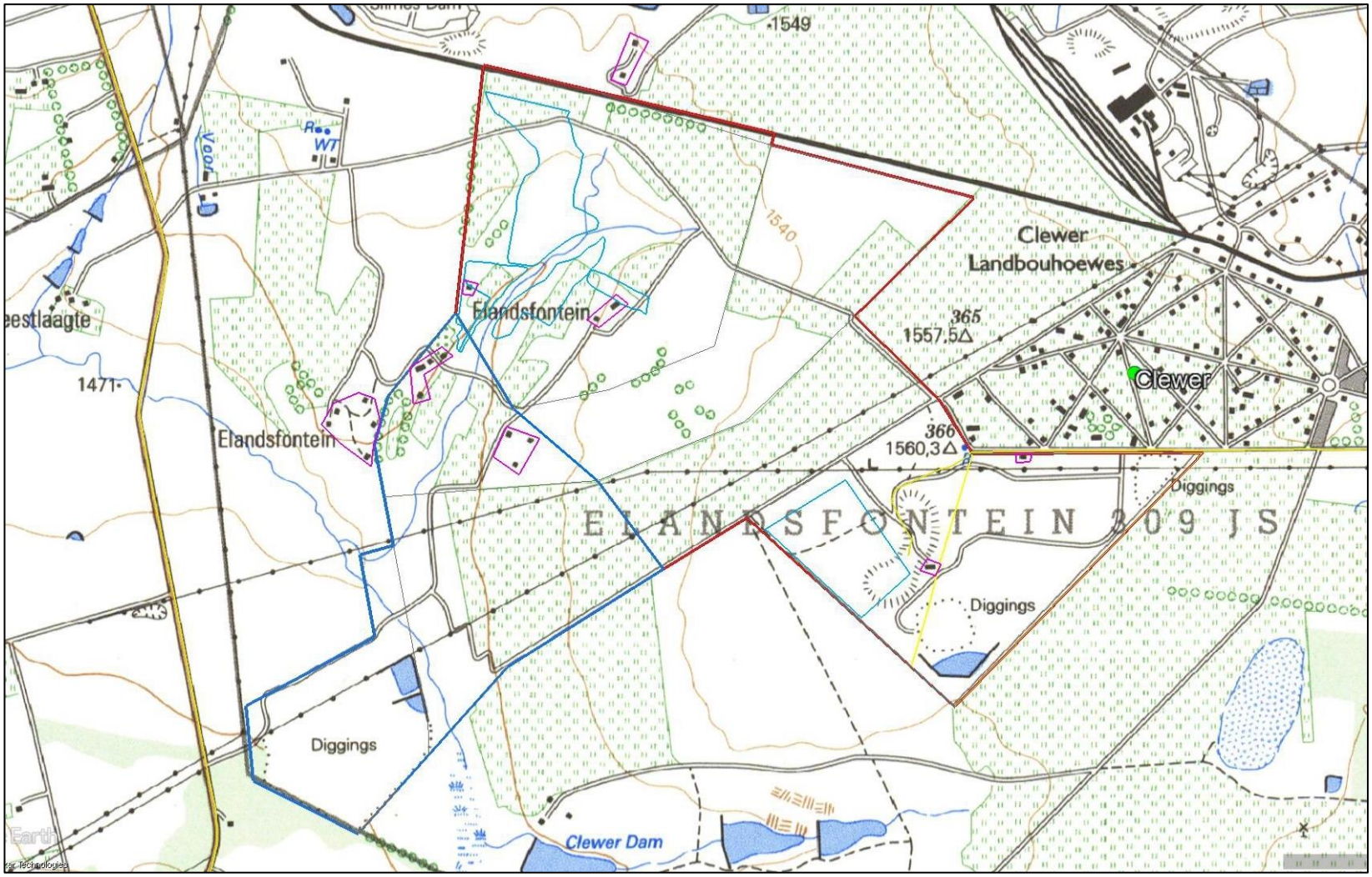


Figure 15 - Section of topographical map 2529CC 1996 showing possible 6 heritage features within the study area (circled in pink) and 2 outside. These include structures or groups of structures (farmsteads). The 3 grave sites depicted previously are not shown.

8.2.4 **Findings of the Heritage Desktop Study**

The desktop study revealed that the surroundings of the study area are characterised by a long and significant history, while previous archaeological and heritage studies from this area have revealed a number of heritage sites that include mainly informal graves or burial grounds and historic farmsteads and homesteads or the remains of such structures.

8.3 **Palaeontology**

The geology of the proposed Elandsfontein Colliery, Emalahleni Local Municipality, Nkangala District Municipality, Mpumalanga Province is shown on the 1:250 000 2528 Pretoria Geological Map (Council for Geosciences) (Figure 3). The proposed development is primarily underlain by the Ecca Group (Vryheid Formation), as well as a small portion in the Dwyka Group (Figure 3). According to the PalaeoMap of South African Heritage Resources Information System the Palaeontological Sensitivity of the Vryheid Formation is Very High, while the Dwyka Group has a Moderate Palaeontological Sensitivity (Almond and Pether 2008, SAHRIS website). Rock formations of moderate to high Palaeontological Sensitivity are present in the study area and thus a field-based assessment by a palaeontologist is required. Diabase is a Basalt and thus unfossiliferous and not further discussed in this report. (Butler 2019).

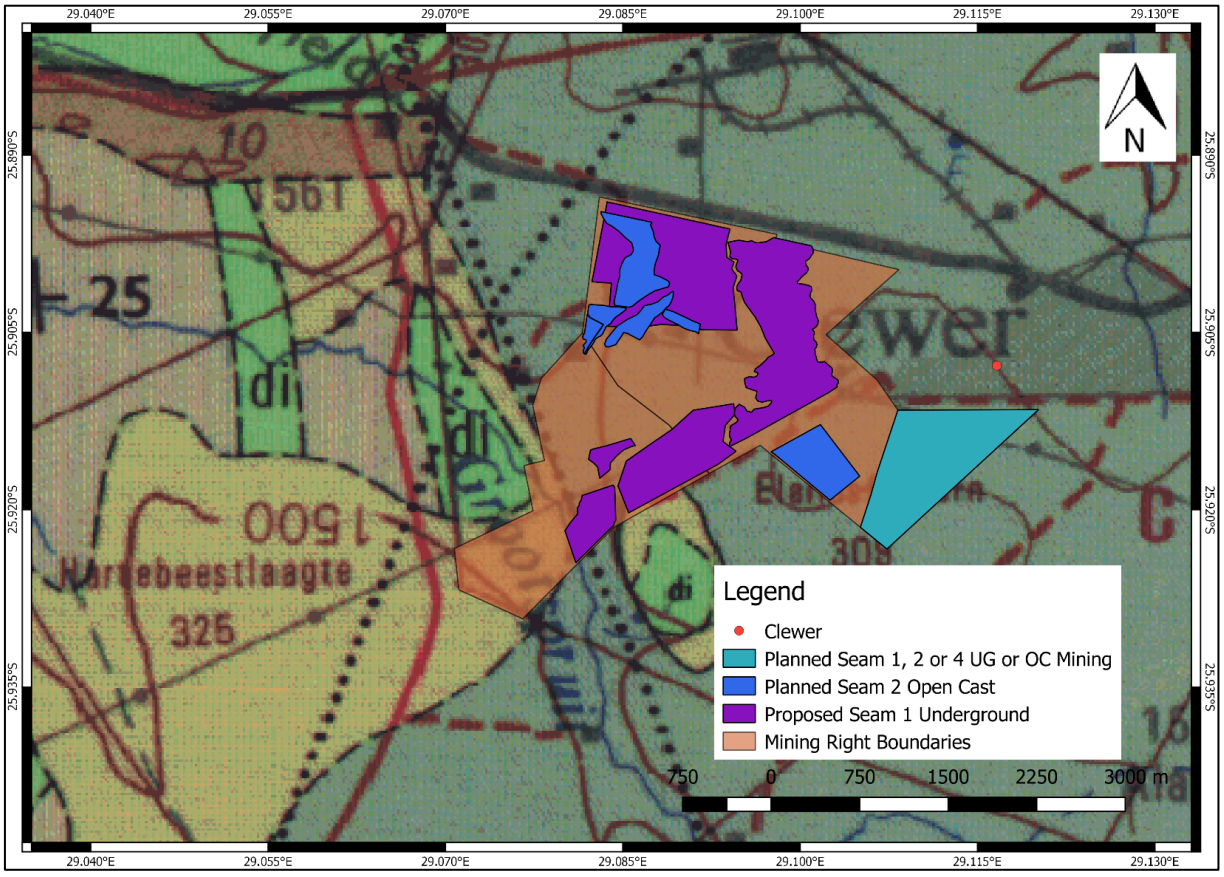


Figure 16. Surface geology of the proposed Elandsfontein Colliery, Emalahleni Local Municipality, Nkangala District Municipality, Mpumalanga Province. Map was drawn by QGIS 2.18.28.

