



# PGS HERITAGE

**WEST WITS MINING MLI (PTY) LTD, ROODEPOORT, JOHANNESBURG  
METROPOLITAN MUNICIPALITY, GAUTENG PROVINCE**

**Mining Permit Application: Proposed Creswell Park Opencast Pit**

Heritage Impact Assessment

**Issue Date:** 23 May 2018  
**Revision No.:** 0  
**PGS Project No.:** 298 HIA  
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### **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.

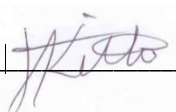
### **Disclosure of Vested Interest**

- 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;

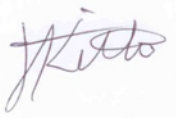

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\_\_\_\_\_

**ACKNOWLEDGEMENT OF RECEIPT**

|                     |   |  |  |
|---------------------|---|--|--|
| <b>Report Title</b> | <b>Heritage Impact Assessment - Mining Permit Application: West Wits<br/>Mining MLI (Pty) Ltd – Proposed Opencast Pit: Creswell Park, Roodepoort,<br/>Johannesburg Metropolitan Municipality, Gauteng</b> |  |  |
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The heritage impact assessment report has been compiled taking into account the NEMA Appendix 6 requirements for specialist reports as indicated in the table below.

| NEMA Regs (2014) - Appendix 6  | Relevant section in report  |
|--|---|
| Details of the specialist who prepared the report  | Page ii of Report – Contact details and company   |
| The expertise of that person to compile a specialist report including a curriculum vita  | Section 1.2 – refer to <b>Appendix D</b>  |
| 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 6   |
| A description of the methodology adopted in preparing the report or carrying out the specialised process   | Section 3.1 and <b>Appendix B and Appendix C</b>  |
| The specific identified sensitivity of the site related to the activity and its associated structures and infrastructure   | Section 4.2   |
| An identification of any areas to be avoided, including buffers  | Section 7   |
| 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;                             | Refer to <b>Figure 13</b>   |
| 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 5 and 6   |
| Any mitigation measures for inclusion in the EMPr  | Section 9   |
| Any conditions for inclusion in the environmental authorisation  | Section 9   |
| Any monitoring requirements for inclusion in the EMPr or environmental authorisation   | Section 9 and 10  |
| A reasoned opinion as to whether the proposed activity or portions thereof should be authorised and  | Section 9 and 10  |
| 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 was handled as part of the BAR 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 to undertake a Heritage Impact Assessment (HIA) that forms part of the Basic Assessment Reporting process (BAR) for the mining permit application for the proposed opencast pit referred to as Creswell Park, located on a portion of portion 406 of the Farm Roodepoort 237 IQ, with a section of the access/haul road located on a portion of Portion 407 of the Farm Roodepoort 237 IQ, Roodepoort Local Municipality, Johannesburg Metropolitan Municipality, Gauteng Province.

The archival and historical research has revealed that the entire area of the farm Roodepoort 237 IQ, on which the proposed Creswell Park opencast mining footprint is situated, has been affected on a continual basis by historical mining activities. These mining activities have continued to the present day, both formally and informally (illegal). The ground affected by the Creswell Park opencast footprint is therefore extremely disturbed.

The HIA study has shown that although the project footprint does not contain heritage resources, the immediate surrounding area does contain some heritage resources. Through data analysis and a site investigation the following issues were identified from a heritage perspective.

The data analysis has enabled the identification of possible heritage sensitive areas that included:

- Structures/buildings (residential);
- Burial grounds and graves;
- Possible archaeological sites (based on experience)

Note that these structures refer to heritage sites as listed in the table below.

*Table: Tangible Heritage sites in the area adjacent to Creswell Park opencast footprint*

| Name  | Description                   | Legislative protection |
|---|-------------------------------|------------------------|
| <b>Architectural Structures (residential)</b> | Possibly older than 60 years  | NHRA Sect 3 and 34     |
| <b>Burial grounds and graves</b>              | Possibly older than 60 years  | NHRA Sect 3 and 36     |
| <b>Archaeological sites</b>                   | Possibly older than 100 years | NHRA Sect 3 and 35     |

During the field assessment for the Creswell Park opencast footprint, no heritage sites were identified within the footprint area, however, a total of three heritage sites were located close to the footprint area. These include one formal burial ground (**CP001**), and two historical residential areas (**CP002, CP003**). Refer to **Figure 22** for the locality of heritage resources in relation to the proposed opencast footprint. In addition, an historical midden of probable archaeological age was identified by a previous study and is located just outside the footprint boundary (**PB 2008**).

The management and mitigation measures as described in Section 9 of this report have been developed to minimise the project impact on heritage resources. Impacts on burial grounds and graves are rated as MEDIUM NEGATIVE before mitigation and LOW NEGATIVE after mitigation measures are implemented. Impacts on historical structures/ residential areas are rated as MEDIUM NEGATIVE before mitigation and LOW NEGATIVE after mitigation measures are implemented. Finally, impacts on palaeontological resources are rated as a LOW NEUTRAL before and after mitigation measures are implemented.

In Palaeontological terms the significance is rated as low neutral. The proposed development is thus unlikely to pose a substantial threat to local fossil heritage. However, should fossil remains be discovered during any phase of construction, either on the surface or exposed by fresh excavations, the ECO responsible for these developments should be alerted immediately. Such discoveries ought to be protected (preferably in situ) and the ECO should alert SAHRA (South African Heritage Research Agency) so that appropriate mitigation (e.g. recording, sampling or collection) can be taken by a professional palaeontologist.

It is my considered opinion, based on the findings of the desktop research together with the fieldwork findings, that the overall direct impact on heritage resources is acceptably low although the indirect impact on heritage resources is Medium before mitigation. However, provided the mitigation measures recommended for the identified sites situated adjacent to the proposed Creswell Park opencast footprint are implemented, the project can be approved from a heritage perspective.

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## 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 period which commenced 10 000 years ago.

## **Late Stone Age**

The archaeology of the last 40 000 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 40 000-300 000 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.

| <b>ACRONYMS</b>         | <b>Description</b>                                       |
|-------------------------|--|
| <b>AIA</b>              | Archaeological Impact Assessment                         |
| <b>ASAPA</b>            | Association of South African Professional Archaeologists |
| <b>BAR</b>              | Basic Assessment Reporting process                       |
| <b>CBD</b>              | Central Business District                                |
| <b>CRM</b>              | Cultural Resource Management                             |
| <b>DEA</b>              | Department of Environmental Affairs                      |
| <b>DMR</b>              | Department of Mineral Resources                          |
| <b>ECO</b>              | Environmental Control Officer                            |
| <b>EIA practitioner</b> | Environmental Impact Assessment Practitioner             |
| <b>EIA</b>              | Environmental Impact Assessment                          |
| <b>ESA</b>              | Early Stone Age  |
| <b>GPS</b>              | Global Positioning System                                |
| <b>HIA</b>              | Heritage Impact Assessment                               |
| <b>I&amp;AP</b>         | Interested & Affected Party                              |
| <b>LSA</b>              | Late Stone Age   |
| <b>LIA</b>              | Late Iron Age  |
| <b>MSA</b>              | Middle Stone Age   |
| <b>MIA</b>              | Middle Iron Age  |

|               |   |
|---------------|---|
| <b>NEMA</b>   | National Environmental Management Act                         |
| <b>NEMAWA</b> | National Environmental Management: Waste Act (No. 59 of 2008) |
| <b>NHRA</b>   | National Heritage Resources Act (No 25 of 1999)               |
| <b>NWA</b>    | National Water Act (36 of 1998)                               |
| <b>PGS</b>    | PGS Heritage  |
| <b>PHRA</b>   | Provincial Heritage Resources Authority                       |
| <b>PHRAG</b>  | Provincial Heritage Resources Authority – Gauteng             |
| <b>PSSA</b>   | Palaeontological Society of South Africa                      |
| <b>SADC</b>   | Southern African Development Community                        |
| <b>SAHRA</b>  | South African Heritage Resources Agency                       |
| <b>SAHRIS</b> | South African Heritage Resources Information System           |
| <b>SAPS</b>   | South African Police Services                                 |
| <b>ZAR</b>    | Zuid-Afrikaansche Republiek                                   |

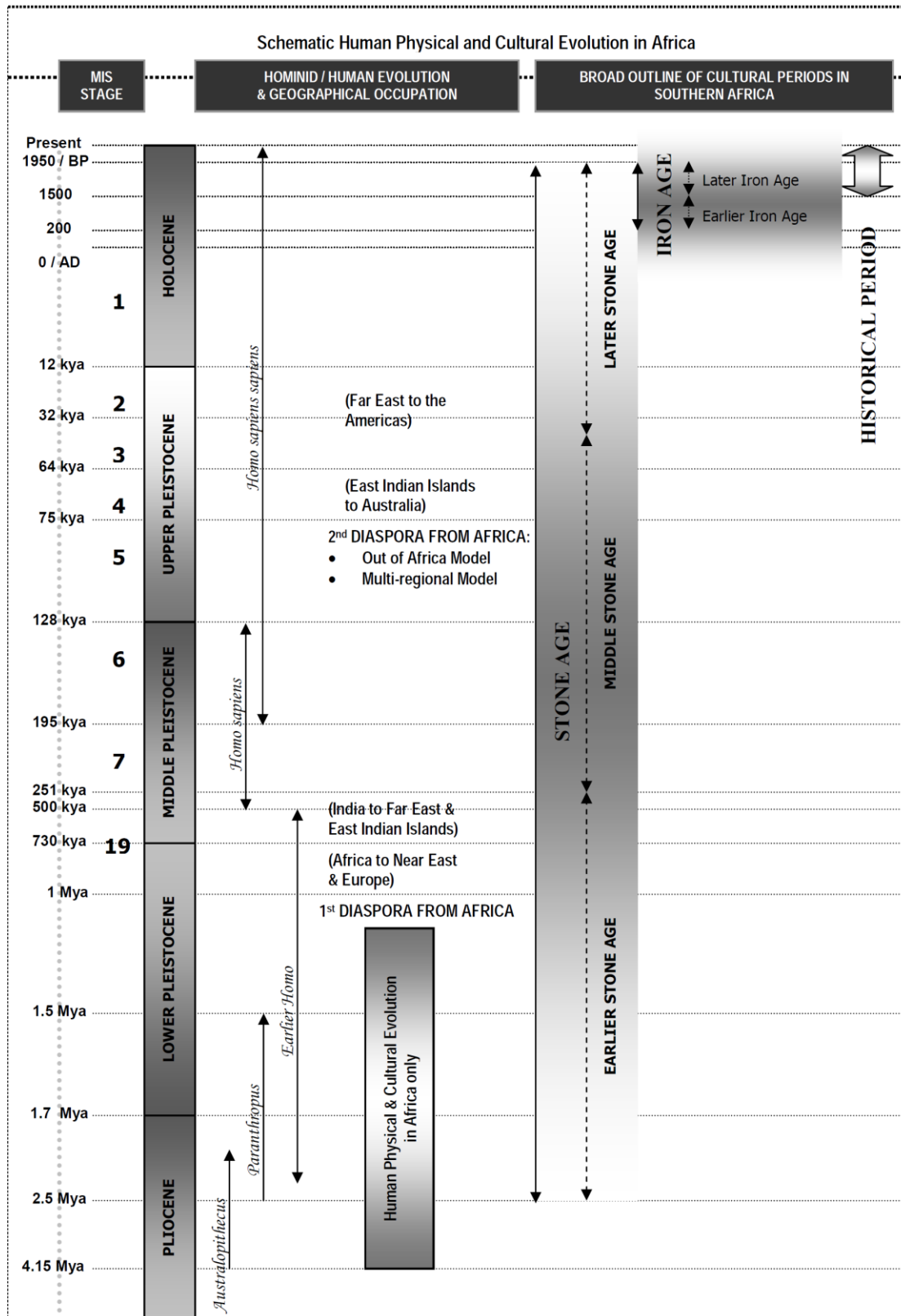


Figure 1: Human and Cultural Time line in Africa (Morris, 2008)

## 1 INTRODUCTION

PGS Heritage (Pty) Ltd (PGS) was appointed to undertake an Heritage Impact Assessment (HIA) that forms part of the BAR for the mining permit application for the proposed opencast pit referred to as Creswell Park, located on a portion of portion 406 of the Farm Roodepoort 237 IQ, with a section of the access/haul road located on a portion of Portion 407 of the Farm Roodepoort 237 IQ, Roodepoort Local Municipality, Johannesburg Metropolitan Municipality, Gauteng Province.

### 1.1 Scope of the Study

The aim of the study is to identify possible heritage sites and finds that may occur in the proposed mining permit area for the Creswell Park opencast pit. The HIA aims to inform the BAR to assist the developer in managing any identified heritage resources in a responsible manner, to protect, preserve, and develop them within the framework provided by the National Heritage Resources Act of 1999 (Act 25 of 1999) (NHRA).

The scope of work for the HIA Phase of the project can be itemised as follows:

- A detailed HIA based on the proposed activities. Impacts must be calculated for each phase of the project and these phases shall be classified as:
  - Planning and Design;
  - Construction;
  - Operation;
  - Decommissioning;
  - Rehabilitation and Closure.
- Identification and description of site sensitivities (if none, motivate why not);
- Identification and description of site constraints (if none, motivate why not);
- Identified potential impacts must be evaluated in accordance with the agreed methodology to determine significance. Identified potential impacts (cumulative, direct and indirect) must be quantified (where possible) and fully described for each feasible alternative utilising the Impact Assessment template provided by Malan Scholes.
- Residual and latent impacts after mitigation must be evaluated (in accordance with the assessment methodology described above) that actual implemented results can be measured against those predicted;



- Each specialist will be required to contribute to the preparation of a detailed site specific EMPr relating to the specific field of expertise and impacts identified;
- Provide detailed mitigation / management measures for the management of the identified impacts for inclusion in the EMPr. The mitigation / management measures must be presented in a tabulated format for each phase of the project and must include:
  - Detailed description of mitigation measures or management options;
  - Roles and Responsibilities for Implementation;
  - Timeframes for implementation;
  - Means of measuring successful implementation (Targets & Performance Indicators).
- Compilation of an Action Plan for Implementation of the recommended mitigation measures. This plan must, at a minimum, include the following:
  - Management Actions for Implementation;
  - Responsibilities for Implementation, Monitoring and Review;
  - Timeframes for implementation;
  - Means of measuring successful implementation (Targets & Performance Indicators).
- Any other Recommendations;
- Identify any gaps in knowledge, data or information;
  - Report on the adequacy of predictive methods utilised
  - Report on the adequacy of underlying assumptions;
  - Report on uncertainties in the information provided.

## **1.2 Specialist Qualifications**

This HIA Report was compiled by PGS.

The staff at PGS has a combined experience of nearly 40 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.

Jennifer Kitto, the 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.

Ilan Smeyatsky, field archaeologist, holds a Master's degree in Archaeology and is registered as a Professional Archaeologist with ASAPA.

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).

### **1.3 Assumptions and Limitations**

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 current dense vegetation cover. 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.

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 burial grounds as well. If any graves or burial grounds are located during the development, the procedures and requirements pertaining to graves and burial grounds will apply as set out below.

Please note that the field survey for this project was constrained by security issues related to illegal mining activity in the footprint area as well as obscured visibility due to some areas of dense vegetation and extensive dumping.

### **1.4 Legislative Context**

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:

- National Environmental Management Act (NEMA), Act 107 of 1998

- National Heritage Resources Act (NHRA), Act 25 of 1999
- Mineral and Petroleum Resources Development Act (MPRDA), Act 28 of 2002

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

- National Environmental Management Act (NEMA) Act 107 of 1998
  - Basic Environmental Assessment (BEA) – Section (23)(2)(d)
  - Environmental Scoping Report (ESR) – Section (29)(1)(d)
  - Environmental Impact Assessment (EIA) – Section (32)(2)(d)
  - Environmental Management Plan (EMP) – Section (34)(b)
- National Heritage Resources Act (NHRA) Act 25 of 1999
  - Protection of Heritage Resources – Sections 34 to 36; and
  - Heritage Resources Management – Section 38
- Mineral and Petroleum Resources Development Act (MPRDA) Act 28 of 2002
  - Section 39(3)

The NHRA stipulates that cultural heritage resources may not be disturbed without authorization from the relevant heritage authority. Section 34(1) of the NHRA states that, “no person may alter or demolish any structure or part of a structure which is older than 60 years without a permit issued by the relevant provincial heritage resources authority...” The NHRA is utilized as the basis for the identification, evaluation and management of heritage resources and in the case of CRM those resources specifically impacted on by development as stipulated in Section 38 of NHRA. This study falls under s38(8) and requires comment from the relevant heritage resources authority.

The NHRA stipulates that cultural heritage resources may not be disturbed without authorization from the relevant heritage authority. Sections 34-36 provides general protection to heritage resources such as structures older than 60 years, archaeological and palaeontological resources and burial grounds and graves.

The NHRA is utilized as the basis for the identification, evaluation and management of heritage resources and, in the case of CRM, those resources specifically impacted on by development as stipulated in Section 38(1) of NHRA, and those developments administered through NEMA and

MPRDA legislation (s38(8)). In the latter cases, the feedback from the relevant heritage resources authority is required by the State and Provincial Departments managing these Acts before any authorizations are granted for development. The last few years have seen a significant change towards the inclusion of heritage assessments as a major component of Environmental Impacts Processes required by NEMA and MPRDA. This change requires us to evaluate the Section of these Acts relevant to heritage (Fourie, 2008).

The NEMA 23(2)(b) states that an integrated environmental management plan should, "...identify, predict and evaluate the actual and potential impact on the environment, socio-economic conditions and cultural heritage".

