

**Prepared for:**

**JMA Consulting (Pty) Ltd**

**PO Box 883**

**Delmas 2210**

**Tel 0136651788 Fax 0136652364**

**A PHASE I HERITAGE IMPACT ASSESSMENT STUDY FOR A  
PROPOSED WASTE DISPOSAL FACILITY FOR BOSVELD  
PHOSPHATES (PTY) LTD ON THE FARM WEGSTEEK 30LU IN  
PHALABORWA IN THE LIMPOPO PROVINCE**

**Prepared by:**

**Dr Julius CC Pistorius**

**Archaeologist & Heritage Consultant**

**Member ASAPA**

**8 5<sup>TH</sup> Avenue**

**Cashan x1**

**Rustenburg 0299**

**Cell 0825545449**

**April 2022**

## EXECUTIVE SUMMARY

A Phase I Heritage Impact Assessment (HIA) study as required in terms of Section 38 of the National Heritage Resources Act (Act 25 of 1999) was done for Bosveld Phosphates (Pty) Ltd (hereafter referred to as Bosveld Phosphates) in Phalaborwa for a proposed new Waste Disposal Facility (WDF) on the farm Wegsteek 31LU in the Limpopo Province.

The aims with the Phase I HIA were the following:

- To establish whether any of the types and ranges of heritage resources ('national estate') as outlined in Section 3 of the National Heritage Resources Act (Act 25 of 1999) (except paleontological) remains do occur in the Project Area.
- To determine the significance of these heritage resources and whether they will be affected by the proposed Bosveld Phosphates Project.
- To propose mitigation measures for those heritage resources that may be affected by the proposed Bosveld Phosphates Project.

The Phase I HIA study for Bosveld Phosphates' proposed Waste Disposal Facility (WDF) revealed none of the types and ranges of heritage resources as outlined in Section 3 of the National Heritage Resources Act (No 25 of 1999) for the Project Area.

There is consequently no reason from a heritage point of view why the proposed Bosveld Phosphates Project cannot proceed. Nevertheless, chance-find procedures are outlined if any heritage resources of significance or graves may be uncovered by the proposed Bosveld Phosphates Project.

### *General (disclaimer)*

It is possible that this Phase I HIA study may have missed heritage resources or graves within the project area. If any heritage resources of significance are exposed during the Bosveld Phosphates Project, the South African Heritage Resources Authority (SAHRA) should be notified immediately, all development activities must be stopped, and an archaeologist accredited with the Association for Southern African Professional Archaeologist (ASAPA) should be notified to determine appropriate mitigation measures for the discovered finds. This may include obtaining the necessary authorisation (permits) from SAHRA to conduct the mitigation measures (see chance-find procedures).

## **ACRONYMS AND ABBREVIATIONS**

ASAPA	Association of South African Professional Archaeologists
BP	Before Present
EA	Environmental Authorisation
EAP	Environmental Assessment Practitioner
EIA	Environmental Impact Assessment
EIA	Early Iron Age
EMPr	Environmental Management Programme
EMPR	Environmental Management Programme Report
ESA	Early Stone Age
GPS	Global Positioning System
GY	Graveyard
HIA	Heritage Impact Assessment
LIA	Late Iron Age
LSA	Late Stone Age
MIA	Middle Iron Age
MPRDA	Mineral and Petroleum Resources Development Act, Act No 28 of 2002
MSA	Middle Stone Age
NEMA	National Environmental Management Act, Act No 107 of 1998
NEM:WA	National Environmental Management: Waste Act, Act No 59 of 2008
NHRA	National Heritage Resources Act, Act No 25 of 1999
No	Number
NWA	National Water Act, Act No 36 of 1998
PHRA	Provincial Heritage Resource Agency
SAHRA	South African Heritage Resources Agency
SAHRIS	South African Heritage Resources Information System
ToR	Terms of Reference

## TERMINOLOGY

Terms that may be used in this report are briefly outlined below:

- **Conservation:** The act of maintaining all or part of a resource (whether renewable or non-renewable) in its present condition to provide for its continued or future use. Conservation includes sustainable use, protection, maintenance, rehabilitation, restoration, and enhancement of the natural and cultural environment.
- **Cultural resource management:** A process that consists of a range of interventions and provides a framework for informed and value-based decision-making. It integrates professional, technical, and administrative functions and interventions that impact on cultural resources. Activities include planning, policy development, monitoring and assessment, auditing, implementation, maintenance, communication, and many others. All these activities are (or will be) based on sound research.
- **Cultural resources:** A broad, generic term covering any physical, natural, and spiritual properties and features adapted, used, and created by humans in the past and present. Cultural resources are the result of continuing human cultural activity and embody a range of community values and meanings. These resources are non-renewable and finite. Cultural resources include traditional systems of cultural practice, belief, or social interaction. They can be but are not necessarily identified with defined locations.
- **Heritage resources:** The various natural and cultural assets that collectively form the heritage. These assets are also known as cultural and natural resources. Heritage resources (cultural resources) include all human-made phenomena and intangible products that are the result of the human mind. Natural, technological, or industrial features may also be part of heritage resources, as places that have made an outstanding contribution to the cultures, traditions and lifestyles of the people or groups of people of South Africa.

- In-Situ Conservation: The conservation and maintenance of ecosystems, natural habitats, and cultural resources in their natural and original surroundings.
- Iron Age: Refers to the last two millennia and 'Early Iron Age' to the first thousand years AD. 'Late Iron Age' refers to the period between the 16<sup>th</sup> century and the 19<sup>th</sup> century and can therefore include the Historical Period.
- Maintenance: Keeping something in good health or repair.
- Pre-historical: Refers to the time before any historical documents were written or any written language developed in a particular area or region of the world. The historical period and historical remains refer, for the Project Area, to the first appearance or use of 'modern' Western writing brought to the Eastern Highveld by the first Colonists who settled here from the 1840's onwards.
- Preservation: Conservation activities that consolidate and maintain the existing form, material and integrity of a cultural resource.
- Recent past: Refers to the 20<sup>th</sup> century. Remains from this period are not necessarily older than sixty years and therefore may not qualify as archaeological or historical remains. Some of these remains, however, may be close to sixty years of age and may, in the near future, qualify as heritage resources.
- Protected area: A geographically defined area designated and managed to achieve specific conservation objectives. Protected areas are dedicated primarily to the protection and enjoyment of natural or cultural heritage, to the maintenance of biodiversity, and to the maintenance of life-support systems. Various types of protected areas occur in South Africa.
- Reconstruction: Re-erecting a structure on its original site using original components.