Butler notes that, in South Africa, the first coal was mined commercially in 1857, and the country is now the 6th largest producer of coal in the world. All the coalfields in South Africa occur in the Karoo Basin as well as in the associated sub-basins. Most of the coal mined in South Africa is from the Permian Vryheid Formation. The depth of the Vryheid Formation in the main Karoo Basin varies from 70 m to 500 m near Vryheid and New Castle in Kwazulu-Natal, where the basin was at its deepest.

According to the SAHRIS palaeo-sensitivity map (Figure 17) there is very high possibility of finding fossils in Vryheid Formation (Very High Palaeontological Sensitivity) while there is a moderate chance finding fossils in the Dwyka Group while the basalt has a Zero Palaeontological Sensitivity.

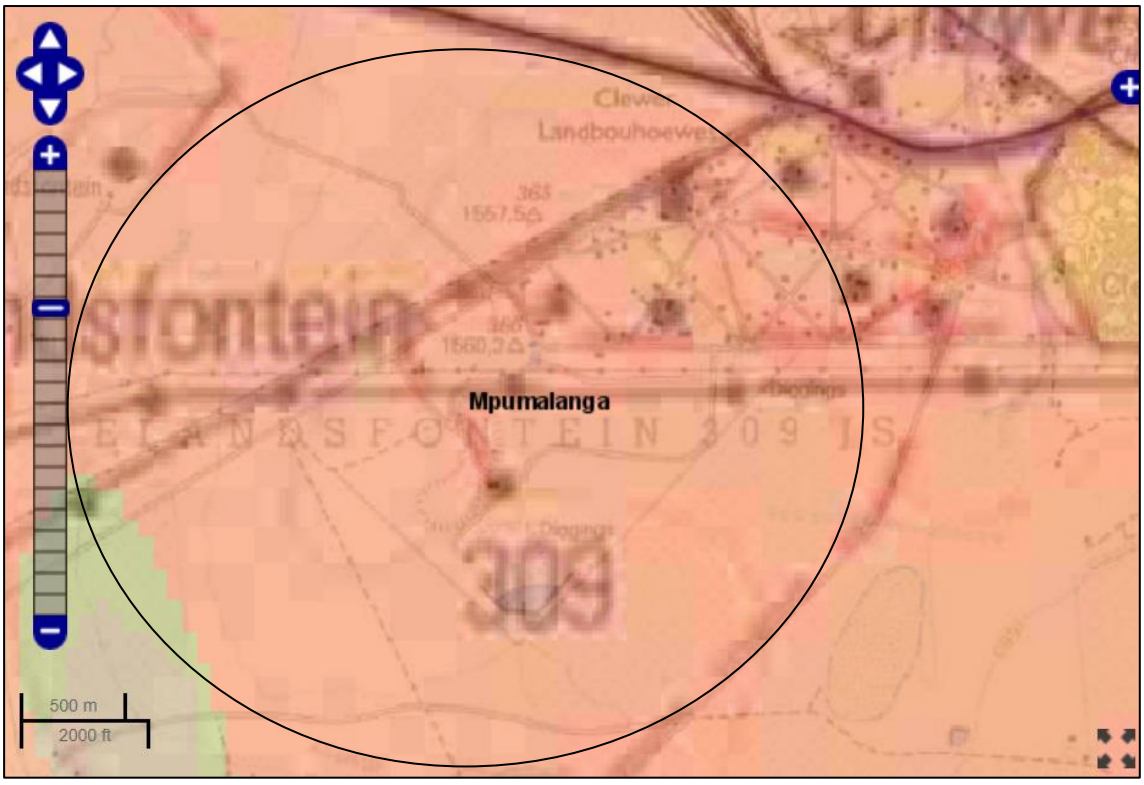


Figure 17: Extract of the 1 in 250 000 SAHRIS PalaeoMap map (Council of Geosciences). Approximate location of the proposed development is indicated by the black circle.

Colour	Sensitivity	Required Action
RED	VERY HIGH	field assessment and protocol for finds is required
ORANGE/YELLOW	HIGH	desktop study is required and based on the outcome of the desktop study, a field assessment is likely
GREEN	MODERATE	desktop study is required
BLUE	LOW	no palaeontological studies are required however a protocol for finds is required

GREY	INSIGNIFICANT/ZERO	no palaeontological studies are required
WHITE/CLEAR	UNKNOWN	these areas will require a minimum of a desktop study. As more information comes to light, SAHRA will continue to populate the map.

8.4 Fieldwork Findings

During the field work a total of eleven heritage resource were identified (Figure 18). The majority of these (eight) were graves and burial grounds (EFN001, EFN002, EFN003, EFN004, EFN007, EFN008, EFN010, EFN011), with the remaining three being structures or remains of structures (EFN005, EFN006, EFN009). See the table below.

It should be noted that while most of the mining rights consolidation area was accessible, a few areas were not accessible due to active opencast mining activities or the location of discard dumps or earth berms surrounding mining areas.

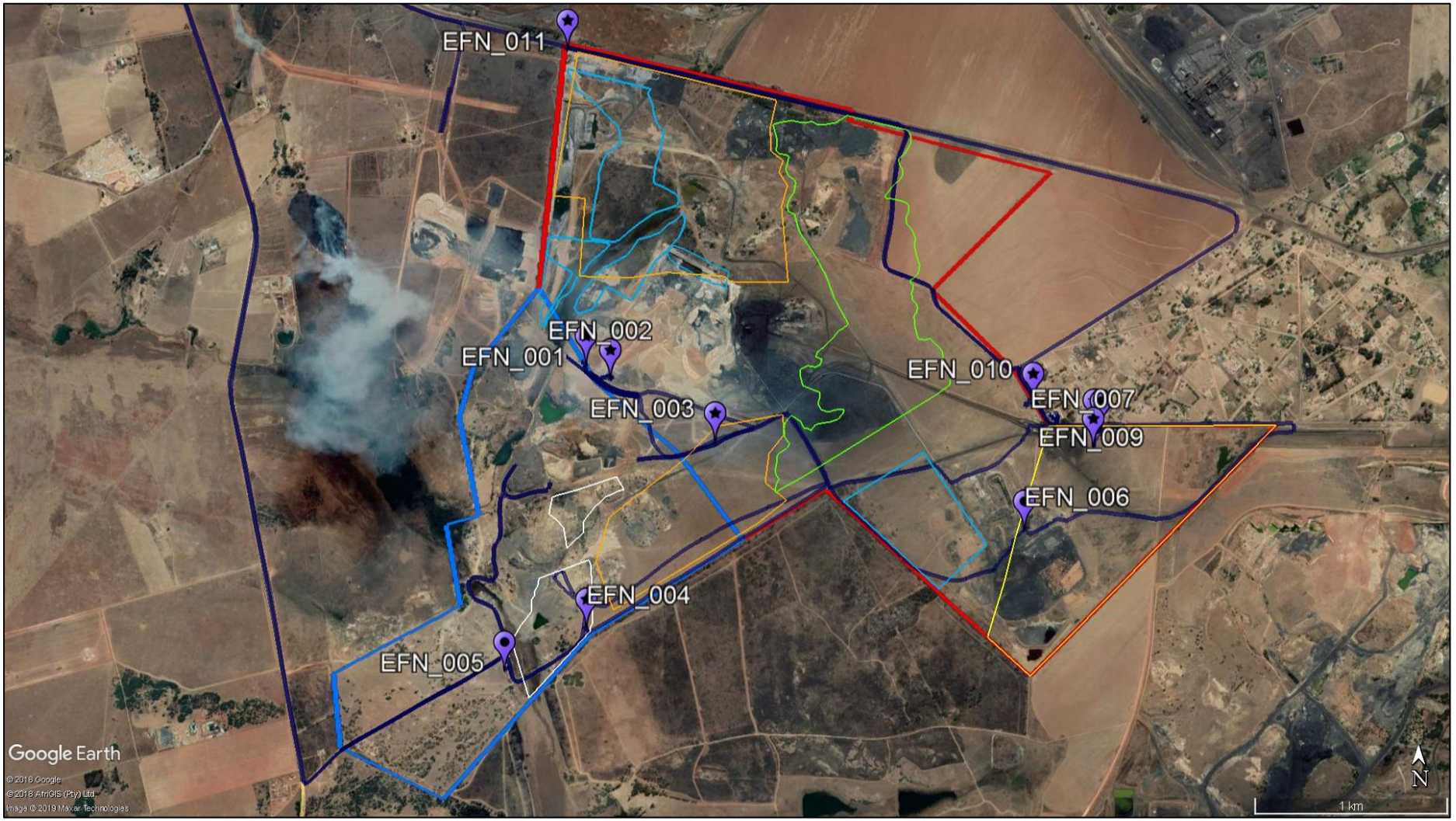


Figure 18 – Tracklog and identified heritage resources in relation to the proposed mining layout footprint