A study of subsections (23)(2)(d), (29)(1)(d), (32)(2)(d) and (34)(b) and their requirements in the NEMA reveals the compulsory inclusion of the identification of cultural resources, the evaluation of the impacts of the proposed activity on these resources, the identification of alternatives and the management procedures for such cultural resources for each of the documents noted in the Environmental Regulations. A further important aspect to be taken account of in the Regulations under NEMA is the Specialist Report requirements laid down in Section 33 of the regulations (Fourie, 2008).

## **1.5 International Requirements**

The regulatory aspects dealt with above relate solely to the in-house South African laws and regulations and would usually be the only requirements for an application for a Mining Right. However, it may be that international financing is required for a large-scale project, in which case Project Finance Advisory Services, Project Finance, Project-Related Corporate Loans or Bridging Loans may be required. In such a case, the applicant for international financing will need to comply with the requirements of the International Finance Corporation (IFC) Performance Standards and the Equator Principles observed by most large international financial institutions. Summaries of these requirements are set out below.

### *i. The International Finance Corporation*

The IFC Performance Standards are an international benchmark for identifying and managing environmental and social risk and have been adopted by many organizations as a key component of their environmental and social risk management. The IFC's Environmental, Health, and Safety

(EHS) Guidelines provide technical guidelines with general and industry-specific examples of good international industry practice to meet the IFC’s Performance Standards (PS).

In many countries, the scope and intent of the IFC Performance Standards is addressed or partially addressed in the country’s environmental and social regulatory framework. The IFC Performance Standards encompass eight topics of which PS 7 and PS 8 have direct relevance to heritage resources:

- i. PS 1 - Environmental and Social Assessment and Management System;
- ii. PS 2 - Labour and Working Conditions;
- iii. PS 3 - Pollution Prevention and Abatement;
- iv. PS 4 - Community Health, Safety and Security;
- v. PS 5 - Land Acquisition and Involuntary Resettlement;
- vi. PS 6 - Biodiversity Conservation and Sustainable Natural Resource Management;
- vii. PS 7 - Indigenous Peoples;
- viii. PS 8 - Cultural Heritage

**Table 1** provides a listing of the relevant sections pertaining to cultural heritage.

*Table 1 :Sections of IFC Standards relevant to heritage resources and their management*

| GUIDELINE   | RELEVANT CHAPTER  | DESCRIPTION OF THE REQUIREMENT   |
|---|---|--|
| International Finance Corporations (IFC) Performance Standard | Standard (PS) 5 – Paragraph 3                                 | Minimization and avoidance of impacts from project related activities.                                     |
|   | Standard (PS) 5 – Paragraph 10 (Community Engagement) (2012). | Engagement with affected communities and the disclosure of relevant information of the relocation process. |
|   | Standard (PS) 5 – Paragraph 20                                | Respecting the social and cultural institutions of the displaced persons and any host communities.         |
|   | Standard (PS) 8 – Paragraph 9 (Consultation) (2012).          | The need for consultation with affected communities to identify  |

| GUIDELINE | RELEVANT CHAPTER   | DESCRIPTION OF THE REQUIREMENT   |
|-----------|--|--|
|           |  | cultural heritage of importance and involve affected communities and involve the relevant national or local regulatory authorities in the decision-making processes. |
|           | Standard (PS) 8 – Paragraph 12 (Removal of Non-Replicable Cultural Heritage) (2012). | The removal of cultural heritage must only be considered when no other alternative is available.   |

The IFC's Performance Standards offer a framework for understanding and managing environmental and social risks for high profile, complex, international or potentially high impact projects. The financial institution is required to verify, as part of its environmental and social due diligence process, that the commercial client/investee complies with the IFC Performance Standards. To do so, the financial institution needs to be knowledgeable about the environmental and social laws of the country in which it operates and compare these regulatory requirements against those of the IFC Performance Standards to identify gaps. A good understanding of both sets of requirements, as well as potential gaps, ensures that the financial institution will effectively identify and assess the key environmental and social risks and impacts that might be associated with a financial transaction.

If non-compliances with the IFC Performance Standards are identified, and depending on the severity of the issue, the financial institution can require the commercial client/investee to develop a corrective action plan for addressing the issue within a reasonable timeframe and stipulate this as a condition of the financial transaction with the commercial client/investee.

The IFC Performance Standards help the IFC and its clients to manage and improve their environmental and social performance through an outcomes-based approach and provide a solid base from which clients may increase the sustainability of their business operations. The desired outcomes are described in the objectives of each Performance Standard, followed by specific requirements to help clients achieve these outcomes through means that are appropriate to the nature and scale of the project and commensurate with the level of environmental and social risks (likelihood of harm) and impacts.

*ii. Equator Principles*

The Equator Principles (EP) is a risk management framework, adopted by financial institutions, for determining, assessing and managing environmental and social risk in projects and is primarily intended to provide a minimum standard for due diligence to support responsible risk decision-making.

The EP apply globally, to all industry sectors and to four financial products –

- 1) Project Finance Advisory Services;
- 2) Project Finance;
- 3) Project-Related Corporate Loans; and
- 4) Bridge Loans. The relevant thresholds and criteria for applications are described in detail in the Scope section of the EP.

Equator Principles Financial Institutions (EPFI) commit to implementing the EP in their internal environmental and social policies, procedures and standards for financing projects and will not provide Project Finance or Project-Related Corporate Loans to projects where the client will not, or is unable to, comply with the EP.

The EP have greatly increased the attention and focus on social/community standards and responsibility, including robust standards for indigenous peoples, labour standards, and consultation with locally affected communities within the Project Finance market. They have also promoted convergence around common environmental and social standards. Multilateral development banks, including the European Bank for Reconstruction & Development, and export credit agencies through the Organisation for Economic Co-operation and Development (OECD) Common Approaches are increasingly drawing on the same standards as the EP.

The EP have also helped spur the development of other responsible environmental and social management practices in the financial sector and banking industry (for example, Carbon Principles in the US, Climate Principles worldwide) and have provided a platform for engagement with a broad range of interested stakeholders, including non-governmental organisations (NGOs), clients and industry bodies.

The EP consist of 10 Principles, outlined below:

i. Principle 1: Review and Categorisation

When a Project is proposed for financing, the EPFI will, as part of its internal environmental and social review and due diligence, categorise it based on the magnitude of its potential environmental and social risks and impacts. Such screening is based on the environmental and social categorisation process of the International Finance Corporation (IFC).

Using categorisation, the EPFI's environmental and social due diligence is commensurate with the nature, scale and stage of the Project, and with the level of environmental and social risks and impacts.

The categories are:

Category A – Projects with potential significant adverse environmental and social risks and/or impacts that are diverse, irreversible or unprecedented;

Category B – Projects with potential limited adverse environmental and social risks and/or impacts that are few in number, generally site-specific, largely reversible and readily addressed through mitigation measures; and

Category C – Projects with minimal or no adverse environmental and social risks and/or impacts

ii. Principle 2: Environmental and Social Assessment

For all Category A and Category B Projects, the EPFI will require the client to conduct an Assessment process to address, to the EPFI's satisfaction, the relevant environmental and social risks and impacts of the proposed Project. The Assessment Documentation should propose measures to manage impacts in a manner relevant and appropriate to the nature and scale of the proposed Project. One or more specialised studies may also need to be undertaken for the Assessment Documentation. It may, in some cases, be appropriate for the client to complement its Assessment Documentation with specific human rights due diligence. For all Projects, in all locations, when combined Scope 1 and Scope 2 Emissions are expected to be more than 100,000 tonnes of CO<sub>2</sub> equivalent annually, an alternatives analysis will be conducted to evaluate less Greenhouse Gas (GHG) intensive alternatives.

iii. Principle 3: Applicable Environmental and Social Standards

The Assessment process should, in the first instance, address compliance with relevant host country laws, regulations and permits that pertain to environmental and social issues.

EPFIs operate in diverse markets: some with robust environmental and social governance, legislation systems and institutional capacity designed to protect their people and the natural environment; and some with evolving technical and institutional capacity to manage environmental and social issues.



The EPFI will require that the Assessment process evaluates compliance with the applicable standards for what are known as Designated Countries (the First World countries with robust regulatory systems), where the Assessment process evaluates compliance with relevant host country laws, regulations and permits that pertain to environmental and social issues; and Non-Designated Countries, where the Assessment process evaluates compliance with the then applicable IFC Performance Standards

iv. Principle 4: Environmental and Social Management System and Equator Principles Action Plan

For all Category A and Category B Projects, the EPFI will require the client to develop or maintain an Environmental and Social Management System (ESMS). Further, an Environmental and Social Management Plan (ESMP) will be prepared by the client to address issues raised in the Assessment process and incorporate actions required to comply with the applicable standards. Where the applicable standards are not met to the EPFI's satisfaction, the client and the EPFI will agree an Equator Principles Action Plan (AP). The Equator Principles AP is intended to outline gaps and commitments to meet EPFI requirements in line with the applicable standards.

v. Principle 5: Stakeholder Engagement

For all Category A and Category B Projects, the EPFI will require the client to demonstrate effective Stakeholder Engagement as an ongoing process in a structured and culturally appropriate manner with Affected Communities and, where relevant, Other Stakeholders. For Projects with potentially significant adverse impacts on Affected Communities, the client will conduct an Informed Consultation and Participation process. The engagement process should be free from external manipulation, interference, coercion and intimidation. The client will take account of, and document, the results of the Stakeholder Engagement process, including any actions agreed resulting from such process. For Projects with environmental or social risks and adverse impacts, disclosure should occur early in the Assessment process, in any event before the Project construction commences, and on an ongoing basis. EPFIs recognise that indigenous peoples may represent vulnerable segments of project-affected communities. Projects affecting indigenous peoples are subject to a more rigorous process of Informed Consultation and Participation.

vi. Principle 6: Grievance Mechanism

For all Category A and, as appropriate, Category B Projects, the EPFI will require the client, as part of the ESMS, to establish a grievance mechanism designed to receive and facilitate resolution of concerns and grievances about the Project's environmental and social

performance. The grievance mechanism will seek to resolve concerns promptly, using an understandable and transparent consultative process that is culturally appropriate, readily accessible, at no cost, and without retribution to the party that originated the issue or concern. The mechanism should not impede access to judicial or administrative remedies. The client will inform the Affected Communities about the mechanism in the course of the Stakeholder Engagement process.

vii. Principle 7: Independent Review: Project Finance

For all Category A and, as appropriate, Category B Projects an Independent Environmental and Social Consultant, not directly associated with the client, will carry out an Independent Review of the Assessment Documentation including the ESMPs, the ESMS, and the Stakeholder Engagement process documentation in order to assist the EPFI's due diligence, and assess Equator Principles compliance.

Project-Related Corporate Loans

An Independent Review by an Independent Environmental and Social Consultant is required for Projects with potential high-risk impacts including, but not limited to, any of the following adverse impacts on indigenous peoples, Critical Habitat impacts, Significant cultural heritage impacts and Large-scale resettlement.

In other Category A, and as appropriate Category B, Project-Related Corporate Loans, the EPFI may determine whether an Independent Review is appropriate or if internal review by the EPFI is sufficient. This may take into account the due diligence performed by a multilateral or bilateral financial institution or an OECD Export Credit Agency, if relevant.

viii. Principle 8: Covenants

An important strength of the Equator Principles is the incorporation of covenants linked to compliance. For all Projects, the client will covenant in the financing documentation to comply with all relevant host country environmental and social laws, regulations and permits in all material respects.

Furthermore, for all Category A and Category B Projects, the client will covenant the financial documentation:

- a) to comply with the ESMPs and Equator Principles AP (where applicable) during the construction and operation of the Project in all material respects;
- b) to provide periodic reports in a format agreed with the EPFI (with the frequency of these reports proportionate to the severity of impacts, or as required by law, but not less than annually), prepared by in-house staff or third-party experts, that document compliance with the ESMPs and Equator Principles AP (where applicable), and

- provide representation of compliance with relevant local, state and host country environmental and social laws, regulations and permits; and
- c) to decommission the facilities, where applicable and appropriate, in accordance with an agreed decommissioning plan.
  - d) Where a client is not in compliance with its environmental and social covenants, the EPFI will work with the client on remedial actions to bring the Project back into compliance to the extent feasible. If the client fails to re-establish compliance within an agreed grace period, the EPFI reserves the right to exercise remedies, as considered appropriate.

ix. Principle 9: Independent Monitoring and Reporting Project Finance

To assess Project compliance with the Equator Principles and ensure ongoing monitoring and reporting after Financial Close and over the life of the loan, the EPFI will, for all Category A and, as appropriate, Category B Projects, require the appointment of an Independent Environmental and Social Consultant, or require that the client retain qualified and experienced external experts to verify its monitoring information which would be shared with the EPFI.

Project-Related Corporate Loans

For Projects where an Independent Review is required under Principle 7, the EPFI will require the appointment of an Independent Environmental and Social Consultant after Financial Close, or require that the client retain qualified and experienced external experts to verify its monitoring information which would be shared with the EPFI.

x. Principle 10: Reporting and Transparency Client Reporting Requirements

The following client reporting requirements are in addition to the disclosure requirements in Principle 5.

For all Category A and, as appropriate, Category B Projects:

The client will ensure that, at a minimum, a summary of the ESIA is accessible and available online.

The client will publicly report GHG emission levels (combined Scope 1 and Scope 2 Emissions) during the operational phase for Projects emitting over 100,000 tonnes of CO<sub>2</sub> equivalent annually.

### *EPFI Reporting Requirements*

The EPFI will report publicly, at least annually, on transactions that have reached Financial Close and on its Equator Principles implementation processes and experience, taking into account appropriate confidentiality considerations.

There are two important Attachments to the Equator Principles: Annexure A dealing with Climate Change: Alternatives Analysis, Quantification and Reporting of Greenhouse Gas Emissions; and Annexure B dealing with Minimum Reporting Requirements on:

- Data and Implementation Reporting
- Project Finance Advisory Services Data
- Bridge Loans Data
- Implementation Reporting
- Project Name Reporting for Project Finance

## **2 TECHNICAL DETAILS OF THE PROJECT**

### **2.1 Locality**

West Wits Mining MLI (Proprietary) Limited (West Wits) holds a prospecting right (GP 30/5/1/1/2/10035 PR) over various portions of certain farms in the Roodepoort area, including Roodepoort 237 IQ, in the City of Johannesburg Metropolitan Municipality, Gauteng Province. Consent in terms of Section 11(2) of the Mineral and Petroleum Resources Development Act (MPRDA) (No. 28 of 2002) to cede a renewed prospecting right MPT No. 29/2016 from Mintails SA Soweto Cluster (Proprietary) Limited to West Wits was granted by the Department of Mineral Resources (DMR) in 2018.

Therefore, West Wits intends to now apply to the DMR for a mining permit for gold, uranium and silver over a portion of portion 406 of the Farm Roodepoort 237 IQ, with a section of the access/haul road located on a portion of Portion 407 of the Farm Roodepoort 237 IQ, referred to as Creswell Park. The resource would be accessed via opencast mining activities.

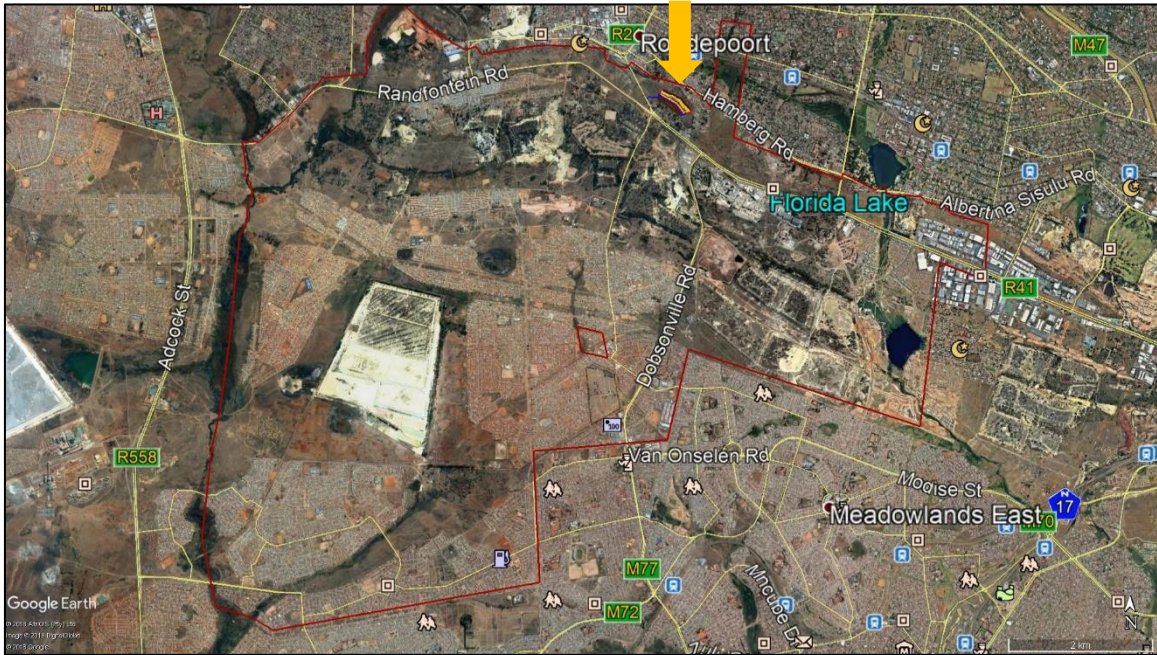


Figure 2: Locality of the Creswell Park opencast footprint (yellow arrow) within the mining right area (red polygon)



Figure 3: Closer view of the location of the Creswell Park footprint (yellow and brown polygons)

## 2.2 Technical Project Description

The following brief project description for the project has been supplied by Malan Scholes Consulting.