- Replication: The act or process of reproducing by new construction the exact form and detail of a vanished building, structure, object, or a part thereof, as it appeared at a specific period.
- Restoration: Returning the existing fabric of a place to a known earlier state by removing additions or by reassembling existing components.
- Stone Age: Refers to the prehistoric past, although Late Stone Age people lived in South Africa well into the Historical Period. The Stone Age is divided into an Earlier Stone Age (3 million years to 150 000 thousand years ago) the Middle Stone Age (150 000 years to 40 000 years ago) and the Late Stone Age (40 000 years to 200 years ago).
- Sustainability: The ability of an activity to continue indefinitely, at current and projected levels, without depleting social, financial, physical and other resources required to produce the expected benefits.
- Translocation: Dismantling a structure and re-erecting it on a new site using original components.
- Project Area: refers to the area (footprint) where the developer wants to focus its development activities.
- Phase I archaeological studies refer to surveys using various sources of data to establish the presence of all possible types and ranges of heritage resources in any given Project Area (excluding paleontological remains as these studies are done by registered and accredited palaeontologists).
- Phase II studies include in-depth cultural heritage studies such as archaeological mapping, excavating and sometimes laboratory work. Phase II work may include the documenting of rock art, engraving or historical sites and dwellings; the sampling of archaeological sites or shipwrecks; extended excavations of archaeological sites; the exhumation of human remains and the

relocation of graveyards, etc. Phase II work involves permitting processes, requires the input of different specialists and the co-operation and approval of the SAHRA.

## CONTENTS

<b>Executive summary</b>	<b>2</b>
<b>Acronyms and abbreviations</b>	<b>3</b>
<b>Terminology</b>	<b>4</b>
<b>1 INTRODUCTION</b>	<b>10</b>
1.1 Background and context	10
1.2 Aims with the report	11
1.3 Assumptions and limitations	12
<b>2 DETAILS OF THE SPECIALIST</b>	<b>14</b>
<b>3 DECLARATION OF INDEPENDENCE</b>	<b>16</b>
<b>4 LEGAL FRAMEWORK</b>	<b>17</b>
4.1 Legislation relevant to heritage resources	17
4.1.1 NEMA	19
4.1.2 MPRDA	19
4.1.3 NHRA	19
4.1.3.1 Heritage Impact Assessment studies	19
4.1.3.2 Section 34 (Buildings and structures)	20
4.1.3.3 Section 35 (Archaeological and palaeontological resources and meteorites)	21
4.1.3.4 Section 36 (Burial grounds and graves)	21
4.1.3.5 Section 37 (Public monuments and memorials)	23
4.1.3.6 Section 38 (HRM)	23
4.4.4 NEMA Appendix 6 requirements	24
<b>5 THE PROJECT AREA</b>	<b>27</b>
5.1 Location	27
5.4 The nature of the Bosveld Phosphates project	27
5.3 The nature of the Bosveld Phosphate's project area	30
5.4 The heritage character of the project area	30



<b>6</b>	<b>CONTEXTUALISING THE STUDY AREA</b>	<b>32</b>
6.1	Stone Age sites	32
6.2	Iron Age remains	33
6.3	The historical period	35
<b>7</b>	<b>APPROACH AND METHODOLOGY</b>	<b>36</b>
7.1	Field survey	36
7.2	Databases, literature survey and maps	37
7.3	Consultation process undertaken and comments received from stakeholders	37 37
7.4	Assumptions and limitations	37
7.5	Significance rating	38
<b>8</b>	<b>HERITAGE SURVEY FOR BOSVELD PHOSPHATES</b>	<b>41</b>
8.1	The field survey	41
8.2	Types and ranges of heritage resources	41
8.3	Chance-find procedures	44
8.3.1	Chance-find procedures for heritage resources	44
8.3.2	Chance-find Procedures for graves	44
<b>9</b>	<b>CONCLUSION AND RECOMMENDATIONS</b>	<b>46</b>
<b>10</b>	<b>SELECT BIBLIOGRAPHY</b>	<b>47</b>
<b>11</b>	<b>SPOKESPERSONS CONSULTED</b>	<b>50</b>

# 1 INTRODUCTION

## 1.1 Background and context

Bosveld Phosphates (Pty) Ltd (hereafter referred to as Bosveld Phosphates) is the owner of an industrial Phosphoric Acid Plant, situated just outside the town of Phalaborwa, in what is called the Phalaborwa Mining and Industrial Complex (PMIC), within the Limpopo Province of South Africa. Bosveld Phosphates was established in the 1960's and has over the years been expanded and operated by several different owners. Bosveld Phosphates purchased the plant from Sasol Nitro (Pty) Ltd in 2011 and after having done some refurbishment, re-started the production of Phosphoric Acid in October 2012.

The plant primarily produces Phosphoric Acid, Sulphuric Acid, Phosphate Rock, Phosphogypsum, Fluorosilicic Acid, Ammonia Gas, Mono-Ammonium Phosphate (MAP) as well as Granular Super Phosphate (GSP) which are transported by road and rail and exported mainly for use in the agricultural sector. Dry fertilizers are also mixed / blended on the plant according to the required demand specifications. Most of these operations are however currently inactive and large portions of the site are under lease agreements to tenants involved in the beneficiation and export of magnetite.

Two of these magnetite beneficiation plants, i. e. Magnetite Dense Media Separation Plant Process (SAOB – South African Ore Beneficiation (Pty) Limited) and Magnetite Drying Plant (MP2 - Mag Plant 2 (Pty) Ltd) have been constructed on the Bosveld Phosphates premises. The intention of these plants is to upgrade Magnetite ( $\text{Fe}_3\text{O}_4$ ) from the adjacent Foskor (Pty) Ltd site, from an average input feed grade of 52% to a concentrate of between 61% Fe and 64% Fe. The upgraded Magnetite final concentrate will be transported to the Phalaborwa station where it will be loaded onto rail wagons and dispatched to either the Maputo or Richards Bay port (see Figure 1(a)).

The non-magnetite tailings originating from this beneficiation processes will be temporarily stored on site until it is processed through a Copper flotation plant/process where Copper mineral will be extracted. In support of these processes, Bosveld Phosphates requires a suitable authorised waste disposal facility where the waste

produced from this copper extraction process can be disposed and stored for future use. This proposed project requires Environmental Authorisation (EA) in terms of the provisions of the National Environmental Management Act (NEMA) Act No. 107 of 1998, the National Environmental Management: Waste Act (NEMWA) Act No. 59 of 2008, as well as the National Water Act (NWA) Act No. 36 of 1998.