Site number	Lat	Lon	Description	Heritage Significance	Heritage Rating
EFN001	-25.908662°S	29.084037°E	The site consists of an Informal burial ground. Approx. 17 visible graves were noted with either concrete, granite or stone dressings. The site is fenced with a locked gate. This prevented access to the burial ground. However, some headstones with African names were visible (Nkabinde, Masilela, Mahlalisa). The burial ground is located very close to an existing gravel road, less than 1m. This site was identified by a previous HIA undertaken by du Piesanie in 2017 (11478/BGG-001). Although the graves are not depicted on either the 1960 or the 1974 map, African homesteads are depicted in the general location. Dates of 1969, 1974, 1981 were noted. It is possible that some of these graves may be 60 years or older. **Site extent**: approx. 20x36m. Situated inside the mining rights area, on the border between MR63 and MR413.	High	IIIA

Figure 19 – View of the graves showing granite and stone dressings

Figure 20 – View of a double grave

Site number	Lat	Lon	Description	Heritage Significance	Heritage Rating
EFN002	-25.909325°S	29.085325°E	The site consists of an Informal burial ground. Approx. 41 visible graves were noted with granite, marble and cement dressings. The site has been fenced and has a gate. However, this gate was not locked securely. Most of these graves have headstones with European names (Vorster, Venter, Hattingh, Lacante, Muller de Jager, O'Neil). Dates range from 1924, 1939, to 1964,1968. Some of these graves have collapsed. The burial ground is located a short distance away from EFN001 (roughly 115m) and is situated further away from the existing gravel road, approx. 50m. This site was identified in a previous HIA study (du Piesanie 2017) as 11478 BGG 002. Two structures and a grave are depicted on the 1974 map in the general location of this site. Several of these graves 60 years or older. Site extent: approx. 22x34m. Situated inside the mining rights area MR 134.	High	IIIA

Figure 21 – View of the burial ground

Figure 22 – View showing damaged graves

Site number	Lat	Lon	Description	Heritage Significance	Heritage Rating
EFN003	-25.912302°S	29.090836°E	The site consists of an Informal burial ground situated on an island between two existing gravel roads. Approx. 8 visible graves were noted with brick or stone dressings. The site has been fenced and has a gate but was not locked securely. Most of these graves have headstones with the name Mashego and Mahlango. Dates were not visible. The burial ground is located roughly 617m south-east of EFN002. This site was identified in a previous HIA study as 11478/BGG 003 (du Piesani 2017). A grave is marked at this location on the 1974 map. Some of these graves are likely to be 60 years or older. Site extent: approx. 12mx17m. Situated inside the mining rights area, MR314.	High	IIIA

Figure 23 – View of the stone dressed graves

Figure 24 – View of the brick dressed graves

Site number	Lat	Lon	Description	Heritage Significance	Heritage Rating
EFN004	-25.921116°S	29.084058°E	The site consists of a small informal burial ground situated close to the southern boundary of MR 63. Approx. 4 visible graves were noted with rectangular stone surface dressings. The site has been fenced and has a locked gate. No headstones with names or dates were visible, although one headstone had fallen. At least some of these graves are likely to be 60 years or older. This site was known by the Mine Environmental Manager but not documented in the 2017 HIA. Site extent: approx. 11mx15m. Situated inside the MR 63 mining rights area and within one of the footprints for the Planned Seam 1 Underground mining.	High	IIIA

Figure 25 – View of the visible 4 graves

Figure 26 – Closer view of the graves

Site number	Lat	Lon	Description	Heritage Significance	Heritage Rating
EFN005	-25.923166° S	29.079712° E	The site contains an old concrete brick lined ditch, which is probably associated with previous mining activities in the area. There were no visible structures associated with the ditch. A dam and associated linear feature is depicted in this location on the 1996 map. Site extent: approx. 103mx5m. Situated inside the MR 63 mining rights area. This area seemed to have been rehabilitated in the recent past.	Low	Not Conservation Worthy (NCW)

Figure 27 – View of the ditch

Figure 28 – Closer view of the ditch

Site number	Lat	Lon	Description	Heritage Significance	Heritage Rating
EFN006	-25.916447°S	29.106972°E	The site comprises the demolished remains of several large concrete structures, which were probably associated with previous mining activities. Some seem to be pipeline supports. No structures are depicted in this location on the 1960 or 1974 topographic maps. One rectangular structure is depicted on the 1996 map. These structures are likely to be less than 23 years old. **Site extent:** between 900-1000m^2, **s**ituated within the mining right area MR314 and just inside the footprint for Planned Seam 1, 2 or 4 UG or OC Mining.	Low	Not Conservation Worthy (NCW)

Figure 29 – View showing some of demolished remains

Figure 30 – View of more demolished remains

Site number	Lat	Lon	Description	Heritage Significance	Heritage Rating
EFN007	-25.912563°S	29.110563°E	The site comprises a single grave with a formal granite dressing. The headstone is inscribed with the name Baba Truter and date of birth and death was 1976. The grave has not been fenced. It is situated very close to an area used by the coal trucks. The grave is not depicted on any of the topographic maps utilised. This site was known by the Mine Environmental Manager but not documented in the 2017 HIA. **Site extent**: 5mx2m**, s**ituated inside the mining right area MR 314 and just inside the footprint for Planned Seam 1, 2 or 4 UG or OC Mining	High	IIIA

Figure 31 – View of the single grave

Figure 32 – Closer view of headstone

Site number	Lat	Lon	Description	Heritage Significance	Heritage Rating
EFN008	-25.911705°S	29.110595°E	The site consists of a small informal burial ground situated close to the north-east boundary of MR 314. Approx. 9 visible graves were noted with formal granite dressings. The site has been fenced and has a locked gate. Several of the headstones were visible, although most were damaged. Names and dates were obscured by the long grass and the damage, although one headstone was inscribed "Du Plessis". This site was documented previously in the 2017 HIA (11478/BGG-005). Site extent: approx. 25mx10m. Situated inside the MR 314 mining rights area and within the footprint for the Planned Seam 1, 2 or 4 UG or OC Mining area.	High	IIIA

Figure 33 – View of some of the graves

Figure 34 – View of damaged graves

Site number	Lat	Lon	Description	Heritage Significance	Heritage Rating
EFN009	-25.911741° S	29.110971° E	The site is a dilapidated house situated very close to EFN008. The house is constructed of brick and plaster and the roof, doors and windows are gone. A single structure is depicted in this location on the 1996 topographic map. **Site extent:** 8mx10m, **s**ituated inside the mining right area MR314 and within the footprint for the Planned Seam 1, 2 or 4 UG or OC Mining	Low	Not Conservation Worthy (NCW)

Figure 35 –The remains of the recent house

Site number	Lat	Lon	Description	Heritage Significance	Heritage Rating
EFN010	-25.910458°S	29.107420°E	The site consists of the Clewer municipal cemetery and contains approx. 66 visible formal graves with European names. Dates range from the 1916 up to 1986. The cemetery is situated right on to the north-central boundary of MR 314. The site is enclosed by a concrete palisade fence and a metal gate. The cemetery is depicted on the 1960 and 1974 map sheets. The majority of these graves are 60 years or older. This site was documented previously in the 2017 HIA (11478/BGG-004). Site extent: approx. 3708m2. Situated inside the MR 314 mining rights area, roughly 157m to the north-west of the footprint for the Planned Seam 1, 2 or 4 UG or OC Mining area.	High	IIIA