The West Wits ('the project') Mining Permit for Creswell Park will include a Mining Work Programme and an integrated Environmental Authorisation application in terms of NEMA and National Environmental Management: Waste Act, No. 59 of 2008 (NEMAWA), as well as in terms of the National Water Act, No 36 of 1998 (NWA). Mining would involve the removal of low grade gold bearing material that would be accessed via opencast mining. The gold bearing material would be processed at plants off-site. Once the removal of economic material has been completed the site will be rehabilitated. The post-closure land use will be identified during the Environmental Impact Assessment process, a Basic Assessment process will be followed, and the land could be suitable for housing or agriculture purposes.

Opencast mining activities would include conventional open pit mining operations of load and haul to off-site processing plants, not excluding the option to blast, but predominantly conducted through using modern methods and equipment for rock breaking which should not be intrusive to communities. Overburden and other non-mineralised rock will be excavated to expose the targeted reefs of the opencast reserves. This material would be used to backfill and rehabilitate the pit areas.

### *Basic overview of the mining method*

At the open pit targets, mining operations will be undertaken using a conventional excavate, load and haul mining cycle. Trees and bush will initially be removed, and topsoil will be excavated and hauled to an identified topsoil stockpile. Waste material below the topsoil will also be excavated and hauled to the identified waste dumping sites. Ore will be excavated and hauled to an ore stockpile for initial crushing before transportation to the processing plant. Breakage of any material that is not susceptible to free-dig excavation will be enabled through excavators fitted with rock breaking technology and it is expected that no blasting will be required at any of the open pit targets. It is expected that mining at the open pit targets will be carried out by a mining contractor. **Figure 4** and **Figure 5** below, show views of the current opencast mining operations at Sol Plaatjie Pit and the rock-breaking machinery being used.



Figure 4: View of the current opencast mining operations at Sol Plaatjie opencast operation.



Figure 5: Closer view of the equipment used to break up the rock. The machine uses an Xcentric Ripper, which is an attachment developed for high-performance rock excavation and concrete demolition work. The production rates are up to 5 times greater than using a hydraulic breaker.

#### *Summary of infrastructure requirements such as roads, rail, electricity and water*

It is envisaged that managerial and supervision operations during the extraction of ore from the open pit target areas will be performed from the existing Sol Plaatjie operation site. No additional infrastructure is therefore required during the open pit phase (Years 1 to 3). The mining and rehabilitation periods for the Creswell Park opencast area are expected to be 3 to 4 months and 5 to 6 months, respectively.

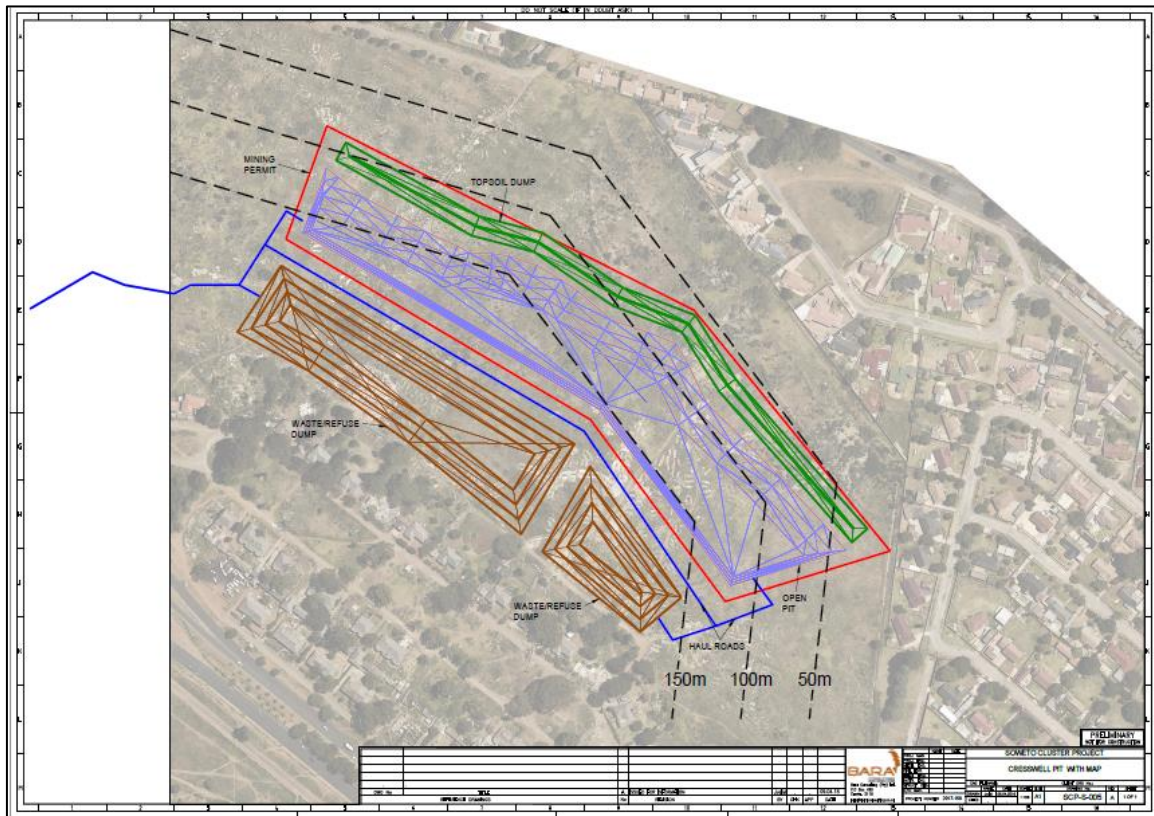


Figure 6: Creswell Park Open Pit Layout (from Bara Consulting), showing the position of the pit (blue polygon), waste rock dump (brown polygons) and the associated access roads (blue)

### 3 ASSESSMENT METHODOLOGY

The section below outlines the assessment methodologies utilised in the study.

#### 3.1 Methodology for Assessing Heritage Site significance

This HIA report was compiled by PGS for the proposed Creswell Park opencast mining permit. The applicable maps, tables and figures, are included as stipulated in the NHRA (no 25 of 1999) and the NEMA (no 107 of 1998). The HIA process consisted of three steps:

Step I – Literature Review: The background information to the field survey relied greatly on the Heritage Background Research.

Step II – Physical Survey: A physical survey was conducted on foot and by vehicle through the proposed project area by a qualified archaeologist and heritage specialist which was aimed at locating and documenting sites falling within and adjacent to the proposed development footprint.



Step III – The final step involved the recording and documentation of relevant heritage resources, the assessment of 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 - <10/50m<sup>2</sup>
  - Medium - 10-50/50m<sup>2</sup>
  - High - >50/50m<sup>2</sup>;
- 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:

#### *Site Significance*

Site significance classification standards prescribed by the SAHRA (2006) and approved by the ASAPA for the Southern African Development Community (SADC) region, were used for the purpose of this report (**Table 2**).

Table 2: Site significance classification standards as prescribed by SAHRA.

| Field Rating                         | Grade    | Significance               | Recommended Mitigation                              |
|--------------------------------------|----------|----------------------------|---|
| <b>National Significance (NS)</b>    | Grade 1  | -                          | <b>Conservation; National Site nomination</b>       |
| <b>Provincial Significance (PS)</b>  | Grade 2  | -                          | <b>Conservation; Provincial Site nomination</b>     |
| <b>Local Significance (LS)</b>       | Grade 3A | High Significance          | <b>Conservation; Mitigation not advised</b>         |
| <b>Local Significance (LS)</b>       | Grade 3B | High Significance          | <b>Mitigation (Part of site should be retained)</b> |
| <b>Generally Protected A (GP. A)</b> | -        | High / Medium Significance | <b>Mitigation before destruction</b>                |
| <b>Generally Protected B (GP. B)</b> | -        | Medium Significance        | <b>Recording before destruction</b>                 |
| <b>Generally Protected C (GP.C)</b>  | -        | Low Significance           | <b>Destruction</b>                                  |

### 3.2 Methodology for Impact Assessment

The environmental assessment methodology used to assess the potential impacts on heritage resources discussed in this report. The methodology uses the following concepts in the assessment:

- **Nature of the impact:** A brief description of the impact being assessed, in terms of the proposed activity or project, including the socio-economic or environmental aspect affected by this impact.
- **Status of the impact:** Whether the impact is of benefit or detriment to the environment or whether it is neutral.
- **Magnitude of the impact:** A brief description of the intensity or amplitude of the impact on socio-economic or environmental aspects.
- **Extent of the project:** A brief description of the spatial influence of the impact or the area that will be affected by the impact.
- **Duration of the impact:** A short description of the period of time the impact will have an effect on aspects.
- **Probability of the impact occurring:** The estimated chance of the impact happening.
- **Degree to which the impact can be reversed:** The ability of an impact to be changed from a state of affecting aspects to a state of not affecting aspects.
- **Degree to which impact may cause irreplaceable loss of resources:** The amount of resources that can/can't be replaced.
- **Degree to which the impact can be mitigated:** The effect of mitigation measures on the impact and its degree of effectiveness.

- **Confidence rating:** Level of certainty of the impact occurring.
- **Significance of the impacts:** The combination of the duration and importance of the impact, in terms of physical and socio-economic extent, resulting in an indicative level of mitigation required.
- **Cumulative impacts:** The effect the combination of past, present and “reasonably foreseeable” future actions have on aspects.

## 4 CURRENT STATUS QUO

### 4.1 Site Description

The greater Roodepoort region has been extensively altered by historical mining activities since the farms Vogelstruisfontein, Roodepoort, Langlaagte and the two portions comprising Paardekraal (in Krugersdorp) were proclaimed as public diggings by the then Zuid-Afrikaansche Republiek (ZAR) government in 1886.

Present land uses associated with the general surrounds include a combination of informal settlements, low-cost and high-cost residential areas, industrial areas and manufacturing and distribution facilities, historical mine housing and historical mine infrastructure (tailings dams, shafts, derelict/abandoned buildings and water dams), powerlines and road infrastructure.

The Creswell Park opencast footprint area consists of relatively flat terrain covered with secondary grassland and khakibos. Historical mining activities and recent illegal informal mining activities have altered the natural topography of the area. The entire footprint area is also covered by extensive dumping of building rubble and general waste (**Figure 7 to Figure 12**). An area of historical residential houses is located immediately south of the proposed opencast footprint area, within 35m of the proposed waste rock dump boundary. The residential suburb of Creswell Park also bounds the footprint area to the north and east. The closest built-up areas are located approximately 50m away to the east and 90-120m away to the north.

It should be noted that there is an existing opencast mining operation underway in the Sol Plaatjies area. The pit is located 3.68 km to the south-west of the proposed Creswell Park opencast footprint. There is also an existing large Tailings Storage Facility located approximately 4.17km to the south-west of Creswell Park footprint.

The current mining operation in the Sol Plaatjies area is being undertaken as a consequence of a Directive received from the DMR and under the NEMA (No 107 of 1998), for the landowner to clean up and rehabilitate the Sol Plaatjie area to rid it of illegal mining. The landowner is compelled to comply with the Directive, and in order to give effect to this NEMA Directive, the landowner appointed West Wits to remove the easily accessible opencast ore on the land which the illegal miners exploit, as removing this ore will stop the illegal mining. As part of this process, West Wits is obliged to concrete over access adits to the old underground workings, to also prevent access by illegal miners. This rehabilitation operation is supported by the DMR and the South African Police services (SAPS). This rehabilitation project is short term and the rehabilitated land will be used after removal of the ore which attracts the illegal miners, for a housing property development. Rehabilitation of this area pursuant to the NEMA Directive is therefore an essential requirement for the property development.



Figure 7: Pit area - view looking south into the eastern end



Figure 8: Pit area – western end, looking south-east, showing dense vegetation



Figure 9: Pit area –eastern section, showing dense long grass



Figure 10: Waste dump area, western section, showing dense vegetation and dumping



Figure 11: Waste Dump area, showing proximity to historical houses, looking south



Figure 12: Waste Dump area – western end, showing dumping and vegetation

## 4.2 Archival findings

The archival research focused on available information sources that were used to compile a background history of the study area and surrounds. This data then informed the possible heritage resources to be expected during field surveying.

### 4.2.1 Heritage mapping

The sensitivity maps were produced by overlying:

- Satellite Imagery; and
- Topographical Maps dating from the 1940s to the 1970s.

This enabled the identification of possible heritage-sensitive areas that included:

- Structures/Buildings;
- Burial grounds and graves;
- Possible archaeological sites (based on experience)

By superimposition and analysis, it was possible to rate these structures/areas according to age and thus their level of protection under the NHRA. Note that these structures refer to possible tangible heritage sites as listed in

**Table 3.**

*Table 3: Possible tangible heritage sites in the study area*

| Name                             | Description                   | Legislative protection |
|----------------------------------|-------------------------------|------------------------|
| <b>Architectural Structures</b>  | Possibly older than 60 years  | NHRA Sect 3 and 34     |
| <b>Burial grounds and graves</b> | Possibly older than 60 years  | NHRA Sect 3 and 36     |
| <b>Archaeological sites</b>      | Possibly older than 100 years | NHRA Sect 3 and 35     |

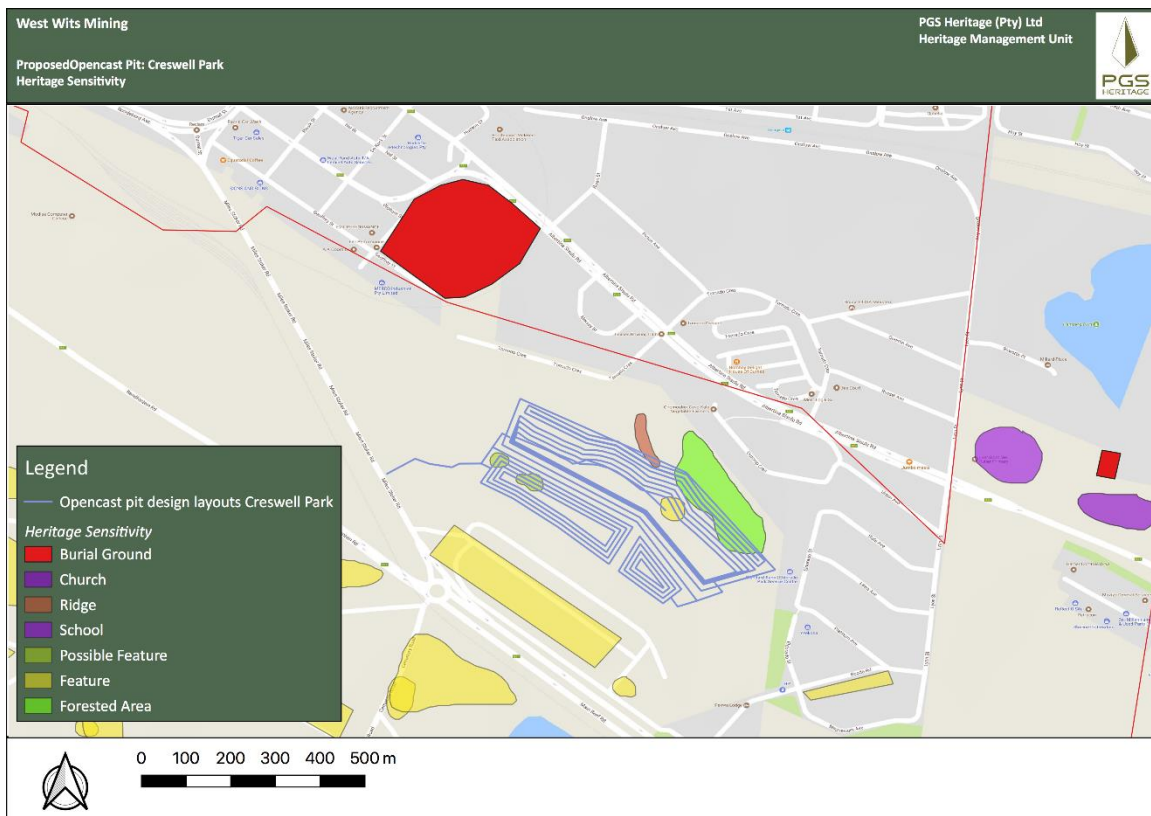


Figure 13: Heritage sensitivity map indicating possible sensitive areas within and around the Creswell Park opencast footprint

### 4.3 South African Heritage Resources Information System (SAHRIS)

A scan of SAHRIS revealed several previous heritage studies conducted in the general region of Roodepoort, however, only a few studies have been undertaken in the immediate vicinity of the Creswell Park opencast footprint. These are summarised below

- *Birkholtz. PD. 2001. Heritage Impact Assessment for the Bram Fischerville Ext. 7 Property Development, Located between Soweto and the Roodepoort CBD, Gauteng. Compiled by CRM Africa CC for Globecon Environmental Management Services*

The HIA report was undertaken as part of the Scoping Report for the proposed development. Only one site was identified, which consisted of two stone artefacts noted on top of a soil heap 20m from the edge of a water pan. The soil heap came from an excavation of about 1.6m deep. It was assumed that the stone artefacts therefore originated from the bottom of the excavation. The site is located 3.29km to the south-west of the Creswell Park footprint.