Based on the nature of the proposed activities associated with this project, the necessary applications must be supported inter alia by a Scoping and Environmental Impact Assessment and Reporting Process (S&EIR) as provided for in the Environmental Impact Assessment (EIA) Regulations of 07 April 2017 (as amended). In this regard an integrated application for an EA in terms of the NEMA and a Waste Management Licence (WML) in terms of the NEMWA will be made to the Limpopo Department of Economic Development, Environment and Tourism (LEDET) as the Competent Authority (CA). A Water Use Licence Application (WULA) will be submitted to the Department of Water and Sanitation (DWS).

## **1.2 Aims with this report**

Focused archaeological surveys and research work has been conducted in the Limpopo Province for more than four decades. These studies have indicated that the Limpopo Province has a rich heritage comprised of remains dating from the pre-historical and from the historical periods of South Africa. These remains in the Limpopo Province form a record of the heritage of most groups living in South Africa today. These remains or heritage resources qualify as part of South Africa's 'national estate' as outlined in Section 3 of the National Heritage Resources Act (No 25 of 1999) (see Box 1, next page).

This document contains the report on the results of a Phase I Heritage Impact Assessment (HIA) study which was done for Bosveld Phosphates proposed new waste disposal facility. The aims with the heritage survey and impact assessment were the following:

- To establish whether any of the types and ranges of heritage resources ('national estate') as outlined in Section 3 of the National Heritage Resources Act (Act 25 of 1999) (except paleontological) remains do occur in the Bosveld

Phosphates project area.

- To determine the significance of these heritage resources and whether they will be affected by the proposed Bosveld Phosphates Project.
- To propose mitigation measures for those heritage resources that may be affected by the proposed Bosveld Phosphates Project.

### **1.3 Assumptions and limitations**

The findings, observations, conclusions, and recommendations reached in this report are based on the author's best scientific and professional knowledge, information that could be collected from spokespersons and his ability to keep up with the physical and other comprehensive challenges that the project commanded. The findings in the report are based on accepted archaeological survey and assessment techniques and methodologies.

The study area comprises a triangular piece of land which varies from disturbed pieces of land to patches where no development has occurred. It was not possible to survey the total surface area on foot because of areas with thick impenetrable vegetation cover, the sheer size of the project area and the fact that the area was surveyed in the past.

It is possible that not all heritage resources were recorded in the project area because the total surface area could not be covered on foot. Excluding the size of the project areas other reasons included the fact that heritage resources, particularly graves, may occur in tall grass or thick clumps of vegetation whilst others may be located below the surface and may only be exposed once development commences. Heritage resources may also simply have been missed because of human failure to observe or to recognise them as such.

If any heritage resources of significance are exposed during the proposed Bosveld Phosphates project the South African Heritage Resources Authority (SAHRA) should be notified immediately, all development activities must be stopped, and an archaeologist accredited with the Association for Southern African Professional

Archaeologist (ASAPA) should be notified to determine appropriate mitigation measures for the discovered finds. This may include obtaining the necessary authorization (permits) from SAHRA to conduct the mitigation measures.

The author preserves the right to modify aspects of the report. This includes the recommendations when new information becomes available particularly if it may have an influence on the results and recommendations of the report. In this regard the report is also viewed as a 'living document' as new uncovered finds such as graves may be added to the heritage resources listed in the report.

## 2 DETAILS OF THE SPECIALIST

**Profession:** Archaeologist, Museologist (Museum Scientists), Lecturer, Heritage Guide Trainer, and Heritage Consultant.

**Qualifications:**

BA (Archaeology, Anthropology and Psychology) (UP, 1976)

BA (Hons) Archaeology (distinction) (UP, 1979)

MA Archaeology (distinction) (UP, 1985)

D Phil Archaeology (UP, 1989)

Post Graduate Diploma in Museology (Museum Sciences) (UP, 1981)

**Work experience:**

Museum curator and archaeologist for the Rustenburg and Phalaborwa Town Councils (1980-1984)

Head of the Department of Archaeology, National Cultural History Museum in Pretoria (1988-1989)

Lecturer and Senior lecturer Department of Anthropology and Archaeology, University of Pretoria (1990-2003)

Independent Archaeologist and Heritage Consultant (2003-)

**Accreditation:** Member of the Association for Southern African Professional Archaeologists. (ASAPA)

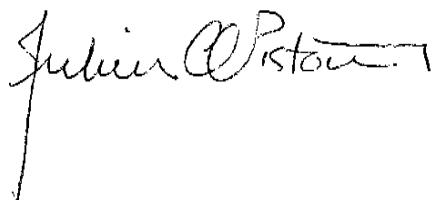
**Summary:** Julius Pistorius is a qualified archaeologist and heritage specialist with extensive experience as a university lecturer, museum scientist, researcher and heritage consultant. His research focussed on the Late Iron Age Tswana and Lowveld-Sotho (particularly the Bamalatji of Phalaborwa). He has published a book on early Tswana settlement in the North-West Province and has completed an unpublished manuscript on the rise of Bamalatji metal workings spheres in Phalaborwa during the last 1 200 years. He has excavated more than twenty LIA settlements in North-West and twelve IA settlements in the Lowveld and has mapped hundreds of stone walled sites in the North-West. He has written a guide for Eskom's field personnel on heritage management. He has published twenty scientific papers in academic journals and several popular articles on archaeology and heritage matters. He collaborated with environmental companies in compiling State of the Environmental Reports for Ekurhuleni, Hartebeespoort and heritage management plans for the Magaliesberg and Waterberg. Since acting as an independent consultant he has done approximately

800 large to small heritage impact assessment reports. He has a longstanding working relationship with Eskom, Rio Tinto (PMC), Rio Tinto (EXP), Impala Platinum, Angloplats (Rustenburg), Lonmin, Sasol, PMC, Foskor, Kudu and Kelgran Granite, Bafokeng Royal Resources, Pilanesberg Platinum Mine (PPM) etc. as well as with several environmental companies.