Figure 36 – View of Clewer Cemetery

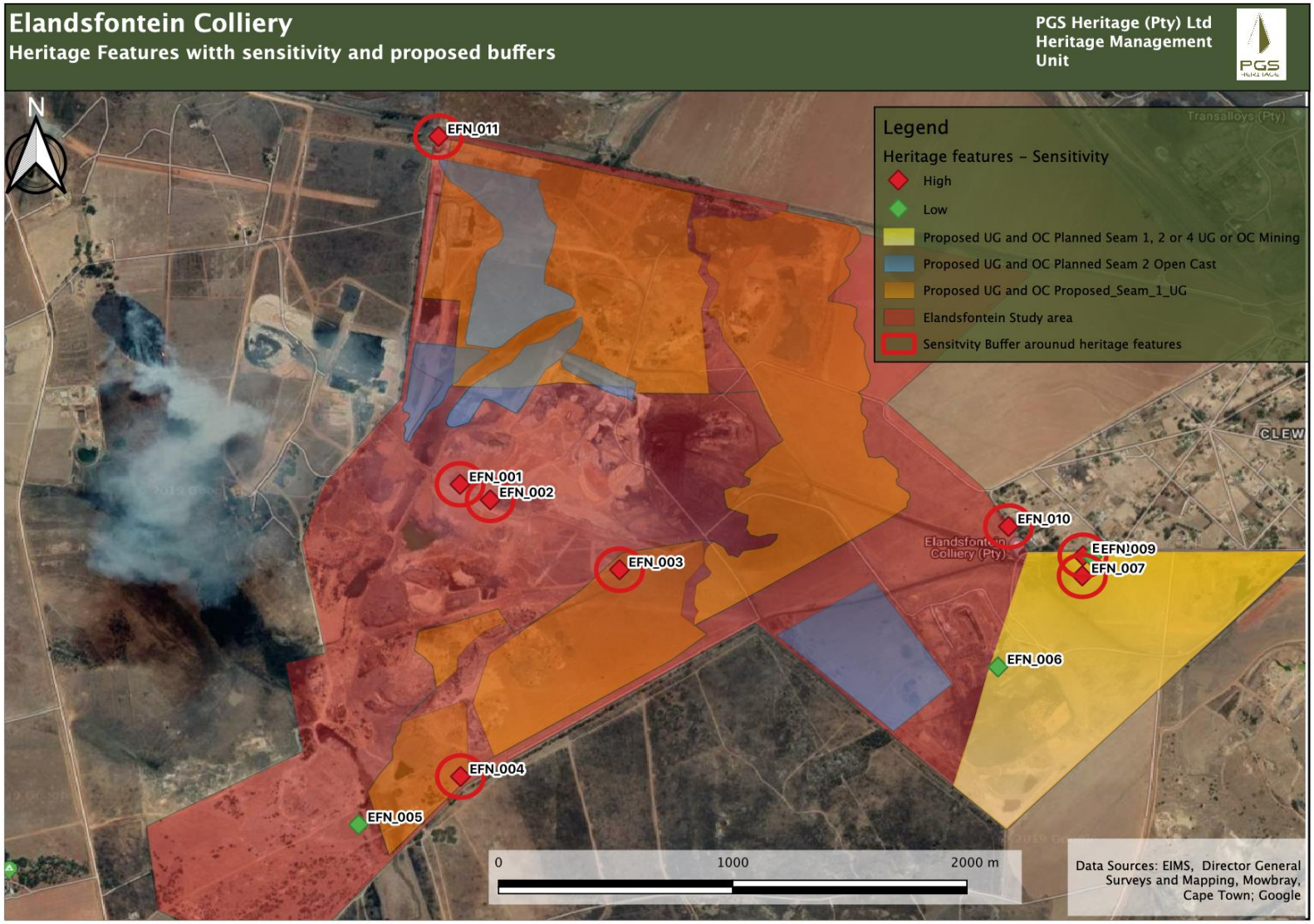
Figure 37 - Graves inside Clewer cemetery

Site number	Lat	Lon	Description	Heritage Significance	Heritage Rating
EFN011	-25.893836°S	29.083119°E	The site consists of a small informal burial ground situated close to the north-west corner of MR 314 area. Approx. 9-10 visible graves were noted, two with stone dressings. The site has been fenced but the gate has been removed. Only one headstone was visible, with a date of 1913. The burial ground is situated right on the edge of an existing earth berm/discard dump of the current opencast mining area. At least some of these graves are likely to be 60 years or older. This site was not documented in the previous 2017 HIA, but the mine Environmental Manager was aware of the location. **Site extent:** approx. 13mx16m. Situated inside the MR 314 mining rights area and just outside the footprints (50-100m) for the Proposed Seam 1 Underground and Planned Seam 2 Open Cast areas.	High	IIIA

Figure 38 – View of the burial ground, showing the proximity of the berm/dump

Figure 39 – View of the graves

9 Spatial Sensitivity Mapping



10 Impact Assessment

10.1 Impact Assessment Methodology

The impact significance rating methodology, as provided by EIMS, is guided by the requirements of the NEMA EIA Regulations 2014 (as amended). The broad approach to the significance rating methodology is to determine the environmental risk (ER) by considering the consequence (C) of each impact (comprising Nature, Extent, Duration, Magnitude, and Reversibility) and relate this to the probability/ likelihood (P) of the impact occurring. This determines the environmental risk. In addition, other factors, including cumulative impacts and potential for irreplaceable loss of resources, are used to determine a prioritisation factor (PF) which is applied to the ER to determine the overall significance (S). The impact assessment will be applied to all identified alternatives. Where possible, mitigation measures will be recommended for impacts identified.

10.1.1 Determination of Environmental Risk

The significance (S) of an impact is determined by applying a prioritisation factor (PF) to the environmental risk (ER). The environmental risk is dependent on the consequence (C) of the particular impact and the probability (P) of the impact occurring. Consequence is determined through the consideration of the Nature (N), Extent (E), Duration (D), Magnitude (M), and reversibility (R) applicable to the specific impact.

For the purpose of this methodology the consequence of the impact is represented by:

$$\boldsymbol{C} = \frac{(\boldsymbol{E}+\boldsymbol{D}+\boldsymbol{M}+\boldsymbol{R}) \times \boldsymbol{N}}{\boldsymbol{4}}$$

Each individual aspect in the determination of the consequence is represented by a rating scale as defined in *Table 5* below.

Table 5: Criteria for Determining Impact Consequence

Aspect	Score	Definition
Nature	- 1	Likely to result in a negative/ detrimental impact
	+1	Likely to result in a positive/ beneficial impact
Extent	1	Activity (i.e. limited to the area applicable to the specific activity)
	2	Site (i.e. within the development property boundary),
	3	Local (i.e. the area within 5 km of the site),
	4	Regional (i.e. extends between 5 and 50 km from the site
	5	Provincial / National (i.e. extends beyond 50 km from the site)
Duration	1	Immediate (<1 year)
	2	Short term (1-5 years),
	3	Medium term (6-15 years),
	4	Long term (the impact will cease after the operational life span of the project),

	5	Permanent (no mitigation measure of natural process will reduce the impact after construction).
Magnitude/ Intensity	1	Minor (where the impact affects the environment in such a way that natural, cultural and social functions and processes are not affected),
	2	Low (where the impact affects the environment in such a way that natural, cultural and social functions and processes are slightly affected),
	3	Moderate (where the affected environment is altered but natural, cultural and social functions and processes continue albeit in a modified way),
	4	High (where natural, cultural or social functions or processes are altered to the extent that it will temporarily cease), or
	5	Very high / don't know (where natural, cultural or social functions or processes are altered to the extent that it will permanently cease).
Reversibility	1	Impact is reversible without any time and cost.
	2	Impact is reversible without incurring significant time and cost.
	3	Impact is reversible only by incurring significant time and cost.
	4	Impact is reversible only by incurring prohibitively high time and cost.
	5	Irreversible Impact

Once the C has been determined, the ER is determined in accordance with the standard risk assessment relationship by multiplying the C and the P. Probability is rated/ scored as per Table 6.

Table 6 : Probability Scoring

Probability	1	Improbable (the possibility of the impact materialising is very low as a result of design, historic experience, or implementation of adequate corrective actions; <25%),
	2	Low probability (there is a possibility that the impact will occur; >25% and <50%),
	3	Medium probability (the impact may occur; >50% and <75%),
	4	High probability (it is most likely that the impact will occur- > 75% probability), or
	5	Definite (the impact will occur)

The result is a qualitative representation of relative ER associated with the impact. ER is therefore calculated as follows:

$$ER = C \times P$$

Table 7 : Determination of Environmental Risk

Consequence	5	5	10	15	20	25
	4	4	8	12	16	20
	3	3	6	9	12	15
	2	2	4	6	8	10
	1	1	2	3	4	5
		1	2	3	4	5
	Probability					

The outcome of the environmental risk assessment will result in a range of scores, ranging from 1 through to 25. These ER scores are then grouped into respective classes as described in Table 8.

Table 8: Significance Classes

Environmental Risk Score	
Value	**Description**
< 9	Low (i.e. where this impact is unlikely to be a significant environmental risk).
≥9 - <17	Medium (i.e. where the impact could have a significant environmental risk),
≥17	High (i.e. where the impact will have a significant environmental risk).

The impact ER will be determined for each impact without relevant management and mitigation measures (pre-mitigation), as well as post implementation of relevant management and mitigation measures (post-mitigation). This allows for a prediction in the degree to which the impact can be managed/mitigated.

10.1.2 **Impact Prioritisation:**

Further to the assessment criteria presented in the section above, it is necessary to assess each potentially significant impact in terms of:

1. Cumulative impacts; and
2. The degree to which the impact may cause irreplaceable loss of resources.

To ensure that these factors are considered, an impact prioritisation factor (PF) will be applied to each impact ER (post-mitigation). This prioritisation factor does not aim to detract from the risk

ratings but rather to focus the attention of the decision-making authority on the higher priority/significance issues and impacts. The PF will be applied to the ER score based on the assumption that relevant suggested management/mitigation impacts are implemented.