- *Birkholtz. PD. 2008. Phase 1 Heritage Impact Assessment for the Proposed Development of Portions 407 and 408 of the Farm Roodepoort 237 IQ, City of Johannesburg Metropolitan Municipality, Roodepoort, Gauteng Province. Compiled for Marsh (Pty) Ltd by Archaeology Africa CC.*

This was a Phase 1 HIA for a proposed residential, commercial & business development on portions 407 and 408 of the farm Roodepoort 237 IQ. The developer for the project was Rand Leases Properties (Pty) Ltd. Sixteen heritage sites were located which were associated with historical gold mining activities. The sites included: eight abandoned mine shafts, five historic mine buildings and Infrastructure, one mine tram line, one old cemetery and one historic ash midden. This study area included the Creswell Park footprint area and the ash midden was the only site identified in the immediate area of the footprint, but it was located outside the northern boundary of the footprint (approx. 38m away from the northern boundary). Since both the satellite imagery and the field survey indicated that this area has been disturbed extensively by dumping and illegal mining excavations, it is highly likely that most of the site has been destroyed since it was identified. However, there may be subsurface material still present.

*Birkholtz and M. Naudé. 2010. Heritage Impact Assessment - Proposed Development of the Remaining Extent of Portion 161 of the Farm Vogelstruisfontein 231-IQ, City of Johannesburg Metropolitan Municipality, Gauteng Province. Compiled for Marsh (Pty) Ltd by Professional Grave Solutions Heritage Unit.*

The HIA study was undertaken for the proposed development known as Rand Leases Ext. 13. It consisted of a mixed density residential development incorporating commercial uses for the affordable housing market. The heritage sites identified included 54 historical mining-related structures, including: 45 housing units, six communal garages, one transformer station, one office complex and one mine shaft. This study area is located approx. 2.20km to the south-east of the Creswell Park footprint.

- *Du Pisanie, J. 2014. Mining Right Application for Reclamation of the Soweto Cluster Dumps, Roodepoort, Gauteng Province Heritage Impact Assessment. DMR Ref Number: GP 30/5/1/2/2(10020) MR. Prepared for Ergo Mining (Pty) Ltd by Digby Wells Environmental.*

The proposed Soweto Cluster Project area is located in the Gauteng Province on the farms Vogelstruisfontein 231 IQ; Roodepoort 237 IQ; and Vlakfontein 238 IQ. The project area is situated adjacent to several suburbs of greater Soweto, approximately 20 km from the Johannesburg Central Business District (CBD). This study identified two burial grounds, several historical structures, several industrial era buildings, the historical Durban Roodepoort Deep Mine and associated structures, and one declared heritage site. The extensive study area included the location of the Creswell Park footprint area. However, no heritage sites were identified within or adjacent to the footprint.

#### **4.4 Archaeological background**

##### *Stone Age period*

The Early Stone Age (ESA) (2.5 million to 250 000 years ago) is the first and oldest 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 (Korsman, & Meyer, 1999). A few ESA sites are known from the general vicinity. One of these is situated roughly 3.29km to the south-west of the Creswell Park footprint (Birkholtz, 2001).

The Middle Stone Age (MSA) is the second oldest phase identified in South Africa's archaeological history (250 000 to 40 000 years ago). This phase is associated with flakes, points and blades manufactured by means of the so-called 'prepared core' technique (Korsman, & Meyer, 1999).

The Later Stone Age (LSA) (40 000 years ago to the historic past) is the third archaeological phase identified and is associated with an abundance of very small artefacts known as microliths (Korsman, & Meyer, 1999).

#### *Overview of the Iron Age in the Johannesburg region*

Early Iron Age (EIA) sites in the Witwatersrand area date between 500 AD and 900 AD. The Magaliesberg mountain range represents the most southern point of distribution of these sites. The most well-known EIA site in this general area is Broederstroom, located next to the Hartebeespoort Dam, to the west of the route corridor. This site is dated to 350 - 600 AD and represents the first phase of occupation in the region by Bantu speaking farmers (Huffman 2007). No EIA sites are known from the immediate vicinity of the footprint area.

The Late Iron Age (LIA) occupation of this area by Sotho-Tswana communities is represented by four ceramic sequences of the Urehwe tradition: Ntsuanatsatsi (1450-1650), Olifantspoort (AD 1500 -1700), Uitkomst (AD 1700-1850) and Buispoort (1700-1840) (Huffman 2007). No LIA sites are known from the immediate vicinity of the footprint area.

It seems that agropastoralists did not settle in the Johannesburg region until the LIA (AD 1300-1840). According to the ceramic evidence, Sotho-Tswana and Nguni speakers moved south into southern Africa between about AD 1100 and 1300. Generally, Nguni occupied the eastern regions, while Sotho-Tswana moved onto the plateau, starting in the Limpopo Province.

After a while, the first Sotho-Tswana groups split into two clusters: a Western cluster (that today includes BaHurutshe, BaKwena, BaKgatla, BaNgwaketse and BaNgwato) centred in the present-day Northwest Province; and a Southwestern cluster (including BaRolong and BaThlaping) that

inhabited the region from the Magaliesberg to Potchefstroom, including Johannesburg. Radiocarbon dates place the pottery (called Olifantspoort after the site where it was first recorded) between about AD 1450 and 1700.

In the 15th century BaFokeng people, using the early type of walling, spread north across the Vaal. Type N sites are on record near Balfour, in the Suikerbosrand, Vredefort Dome, Pretoria and Greater Johannesburg area. For Johannesburg, some of the best examples occur in the Klipriviersberg to the south. The associated pottery is called “*Uitkomst*” (after the name of a cave where it was first found). Radiocarbon dates place this first walling with “*Uitkomst*” pottery between about AD 1440 and 1665 (Bergh 1999, <http://www.sahistory.org.za/places/johannesburg>).

All agropastoralists appear to have left Greater Johannesburg between AD 1670 and 1780 when the climate became cooler and drier. When conditions improved 100 years later, Sotho-Tswana farmers once again lived in the area. Sotho-Tswana occupation came to an end in the Greater Johannesburg in 1823 during the *difaqane* period when Mzilikazi’s Ndebele group moved into and through the area. Mzilikazi first established his headquarters near Heidelberg before moving to Pretoria (Bergh 1999, <http://www.sahistory.org.za/places/johannesburg>).

#### **4.5 Archival/historical maps**

The examination of historical data and cartographic resources represents a critical tool for locating and identifying heritage resources and in determining the historical and cultural context of the study area. Relevant topographic maps and satellite imagery were studied to identify structures, possible burial grounds or archaeological sites present in the footprint area.

Topographic maps for various years were assessed to observe the development of the area, as well as the location of possible historical sites and burial grounds. The maps were also used to assess the possible age of structures located, to determine whether they could be considered as heritage sites. Map overlays were created showing the possible heritage sites identified within the areas of concern, as can be seen below (**Figure 14 to Figure 16**).

##### **4.5.1 Topographic map sheet 2627BB First Edition 1943**

A portion of the First Edition of the 2627BB Topographical Sheet is depicted below. The map was compiled and drawn by the Survey Depot (Tech.) S.A.E.C. from 1:25 000 sheets by the Survey

Depot S.A.E.C. in 1943. A field revision was undertaken by the 45 Survey Coy. S.A.E.C. in 1943. It was reprinted in the Union of South Africa by the Government Printer, Pretoria in 1955.

#### 4.5.2 Topographic map sheet 2627BB Second Edition 1954

A portion of the Second Edition of the 2627BB Topographical Sheet is depicted below. The map was based on air photography from 1952. It was surveyed in 1954 and drawn in 1956 by the Trigonometrical Survey Office. It was printed in the Union of South Africa by the Government Printer, Pretoria in 1957.

#### 4.5.3 Topographic map sheet 2627BB Second Edition 1977

A portion of the Third Edition of the 2627BB Topographical Sheet is depicted below. The sheet was remapped in 1977 by the Director-General Surveys. It was printed and published by the Government Printer in 1979.



Figure 14: Enlarged section of the sheet 2627BB Ed 1, 1943. The only feature depicted close to the location of the Creswell Park footprint area is the “Kimberley Skag/Shaft”. However, an area with two rows of structures is depicted to the south-west (red polygon).

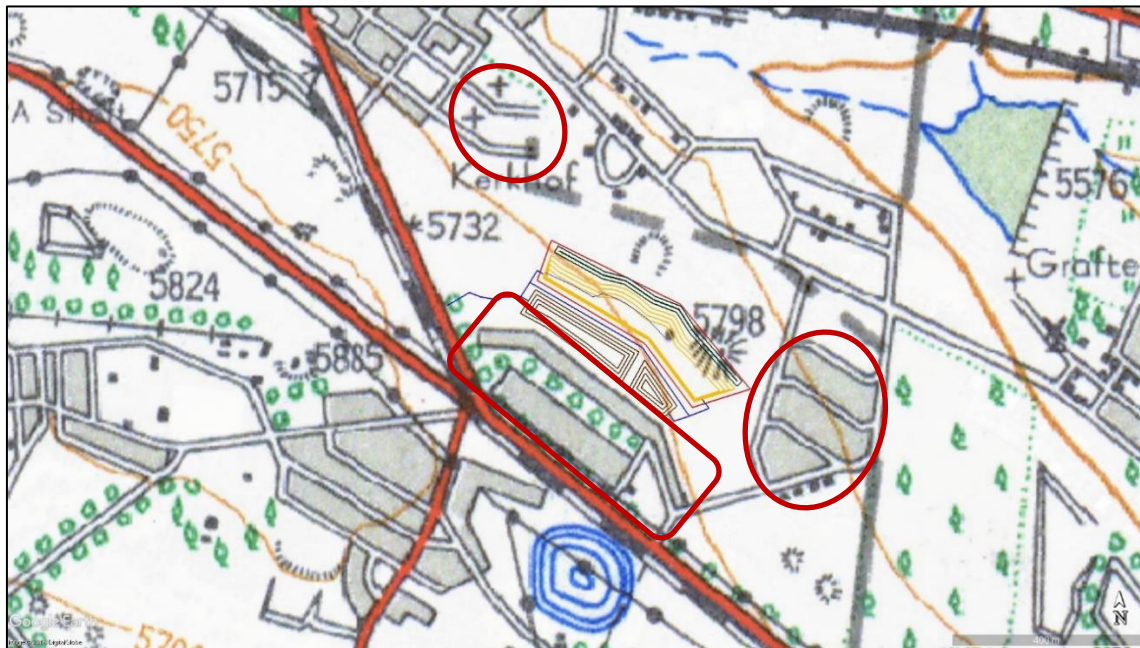


Figure 15: Enlarged section of the sheet 2627BB Ed 2, 1954. The only feature depicted within the location of the Creswell Park footprint area is an excavation. The area to the south-west of the footprint is depicted as built-up (and has expanded) and three blocks of a built-up area are depicted to the immediate east of the footprint (red polygons). A cemetery is depicted to the north-west of the footprint

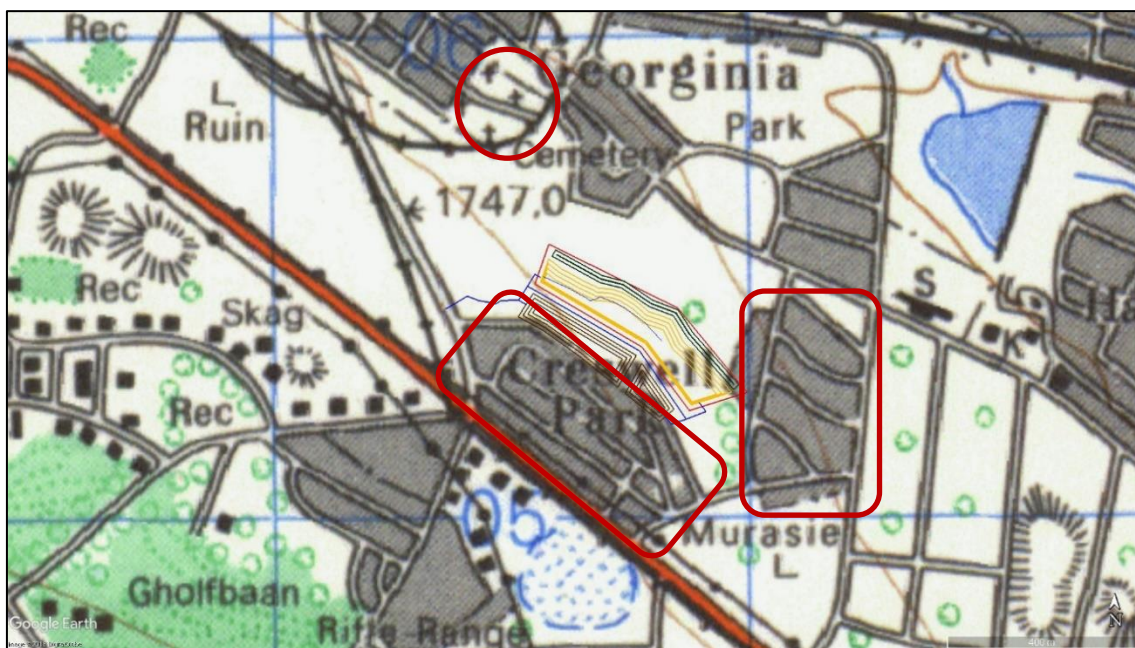


Figure 16: Enlarged section of the map 2627BB Ed 3 1977. No heritage features are depicted within the Creswell Park footprint area. The areas to the immediate south and east of the footprint are shown as built-up (red polygons). The cemetery is depicted to the north-west of the footprint.

The field survey confirmed the existence of the two historical built-up areas and the cemetery.

#### **4.6 Aspects of the area's history as revealed by the archival/desktop study**

##### *4.6.1 Brief History of Roodepoort and surrounds*

After the discovery of gold on the farm Roodepoort and surrounding farms during 1886, these properties were declared public prospecting areas by a Notice in the "Staatscourant" published on 8 September 1886 (Roux, 1955). The expansion of gold prospecting activities in and around the farm Roodepoort, resulted in the need for a town. By February 1887, the first residential stands of what would become Roodepoort were sold (Erasmus, 2004). In 1904, the town of Roodepoort-Maraisburg was given municipal status (Erasmus, 2004).

##### *4.6.2 History of Gold Mining within the Study Area and Surrounding Landscape (Birkholtz, 2017)*

###### *Roodepoort*

The farm Roodepoort located on the southern ridge of the Witwatersrand originally belonged to the brothers J.H. and A.S. du Plessis. On 14 November 1885 the brothers signed a contract with a group of prospectors which provided for prospecting rights on the farm Roodepoort in return for a percentage of the profits gained from the discovery and mining of any minerals found there. Four months after this, one of the prospectors, J.G. Bantjies, discovered the so-called Bird Reef during March 1886 on the farm Roodepoort. This was about the same time that the Main Reef was discovered accidentally by George Harrison and George Walker on the farm Langlaagte. Fred Struben subsequently discovered the same reef on the western boundary of the farm Vogelstruisfontein, and before long it was located on a number of the neighbouring farms, including Roodepoort.

In April of 1886 President Kruger received three petitions requesting that the farms Vogelstruisfontein, Roodepoort, Langlaagte and the two portions comprising Paardekraal be declared public diggings. The amended gold laws of 4 August 1886 had enabled the government to proclaim privately owned land as public diggings with or without the owner's approval. Subsequently, on 8 September 1886, a notice in the "De Staatscourant" informed all interested parties that the government had located yielding gold reefs on the Witwatersrand in the district of Heidelberg, including the farms Vogelstruisfontein and Roodepoort. The farms

Vogelstruisfontein and Roodepoort were to be declared a public prospecting area on the 11 October 1886, as long as the owners or renters did not have the land cordoned off as workable areas, gardens, arable land and water furrows. By the end of 1886 there were approximately 150 persons residing on the farm Roodepoort (Roux, 1955).

Gold mining shares subsequently boomed in 1895. However, this boom and the progress of the gold mining industry was affected severely by the Jameson raid at the end of 1895. The farm of Vlakfontein was the scene of the surrender to Genl. Cronje., whose Boer forces held the koppie of Doornkop, blocking the way to Johannesburg (Payne, 1948).

Three mynpachts were granted on the farm Roodepoort in 1886 and in 1887 two of these mynpachts were transferred in trust to the Roodepoort Gold Mining Company (G.M. Co.) which was later known as the Kimberley Roodepoort G.M. Co. The remaining mynpacht was obtained by the Durban Roodepoort G.M. Co. The Roodepoort G.M. Co was one of the first companies to begin crushing the Main Reef (Payne, 1948).

Roodepoort United absorbed the Kimberley Roodepoort in December 1908. The First world War caused the cost of mining operations to rise considerably and this resulted in the closure of several mines between 1917 and 1928, including the Roodepoort United, which had been one of the biggest mines (Payne, 1948).

In 1934, the property and assets of the New Steyn Estate were taken over by the Durban Deep mining company. These included the claims, plant and building of the old Roodepoort United. By 1948, the Durban Deep owned 3,007 mining claims on the farms Roodepoort, Vogelstruisfontein, Vlakfontein and Witpoortjie. In addition, its freehold property measured 4, 443 morgen (Payne, 1948).