### 3 DECLARATION OF INDEPENDENCE

I, Dr Julius CC Pistorius declare the following:

- I act as an independent specialist in this application;
- I will perform the work relating to the application in an objective manner, even, if this result in views and findings that are not favourable for the applicant;
- I declare that there are no circumstances that may compromise my objectivity in performing such work;
- I have expertise in conducting the specialists report relevant to this application, including knowledge of the Act, Regulations and any guidelines that have relevance to the applications;
- I will comply with the Act, Regulations and other applicable legislation;
- I will consider, to the extent possible, the matters listed in Regulation 13;
- I understand to disclose to the applicant and the competent authority all material information in my possession
- All the particulars furnished by me in this form are true and correct 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; and
- I realise that a false declaration is offence in terms of regulation 48 and is punishable in terms of section 24F of the Act.



**April 2022**



## **4 LEGAL FRAMEWORK**

South Africa's heritage resources ('national estate') are protected by international, national, provincial, and local legislation which provides regulations, policies and guidelines for the protection, management, promotion and utilization of heritage resources. South Africa's 'national estate' includes a wide range of various types of heritage resources as outlined in Section 3 of the NHRA (see Box 1).

At a national level, heritage resources are dealt with by the National Heritage Council Act (Act No 11 of 1999) and the NHRA. According to the NHRA, heritage resources are categorized using a three-tier system, namely Grade I (national), Grade II (provincial) and Grade III (local) heritage resources.

At the provincial level, heritage legislation is implemented by Provincial Heritage Resources Agencies (PHRA's) which apply the NHRA together with provincial government guidelines and strategic frameworks. Metropolitan or Municipal (local) policy regarding the protection of cultural heritage resources is also linked to national and provincial acts and is implemented by the (SAHRA and the PHRA's).

### **4.1 Legislation relevant to heritage resources**

Legislation relevant to South Africa's national estate includes the following:

- National Environmental Management Act (NEMA), Act No 107 of 1998
- Minerals and Petroleum Resources Development Act (MPRDA), Act No 28 of 2002
- National Heritage Resources Act (NHRA), Act No 25 of 1999.

**Box 1: Types and ranges of heritage resources (the national estate) as outlined in Section 3 of the National Heritage Resources Act, 1999 (No 25 of 1999).**

The National Heritage Resources Act (Act No 25 of 1999, Art 3) outlines the following types and ranges of heritage resources that qualify as part of the National Estate, namely:

- (a) places, buildings structures and equipment of cultural significance;
- (b) places to which oral traditions are attached or which are associated with living heritage;
- (c) historical settlements and townscapes;
- (d) landscapes and natural features of cultural significance;
- (e) geological sites of scientific or cultural importance;
- (f) archaeological and palaeontological sites;
- (g) graves and burial grounds including-
  - (i) ancestral graves;
  - (ii) royal graves and graves of traditional leaders;
  - (iii) graves of victims of conflict;(iv) graves of individuals designated by the Minister by notice in the Gazette;
  - (v) historical graves and cemeteries; and
  - (vi) other human remains which are not covered by in terms of the Human Tissues Act, 1983 (Act No 65 of 1983);
- (h) sites of significance relating to the history of slavery in South Africa;
- (i) movable objects, including -
  - (i) objects recovered from the soil or waters of South Africa, including archaeological and palaeontological objects and material, meteorites and rare geological specimens;
  - (ii) objects to which oral traditions are attached or which are associated with living heritage;
  - (iii) ethnographic art and objects;
  - (iv) military objects;
  - (v) objects of decorative or fine art;
  - (vi) objects of scientific or technological interest; and
  - (vii) books, records, documents, photographs, positives and negatives, graphic, film or video material or sound recordings, excluding those that are public records as defined in section 1(xiv) of the National Archives of South Africa Act, 1996 (Act No 43 of 1996).

The National Heritage Resources Act (Act No 25 of 1999, Art 3) also distinguishes nine criteria for places and objects to qualify as 'part of the national estate if they have cultural significance or other special value ...'. These criteria are the following:

- (a) its importance in the community, or pattern of South Africa's history;
- (1) its possession of uncommon, rare or endangered aspects of South Africa's natural or cultural heritage;
- (2) its potential to yield information that will contribute to an understanding of South Africa's natural or cultural heritage;
- (3) its importance in demonstrating the principal characteristics of a particular class of South Africa's natural or cultural places or objects;
- (e) its importance in exhibiting particular aesthetic characteristics valued by a community or cultural group;
- (f) its importance in demonstrating a high degree of creative or technical achievement at a particular period;
- (g) its strong or special association with a particular community or cultural group for social, cultural or spiritual reasons; (h)
- (h) its strong or special association with the life or work of a person, group or organisation of importance in the history of South Africa;
- (i) sites of significance relating to the history of slavery in South Africa

#### **4.1.1 NEMA**

The NEMA stipulates under Section 2(4)(a) that sustainable development requires the consideration of all relevant factors including (iii) the disturbance of landscapes and sites that constitute the nation's cultural heritage must be avoided, or where it cannot be altogether avoided, is minimised and remedied. Heritage assessments are implemented in terms of the NEMA Section 24 to give effect to the general objectives. Procedures considering heritage resource management in terms of the NEMA are summarised under Section 24(4) as amended in 2008. In addition to the NEMA, the National Environmental Management: Protected Areas Act, 2003 (Act No 57 of 2003) may also be applicable. This act applies to protected areas and world heritage sites, declared as such in terms of the World Heritage Convention Act, 1999 (Act No 49 of 1999).

#### **4.1.2 MPRDA**

The MPRDA stipulates under Section 5(4) no person may prospect for or remove, mine, conduct technical co-operation operations, reconnaissance operations, explore for and produce any mineral or petroleum or commence with any work incidental thereto on any area without (a) an approved environmental management programme or approved environmental management plan.

#### **4.1.3 NHRA**

According to Section 3 of the NHRA the 'national estate' comprises a wide range and various types of heritage resources (see Box 1).

##### **4.1.3.1 Heritage Impact Assessment studies**

According to Section 38 of the NHRA, a HIA process must be followed under the following circumstances:

- The construction of a linear development (road, wall, power line, canal etc.) exceeding 300m in length

- The construction of a bridge or similar structure exceeding 50m in length
- Any development or activity that will change the character of a site and which exceeds 5 000m<sup>2</sup> or which involve three or more existing erven or subdivisions thereof
- Re-zoning of a site exceeding 10 000 m<sup>2</sup>
- Any other category provided for in the regulations of SAHRA, a provincial or local heritage authority or any other legislation such as NEMA, MPRDA, etc.