Table 9: Criteria for Determining Prioritisation

Cumulative Impact (CI)	Low (1)	Considering the potential incremental, interactive, sequential, and synergistic cumulative impacts, it is unlikely that the impact will result in spatial and temporal cumulative change.
	Medium (2)	Considering the potential incremental, interactive, sequential, and synergistic cumulative impacts, it is probable that the impact will result in spatial and temporal cumulative change.
	High (3)	Considering the potential incremental, interactive, sequential, and synergistic cumulative impacts, it is highly probable/ definite that the impact will result in spatial and temporal cumulative change.
Irreplaceable Loss of Resources (LR)	Low (1)	Where the impact is unlikely to result in irreplaceable loss of resources.
	Medium (2)	Where the impact may result in the irreplaceable loss (cannot be replaced or substituted) of resources but the value (services and/or functions) of these resources is limited.
	High (3)	Where the impact may result in the irreplaceable loss of resources of high value (services and/or functions).

The value for the final impact priority is represented as a single consolidated priority, determined as the sum of each individual criteria represented in Table 5. The impact priority is therefore determined as follows:

$$\text{Priority} = CI + LR$$

The result is a priority score which ranges from 3 to 9 and a consequent PF ranging from 1 to 2 (Refer to Table 10).

Table 10 : Determination of Prioritisation Factor

Priority	Ranking	Prioritisation Factor
2	Low	**1**
3	Medium	**1.125**
4	Medium	**1.25**
5	Medium	**1.375**
6	High	**1.5**

In order to determine the final impact significance, the PF is multiplied by the ER of the post mitigation scoring. The ultimate aim of the PF is an attempt to increase the post mitigation

environmental risk rating by a full ranking class, if all the priority attributes are high (i.e. if an impact comes out with a medium environmental risk after the conventional impact rating, but there is significant cumulative impact potential and significant potential for irreplaceable loss of resources, then the net result would be to upscale the impact to a high significance).

Table 11 : Final Environmental Significance Rating

Environmental Significance Rating	
Value	**Description**
≤ -20	High negative (i.e. where the impact must have an influence on the decision process to develop in the area).
> -20 ≤ -10	Medium negative (i.e. where the impact could influence the decision to develop in the area).
> -10	Low negative (i.e. where this impact would not have a direct influence on the decision to develop in the area).
0	No impact
<10	Low positive (i.e. where this impact would not have a direct influence on the decision to develop in the area).
≥ 10 < 20	Medium positive (i.e. where the impact could influence the decision to develop in the area).
≥ 20	High positive (i.e. where the impact must have an influence on the decision process to develop in the area).

The significance ratings and additional considerations applied to each impact will be used to provide a quantitative comparative assessment of the alternatives being considered. In addition, professional expertise and opinion of the specialists and the environmental consultants will be applied to provide a qualitative comparison of the alternatives under consideration. This process will identify the best alternative for the proposed project.

10.2 **Planning Phase Impacts**

10.2.1 **Burial Grounds and Graves**

Eight burial grounds are present on the property (EFN001, EFN002, EFN003, EFN004, EFN007, EFN008, EFN010, EFN011). Burial grounds and graves have high heritage significance and are given a Grade IIIA significance rating in accordance with the system described in Section **Error! Reference source not found.** of this document.

The impact would be damage to identified graves and burial grounds due to earth-moving or vegetation clearance activities.

The pre-mitigation Environmental Risk impact significance is rated as Medium, but with the implementation of the required mitigation measures the post-mitigation ER impact will be Low. The overall Environmental significance will be Medium negative

10.2.1.1 MITIGATION MEASURES

Mitigation measures would include fencing of the graves and burial grounds and strict avoidance of these sites. Section 17.6(a) of the Mine Health and Safety Act (Act 29 of 1996 and Regulations (2014)) requires the employer to ensure that no mining operations are carried out under or within a horizontal distance of 100m from buildings, roads, railways, reserves, boundaries, any structure whatsoever or any surface which it may be necessary to protect. Reduction of this distance can only be approved by the DMR.

10.2.1.2 CUMULATIVE IMPACTS

Cumulative impacts are already visible in the damage to existing graves which is likely to be due to previous mining activities.

10.2.1.3 IRREPLACEABLE LOSS OF RESOURCES

Any damage or destruction that occurs to a grave or burial ground is very likely to result in the irreplaceable loss of resources of high value to the community associated with the grave and or burial ground.

10.2.1.4 IMPACT ON ALTERNATIVES CONSIDERED

As the proposed activity is mining which depends on the presence of mineral resources, no alternatives are considered.

10.2.2 Historical/ Recent Structures

Three historical/recent structure sites are present on the property (EFN005, EFN006, EFN009). These structures have low heritage significance and are given a Not Conservation Worthy rating in accordance with the system described in Section **Error! Reference source not found.** of this document.

The impact would be damage to identified historical/recent structures due to earth-moving or vegetation clearance activities.

The pre-mitigation Environmental Risk impact significance is rated as Low, and with the implementation of the required mitigation measures the post-mitigation ER impact will be Low. The overall Environmental significance would be Low positive.

10.2.2.1 MITIGATION MEASURES

No mitigation measures would be required.

10.2.2.2 CUMULATIVE IMPACTS

Cumulative impacts would be the further damage or destruction to structures that are already in a demolished or dilapidated stare, which is likely to be due to previous mining activities.

10.2.2.3 IRREPLACEABLE LOSS OF RESOURCES

Any damage or destruction that occurs to these historic/recent structures is very likely to result in the irreplaceable loss of these resources; however, they are assessed to be of low value.

10.2.2.4 IMPACT ON ALTERNATIVES CONSIDERED

As the proposed activity is mining which depends on the presence of mineral resources, no alternatives are considered.

10.2.3 Palaeontology

No Impacts will occur during the Planning Phase

10.3 Construction Phase Impacts

10.3.1 Burial Grounds and Graves

Although activities would be different, as ground excavations are involved, it is anticipated that the construction phase impacts would be substantially the same as those for the planning phase.

10.3.2 Historical/ Recent Structures

Although activities would be different, as ground excavations are involved, it is anticipated that the construction phase impacts would be substantially the same as those for the planning phase

10.3.3 Palaeontology

The impact will destroy fossil heritage or permanently seal-in fossils at or below the ground surface. These fossils will no longer be available for research.

Activities that can potentially contribute to the impact would be:

The site clearance and excavations for the Elandsfontein mine will include widespread digging into the shallow sediment cover as well as into the underlying bedrock. The excavations will also change the topography of the development site. According to the Geology of the project site there is a Very High possibility of finding fossils.

10.3.3.1 MITIGATION MEASURES

It is recommended that an EIA level palaeontology report should be conducted to assess the value and prominence of fossils in the development area and the effect of the proposed development on the palaeontological heritage. The purpose of the EIA Report is to elaborate on the issues and potential impacts identified during the scoping phase. A Phase 1 field-based assessment will be conducted and research in the site-specific study area as well as a comprehensive assessment of the impacts identified during the scoping phase

10.3.3.2 CUMULATIVE IMPACTS

Various mining activities are present in the area and thus the cumulative impact is rated as high.

10.3.3.3 IRREPLACEABLE LOSS OF RESOURCES

Impacts on fossil heritage are irreversible. Scientifically all well-documented reports and palaeontological studies of any fossils uncovered during construction would be a positive impact. A negative impact on the fossil heritage can be limited by the application of adequate damage mitigation procedures. If damage mitigation is properly undertaken the benefit scale for the project will lie within the beneficial category.

10.3.3.4 IMPACT ON ALTERNATIVES CONSIDERED

No Alternatives are considered.

10.4 Operational Phase Impacts

10.4.1 Burial Grounds and Graves

It is anticipated that the operation phase impacts would be substantially the same as those for the construction phase.

10.4.2 Historical/ Recent Structures

It is anticipated that the operations phase impacts would be substantially the same as those for the construction phase

10.4.3 Palaeontology

No Impacts will occur during the Operational Phase

10.5 Decommissioning Phase Impacts

10.5.1 Burial Grounds and Graves

It is anticipated that the decommissioning phase impacts would be substantially the same as those for the operation phase.

10.5.2 Historical/ Recent Structures

It is anticipated that the decommissioning phase impacts would be substantially the same as those for the operational phase

10.5.3 Palaeontology

No Impacts will occur during the Decommissioning Phase

.

10.6 Rehabilitation and Closure Phase Impacts

10.6.1 Burial Grounds and Graves

It is anticipated that the Rehabilitation and closure phase impacts would be substantially the same as those for the decommissioning phase.