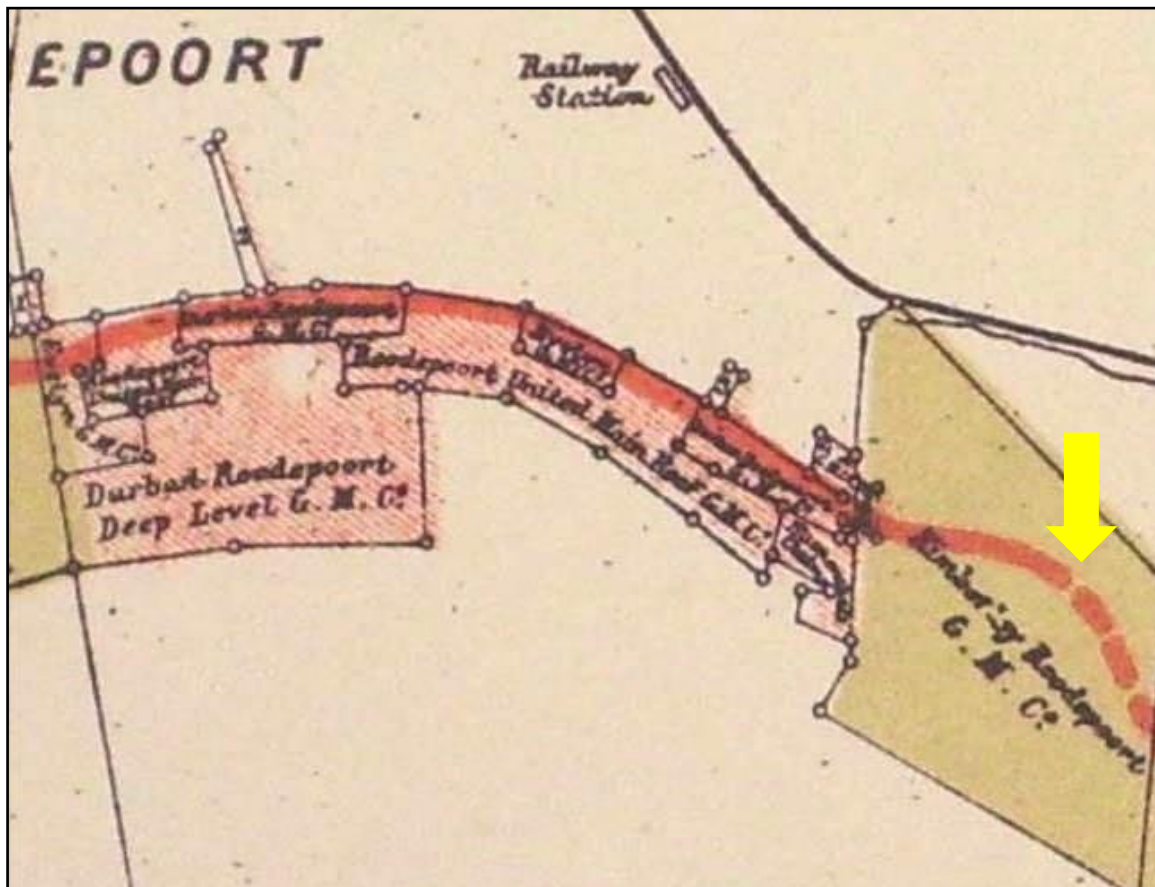


Figure 17: An enlarged section of *C.S. Goldman's* "The Witwatersrand Gold Fields" map, (dated to August 1891), showing the approximate footprint area and direct surroundings – yellow arrow (Birkholtz, 2008).

#### 4.7 Conclusions

The archival and historical research has revealed that the entire area of the farm Roodepoort 237 IQ, on which the proposed Creswell Park opencast mining footprint is situated, has been affected on a continual basis by historical mining activities, since c1886/87 and was associated with several historical gold mine companies. These mining activities have continued to the present day, both formally and informally (illegal). The ground affected by the Creswell Park opencast footprint is therefore extremely disturbed. Moreover, a cemetery is depicted in close proximity to the Creswell Park footprint on the 1954 and 1977 topographical maps of the area and two areas of historical structures are also depicted in close proximity.

## 5 PALAEOLOGY

A basic palaeontological sensitivity was determined using the SAHRIS database palaeosensitivity map (<http://www.sahra.org.za/sahris/map/palaeo>). As can be seen in **Figure 18** to **Figure 20**, the proposed route occurs in an area where palaeontology is assessed as being entirely of Low significance and no palaeontological studies are required. However, a finds protocol will be required.



Figure 18: Overlay of the Creswell Park opencast footprint on the palaeosensitivity map from the SAHRIS database (showing that the entire footprint is coloured blue, which is rated as Low sensitivity).



Figure 19: Enlarged section of the overlay of the Creswell Park footprint on the palaeosensitivity map, which confirms the entire area as being of Low sensitivity.



| 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. |

Figure 20: Sensitivity ratings from SAHRIS

## 6 FIELD WORK FINDINGS

Due to the nature of cultural remains, with the majority of artefacts occurring below the surface, a controlled-exclusive surface survey was conducted on two separate days (26 April and 8 May 2018) by vehicle and on foot by a team from PGS consisting of an archaeologist and a heritage specialist on one day and a heritage specialist and field technician on the other day (accompanied by two security staff on both days). The fieldwork was logged with a GPS receiver and all finds were marked. The second survey was undertaken to assess areas which had not been included in the original footprint area provided to PGS.

During the field assessment of the Creswell Park pit footprint, no heritage sites were identified within the footprint area. However, one Muslim cemetery and two residential areas containing historical housing structures were identified near the footprint area. Refer to **Figure 21** for the tracklog of the proposed footprint area and **Figure 22** showing the identified sites located adjacent to the footprint.

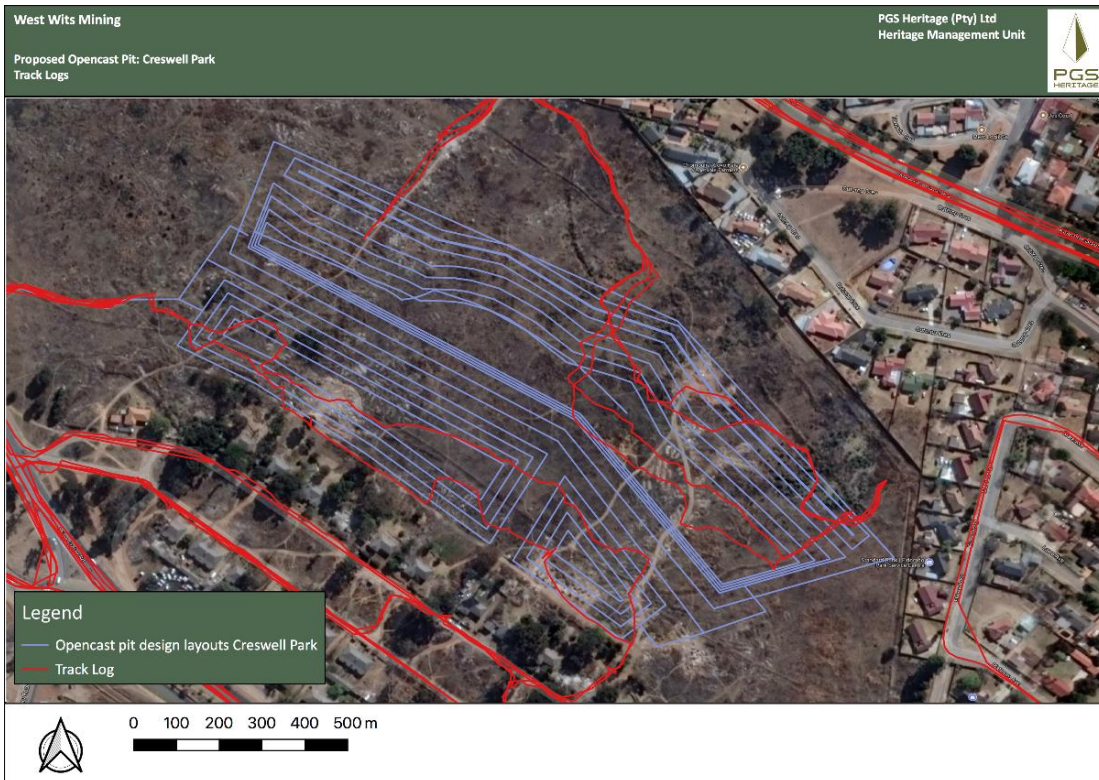


Figure 21: Tracklog of the field survey of the Creswell Park opencast footprint (red lines).

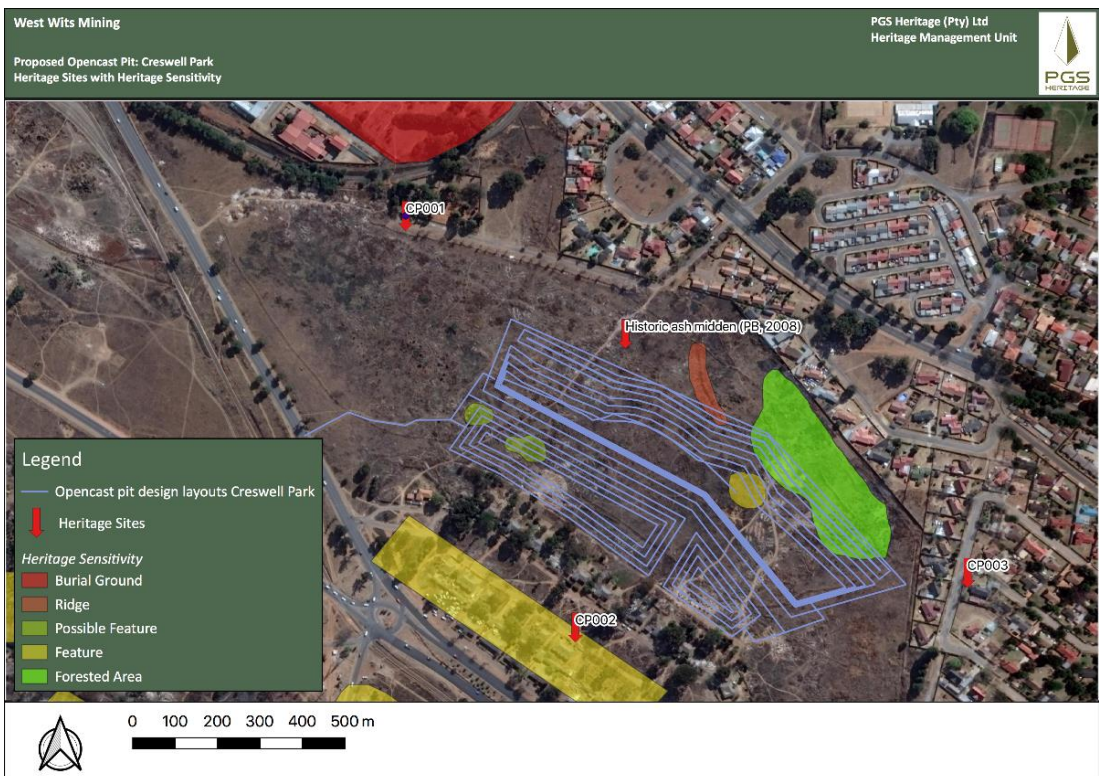


Figure 22: Map showing the identified heritage sites overlain with the heritage sensitive areas

## **6.1 Site Descriptions**

No heritage sites were identified within the footprint for the Creswell Park opencast area. However, one Muslim cemetery and two residential areas containing historical housing structures were identified in close proximity to the footprint area. All three identified sites are situated extremely close to the Creswell Park opencast footprint area; therefore, these sites are described below. In addition, an historical ash midden was identified by a previous HIA study (Birkholtz, 2008), which is located just outside the northern boundary of the opencast area footprint. The site description has been included in this report.

Refer to section 9 for the recommended general management measures as proposed for inclusion in the EMPr.

### 6.1.1 Site CP001:

**GPS:** -26°10'4.74"S; 27°52'28.21"E

**Description:** A burial ground was identified at this location. This is the municipal Roodepoort Muslim and Hindu Cemetery (<http://www.jhbcityparks.com/index.php/cemeteries-contents-61/find-a-cemetery-contents-42#oldr>). The burial ground is located approximately 108.53m north-west of the Creswell Park opencast footprint.

This is a large formal burial ground containing approximately 350-500 graves. The cemetery is surrounded by a concrete palisade fence. The graves are oriented in a west to east direction. Grave markers present gave an estimate of numbers, however there was no logical order. Graves of different apparent dates are buried in the same sections. Dressings included earth heaps, brick borders and cement borders. Many of the graves have headstones/markers of concrete or granite with inscriptions in either Arabic or English or both. The English inscriptions include historical as well as very recent dates (in the 2000s). A cemetery is depicted in this location on the 1954 and 1977 topographical maps. Two graves with historical dates were noted:

- Dadoo Fakir, Died 15 July 1920
- Ameen Mohammat Seedat, Passed Away 1956

**Site size:** 0.49ha (estimated from satellite imagery).

#### **Site significance: GP. A**

It is important to understand that the identified burial ground and the graves could have significant heritage value to the relevant families (if identified) and should therefore be preserved. The site is deemed to be of High Significance and is rated as **GP. A**. This burial ground is a formal municipal cemetery so will be protected and administered under The Cemetery and Crematoria By-laws for the City of Johannesburg (including exhumations) as well as Regulation 363 promulgated under the National Health Act (Act 61 of 2003).

**Mitigation:**

The management and authorisation for the relocation of burial grounds and graves are managed under Subsection 3(a) of section 36 of the NHRA. This specifically controls relocations of “*the grave of a victim of conflict (s3(a)(a))*” or “*graves or burial grounds older than 60 years*” (s3(a)(b)). Regulations promulgated under the NHRA define the consultation process to be complied with regarding burial grounds and graves.

Mitigation measures and permits would be therefore required if there is a possibility that the graves could be affected or moved/destroyed.

It is recommended that the cemetery should be left *in situ*. If there is any activity in the vicinity, at least a 100m buffer around the cemetery should be applied as per the requirements of Section 17.6(a) of the Mine Health and Safety Act. If, for any reason, the cemetery cannot be avoided, a grave relocation process will need to be implemented. A permit from SAHRA will be required for any relocation.

The site is already fenced but should be clearly marked as a cemetery and consultation with stakeholders (the local Muslim and Hindu community) is required regarding the recommended buffer zone (of 100m).



Figure 23: Site CP001, Roodepoort Muslim and Hindu Cemetery – general view



Figure 24: View of cement headstone with date

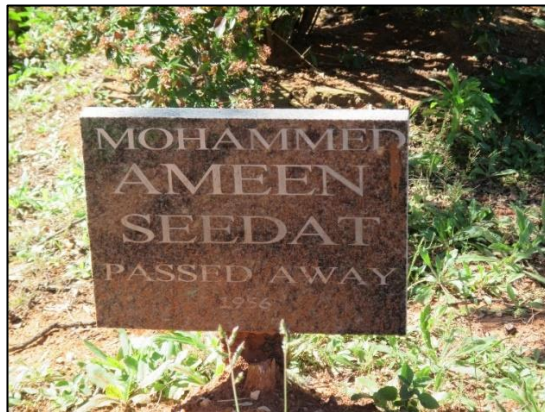


Figure 25: View of granite marker with date

### 6.1.2 Site CP002:

**GPS:** -26°10'20.28"S; 27°52'34.62"E

**Description:** A historical mining residential area was identified at this location, which is likely to be associated with the Kimberley Roodepoort or Roodepoort United gold mine, which was operational in this area.

This site comprises several three rows of historical houses which are likely to have provided accommodation for employees of one of the historical mines that operated in this area. The houses in two of the rows are semi-detached with a partial verandah (which has usually been enclosed), while the houses in the third row are single detached houses each with a separate garage. There are approximately 30 housing units in total, several of which are quite dilapidated or half-demolished. A large number are occupied. Structures are depicted in this location on the 1943, 1954 and 1977 topographical maps. The two rows of houses nearest to Main Reef road are depicted on the 1943 map and thus older than the third row, which is depicted on the 1954 map. The closest row of houses is located within 50m south of the southern boundary of the waste rock dump area.

**Site size:** 8.24 ha (estimated from satellite imagery).

**Site significance: GP. B**

The site is graded as locally significant **GP. B**, due to the age of the houses and their highly likely association with one of the historical mines in this area.

**Mitigation:**

A buffer zone of 100m (Section 17.6(a) of the Mine Health and Safety Act) is required to protect the houses located closest to the southern boundary of the Creswell Park footprint. There could be a possibility of damage caused by the vibrations from the proposed opencast mining activity. However, this would need to be confirmed by a vibration study.

A permit from the Gauteng PHRA will be required if there is a possibility of any damage to these structures. The buildings could also require documentation by drawings or photographs.



Figure 26: Site CP002, view of historical houses, looking west along the row.



Figure 27: View of one of the semi-detached houses, showing the enclosed verandah





Figure 28: View of a half-demolished semi-detached house



Figure 29: Site CP002, view of the later row of detached houses with separate garages



Figure 30: Closer view of one of the detached houses

### 6.1.3 Site CP003:

**GPS:** - 26°10'18.22"S; 27°52'49.45"E

**Description:** A historical residential area was identified at this location.

This site comprises the three southernmost blocks of the Creswell Park residential suburb, which are located 60m east of the Creswell Pit footprint area, and which are marked as a built-up area on both the 1954 and the 1977 topographical maps of the area. This means that several of the houses located in this area are likely to be 60 years or older. A drive-through of the area revealed that some houses show fabric and features that would indicate a date of c1940s/1950s. Other houses seem to be more recent or have been altered since they were first built. (Note: the figures for these houses were taken from Google earth as all the streets had security guards).

**Site size:** 5.84 ha (approximate extent estimated from satellite imagery).

**Site significance: GP. C**

The site is graded as locally significant **GP. C**, due to the presence of houses that are likely to be 60 years or older.

**Mitigation:**

A buffer zone of 100m is required (Section 17.6(a) of the Mine Health and Safety Act) to protect the houses located closest to the eastern and northern boundaries of the Creswell Park footprint. A permit from the Gauteng PHRA will be required for any destruction of these structures. The buildings may require documentation by drawings or photographs.