#### **4.1.3.2 Section 34 (Buildings and structures)**

Section 34 of the NHRA provides for general protection of structures older than 60 years. According to Section 34(1) no person may alter (demolish) any structure or part thereof which is older than 60 years without a permit issued by the relevant provincial heritage resources authority.

A structure means any building, works, device or any other facility made by people and which is fixed to land and which includes fixtures, fittings and equipment associated with such structures.

Alter means any action which affects the structure, appearance or physical properties of a place or object, whether by way of structural or any other works such as painting, plastering, decorating, etc..

Most importantly, Section 34(1) clearly states that no structure or part thereof may be altered or demolished without a permit issued by the relevant PHRA. These permits will not be granted without a HIA being completed. A destruction permit will thus be required before any removal and/or demolition may take place, unless exempted by the PHRA according to Section 34(2) of the NHRA.

#### **4.1.3.3 Section 35 (Archaeological and palaeontological resources and meteorites)**

Section 35 of the NHRA provides for the general protection of archaeological and palaeontological resources, and meteorites. If archaeological resources are discovered during the course of development, Section 38(3) specifically requires that the discovery must immediately be reported to the PHRA, or local authority or museum who must notify the PHRA. Furthermore, no person may without permits issued by the responsible heritage resources authority may:

- destroy, damage, excavate, alter, deface, or otherwise disturb any archaeological or paleontological site or any meteorite
- destroy, damage, excavate, remove from its original position, collect, or own any archaeological or paleontological material or object or any meteorite
- trade in, sell for private gain, export, or attempt to export from the Republic any category of archaeological or paleontological material or object, or any meteorite; or bring onto or use at an archaeological or paleontological site any excavation equipment or any equipment that assists in the detection or recovery of metals or archaeological and paleontological material or objects, or use such equipment for the recovery of meteorites
- alter or demolish any structure or part of a structure which is older than 60 years.

Heritage resources may only be disturbed or moved by an archaeologist after being issued with a permit received from SAHRA. To demolish heritage resources, the developer has to acquire a destruction permit by from SAHRA.

#### **4.1.3.4 Section 36 (Burial grounds and graves)**

Section 36 of the NHRA allows for the general protection of burial grounds and graves. Should burial grounds or graves be found during development, Section 36(6) stipulates that such activities must immediately cease, and the discovery reported to the responsible heritage resources authority and the South African Police Service

(SAPS). Section 36 also stipulates that no person without a permit issued by the relevant heritage resources authority may:

- (a) destroy, damage, alter, exhume, or remove from its original position or otherwise disturb the grave of a victim of conflict, or any burial ground or part thereof which contains such graves
- (b) destroy, damage, alter, exhume, or remove from its original position or otherwise disturb any grave or burial ground older than 60 years which is situated outside a formal cemetery administered by a local authority; or
- 9(c ) bring onto or use at a burial ground or grave referred to in paragraph (a) or (b) any excavation, or any equipment which assists in the detection or recovery of metals.

Section 36 of the NHRA divides graves and burial grounds into the following categories:

- a. ancestral graves
- b. royal graves and graves of traditional leaders
- c. graves of victims of conflict
- d. graves designated by the Minister
- e. historical graves and cemeteries
- f. human remains

Human remains less than 60 years old are subject to provisions of the National Health Act, 2003 (Act No 61 of 2003), Ordinance 12 of 1980 (Exhumation Ordinance) and Ordinance No 7 of 1925 (Graves and dead bodies Ordinance, repealed by Mpumalanga). Municipal bylaws about graves and graveyards may differ. Professionals involved with the exhumation and relocation of graves and graveyards must establish whether such bylaws exist and must adhere to these laws.

Unidentified graves are handled as if they are older than 60 years until proven otherwise.

Permission for the exhumation and relocation of graves older than sixty years must also be gained from descendants of the deceased (where known), the National Department of Health, Provincial Department of Health, Premier of the Province, and

local police. Furthermore, permission must also be gained from the various landowners (i. e. where the graves are located and where they are to be relocated) before exhumation can take place.

Human remains can only be handled by a registered undertaker, or an institution declared under the Human Tissues Act (Act No 65 of 1983 as amended).

#### **4.1.3.5 Section 37 (Public monuments and memorials)**

Section 37 makes provision for the protection of all public monuments and memorials in the same manner as places which are entered in a heritage register referred to in Section 30 of the NHRA.

#### **4.1.3.6 Section 38 (Heritage Resource Management)**

Section 38 (8): The provisions of this section do not apply to a development as described in Section 38 (1) if an evaluation of the impact of such development on heritage resources is required in terms of the Environment Conservation Act, 1989 (Act No 73 of 1989), or the integrated environmental management guidelines issued by the Department of Environment Affairs and Tourism, or the Minerals Act, 1991 (Act No 50 of 1991), or any other legislation. Section 38(8) ensures cooperative governance between all responsible authorities through ensuring that the evaluation fulfils the requirements of the relevant heritage resources authority in terms of Subsection (3), and any comments and recommendations of the relevant heritage resources authority about such development have been considered *prior* to the granting of the consent.

The Listed Activities in terms of the Government Notice Regulations (GNRs) stipulated under NEMA for which EA will be applied for, will trigger a HIA as contemplated in Section 38(1) above as follows:

#### 4.4.4 NEMA Appendix 6 requirements

<b>NEMA Regulations, 2014 (as amended 2017) - Appendix 6</b>	<b>Relevant section in report</b>
Details of the specialist who prepared the report and the expertise of that person to compile a specialist report including a curriculum vitae	Part 2. Details of the specialist
A declaration that the person is independent in a form as may be specified by the competent authority	Part 3. Declaration of independence
An indication of the scope of, and the purpose for which, the report was prepared	Part 1. Introduction
An indication of the quality and age of base data used for the specialist report	
The duration, date and season of the site investigation and the relevance of the season to the outcome of the assessment	Part 7. Approach and Methodology Part 8.1. Field survey
A description of the methodology adopted in preparing the report or carrying out the specialised process inclusive of equipment and modelling used	Part 7. Approach and Methodology
Details of an assessment of the specific identified sensitivity of the site related to the proposed activity or activities and its associated structures and infrastructure, inclusive of a site plan identifying site alternatives	Part 8. The heritage survey Part 8.1 Field survey
An identification of any areas to be avoided, including buffers	Part 8. The heritage survey Part 8.1 Field survey Part 8.3 Chance-find procedures