10.6.2 Historical/ Recent Structures

It is anticipated that the Rehabilitation and closure phase impacts would be substantially the same as those for the decommissioning phase

10.6.3 Palaeontology

No Impacts will occur during the Rehabilitation and closure Phase

11 PLAN OF STUDY FOR EIA PHASE

11.1 Heritage Assessment Methodology

The Heritage Impact Assessment (HIA) report to be compiled by PGS Heritage (PGS) for the proposed Elandsfontein Project will assess the heritage resources found on site. This report will contain the applicable maps, tables and figures as stipulated in the NHRA (no 25 of 1999), the National Environmental Management Act (NEMA) (no 107 of 1998) and the Minerals and Petroleum Resources Development Act (MPRDA) (28 of 2002). The HIA process consists of three steps:

- Step I - Literature Review and cartographic analysis: a high-level desktop study was undertaken to identify potential heritage resources and areas of potential heritage sensitivity (desktop level Heritage Scoping report)

- Step II – Physical Survey: A physical survey was conducted through the proposed project area by qualified and experienced heritage specialists, aimed at locating and documenting heritage resources falling within and adjacent to the proposed development footprint.

- Step III – The final step will involve the recording and documentation of relevant heritage resources, as well as the assessment of resources in terms of the heritage impact assessment criteria and report writing, as well as mapping and constructive recommendations.

11.2 Further Studies Towards HIA/EIA

To be able to compile a heritage management plan to be incorporated into the Environmental Management Plan, the following further work will be required for the EIA phase of this project.

- Heritage field study of the specific areas where the project will have a direct impact (development footprint);
- Palaeontological field assessment of the study area;
- Refer to Appendix C for a plan of study for the HIA.

Table 12 –Heritage Issues and Potential Impacts

ISSUE	IMPACT ON HISTORICAL STRUCTURES
DISCUSSION	As seen from the archival work and discussion in section 8, the possible impact on several areas containing historical structures has been identified as **Low** and thus fieldwork at the EIA stage is required to develop a comprehensive Heritage Management Plan.

EXISTING IMPACT	None known
PREDICTED IMPACT	Unidentified historical structures and the discovery of such structures during construction can seriously hamper construction timelines. Fieldwork can thus provide valuable information on such structures in the study area and provide timeous management of such sites through realignment of development or mitigation of such sites where needed.
EIA INVESTIGATION REQUIRED	Archaeological fieldwork of impact areas will identify possible impacted structures
CUMULATIVE EFFECT	None foreseen at this stage.

ISSUE	**IMPACT ON GRAVES AND BURIAL GROUNDS**
DISCUSSION	As seen from the archival work and discussion in section 8, the possible impact on graves and burial grounds has been identified as being **High** and fieldwork is required to develop a comprehensive Heritage Management Plan.
EXISTING IMPACT	None known
PREDICTED IMPACT	Unidentified graves and burial grounds and the discovery of such sites during construction can seriously hamper construction timelines. Fieldwork can thus provide valuable information on such sites in the study area and provide timeous management of such sites through realignment of the development or mitigation of such sites where needed.
EIA INVESTIGATION REQUIRED	Archaeological fieldwork of impact areas
CUMULATIVE EFFECT	None foreseen at this stage.

ISSUE	**IMPACT ON PALAEONTOLOGICAL SITES**
DISCUSSION	The palaeontological potential of the area has been confirmed as being **Moderate to high** and further fieldwork is required to develop a comprehensive Heritage Management Plan.

EXISTING IMPACT	The proposed study area has been impacted by many previous developments
PREDICTED IMPACT	Unidentified palaeontological sites and the discovery of such sites during construction can seriously hamper construction timelines.
EIA INVESTIGATION REQUIRED	Further palaeontological assessment work at the EIA stage will be required to augment the information for the HIA
CUMULATIVE EFFECT	None foreseen at this stage.

ISSUE	**IMPACT ON ARCHAEOLOGICAL SITES**
DISCUSSION	As seen from the archival work and discussion in section 8, the possible impact on archaeological finds has been identified as being **Low,** however this can only be confirmed by fieldwork in the EIA phase to develop a comprehensive Heritage Management Plan.
EXISTING IMPACT	None known
PREDICTED IMPACT	Unidentified archaeological sites and the discovery of such sites during construction can seriously hamper construction timelines. Fieldwork can thus provide valuable information on such sites in the study area and provide timeous management of such sites through realignment of the development or mitigation of such sites where needed.
EIA INVESTIGATION REQUIRED	Archaeological fieldwork of impact areas
CUMULATIVE EFFECT	The possible research opportunities due to the discovery of new archaeological sites and the subsequent mitigation will provide valuable information on archaeology.

11.2.1 **Timeframes**

It must be kept in mind that mitigation and monitoring of heritage resources discovered during construction activity will require permitting for collection or excavation of heritage resources and lead times must be worked into the construction time frames. **Table 13** gives guidelines for lead times on permitting.

Table 13- Lead times for permitting and mobilisation

Action	Responsibility	Timeframe
Preparation for field monitoring and finalisation of contracts	The contractor and service provider	1 month
Application for permits to do necessary mitigation work	Service provider – Archaeologist and SAHRA	2 months
Documentation, excavation and archaeological report on the relevant site	Service provider – Archaeologist	3 months
Handling of chance finds – Graves/Human Remains	Service provider – Archaeologist and SAHRA	2 weeks
Relocation of burial grounds or graves in the way of construction	Service provider – Archaeologist, SAHRA, local government and provincial government	6 months

12 SPECIALIST MANAGEMENT PLAN

Table 14: Mitigation measures including requirements for timeframes, roles and responsibilities etc.

No.	Mitigation Measures	Phase	Timeframe	Responsible Party for Implementation	Monitoring Party (Frequency)	Target	Performance Indicators (Monitoring Tool)
			1. Burial Grounds and Graves				
A	If any of the burial grounds will be impacted directly by the planned mining activities, they. must be relocated after completion of a detailed grave relocation process, that includes a thorough stakeholder engagement component, adhering to the requirements of s36 of the NHRA and its regulations as well as the National Health Act and its regulations.	Planning Construction Operation Decommissioning Rehab and closure	Prior to construction and ongoing throughout lifespan of mine	Applicant ECO Heritage Specialist	ECO (Monthly)	Ensure compliance with relevant legislation	(ECO Monthly Checklist/Report)
B	Any graves or burial grounds that will not be impacted must be avoided and retained in situ with a buffer zone of 100m.	Planning Construction Operation Decommissioning Rehab and closure	Prior to construction and ongoing throughout lifespan of mine	Applicant ECO	ECO (Monthly)	Ensure compliance with relevant legislation	(ECO Monthly Checklist/Report)
			2. Historical/ Recent structures				
A	Structures older than 60 years are protected under Section 34 of the NHRA and require a formal process of application for a destruction permit issued by the Mpumalanga Provincial Heritage Authority	Construction Operation Decommissioning Rehab and closure	Prior to construction and ongoing throughout lifespan of mine	Applicant Contractor	ECO (Monthly)	Ensure compliance with relevant legislation	(ECO Monthly Checklist/Report)
B	Structures that are younger than 60 years do not require mitigation	Construction Operation Decommissioning Rehab and closure	Prior to construction and ongoing throughout lifespan of mine	Applicant Contractor	ECO (Monthly)		
			3. Palaeontology				
A	An EIA level palaeontology report should be conducted to assess the value and prominence of fossils in the development area and the effect of the proposed development on the palaeontological heritage	Construction Operation	Prior to construction	Applicant Palaeontologist	ECO (Monthly)	Ensure compliance with relevant legislation	(ECO Monthly Checklist/Report)

13 Conclusion

13.1 Conclusions and Recommendations

The HIA identified various heritage resources within the study area of which the burial grounds and graves and the palaeontology could be rated as having a High to Very High heritage significance and would require mitigation measures before the project can commence. Three sites comprising historical/recent structures were identified which could be rated as having a Low heritage significance and would not require mitigation measures.

13.1.1 Burial Grounds and Graves

If any of the eight burial grounds will be impacted directly by the planned mining activities, they. must be relocated after completion of a detailed grave relocation process, that includes a thorough stakeholder engagement component, adhering to the requirements of s36 of the NHRA and it regulations as well as the National Health Act ad its regulation. Any graves or burial grounds that will not be impacted must be avoided and retained in situ with a buffer zone of 100m.

13.1.2 Historical/Recent Structures

Three sites containing structures were identified. None of these structures is likely to be 60 years or older and therefore no mitigation measures are required.

13.1.3 Palaeontology

The geology of the proposed Elandsfontein Colliery, Emalahleni Local Municipality, Nkangala District Municipality, Mpumalanga Province is primarily underlain by the Vryheid Formation (Ecca Group), and a small portion in the Dwyka Group (Figure 3). According to the PalaeoMap of South African Heritage Resources Information System the Palaeontological Sensitivity of the Vryheid Formation is Very High, while the Dwyka Group has a Moderate Palaeontological Sensitivity (Almond and Pether 2008, SAHRIS website).