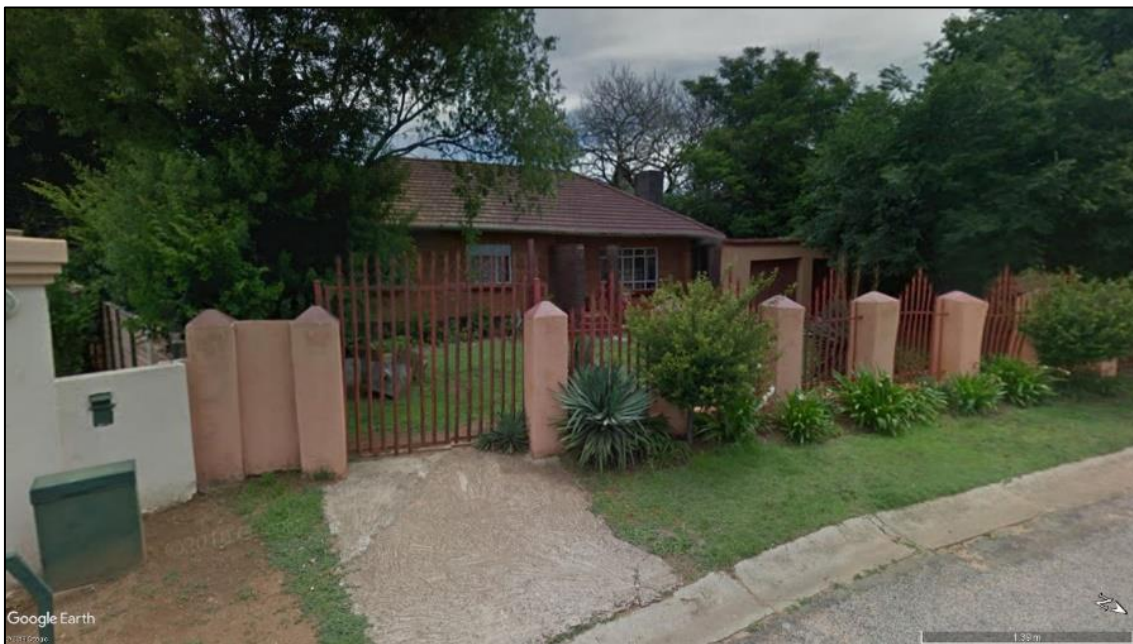


Figure 31: Site CP003, historical house in Creswell Park suburb



Figure 32: Site CP003, a different style of historical house in Creswell Park suburb



Figure 33: Site CP003, another style of historical house in Creswell Park suburb

#### 6.1.4 Site PB, 2008 - Site identified in previous heritage study

**GPS:** 26°10'9.19"S; 27°52'36.52"E

**Description:** an historical ash midden was identified at this location during the HIA study by Birkholtz in 2008 (the description is taken from the report).

The site is located on Portion 408 of the farm Roodepoort 237-IQ and comprises an historic ash heap. Although the site was densely overgrown by khaki weed (*Tagetes minuta*) at the time of the fieldwork, a number of glass bottles and fragments were observed. Bottles identified on the site include an aerated mineral water bottle owned by *Thomas, H & Company* of Roodepoort. The company was established in 1890 and operated until 1910. They were one of four companies manufacturing mineral water and ginger beer in the Roodepoort area at the time.

Another bottle observed on the site was a coconut oil bottle. These bottles were typically sealed with cork-lined glass stoppers, were manufactured in four different sizes and were either green or translucent in colour. The seams on the bottle indicate that it was moulded in a post-bottom full height (two-piece) mould which was mouth blown between 1880 and 1910. The lip and collar were hand-finished and could have been embossed.

A third bottle from the site has the words *The Singer Manfc. Co.* embossed on the side and can be identified as a container in which the oil used for lubricating the *Singer*-manufactured sewing machines were sold and kept. The company was originally started in the United States in 1851 as *I.M. Singer & Co* and immediately became a popular manufacturer of sewing machines. In 1865 its name was changed to *The Singer Manufacturing Company* (the name appearing on the bottle). The company held on to this name until 1963, when it was changed to *The Singer Company*. This indicates that the bottle was certainly made between 1865 and 1963. The greenish colour of the glass (known as aqua glass) also indicates that the bottle was made before 1920 ([www.antiquebottles.co.za](http://www.antiquebottles.co.za)), while the presence of bubbles indicate that it was also made before 1920 ([www.antiquebottles.com](http://www.antiquebottles.com)). The seams on the bottle ending below the lip indicate that the bottle was manufactured according to the post-bottom full height (two-piece) mould, a manufacturing method that was popular between 1880 and 1910.

All the glass artefacts from the site which could be identified were dated between 1880 and 1910. These dates fit into the early mining history of the area and in fact the First Edition of the 2627BB Topographical Map compiled in 1943 indicates the shaft of the *Roodepoort (Kimberley) Gold Mine* in the general vicinity of where this site was found. Although exact dates for the origin of this mine could not be found, a map of mining operations published in Goldman (1892) shows the Kimberley Shaft already in existence.

**Site Significance: GP.C**

The site represents a historic rubbish dump associated with one of the early gold mines on the Witwatersrand goldfields. As such it has the potential to possess information on everyday life on these early gold mines. The site is graded as locally significant **GP. C**.

Archaeological sites are defined by the National Heritage Resources Act as man-made features and artefacts older than 100 years. This Site can be identified as an archaeological site and falls under the protection of Section 35(4) of the Act.

**Mitigation:** The original mitigation measures recommended were that an archaeological excavation should take place on the rubbish dump (under a permit from SAHRA), resulting in an archaeological excavation report which could then be submitted to SAHRA with a permit application that would allow the site to be destroyed.

However, since it is extremely likely that the site has been destroyed in the years since it was identified (by illegal mining activity and dumping), and due to the location of the site outside the Creswell Park footprint, it is recommended instead that an archaeological monitoring programme should be undertaken on commencement of vegetation clearance and earth moving activities to identify any archaeological material that may be located sub-surface.



Figure 34: View of the site with the author of the 2008 report inspecting one of the bottles observed on site (Birkholtz 2008).

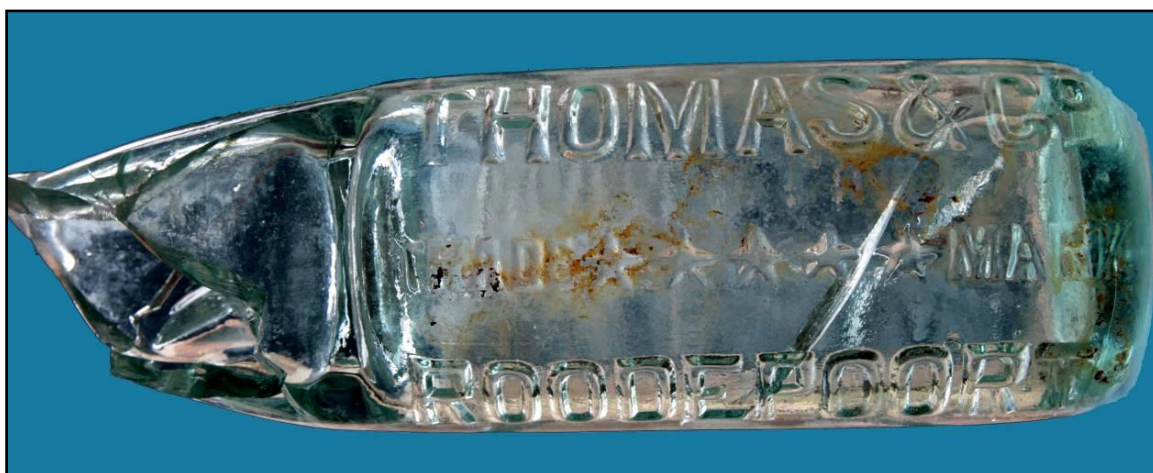


Figure 35: View of one of the Thomas, H & Company aerated mineral water bottles observed on the surface (Birkholtz 2008).

## 7 IMPACT ASSESSMENT

The aim of the impact evaluation is to determine the extent of the impact of the proposed project on the identified heritage resources and predict possible impacts on unidentified heritage resources.

During the field assessment of the Creswell Park opencast footprint area, no heritage sites were located within the footprint. Therefore, no direct impact on heritage resources can be assessed for the footprint area. However, since three sites were identified situated close to the footprint area, the indirect impact on these heritage resources is required to be assessed. Refer to **Figure 22** for the locality of these heritage resources in relation to the proposed footprint area.

It must be considered that the heritage significance of the identified sites plays a role in the evaluation of the impact and must influence the magnitude rating of the impact tables. Thus, a heritage resource with a high heritage significance rating will have a higher impact magnitude rating than a resource with a low or no heritage significance rating. Consequently, mitigation measures will be more extensive for a heritage resource with a high heritage significance than for those with a low heritage significance.

The impacts are expected to happen during both construction and operational activities.

### 7.1 Status Quo and “No Go” option

#### 7.1.1 *Status Quo*

**No fatal flaws** were identified from a cultural, historical, archaeological and paleontological perspective.

#### 7.1.2 *“No go” Option*

No such option is contemplated.



## 8 PROJECT IMPACT

### 8.1 Heritage resources and sensitivity

The identified heritage resources are allocated a sensitivity buffer based on the recognised management buffers accepted by SAHRA in the past few years. No regulations in the NHRA provide guidelines on buffer zones. However, in the case of heritage sensitivity, a buffer of 20 – 50 meters is generally proposed based on the type of heritage resource. In the case of burial grounds and graves (BGG) a buffer of 50 meters is generally proposed and 20 meters for a heritage structure such as ruins and other historical structures.

However, since the proposed activity is a mining permit, Section 17.6(a) of the Mine Health and Safety Act 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, unless a shorter distance has been determined safe by risk assessment and all restrictions and conditions determined in terms of the risk assessment are complied with. Reduction of this distance can only be approved by the DMR. A buffer zone of 100m has therefore been recommended for the identified heritage resources.

### 8.2 Impact on burial grounds

One formal burial ground/cemetery was identified during the field work. Due to the social and cultural significance of burial grounds and graves, a high heritage significance is given to such sites. **CP001** is demarcated formally with a concrete palisade fence.

The impact of the proposed project on the burial ground is rated as having a MEDIUM negative significance before mitigation and with the implementation of mitigation measures as having a LOW negative significance (**Table 4**).

### 8.3 Impact on Historical Structures

The impact of the proposed project on the historic heritage resources at **CP002** and **CP003** is rated as MEDIUM negative significance before mitigation and with the implementation of the mitigation measures the impact significance is reduced to LOW negative. This is based on the very close

proximity of site **CP002** to the proposed waste rock dump area of the opencast footprint as well as the possibility of damage from blasting vibrations. Site **CP003** is located further away and thus it is likely that any impact will be substantially less (**Table 4**).

#### **8.4 Impact on Palaeontological Resources**

The palaeontological sensitivity of the area determined using the SAHRIS database palaeosensitivity map (<http://www.sahra.org.za/sahris/map/palaeo>) indicated that the entire proposed Creswell Park opencast footprint is underlain by geology of a Low palaeontological significance and no palaeontological studies are required. However, a finds protocol will be required.

The impact of the proposed project on the Palaeontology is rated as having a LOW neutral significance rating before mitigation with no further mitigation measures required (**Table 4**).

#### **8.5 Impact on Archaeological Resources**

As a midden likely to be 100 years or older was identified in a previous survey, although located outside the footprint area, an indirect impact is anticipated. Notwithstanding that it is likely that the midden may have been destroyed in the years since it was identified, there is a possibility of sub-surface material being uncovered.

The impact of the proposed project on archaeological material is rated as having a MEDIUM negative significance before mitigation and with the implementation of mitigation measures as having a LOW negative significance (**Table 4**)

#### **8.6 Possible sub-surface heritage resources**

The impact of the proposed project on subsurface heritage material is rated as having a LOW negative significance before mitigation and with the implementation of mitigation measures as having a LOW negative significance (**Table 4**).

Table 4 - Assessment of impact on heritage resources

| ENVIRONMENTAL ASPECT | NATURE OF THE IMPACT  | IMPACT STATUS | MAGNITUDE | EXTENT | DURATION | REVERSIBILITY | IRREPLACEABILITY | PROBABILITY | SIGNIFICANCE   | MITIGATION POTENTIAL | SIGNIFICANCE    | CONFIDENCE RATING | CUMULATIVE IMPACTS |
|----------------------|---|---------------|-----------|--------|----------|---------------|------------------|-------------|----------------|----------------------|-----------------|-------------------|--------------------|
|                      |   |               |           |        |          |               |                  |             | PRE-MITIGATION |                      | POST-MITIGATION |                   |                    |
| HERITAGE             | Possible destruction of palaeontological fossil material      | Neutral       | 1         | 1      | 1        | 4             | 7                | 2           | 14             | Medium               | 14              | Sure              | Low                |
|                      | Possible destruction of archaeological structures or material | Negative      | 4         | 2      | 5        | 4             | 15               | 3           | 45             | Medium               | 15              | Unsure            | Low                |
|                      | Possible destruction of burial grounds and graves             | Negative      | 5         | 3      | 5        | 5             | 18               | 3           | 54             | Medium               | 18              | Sure              | Low                |
|                      | Possible destruction of historical structures or material     | Negative      | 5         | 3      | 5        | 5             | 18               | 3           | 54             | Medium               | 18              | Sure              | Medium             |
|                      | Possibility of uncovering subsurface heritage material        | Negative      | 2         | 1      | 1        | 5             | 9                | 2           | 18             | Medium               | 9               | Unsure            | Low                |

## **8.7 Project Impact (Unmitigated)**

Since no heritage sites were located within the Creswell Park opencast footprint, the direct impact of the proposed project unmitigated will be VERY LOW to negligible and requires no mitigation.

However, the indirect impact of the proposed project unmitigated on the identified heritage resources will be MEDIUM and will require a certain amount of mitigation.

The palaeontological sensitivity of the Witwatersrand Goldfields geology underlying the proposed opencast footprint and general region is rated as Low. It is therefore recommended that no further palaeontological heritage studies, ground truthing and/or specialist mitigation are required, pending the discovery of newly discovered fossils. It is thus considered that the establishing of the proposed development is deemed appropriate and feasible and will not lead to detrimental impacts on the palaeontological resources of the area.

If fossil remains are discovered during any phase of construction, either on the surface or unearthed by fresh excavations, the ECO in charge of these developments ought to be alerted immediately. These discoveries ought to be protected (preferably *in situ*) and the ECO must report to SAHRA so that appropriate mitigation (*e.g.* recording, collection) can be carried out by a professional paleontologist.

Preceding any collection of fossil material, the specialist would need to apply for a collection permit from SAHRA. Fossil material must be curated in an approved collection which comprises a museum or university collection, while all fieldwork and reports should meet the minimum standards for palaeontological impact studies proposed by SAHRA.

## **8.8 Cumulative Impact**

The Creswell Park opencast mining footprint has been disturbed extensively by historical and recent gold mining activities. Any archaeological or other heritage resources that existed within the footprint have been destroyed by these activities and therefore the additional project impacts will not increase or decrease the significance of the existing baseline impacts within the footprint area. The impact is going to happen and will be short term in nature. The impact risk class is thus Low with regards to cumulative impacts within the footprint area.

However, the cumulative impacts of the proposed project on heritage resources identified in close proximity to the footprint area, are likely to increase the significance of the existing baseline impacts in the area immediately adjacent to the footprint area. The impact is going to happen and will be long term in nature.

The impact risk class is thus Medium with regards to cumulative impacts on the historical structures located adjacent to the footprint area.

The impact risk class is thus Low with regards to cumulative impacts on the burial ground located adjacent to the footprint area.

The baseline impacts are considered to be Low for palaeontological resources, and additional project impacts (if no mitigation measures are implemented) will not increase the significance of the existing baseline impacts, the cumulative unmitigated impact will probably be of a Low negative significance. The impact is going to happen and will be short term in nature. The impact risk class is thus Low.

## **9 MANAGEMENT RECOMMENDATIONS AND GUIDELINES**

### **9.1 Construction phase**

The project will encompass a range of activities during the construction phase, including ground clearance, establishment of construction camps area and small-scale infrastructure development associated with the project.

It is possible that cultural material will be exposed during construction and may be recoverable, keeping in mind delays can be costly during construction and as such must be minimised. Development surrounding infrastructure and construction of facilities results in significant disturbance, however foundation holes do offer a window into the past and it thus may be possible to rescue some of the data and materials. It is also possible that substantial alterations will be implemented during this phase of the project and these must be catered for. Temporary infrastructure, such as construction camps and laydown areas, is often changed or added to the project as required. In general, these are low impact developments as they are superficial, resulting in little alteration of the land surface, but still need to be catered for.

During the construction phase, it is important to recognize any significant material being unearthed, making the correct judgment on which actions should be taken. It is recommended that the following monitoring and chance find procedure is implemented.

## **9.2 Monitoring Program (Watching Brief)**

### *9.2.1 Aim*

The following outline for the watching brief agreement conforms to international standards.

The purpose of a watching brief is:

- To allow, within the resources available, the preservation by record of archaeological deposits, the presence and nature of which could not be established.
- To provide an opportunity, if needed, for the watching archaeologist to signal to all interested parties, before the destruction of the material in question, that an archaeological find has been made for which the resources allocated to the watching brief itself are not sufficient to support treatment to a satisfactory and proper standard.
- A watching brief is not intended to reduce the requirement for excavation or preservation of known or inferred deposits, and it is intended to guide, not replace, any requirement for contingent excavation or preservation of possible deposits.
- The objective of a watching brief is to establish and make available information about the archaeological resource existing on a site.
- An archaeologist shall only undertake a watching brief, which is governed by a written and agreed specification or project design prepared in advance of work commencing.
- The specification or project design must identify the objectives, scope, geographical area, and means of dissemination of the results of the watching brief and incorporate a method statement and work programme.