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;	Figure 2
A description of any assumptions made and any uncertainties or gaps in knowledge;	Part 1.3. Assumptions and limitations
A description of the findings and potential implications of such findings on the impact of the proposed activity, including identified alternatives, on the environment	Part 8.3      Chance-find procedures
Any mitigation measures for inclusion in the EMPr	Part 8.3      Chance-find procedures
Any conditions for inclusion in the environmental authorisation	Part 8.3      Chance-find procedures
Any monitoring requirements for inclusion in the EMPr or environmental authorisation	Part 8.3      Chance-find procedures
A reasoned opinion – <ul style="list-style-type: none"> <li>• whether the proposed activity, activities or portions thereof should be authorised;</li> <li>• regarding the acceptability of the proposed activity or activities; and</li> </ul> if the opinion is that the proposed activity, activities or portions thereof should be authorised, any avoidance, management and mitigation measures that should be included in the EMPr.	Part 9 Conclusion and recommendations Part 8.3 Chance-find procedures
A description of any consultation process that was undertaken during preparing the specialist report	Part 7.4 Consultation process undertaken, and comments received from stakeholders
A summary and copies if any comments that were received during any consultation process	Part 7.4      Consultation process undertaken and comments received from stakeholders

Any other information requested by the competent authority.	None
---	------

## **5 THE PROJECT AREA**

### **5.1 Location**

Bosveld Phosphates is located on the farm Wegsteek 30LU within the Ba-Phalaborwa Local Municipality which is located within the Mopani District Municipality of the Limpopo Province of the Republic of South Africa. The central coordinates of the site are 23° 59' 22.9" S, 31° 05' 17.8" E (WGS84). The industry's premises is caught between the Selati River in the south and Foskor and the Palabora Mining Company (PMC) in the east. Bosveld Phosphates joins the southern shoulder of the road that links the town of Phalaborwa in the north-east with the Hoedspruit Road in the south-west (Figure 1; 2331CC Phalaborwa 1:50 000 topographical map and Google imagery).

### **5.2 The nature of the Bosveld Phosphates proposed project**

Bosveld Phosphates is the owner of an industrial Phosphoric Acid Plant, situated outside the town of Phalaborwa, in what is referred to as the Phalaborwa Mining and Industrial Complex (PMIC). The site was established in the 1960's and was operated and expanded by several owners. Bosveld Phosphates (Pty) Ltd purchased the plant from Sasol Nitro (Pty) Ltd in 2011 and after refurbishing the plant re-started the production of Phosphoric Acid in October 2012.

The plant primarily produces Phosphoric Acid, Sulphuric Acid, Phosphate Rock, Phosphogypsum, Fluorosilicic Acid, Ammonia Gas, Mono-Ammonium Phosphate (MAP) as well as Granular Super Phosphate (GSP). These products are transported by road and rail and but also exported and mainly used in the agricultural sector. Dry fertilizers are also mixed / blended on the plant according to the required demand specifications. Most of these operations are currently inactive and large portions of the site are under lease agreements to tenants involved in the beneficiation and export of magnetite.



Two magnetite beneficiation plants, namely the Magnetite Dense Media Separation Plant Process, also known as South African Ore Beneficiation (Pty) Limited (SAOB), and the Magnetite Drying Plant known as MP2 (Mag Plant 2 (Pty) Ltd have been constructed on the Bosveld Phosphates premises. The intention of these plants is to upgrade Magnetite ( $\text{Fe}_3\text{O}_4$ ) from the adjacent Foskor (Pty) Ltd site, from an average input feed grade of 52% to a concentrate of between 61% Fe and 64% Fe. The upgraded Magnetite final concentrate will be transported to the Phalaborwa station where it will be loaded onto rail wagons and dispatched to either the Maputo or Richards Bay port.



**Figure 2- The orange shaded Bosveld Phosphates project area on Wegsteek 30LU north of the Selati River in a mining and industrial landscape which have been altered significantly during the past five decades (above).**

The non-magnetite tailings originating from this beneficiation processes will be temporarily stored on site until it is processed through a Copper flotation plant/process where Copper mineral will be extracted. In support of these processes, Bosveld

Phosphates requires a suitable authorised waste disposal facility where the waste produced from this copper extraction process can be disposed and stored for future use.

### **5.3 The nature of the Project Area**

The Bosveld Phosphates site is some 616 hectares (ha) in size and is in a small sub-catchment area of the Selati River. The site is situated to the east of the Selati River and has a river frontage of approximately 4 000 meters.

The project area cannot be described as pristine any longer. Several developmental activities such as dirt roads which criss-cross the area; a club house with a dam; a railway line; ponds with soil walls serving as catchments for possible spills from a tailings dam and fences were constructed in the project area as well as close to its boundaries (Figures 2 & 3).

The nature of the project area is further discussed and illuminated with photographs in Part 8.1, 'The field survey'.