It is thus recommended that an EIA level palaeontology report should be conducted to assess the value and prominence of fossils in the development area and the effect of the proposed development on the palaeontological heritage. The purpose of the EIA Report is to elaborate on the issues and potential impacts identified during the scoping phase. A Phase 1 field-based assessment would be conducted with research in the site-specific study area as well as a comprehensive assessment of the impacts identified during the scoping phase.

13.1.4 General

The combined considered opinion of the heritage specialists is that the potential impacts on identified heritage resources could be mitigated sufficiently to allow the project to continue. However, this will require confirmation at the EIA level.

14 Assumptions, Uncertainties and Gaps In Knowledge

Not detracting in any way from the comprehensiveness of the fieldwork undertaken, it is necessary to realise that the heritage resources located during the fieldwork do not necessarily represent all the possible heritage resources present within the area. Various factors account for this, including the subterranean nature of some archaeological sites and the existing highly disturbed nature of the study area. As such, should any

heritage features and/or objects not included in the present inventory be located or observed, a heritage specialist must immediately be contacted.

Note: it was not possible to access a couple of areas within the larger study area, due to existing opencast mining activities as well as the presence of discard dumps and earth berms that prevented access to certain areas.

Such observed or located heritage features and/or objects may not be disturbed or removed in any way until such time that the heritage specialist has been able to make an assessment as to the significance of the site (or material) in question. This applies to graves and cemeteries as well. If any graves or burial places are located during the development, the procedures and requirements pertaining to graves and burials will apply as set out below.

15 REFERENCES

BERGH, I.S. (ed.). 1999. *Geskiedenisatlas van Suid-Afrika. Die vier noordelike provinsies*. Pretoria: J.L. van Schaik.

BULPIN, T.V. 1989. *Lost Trails of the Transvaal*. Books of Africa, Cape Town.

BUTLER, E. 2019. *Palaeontological Desktop Assessment for the Proposed Elandsfontein Colliery Project near Witbank, Kangala Local Municipality, Mpumalanga Province*

DU PISANIE, J. 2017. *Heritage Impact Assessment: Environmental Regulatory Processes relating to the amendment of the Environmental Management Programme for its Elandsfontein Operations*

ERASMUS, B.P.J. 2014. *On Route in South Africa*. Third edition. Jonathan Ball Publishers: Johannesburg

ESTERHUYSEN, A & SMITH, J. 2007. *The Archaeology of Mpumalanga*. 7-21.

FALCONER, KW 1990. Spotlight on 100 years of coal mining in Witbank. *Journal of the South African Institute of Mining and Metallurgy, pp 78*

FOURIE, W. 2008. Archaeological Impact Assessments within South African Legislation. *South African Archaeological Bulletin* 63 (187): 77–85, 2008.

HUFFMAN, T.N. 2007. *Handbook to the Iron Age: The archaeology of Pre-Colonial Farming Societies in Southern Africa*. University of KwaZulu-Natal Press, Scottsville.

KUSEL, U. 2016. *Phase I Cultural Heritage Resources Impact Assessment for a Temporary Road for a Large Dragline to be Moved from Kromdraai Coal Mine to Clewer in the Emalahleni District Mpumalanga Province.*

MORRIS, D. 2008. *Archaeological and Heritage Impact Assessment on Remainder of Carter Block 458, near Lime Acres, Northern Cape*. McGregor Museum.

MYBURGH, A.C. 1956. *Die Stamme van die Distrik Carolina*. Departement van Naturelle Sake, Pretoria.

PISTORIUS, JCC. 2013. *A Phase I Heritage Impact Assessment (HIA) Study for the Proposed Landau Colliery Life Extension Project near Emahlaleni (Witbank) tn The Eastern Highveld in the Mpumalanga Province*.

SKINNER, W. 1911. *The Mining Manual*. The Capitalist. London

VAN DER WALT, J. 2013. *Archaeological Scoping Report for The Proposed Establishment Of The Transalloys Coal-Fired Power Plant Near Witbank, Mpumalanga Province*.

VAN DER WESTHUIZEN, G.P. AND VAN DER WESTHUIZEN, E., 2000. *Guide to the Anglo Boer War in the Eastern Transvaal, 1899-1902, 100 Years*. Volksrust: G.P. van der Westhuizen.

VAN VOLLENHOVEN, A & COLLINS, Z. 2014. A Report on a Cultural Heritage Impact Assessment for the Proposed Development at Transalloys on Portions 34 and 35 (Portion Of Portion 34) of the Farm Elandsfontein 309 JS And Portions 20 And 24 Of The Farm Schoongezicht 308 JS, Close to Emalahleni, Mpumalanga Province.

VAN VOLLENHOVEN, A. 2017. *A Report on a Cultural Heritage Impact Assessment for the Proposed Relocation of 3 X 400kv Power Lines at the Landau 3 Colliery, Close to Emalahleni, Mpumalanga Province.*

http://www.angloboerwar.com/other-information/88-concentration-camps/1833-concentration-camps-locations

16 APPENDICES

Appendix A: Specialist CVs

.

PROFESSIONAL CURRICULUM: JENNIFER KITTO

Profession:	Heritage Specialist
Date of Birth:	1966-09-11
Parent Firm:	PGS Heritage (Pty) Ltd
Position in Firm:	Heritage Consultant
Years with Firm:	8 Years
Years experience:	20
Nationality:	South African
HDI Status:	White Female

EDUCATION:

Name of University or Institution: Dorset Institute for Higher Education (now Bournemouth University), Poole, United Kingdom

Degree obtained: **:**Higher National Diploma: Practical Archaeology

Year **:**1989

Name of University or Institution **:** University of the Witwatersrand

Degree obtained **:** BA

Major subjects **:**Archaeology and Social Anthropology

Year **:**1993

Name of University or Institution **:**University of the Witwatersrand

Degree obtained **:** BA [Hons]

Major subjects **:**Social Anthropology

Year **:** 1994

Professional Qualifications:

Member - Association of Southern African Professional Archaeologists – Technical Member No. 444

Languages:

English First Language

Afrikaans - Speaking (Fair) Reading (Fair), Writing (Fair**)**

KEY QUALIFICATIONS

Cultural Resource Management and Heritage Impact Assessment Management, Historical and Archival Research, Archaeology, Anthropology, Applicable survey methods, Fieldwork and Project Management.

SUMMARY OF EXPERIENCE

Specialised expertise in Cultural Resource Management and Heritage Impact Assessment Management, Archaeology, Anthropology, Applicable survey methods, Fieldwork and project management, including *inter alia* -

Involvement with various Heritage Impact Assessments, within South Africa, including -

- Archaeological Walkdowns for various projects
- Phase 2 Heritage Impact Assessments and EMPs for various projects
- Heritage Impact Assessments for various projects
- Heritage Audits and subsequent Compilation of Heritage Management Policy for various projects

HERITAGE ASSESSMENT PROJECTS

Below a selected list of Heritage Impact Assessments (HIA) and Heritage Audit and Management Projects completed:

- Heritage Screening Reports for Various Road Routes: Bronkhorstspruit, Carletonville and Randfontein and Eikenhof-Vaal Dam regions, Gauteng Department of Roads and Transport, Gauteng Province
- Heritage Audit and Management Policy, Sibanye Gold, Beatrix Mining area, Lejweleputswa District Municipality, Free State Province
- Heritage Audit and Management Policy, Sibanye Gold, Kloof and Driefontein Mining areas, West Rand District Municipality, Gauteng Province
- HIA Report, Dolos-Giraffe Substation, Hopefield-Bultfontein, Free State Province
- HIA Report and Phase 2 Mitigation Report, AEL Mining Services, Decontamination of AEL Detonator Campus, Modderfontein Factory, Modderfontein, City of Johannesburg Metropolitan Municipality, Gauteng
- HIA Report, Old Rand Leases Hostel redevelopment, Fleurhof Ext 10, Roodepoort, City of Johannesburg Metropolitan Municipality, Gauteng

- HIA Report, Watershed Substation, North-West Province
- HIA Report, Solid Waste Landfill Facility, Rhodes Village, Eastern Cape
- HIA Report, Solid Waste Landfill Facility, Rossouw, Eastern Cape
- Phase 2 Mitigation Report, Cass Farmstead, Optimum Colliery, Mpumalanga
- HIA Report, Kusile Ash Disposal Facility, Witbank, Mpumalanga
- Report on Rand Steam Laundries Background History, City of Johannesburg Metropolitan Municipality, Gauteng
- New Cemetery, Barkly East, Senqu Municipality, Eastern Cape (desktop/archival research for HIA report)
- Lady Slipper Country Estates, Nelson Mandela Metro Municipality, Eastern Cape (desktop/archival research for HIA report)
- Exxaro Resources Paardeplaats Project, Belfast, Mpumalanga (field survey and archival research for HIA report)
- Copperleaf Mixed Use Development, Farm Knoppieslaagte 385/Knopjeslaagte 140, Centurion, Gauteng (field survey and archival research for HIA report)
- Isundu-Mbewu Transmission Line Project, Pietermaritzburg, Kwazulu Natal (Initial Heritage Scan (survey) for Corridor 3 Alternative 1)