### *9.2.2 Monitoring*

All work must be monitored by the archaeological contractor undertaking the project, and if appropriate by the PHRA, the Cultural Resources Management Section of the South African Association of Archaeologists (CRM Section of ASAPA), or their nominated representatives. The guidance below is directed in general at monitors from outside the organisation undertaking the work, but many of the points apply equally to internal monitors or managers.

A monitor should be suitably experienced and qualified or have access to appropriate specialist advice.

Monitoring must be undertaken against the written specification and/or project design.

Monitors, where not representing the commissioning body, should bear in mind the need for flexibility, within the stated parameters, in contractual matters such as staff numbers, budgets or timetable.

All monitoring visits must be documented and agreed by each party.

Non-compliance with the agreed specification or project design must be pointed out by the monitor to the archaeologist undertaking the work, and their client if appropriate, at the earliest opportunity.

Monitors should be aware of their professional and moral duties regarding Health and Safety, in particular reporting and advising against bad and unsafe practice.

All monitoring arrangements must be agreed at the outset of the project; the archaeologist undertaking fieldwork must inform the planning archaeologist or other monitor of the commencement of work with reasonable notice.

Although monitors may choose to visit at any time, they should normally inform the archaeologist undertaking the work of any intended visits in advance. Monitors must respect reasonable requests from the client commissioning the work to attend only at prearranged times and, if necessary, in the company of the client's representative.

Any costs for monitoring to be charged by the planning archaeologist or other monitor must be agreed in writing at the outset of the project.

### *9.2.3 Fieldwork should excavations be required*

All relevant parties must agree to the specification and/or project design before work commences. All work must conform to the agreed specification or project design. All relevant parties must agree to any variations in writing.

Sufficient and appropriate resources (staff, equipment, accommodation etc) must be used to enable the project to achieve its aims, the desired quality and timetable, and comply with all statutory requirements. Any contingency elements must be identified clearly and justified. It is the role of the archaeologist undertaking the work to define appropriate staff levels.

All techniques used must comply with relevant legislation and be demonstrably fit for the defined purpose(s).

All staff, including subcontractors, must be suitably qualified and experienced for their project roles, and employed in line with relevant legislation. The site director and/or manager should preferably be a Principal Inspector with the CRM Section of ASAPA.

All staff, including subcontractors, must be fully briefed and aware of the work required under the specification, and must understand the aims and methodologies of the project.

All equipment must be suitable for the purpose and in sound condition and comply with Health and Safety regulations and recommendations.

Sufficient and appropriate resources (staff, equipment, accommodation etc) must be used to enable the project to achieve its aims, the desired quality and timetable, and to comply with all statutory requirements. Any contingency elements must be clearly identified and justified. It is the role of the archaeologist undertaking the work to define appropriate staff levels.

Full and proper records (written, graphic, electronic and photographic as appropriate) should be made for all work, using pro forma record forms and sheets as applicable.

Digital records created, as part of the project should comply with specified data standards. An archaeologist must ensure that digital information, paper and photographic records should be stored in a secure and appropriate environment, and be regularly copied or backed up, and copies stored in a separate location.

Artefact and environmental data collection and discard policies, strategies and techniques must be fit for the defined purpose, and understood by all staff and subcontractors

Health and Safety regulations and requirements cannot be ignored no matter how imperative the need to record archaeological information; hence Health and Safety will take priority over archaeological matters. All archaeologists undertaking fieldwork must do so under a defined Health and Safety Policy.

Archaeologists undertaking fieldwork must observe safe working practices; the Health and Safety arrangements must be agreed and understood by all relevant parties before work commences.

Archaeologists must liaise closely with the principal contractor and comply with specified site rules. Archaeologists are advised to note the onerous responsibilities of the role of planning supervisor.

The archaeologist undertaking a watching brief must ensure that he or she has adequate insurance policies, public and employer's liability and some relevant form of civil liability indemnity or professional indemnity.



On arrival on site, the archaeologist should report to the site manager or other identified representative of the principal contractors or developers and conform to their arrangements for notification of entering and leaving site.

Where the archaeologist has by instruction or agreement the power to suspend development work, he or she shall, in exercising such power, follow procedures previously agreed with the other contractors on the site. Within the constraints of the nature of the archaeological resource, the archaeologist shall not cause unreasonable disruption to the maintenance of the work schedules of other contractors.

An archaeologist should keep a record of the date, time and duration of all visits, the number of staff involved, and any actions taken.

### **9.3 Chance find procedure**

- A heritage practitioner should be appointed to develop a heritage induction program and conduct training for the ECO, as well as team leaders, in the identification of heritage resources and artefacts.
- An appropriately qualified archaeologist must be identified to be called upon if any possible heritage resources or artefacts are identified.
- Should an archaeological site or cultural material be discovered during construction (or operation), the area should be demarcated, and construction activities be halted.
- The qualified archaeologist will then need to come out to the site and evaluate the extent and importance of the heritage resources and make the necessary recommendations for mitigating the find and impact on the heritage resource.
- The contractor therefore should have some sort of contingency plan so that operations could move elsewhere temporarily while the material and data are recovered.
- Construction / Operational activities can commence as soon as the site has been cleared and signed off by the archaeologist.

### **9.4 Possible finds during mining operations**

The footprint area occurs within an already extremely disturbed area. However, although unlikely, it is possible that soil clearance and mining operations could uncover the following:

- foundations of historical mining infrastructures;

- ash middens associated with historical structures that can contain bone, glass and clay ceramics, ash, metal objects such as spoons, forks, and knives.
- possible infant burials at historical African homesteads

## 9.5 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 5** gives guidelines for lead times on permitting.

*Table 5: Lead times for permitting and mobilisation*

| ACTION  | RESPONSIBILITY   | TIMEFRAME |
|---|--|-----------|
| Preparation for field monitoring and finalisation of contracts                    | The contractor and service provider                            | 1 months  |
| Application for permits to do necessary mitigation work                           | Service provider – Archaeologist/ Heritage Architect and SAHRA | 1 month   |
| Documentation, excavation and archaeological/heritage report on the relevant site | Service provider – Archaeologist/ Heritage Architect           | 3 months  |
| Handling of chance finds – Archaeology, Graves/Human Remains or Palaeontology     | Service provider – Archaeologist/Palaeontologist and SAHRA     | 2 weeks   |

## 9.6 Heritage Management Plan for EMP implementation

| NO.                   | MITIGATION MEASURES   | PHASE        | TIMEFRAME           | RESPONSIBLE PARTY FOR IMPLEMENTATION              | MONITORING PARTY (FREQUENCY) | TARGET   | PERFORMANCE INDICATORS (MONITORING TOOL) | COST |
|-----------------------|---|--------------|---------------------|---|------------------------------|--|--|------|
| <b>Possible finds</b> |   |              |                     |   |                              |  |  |      |
| A                     | Implement chance find procedures in case where possible heritage finds are made.  | Construction | During construction | Applicant ECO Heritage Specialist                 | ECO (weekly)                 | Ensure compliance with relevant legislation and recommendations from SAHRA under Section 35, 36 and 38 of NHRA | ECO Monthly Checklist/Report             |      |
| B                     | Implement archaeological monitoring program for Site PB, 2008.  | Construction | Before construction | Applicant ECO Heritage Specialist / Archaeologist | ECO (weekly)                 | Ensure compliance with relevant legislation and recommendations from SAHRA under Section 35, 36 and 38 of NHRA |  |      |
| <b>Known sites</b>    |   |              |                     |   |                              |  |  |      |
| <b>Burial Grounds</b> | <ul style="list-style-type: none"> <li>Demarcate sites with a 100m buffer and avoid them.</li> <li>Stakeholder engagement will need to be implemented</li> <li>If avoidance is not possible, a detailed grave relocation process must be implemented as required under the NHRA and National Health Act regulations.</li> </ul> | Construction | During construction | Applicant ECO                                     | Applicant ECO                | Ensure compliance with relevant legislation and recommendations from SAHRA under Section 36 and 38 of NHRA     | ECO Monthly Checklist/Report             |      |

| NO.                          | MITIGATION MEASURES   | PHASE        | TIMEFRAME    | RESPONSIBLE PARTY FOR IMPLEMENTATION | MONITORING PARTY (FREQUENCY) | TARGET   | PERFORMANCE INDICATORS (MONITORING TOOL) | COST |
|------------------------------|---|--------------|--------------|--------------------------------------|------------------------------|--|--|------|
| <b>Historical structures</b> | <ul style="list-style-type: none"> <li>The sites should be avoided with at least a 100m buffer if activities should occur near them.</li> <li>If the sites will be affected directly, the site <b>CP002</b> will need to be documented before a destruction permit can be applied for at the provincial heritage resource authority (Gauteng).</li> <li><b>CP003</b> should not be affected as it occurs outside the footprint. However, it should be noted. If it would be impacted negatively by the proposed development, consultation with the local community is recommended.</li> <li>If any other heritage resources are uncovered SAHRA should be contacted and a qualified archaeologist appointed to evaluate the finds and make appropriate recommendation on</li> </ul> | Construction | Construction | Applicant<br>ECO                     | Applicant<br>ECO             | Ensure compliance with relevant legislation and recommendations from PHRAG under Section 34 and 38 of NHRA | ECO Monthly Checklist/Report             |      |

| NO.                  | MITIGATION MEASURES  | PHASE        | TIMEFRAME    | RESPONSIBLE PARTY FOR IMPLEMENTATION | MONITORING PARTY (FREQUENCY) | TARGET   | PERFORMANCE INDICATORS (MONITORING TOOL) | COST |
|----------------------|--|--------------|--------------|--------------------------------------|------------------------------|--|--|------|
| <b>Palaeontology</b> | <ul style="list-style-type: none"> <li>The construction and operation of the development footprint is deemed appropriate and feasible and will not lead to detrimental impacts on the palaeontological resources of the area.</li> <li>If fossil remains are discovered during any phase of construction, either on the surface or exposed by new excavations or removal of vegetation, the ECO in charge for the developments ought to be informed instantly. These finds must be protected (preferably in situ) and the ECO must alert SAHRA (South African Heritage Research Agency) to ensure that mitigation (e.g. recording, collection) can be undertaken by a professional palaeontologist.</li> <li>Preceding any excavation of fossils, a collection permit from SAHRA must be obtained. The fossil material must be housed in an approved collection (museum or university collection) and the fieldwork and reports need to comply with the minimum standards for palaeontological impact studies developed by SAHRA.</li> </ul> | Construction | Construction | Applicant<br>ECO<br>Palaeontologist  | Applicant<br>ECO             | Ensure compliance with relevant legislation and recommendations from SAHRA under Section 35 and 38 of NHRA | ECO Monthly Checklist/Report             |      |

## 10 CONCLUSIONS AND RECOMMENDATIONS

PGS was appointed to undertake an HIA that forms part of the BAR for the mining permit application for the proposed opencast pit referred to as Creswell Park, located on a portion of portion 406 of the Farm Roodepoort 237 IQ, with a section of the access/haul road located on a portion of Portion 407 of the Farm Roodepoort 237 IQ, Roodepoort Local Municipality, Johannesburg Metropolitan Municipality, Gauteng Province.

The archival and historical research has revealed that the entire area of the farm Roodepoort 237 IQ, on which the proposed Creswell Park opencast mining footprint is situated, has been affected on a continual basis by historical mining activities. These mining activities have continued to the present day, both formally and informally (illegal). The ground affected by the Creswell Park opencast footprint is therefore extremely disturbed.

The HIA study has shown that although the project footprint does not contain heritage resources, the immediate surrounding area does contain some heritage resources. Through data analysis and a site investigation the following issues were identified from a heritage perspective.

The data analysis has enabled the identification of possible heritage sensitive areas that included:

- Structures/buildings (residential);
- Burial grounds and graves;
- Possible archaeological sites (based on experience)

Note that these structures refer to heritage sites as listed in **Table 6**.

*Table 6 - Tangible Heritage sites in the area adjacent to Creswell Park opencast footprint*

| Name                                   | Description                   | Legislative protection |
|--|-------------------------------|------------------------|
| Architectural Structures (residential) | Possibly older than 60 years  | NHRA Sect 3 and 34     |
| Burial grounds and graves              | Possibly older than 60 years  | NHRA Sect 3 and 36     |
| Archaeological sites                   | Possibly older than 100 years | NHRA Sect 3 and 35     |

During the field assessment for the Creswell Park opencast footprint, no heritage sites were identified within the footprint area, however, a total of three heritage sites were located close to the footprint area. These include one formal burial ground (**CP001**), and two historical residential areas (**CP002, CP003**). Refer to **Figure 22** for the locality of heritage resources in relation to the

proposed opencast footprint. In addition, an historical midden of probable archaeological age was identified by a previous study and is located just outside the footprint boundary (**PB 2008**).

The management and mitigation measures as described in Section 9 of this report have been developed to minimise the project impact on heritage resources. Impacts on burial grounds and graves are rated as MEDIUM NEGATIVE before mitigation and LOW NEGATIVE after mitigation measures are implemented. Impacts on historical structures/ residential areas are rated as MEDIUM NEGATIVE before mitigation and LOW NEGATIVE after mitigation measures are implemented. Finally, impacts on palaeontological resources are rated as a LOW NEUTRAL before and after mitigation measures are implemented.

### **10.1 Archaeology**

No archaeological heritage resources were identified within the Creswell Park opencast footprint area. However, an historical midden of probable archaeological age was identified by a previous study located just outside the footprint boundary (**PB, 2008**).

### **10.2 Historical Structures**

No historical structures were identified within the Creswell Park opencast footprint area. However, two historical residential areas (**CP002, CP003**) were identified immediately adjacent to the footprint area.

### **10.3 Burial grounds and graves**

No burial grounds or graves were identified within the Creswell Park opencast footprint area. However, one formal Muslim and Hindu cemetery (**CP001**) was identified very close to the Creswell Park opencast footprint area.

### **10.4 Palaeontology**

In Palaeontological terms the significance is rated as low neutral. The proposed development is thus unlikely to pose a substantial threat to local fossil heritage. However, should fossil remains be discovered during any phase of construction, either on the surface or exposed by fresh excavations, the ECO responsible for these developments should be alerted immediately. Such discoveries ought to be protected (preferably in situ) and the ECO should alert SAHRA (South

African Heritage Research Agency) so that appropriate mitigation (e.g. recording, sampling or collection) can be taken by a professional palaeontologist.

## 10.5 General

In the event that heritage resources are discovered during site clearance, construction activities must stop, and a qualified archaeologist appointed to evaluate and make recommendations on mitigation measures.

Since no heritage resources were identified within the Creswell Park opencast footprint area, the overall direct impact of the development on heritage resources is regarded as LOW to negligible and no mitigation measures are required for the footprint area. However, the indirect impact of the proposed project unmitigated on the heritage resources identified in the immediate vicinity of the footprint will be MEDIUM and will require a certain amount of mitigation.

It is my considered opinion, based on the findings of the desktop research together with the fieldwork findings, that the overall direct impact on heritage resources is acceptably low although the indirect impact on heritage resources is Medium before mitigation. However, provided the mitigation measures recommended for the identified sites situated adjacent to the proposed Creswell Park opencast footprint are implemented, the project can be approved from a heritage perspective.

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## LEGISLATIVE REQUIREMENTS – TERMINOLOGY AND ASSESSMENT CRITERIA

**1 General principles**

In areas where there has not yet been a systematic survey to identify conservation worthy places, a permit is required to alter or demolish any structure older than 60 years. This will apply until a survey has been done and identified heritage resources are formally protected.

Archaeological and paleontological sites, materials, and meteorites are the source of our understanding of the evolution of the earth, life on earth and the history of people. In the NHRA, permits are required to damage, destroy, alter, or disturb them. People who already possess material are required to register it. The management of heritage resources is integrated with environmental resources and this means that before development takes place heritage resources are assessed and, if necessary, rescued.

In addition to the formal protection of culturally significant graves, all graves, which are older than 60 years and are not in a formal cemetery (such as ancestral graves in rural areas), are protected. The legislation protects the interests of communities that have an interest in the graves - they should be consulted before any disturbance takes place. The graves of victims of conflict and those associated with the liberation struggle are to be identified, cared for, protected and memorials erected in their honour.

Anyone who intends to undertake a development must notify the heritage resource authority and if there is reason to believe that heritage resources will be affected, an impact assessment report must be compiled at the construction company's cost. Thus, the construction company will be able to proceed without uncertainty about whether work will have to be stopped if an archaeological or heritage resource is discovered.

According to the National Heritage Act (Act 25 of 1999 section 32) it is stated that -

An object or collection of objects, or a type of object or a list of objects, whether specific or generic, that is part of the national estate and the export of which SAHRA deems it necessary to control, may be declared a heritage object, including –

- objects recovered from the soil or waters of South Africa, including archaeological and paleontological objects, meteorites and rare geological specimens;
- visual art objects;

- military objects;
- numismatic objects;
- objects of cultural and historical significance;
- objects to which oral traditions are attached and which are associated with living heritage;
- objects of scientific or technological interest;
- books, records, documents, photographic positives and negatives, graphic material, film or video or sound recordings, excluding those that are public records as defined in section 1 (xiv) of the National Archives of South Africa Act, 1996 ( Act No. 43 of 1996), or in a provincial law pertaining to records or archives; and
- any other prescribed category.