### **5.4 The heritage character of the project area**

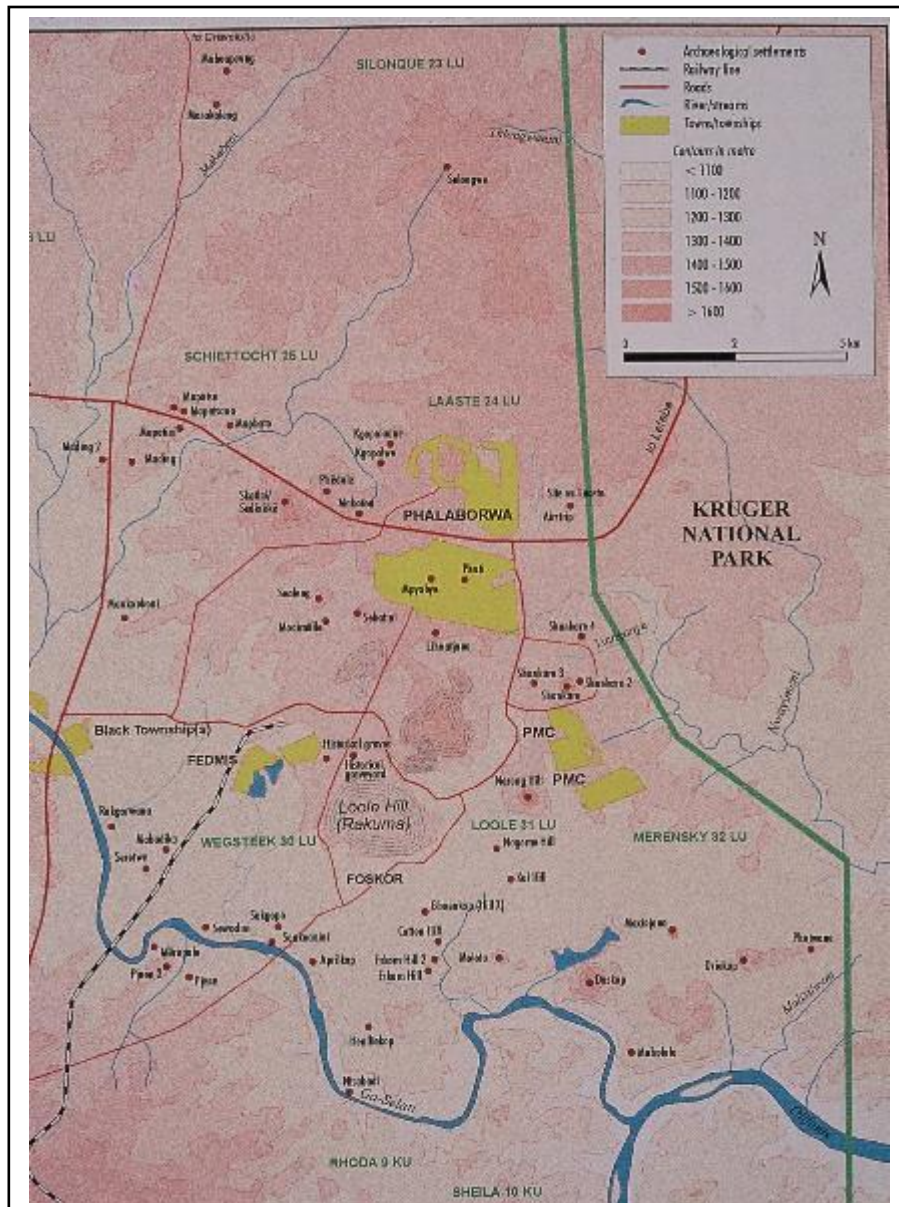
Bosveld Phosphates is amid a cultural landscape that is marked by extensive remains that date from the Iron Age. These heritage sites are associated with pre-historical and historical mining, metal working and residential remains. These types of heritage sites are not only limited to Phalaborwa but also extends southwards towards Hoedspruit, eastwards into the Kruger National Park and northwards to the Letaba River (Figure 2).

Stone Age sites that are associated with stone tools also occur in the Phalaborwa region but not in such large numbers as sites which date from the Iron Age. Larger numbers of SA sites may occur, but no deliberate surveys for these sites have yet been undertaken in this part of the Lowveld. No rock art sites occur within Bosveld Phosphates boundaries. Those that do occur are found in the Drakensberg range of mountains further to the west as well as eastwards in the Kruger National Park. Mining heritage remains, such as



vermiculite and copper mines respectively dating from the historical and pre-historical era used to occur within the boundaries of the neighbouring PMC and Foskor.

The archaeological and historical significance of this cultural landscape, which has been severely affected by mining during the last sixty years, is outlined in the next chapter of this report ('Part 6, Contextualising the Project Area').



**Figure 3- A considerable number of Late Iron Age and historical metal working sites recorded around Phalaborwa. All these settlements were occupied by metal workers who practised iron and copper working during the last four to five hundred years (above).**

## **6 CONTEXTUALISING THE PROJECT AREA**

The following brief overview of pre-historical, historical, cultural and economic evidence will help to contextualise the Project Area.

### **6.1 Stone Age sites**

Stone Age sites are marked by stone artefacts that are found scattered on the surface of the earth or as parts of deposits in caves and rock shelters. The Stone Age is divided into the Early Stone Age (covers the period from 2.5 million years ago to 250 000 years ago), the Middle Stone Age (refers to the period from 250 000 years ago to 22 000 years ago) and the Late Stone Age (the period from 22 000 years ago to 2 000 years ago).

These Stone Ages can be divided into different 'cultural' periods, each of which is characterised by specific hominids, artefact types and lifestyles. These cultural periods existed under different climatic conditions and did not necessarily cover the same time periods in different regions of South Africa.

Heritage surveys up to now have revealed few Stone Age sites in the Phalaborwa region, primarily because these surveys did not focus on the recording of Stone Age sites. It can be expected that all the phases of the Stone Age will be present in the Phalaborwa area. Archaeological surveys and excavations conducted by the University of Pretoria in the Kruger National Park during the 1970's and 1980's has indicated that this part of the Lowveld holds Middle Stone Age and Late Stone Age sites.

The Late Stone Age is also associated with rock paintings and engravings which were done by the San, Khoi Khoi and in more recent times by Negroid (Iron Age) farmers. Rock paintings as well as rock engravings do occur in the Kruger National Park, to the east of PMC but have not been recorded in Phalaborwa.



## 6.2 Iron Age remains

The Iron Age is associated with the first Bantu-Negroid agro-pastoralists who lived in semi-permanent villages and who practised metal working during the last two millennia. The Iron Age is usually divided into the Early Iron Age (covers the 1<sup>st</sup> millennium AD) and the Later Iron Age (covers the first 880 years of the 2<sup>nd</sup> millennium AD).

The Phalaborwa region was occupied by metalworking communities during at least two periods in the last 1 200 years. Both phases of occupation (the 9<sup>th</sup>-13<sup>th</sup> and 17<sup>th</sup>-20<sup>th</sup> centuries) coincided with trade along the East Coast of Africa. Very little is known about the early phase of metal [copper] working. There is a strong possibility that the metal trade was, initially at least, geared to address the needs of local communities rather than to cater for traders from elsewhere.

West of Phalaborwa, in the fertile foothills of the Drakensberg, eastern Sotho clans such as the Lobedu, Kgaga, Nareng and Koni led a predominantly agricultural existence. Physiographic and climatic differences between the tropical foothills of the Drakensberg and the dry, barren Lowveld further east supported a process of cultural ecological symbiosis (short-distance trade) between the Drakensberg agriculturists and the Lowveld metal workers. Iron tools vital for agriculture was traded for crop plants, which could not be produced in Phalaborwa.

Long-distance trade between the South African interior and the East Coast, which started as early as the 8<sup>th</sup> century AD, expanded in the 16<sup>th</sup> century, when Europeans entered the Indian Ocean trade network. Phalaborwa became one of the hubs of the short- and long-distance trade networks. Different groups controlled the manufacture and trade of metals: the most dominant spheres of influence in Phalaborwa were those of the Makušane-Malatji and the Masêkê-Malatji. Later, in the 19<sup>th</sup> century, spheres of influence dominated by the Šai (in the Mašišimale Hills) and the Majaji-Malatji (in what is now the Kruger National Park), to the south and to the east of Phalaborwa, rose to prominence.