GRAVE RELOCATION PROJECTS

Below, a selection of grave relocation projects involvement:

- Mitigation Report on previous Grave Relocation and Permit applications for Test Excavation of two possible graves, Nkomati Mine, Mpumalanga
- Relocation of two graves Olievenhoutbosch, Tshwane, Gauteng (applications to SAHRA, Gauteng Dept. of Health and Local Authorities for relevant permits)
- Relocation of graves HL Hall Family, Nelspruit, Mpumalanga (applications to SAHRA, Mpumalanga Department of Health and Local Authorities for relevant permits)
- Relocation of two possible graves Noordwyk Ext 63, Midrand, Johannesburg, Gauteng (applications to SAHRA, Gauteng Dept. of Health and Local Authorities for relevant permits)
- Relocation of informal cemetery (50+) and additional unknown graves (50+) at Fleurhof Extension 5, Roodepoort, Gauteng (desktop research and applications to SAHRA, Gauteng Health Department and Local Government for relevant permits in terms of the applicable legislation)
- Relocation of informal graves (9) at Tselentis Colliery, Breyten, Mpumalanga (applications to SAHRA, Mpumalanga Department of Health and Local Authorities for relevant permits)

- Relocation of various informal cemeteries at New Largo Mine, Balmoral, Mpumalanga (as above)
- Relocation of graves at Mookodi Power Station, Vryburg, North-West Province (initial social consultation)
- Relocation of graves at Hendrina Power Station, Hendrina, Mpumalanga (social consultation, permit applications, etc)

EMPLOYMENT SUMMARY:

Positions Held

- 2011 – to date: Heritage Specialist - PGS Heritage (Pty) Ltd
- 2008 – 2011: Cultural Heritage Officer (National), Burial Grounds and Graves Unit: South African Heritage Resources Agency (SAHRA)
- 1998 – 2008: Cultural Heritage Officer (Provincial), Provincial Office – Gauteng: SAHRA

LINEREÈ DE JAGER CURRICULUM VITAE

Email: lineree@pgsheritage.co.za

ID: 891010 0072 083

Nationality: South African

Languages: English and Afrikaans

Designation: Health Surveillance Forensic Archaeologist, Project Manager

Mobile: +27 (0) 71 471 3897 *RSA*

+258 84 776 8906 *MZ*

Office: +27 (0) 12 332 5305

EDUCATION AND TRAINING

February 2017: Health and Safety Representative Course (EOH Legal)

September 2016: First Aid Level 1 Course (First-Aid Training SA, Certificate Number 16/5422)

June 2015: Science Writing and Presentation Skills workshop (NRF-National Research Foundation)

October 2015: Basic Project Management (NRF-National Research Foundation)

April 2014: BA (Hons) Archaeology at UNISA

Research dissertation: *A spatial analysis of the Botshabelo Mission Station Graveyard Mpumalanga*.

April 2012: BA Archaeology at UNISA

Majored in Archaeology and Anthropology with additional subjects in Biblical Archaeology, Philosophy and Ancient Near Eastern History

September 2012: Mapping and GIS workshop (Unisa)

KEY ATTRIBUTES

Meticulous attention to detail, written communication skills, ability to extract and analyse data, good communication skills, ability to work under pressure, computer literate, good organisational skills, good report writing.

SOCIETY MEMBERSHIP

(Since September 2011) South African Archaeology Society 2018/09/13

L. de Jager 2 of 3

(Since March 2016) Association of South African Professional Archaeologists (ASAPA), Professional Membership (#412)

(Since June 2018) Association of South African Professional Archaeologists (ASAPA), CRM Accreditation (Field Supervisor Stone Age, Iron Age and Grave Relocation and Field Director Grave Relocation)

EMPLOYMENT HISTORY

PGS Heritage (Pty) Ltd Archaeologist

April 2015 – Present

Anton Pelser (Part time work experience)

August 2013

FIELD WORK EXPERIENCE

Current: Grave Relocation at Orchards Development, Gauteng Province

Current: Survey and Grave Relocation at Blaauwbosch (Kophia) Diamond Mine, Free State Province

Current: Grave Relocation at Northern Coal Mine, Carolina, Mpumalanga Province

Current: Grave Relocation at Ikwezi Mine, Dannhauser, KwaZulu-Natal Province

2016 - Current: Grave Relocations at Platreef, Limpopo Province

2016 - Current: Grave Relocations at Atcom Impunzi Open Cast, Mpumalanga Province

2016 - Current: Grave Relocation at the R61 road expansion, Eastern Cape Province

2018: Grave Relocations at Anadarko, Afungi Mozambique area, Cabo Delgado Province

2016 - 2018: Grave Relocations at Tweefontein Open Cast, Mpumalanga Province

2017: Monitoring at Atcom Open Cast Coal Mine, Mpumalanga Province

2017: Grave Relocation at Lotus Gardens Development, Gauteng Province

2017: Grave Relocation at Optimum Colliery (North Operations), Mpumalanga Province

2017: Survey at Sibanye mine for Heritage Management, Free State Province

2017: Grave Relocation at Zonnebloem, Mpumalanga Province

2017: Grave Relocation at Sabrix, Gauteng Province

2017: Grave Relocation at Goedehoop Coal Mine, Mpumalanga Province

2017: Field survey at Tetra4 gold mine, Free State Province

2016: Grave Relocation at Kroonstad, Free State Province

2016: Grave Relocations at Coega, Eastern Cape Province

2016: Grave Relocation at Nkomati Mine, Mpumalanga Province

2015: Field survey at the Jeanette Gold mine, Free State Province

2015: Grave Relocation at Kgalabatsane, Gauteng Province

2015: Grave Relocation at Wonderboom, Gauteng Province

2015: Survey, Monitoring and Archaeological Excavation Johannesburg Zoo, Gauteng Province 2018/09/13

2015: Grave Relocation at Crystal Park, Gauteng Province

2015: Field survey at Kroondal, North West Province

2013: Excavation at Lafarge in Polokwane, Limpopo Province

2013: Unisa Archaeological Fieldwork Excursion at Botshabelo Mission Station, Mpumalanga Province

2012: Unisa Archaeological Fieldwork Excursion at Magoro Hill, Limpopo Province

2011: Unisa Anthropological Field Excursion, Buysdorp, Limpopo Province

CONFERENCE PRESENTATIONS

August 2015: Accepted to present a poster *A spatial analysis of the Botshabelo Mission Station Graveyard Mpumalanga* at the ASAPA Conference in Zimbabwe.

.

WOUTER FOURIE

Professional Heritage Specialist and Professional Archaeologist and Director PGS Heritage

Summary of Experience

Specialised expertise in Archaeological Mitigation and excavations, Cultural Resource Management and Heritage Impact Assessment Management, Archaeology, Anthropology, Applicable survey methods, Fieldwork and project management, Geographic Information Systems, including *inter alia* -

Involvement in various grave relocation projects (some of which relocated up to 1000 graves) and grave "rescue" excavations in the various provinces of South Africa

Involvement with various Heritage Impact Assessments, within South Africa, including -

- Archaeological Walkdowns for various projects
- Phase 2 Heritage Impact Assessments and EMPs for various projects
- Heritage Impact Assessments for various projects
- Iron Age Mitigation Work for various projects, including archaeological excavations and monitoring
- Involvement with various Heritage Impact Assessments, outside South Africa, including -
- Archaeological Studies in Democratic Republic of Congo
- Heritage Impact Assessments in Mozambique, Botswana and DRC
- Grave Relocation project in DRC

Key Qualifications

BA [Hons] (Cum laude) - Archaeology and Geography - 1997

BA - Archaeology, Geography and Anthropology - 1996

Professional Archaeologist - Association of Southern African Professional Archaeologists (ASAPA) - Professional Member

Accredited Professional Heritage Specialist – Association of Professional Heritage Practitioners (APHP)

CRM Accreditation (ASAPA) -

Principal Investigator - Grave Relocations

Field Director – Iron Age

Field Supervisor – Colonial Period and Stone Age

Accredited with Amafa KZN

Key Work Experience

2003- current - Director – Professional Grave Solutions (Pty) Ltd

2007 – 2008 - Project Manager – Matakoma-ARM, Heritage Contracts Unit, University of the Witwatersrand

2005-2007 - Director – Matakoma Heritage Consultants (Pty) Ltd

2000-2004 - CEO– Matakoma Consultants

1998-2000 - Environmental Coordinator – Randfontein Estates Limited. Randfontein, Gauteng

1997-1998 - Environmental Officer – Department of Minerals and Energy. Johannesburg, Gauteng

Worked on various heritage projects in the SADC region including, Botswana, Mozambique, Mauritius, Malawi and the Democratic Republic of the Congo