Under the National Heritage Resources Act (Act No. 25 of 1999), provisions are made that deal with, and offer protection to, all historic and pre-historic cultural remains, including graves and human remains.

## **2 Graves and cemeteries**

Graves younger than 60 years fall under Section 2(1) of the Removal of Graves and Dead Bodies Ordinance (Ordinance no. 7 of 1925) as well as the Human Tissues Act (Act 65 of 1983) and are under the jurisdiction of the National Department of Health and the relevant Provincial Department of Health and must be submitted for final approval to the Office of the relevant Provincial Premier. This function is usually delegated to the Provincial MEC for Local Government and Planning, or in some cases the MEC for Housing and Welfare. Authorisation for exhumation and reinterment must also be obtained from the relevant local or regional council where the grave is situated, as well as the relevant local or regional council to where the grave is being relocated. All local and regional provisions, laws and by-laws must also be adhered to. In order to handle and transport human remains, the institution conducting the relocation should be authorised under Section 24 of Act 65 of 1983 (Human Tissues Act).

Graves older than 60 years, but younger than 100 years, fall under Section 36 of Act 25 of 1999 (National Heritage Resources Act) as well as the Human Tissues Act (Act 65 of 1983) and are under the jurisdiction of the South African Heritage Resource Agency (SAHRA). The procedure for Consultation Regarding Burial Grounds and Graves (Section 36(5) of Act 25 of 1999) is applicable to graves older than 60 years that are situated outside a formal cemetery administrated by a local authority. Graves in the category located inside a formal cemetery administrated by a local

authority will also require the same authorisation as set out for graves younger than 60 years, over and above SAHRA authorisation.

If the grave is not situated inside a formal cemetery but is to be relocated to one, permission from the local authority is required and all regulations, laws and by-laws set by the cemetery authority must be adhered to.

### **Methodology for Assessing Heritage Site significance**

This HIA report was compiled by PGS Heritage (PGS) for the proposed Kimberley West opencast mining permit. The applicable maps, tables and figures, are included as stipulated in the NHRA (no 25 of 1999), the National Environmental Management Act (NEMA) (no 107 of 1998). The HIA process consisted of three steps:

Step I – Literature Review: The background information to the field survey relied greatly on the Heritage Background Research.

Step II – Physical Survey: A physical survey was conducted on foot through the proposed project area by a qualified archaeologist and heritage specialist which was aimed at locating and documenting sites falling within and adjacent to the proposed development footprint.

Step III – The final step involved the recording and documentation of relevant heritage resources, the assessment of 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 - <10/50m<sup>2</sup>
  - Medium - 10-50/50m<sup>2</sup>
  - High - >50/50m<sup>2</sup>;
- 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:

#### *Site Significance*

Site significance classification standards prescribed by the SAHRA (2006) and approved by the ASAPA for the Southern African Development Community (SADC) region, were used for the purpose of this report.

*Table: Site significance classification standards as prescribed by SAHRA.*

| Field Rating                 | Grade    | Significance               | Recommended Mitigation                       |
|------------------------------|----------|----------------------------|--|
| National Significance (NS)   | Grade 1  | -                          | Conservation; National Site nomination       |
| Provincial Significance (PS) | Grade 2  | -                          | Conservation; Provincial Site nomination     |
| Local Significance (LS)      | Grade 3A | High Significance          | Conservation; Mitigation not advised         |
| Local Significance (LS)      | Grade 3B | High Significance          | Mitigation (Part of site should be retained) |
| Generally Protected A (GP.A) | -        | High / Medium Significance | Mitigation before destruction                |
| Generally Protected B (GP.B) | -        | Medium Significance        | Recording before destruction                 |
| Generally Protected C (GP.A) | -        | Low Significance           | Destruction                                  |

**THE SIGNIFICANCE RATING SCALES FOR THE PROPOSED PROSPECTING ACTIVITIES ON  
HERITAGE RESOURCES**

*(a) Nature of the impact*

The NATURE of an impact can be defined as: “a brief description of the impact being assessed, in terms of the proposed activity or project, including the socio-economic or environmental aspect affected by this impact”.

*(b) The status of the impact:*

| STATUS | Status       | Description                                     |
|--------|--------------|---|
|        | Positive (+) | A benefit to the holistic environment.          |
|        | Negative (-) | A cost to the holistic environment.             |
|        | Neutral (N)  | No cost or benefit to the holistic environment. |

*(c) Magnitude of the impact*

The MAGNITUDE of an impact can be defined as: “a brief description of the intensity or amplitude of the impact on socio-economic or environmental aspects”.

| Determining the magnitude of an impact                   |           |       |  |
|--|-----------|-------|--|
| MAGNITUDE  | Magnitude | Score | Description  |
| Magnitude / intensity of impact (at the specified scale) | Zero      | 1     | Natural and/or social functions and/or processes remain unaltered.       |
|  | Very low  | 2     | Natural and/or social functions and/or processes are negligibly altered. |
|  | Low       | 3     | Natural and/or social functions and/or processes are slightly altered.   |
|  | Medium    | 4     | Natural and/or social functions and/or processes are notably altered.    |



|  |             |          |   |
|--|-------------|----------|---|
|  | <b>High</b> | <b>5</b> | <b>Natural and/or social functions and/or processes severely altered.</b> |
|--|-------------|----------|---|

(d) Extent of the impact

The EXTENT of an impact can be defined as: “a brief description of the spatial influence of the impact or the area that will be affected by the impact”.

| <b>Determining the extent of an impact</b>   |                  |              |   |
|--|------------------|--------------|---|
| <b>EXTENT</b>                                | <b>Extent</b>    | <b>Score</b> | <b>Description</b>  |
| <b>Extent or spatial influence of impact</b> | <b>Footprint</b> | <b>1</b>     | <b>Only as far as the activity, such as footprint occurring within the total site area</b>              |
|  | <b>Site</b>      | <b>2</b>     | <b>Only the site and/or 500m radius from the site will be affected</b>                                  |
|  | <b>Local</b>     | <b>3</b>     | <b>Local area / district (neighbouring properties, transport routes and adjacent towns) is affected</b> |
|  | <b>Region</b>    | <b>4</b>     | <b>Entire region / province is affected.</b>  |
|  | <b>National</b>  | <b>5</b>     | <b>Country is affected</b>  |

(e) Duration of the impact

The DURATION of an impact can be defined as: “a short description of the period of time the impact will have an effect on aspects”.

| <b>Determining the duration of an impact</b> |                             |              |                          |
|--|-----------------------------|--------------|--------------------------|
| <b>DURATION</b>                              | <b>Extent</b>               | <b>Score</b> | <b>Description</b>       |
| <b>Duration of the impact</b>                | <b>Short term</b>           | <b>1</b>     | <b>Less than 2 years</b> |
|  | <b>Short to medium term</b> | <b>2</b>     | <b>2 – 5 years</b>       |
|  | <b>Medium term</b>          | <b>3</b>     | <b>6 – 25 years</b>      |
|  | <b>Long term</b>            | <b>4</b>     | <b>26 – 45 years</b>     |
|  | <b>Permanent</b>            | <b>5</b>     | <b>46 years or more</b>  |

(f) Degree to which impact can be reversed

The REVERSIBILITY of an impact can be defined as: *“the ability of an impact to be changed from a state of affecting aspects to a state of not affecting aspects”*.

| <b>Determining the reversibility of an impact</b> |                                     |              |  |
|---|-------------------------------------|--------------|--|
| <b>REVERSIBILITY</b>                              | <b>Reversibility</b>                | <b>Score</b> | <b>Description</b>   |
|   | <b>Completely reversible</b>        | <b>1</b>     | <b>Impacts can be reversed through the implementation of minimal mitigation measures and rehabilitation with negligible residual effects.</b>                    |
|   | <b>Nearly completely reversible</b> | <b>2</b>     | <b>Impacts can nearly be completely reversed through the implementation of mitigation measures and rehabilitation, with marginal residual effects.</b>           |
|   | <b>Partly reversible</b>            | <b>3</b>     | <b>Impacts can be partly reversed through the implementation of mitigation measures and rehabilitation with moderate residual effects.</b>                       |
|   | <b>Nearly irreversible</b>          | <b>4</b>     | <b>Impacts can be mitigated, but only marginally reversed through the implementation of mitigation measures and rehabilitation with severe residual effects.</b> |
|   | <b>Irreversible</b>                 | <b>5</b>     | <b>Impacts are permanent and can't be reversed by the implementation of mitigation measures or rehabilitation is not viable.</b>                                 |

(g) Degree to which impact may cause irreplaceable loss of resources

The irreplaceability of an impact can be defined as “the amount of resources that can/can't be replaced”.

Irreplaceability = Magnitude + Extent + Duration + Reversibility

| Degree to which impact may cause irreplaceable loss of resources |                  |         |                               |
|--|------------------|---------|-------------------------------|
| IRREPLACEABILITY   | Irreplaceability | Score   | Description                   |
| Irreplaceable loss of resources                                  | No loss          | 0       | No loss of any resources      |
|  | Very Low         | 1 - 5   |                               |
|  | Low              | 6 - 10  | Marginal loss or resources    |
|  | Medium           | 11 - 15 | Significant loss of resources |
|  | High             | 16 - 20 | Complete loss of resources    |
|  |                  |         |                               |

(h) Probability of the impact occurring

The PROBABILITY of an impact can be defined as: “the estimated chance of the impact happening”.

| Determining the probability of an impact |                 |       |   |
|--|-----------------|-------|---|
| PROBABILITY                              | Probability     | Score | Description   |
|  | Unlikely        | 1     | Unlikely to occur (0 – 15% probability of impact occurring) |
|  | Possible        | 2     | May occur (15 – 40% chance of occurring)                    |
|  | Probable        | 3     | Likely to occur (40– 60% chance of occurring)               |
|  | Highly Probable | 4     | Between 60% and 85% sure that the impact will occur         |
|  | Definite        | 5     | Will certainly occur (85 - 100% chance of occurring)        |
|  |                 |       |   |

(i) Significance of Impacts - Pre-Mitigation

The SIGNIFICANCE can be defined as:” the combination of the duration and importance of the impact, in terms of physical and socio-economic extent, resulting in an indicative level of mitigation required”.

The significance of an impact is determined as follows:

Significance = Irreplaceability x Probability

The maximum value is 100 significance points (SP). Environmental impacts were rated as either of Very High (VH) High (H), Medium (M), Low (L) or Very Low (VL) significance on the following basis:

Table 7: Significance Rating (SR) Basis

| Score     | Significance |
|-----------|--------------|
| 0         | Neutral      |
| 1 to 20   | Very low     |
| 21 to 40  | Low          |
| 41 to 60  | Medium       |
| 61 to 80  | High         |
| 81 to 100 | Very high    |

(j) Degree to which the impact can be mitigated

The degree to which an impact can be MITIGATED can be defined as: “the effect of mitigation measures on the impact and its degree of effectiveness”.

| MITIGATION POTENTIAL | Determining the mitigation potential of an impact |   |                       |
|----------------------|---|---|-----------------------|
|                      | Degree  | Calculation   | Description           |
|                      | High  | Pre-mitigation SR / 3 =<br>Post Mitigation SR                                       | Impact 100% mitigated |
|                      | Medium  | Pre-mitigation SR / 2 =<br>Post Mitigation SR                                       | Impact >50% mitigated |
|                      | Low   | Pre-mitigation SR / 3 = x<br>Then:<br>Pre-mitigation SR – x =<br>Post Mitigation SR | Impact <50% mitigated |

(k) Significance of Impacts Post-Mitigation

The SIGNIFICANCE can be defined as:” *the combination of the duration and importance of the impact, in terms of physical and socio-economic extent, resulting in an indicative level of mitigation required*”.

The significance of an impact is determined as follows:

Significance = Irreplaceability x Probability

Table 8: Significance Rating

| Score     | Significance |
|-----------|--------------|
| 0         | Neutral      |
| 1 to 20   | Very low     |
| 21 to 40  | Low          |
| 41 to 60  | Medium       |
| 61 to 80  | High         |
| 81 to 100 | Very high    |

(l) Confidence rating

CONFIDENCE in the assessment of an impact can be defined as the:” *level of certainty of the impact occurring*”.

| Determining the confidence rating of an impact |            |         |   |
|--|------------|---------|---|
| CONFIDENCE RATING                              | CONFIDENCE | Certain | Amount of information on and/or understanding of the environmental factors that potentially influence the impact is unlimited and sound             |
|  |            | Sure    | Amount of information on and/or understanding of the environmental factors that potentially influence the impact is reasonable and relatively sound |
|  |            | Unsure  | Amount of information on and/or understanding of the environmental factors that potentially influence the impact is limited                         |

(m) Cumulative impacts

The effect of CUMULATIVE impacts can be described as:” the effect the combination of past, present and “reasonably foreseeable” future actions have on aspects”.

| <b>Determining the confidence rating of an impact</b> |                           |               |                                       |
|---|---------------------------|---------------|---------------------------------------|
| <b>CUMULATIVE RATING</b>                              | <b>CUMULATIVE EFFECTS</b> | <b>Low</b>    | <b>Minor cumulative effects</b>       |
|   |                           | <b>Medium</b> | <b>Moderate cumulative effects</b>    |
|   |                           | <b>High</b>   | <b>Significant cumulative effects</b> |

**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 and the Democratic Republic of the Congo



**PROFESSIONAL CURRICULUM  
FOR JENNIFER KITTO**

**Name:** 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:** 6 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  
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* -

Limited involvement in various grave relocation projects 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
- 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: Bronkhorstspuit, 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 completed:

- 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

**ILAN SMEYATSKY**  
**Professional Archaeologist**

**Personal Details**

- **Name:** Ilan
- **Surname:** Smeyatsky
- **Identity Number:** 9109275072080
- **Date of Birth:** 27-09-1991
- **Citizenship:** South African
- **Gender:** Male
- **Marital Status:** Single
- **Languages Spoken:** English

**Education History**

**2010-2013: BSc Bachelors Degree**

University of the Witwatersrand, Johannesburg, South Africa

- Archaeology
- Psychology
- Statistics
- Research Design and Analysis
- 67% Pass (**2:1 Qualification**)

**2014: BSc (Hons) in Archaeology**

**AWARDS:**

- Received the 2014 Center of Excellence in Palaeoscience award - **Bursary to the value of ZAR 30000 ≈ \$2500**
- Received the Post-Graduate Merit Award in 2015 for academic merit for my Honours academic results - **Bursary to the value of ZAR 25000 ≈ \$1800**

University of the Witwatersrand, Johannesburg, South Africa

- Archaeology
- Excavation techniques
- Theory
- 69% Pass (**2:1 Qualification**)
- **Distinction** received for thesis entitled: "Stylistic variation in Later Stone Age tanged arrowheads: a pilot study using geometric morphometrics"

**2015-2017: MSc by Research (Archaeology)**

University of the Witwatersrand, Johannesburg, South Africa

- Archaeology
- Statistical analysis
- GIS (Geographic Information Systems)
- Thesis entitled: "Discerning and explaining shape variations in Later Stone Age tanged arrowheads, South Africa"

**Aug 2016 –**

**Jan 2017: Semester of Archaeology Masters**

**AWARD:** Received the 2016 AESOP+ full Masters scholarship to study at Uppsala University, Uppsala, Sweden – **Scholarship to the value of ZAR 160,000 ≈ \$11,000**

Uppsala University, Uppsala, Sweden

- Archaeological theory
- GIS (Geographic Information Systems)
- Invitational research

## **Employment History**

### **Part time employment as a student:**

- **2009-2013:** Part-Time Electrician Apprentice: Assisting in home electrical repair jobs.
- **2014-2015:** Lab Research Assistant: Analysing and classifying lithic artefacts, Data capturing, Mentoring trainee research assistants.

### **Experience in the field of archaeology:**

- **2013-2015: Fieldwork/Excavator - Responsibilities:** Feature detection, excavation, sieving, sorting, analysis, soil sampling, field documentation, ‘dumpy’ operation, Total Station operation, DGPS operation, rock art tracing and photography, engraving tracing and photography.
  - South African excavations:
    - Early Stone Age excavation at Maropeng World Heritage Site in Gauteng (1 Week – August 2015)
    - Pig cadaver exhumation as part of forensic experiment near Pretoria, Gauteng (1 Week – December 2014) - Praised for having the determination of returning for each subsequent excavation day as it was performed on a purely volunteer basis and the work conditions were particularly strenuous - Dr. Coen Nienaber
    - Iron Age excavation at Komati Gorge, Mpumalanga (1 Week – August 2014) - Praised for being exceptionally “methodical and proficient” with my excavation techniques – Dr. Alex Schoeman
    - Rock art fieldwork at Komati Gorge, Mpumalanga (1 Week – August 2014)
    - Underwater archaeology site mapping Komati Gorge, Mpumalanga (1 Week – August 2014)
    - Early Stone Age excavation at Maropeng World Heritage Site in Gauteng (2 Weeks - September 2013) - Personally uncovered some of the only stone tools (~1.8 million years old) found during that digging season.
- **2016: Excavation Supervisor - Responsibilities:** Supervision of two junior excavators, site detection, decision of excavation grid placement, excavation, sieving, sorting, soil sampling, field documentation.
  - Historical (farm site) excavation at Graaff-Reinet, Eastern Cape, South Africa (2 Weeks)
  - Completed dig 1 week ahead of schedule aided by my efficient direction, drive and support to the excavators under my supervision.
- **2017 – PRESENT:** Intern Archaeologist – PGS Heritage: Heritage Impact assessments, background research, report writing, permit applications, collections management, stakeholder engagement and grave relocation.