Approximately 53 metal working sites, the majority of which are associated with syenite hills occur across the Phalaborwa region. The settlement style of the metal workers indicates a geographical separation of primary (ore smelting) and secondary (iron forging and copper smelting and forging) metalworking activities. The metal workers and their families lived on terraces located against the slopes of hills and on level ground, but iron and copper smelting furnaces were located some distance from these living quarters. Iron forge furnaces with massive anvil stones on which iron bloom were forged were built on terraces against the slopes of the hills or on level ground, mostly close to where the people lived.

This pattern is consistent with an ideology in which smelting was practised with ritual and was associated with many taboos. Smelting was done away from villages, so that menopausal women could not attend or interfere with these activities. Medicine holes in iron-smelting furnaces and certain iron forge furnaces served as receptacles for 'medicine', such as possible human remains. Other possible 'medicines' include remains from the aardvark, lions, and neonatal sheep. Some of these medicines were used to propitiate the forefathers to ensure a successful smelt.

The geographical separation of smelters' working areas from the residential areas may indicate that 'smelters were married to their furnaces' during smelting periods and consequently abstained from sexual intercourse with women during times of iron and copper smelting. The metalworking process was also regarded as a metaphor for human sexual intercourse, fertility, and fecundity. Metal working eventually became entrenched in the political, social, and religious and other aspects of the lives of the metal workers.

Iron and copper ores were smelted in various types of clay furnaces loaded with ores, charcoal, and fluxes such as quartzite stone, bones, and mollusc shells. The smelters operated clay bellows (*tyeres*). The end of the blowpipe was placed into openings in the furnace while the other end was attached to leather bellows. Air produced in the bellows was blown (pushed) into the furnaces through the blowpipes.

Two processes were used to manufacture iron and copper, namely the smelting (reduction) of the iron and copper ores and the refining of the manufactured iron bloom

and the solidified copper (ingots). Iron bloom was transformed into artefacts such as iron hoes, axes, spearheads, and adzes. The reworking of copper (ingots) consisted of the melting and casting of copper; cold or hot forging of copper; or copper wire drawing. Copper was mostly used for jewellery such as arm bangles, wire, beads, etc.

The metalworking industry in Phalaborwa declined during the last quarter of the 19<sup>th</sup> century. After Sochangaan had subjugated the Tsonga in Moçambique during the 1840's, access to harbours such as Delagoa Bay and Inhambane, from where some of Phalaborwa's metal work entered the Indian Ocean trade network was restricted. European manufactured iron goods, including iron hoes, were imported into the Lowveld causing a decline in the demand for these products. Oral tradition also points to internal strife between various metal working domains in Phalaborwa which was exacerbated by the influx of Changaan groups from Moçambique and the interference of trader groups who established new alliances with local metal working groups which all contributed to the collapse of the local metal working industry.

### **6.3 The historical period**

Phalaborwa's ancient metalworking industry died during the last decades of the 19<sup>th</sup> century. Remnants of metalworking groups were removed and resettled in the townships that exist around Phalaborwa today. The first European prospectors entered the area during the first decades of the 20<sup>th</sup> century.

The first commercial mining enterprise in the area was the Guide copper mine in 1904, but transport difficulties soon put the mine out of business. In 1938 a start was made with the mining of vermiculite from the world's largest known ore body. The real mining thrust came after Foskor was formed in 1951 to mine phosphate to manufacture fertilisers. Copper extraction from carbonatite began in earnest in 1965. The farm Laaste was bought to establish a town for the mineworkers. Phalaborwa received municipal status during the 1950's.

## 7 APPROACH AND METHODOLOGY

This Phase I HIA study was conducted by means of the following:

### 7.1 Field survey

The Bosveld Phosphates project area was subjected to heritage surveys in the past (See 'Select Bibliography', Part 10). Nevertheless, the project area was again surveyed with a vehicle following the numerous dirt roads that criss-cross the area while some pedestrian surveys, where it was possible, were conducted from these tracks into the veld.

The author was accompanied by Mr Wikus Erasmus, a consultant working for MP2, who is well acquainted with the project area. The survey was conducted on 25 March 2022.



**Figure 4- The survey for the Project Area followed the red route indicated on the Google image (above).**

As a result of above average rainfall the project area was densely covered with high grass as can be noted in the photographs whilst patches with impenetrable trees and bush are common.

## **7.2 Databases, literature survey and maps**

Databases kept and maintained at institutions such as the Provincial Heritage Resources Agency (PHRA), the Archaeological Data Recording Centre at the National Flagship Institute (Museum Africa) in Pretoria and SAHRA's national archive (SAHRIS) were consulted to determine whether any heritage resources of significance have been identified during earlier heritage surveys in or near the Project Area.

The author is acquainted with the project area at large as he had done several surveys and heritage impact assessment studies near the Project Area (see Part 10, 'Select Bibliography').

Literature relating to the pre-historical and the historical unfolding of the project area was reviewed (see Part 6, 'Contextualising the Project Area').

Maps outlining the Project Area were studied (2331CC Phalaborwa 1:50 000 topographical map) as well as Google Earth imagery prior to conducting the fieldwork and afterwards.

## **7.3 Consultation process undertaken and comments received from stakeholders**

No specific consultation process was undertaken for the purposes of the heritage study as the stakeholder consultation for the project is being done by JMA Consulting (Pty) Ltd as part of their Environmental Impact Assessment Process.

## **7.4 Assumptions and limitations**

It is possible that this Phase I HIA study may have missed heritage resources in the Project Area as heritage sites may occur in thick clumps of vegetation while others

may lie below the surface of the earth and may only be exposed once development commences.

If any heritage resources of significance are exposed during the proposed Bosveld Phosphates project the South African Heritage Resources Authority (SAHRA) should be notified immediately, all development activities must be stopped, and an archaeologist accredited with the Association for Southern African Professional Archaeologist (ASAPA) should be notified to determine appropriate mitigation measures for the discovered finds. This may include obtaining the necessary authorization (permits) from SAHRA to conduct the mitigation measures.

## 7.5 Significance rating

The significance of possible impacts on the heritage resources was determined using a ranking scale as outlined below. However, since no direct impact will occur on any heritage sites no significance ratings for the severity of any impacts were undertaken.

The significance of heritage resources which occur near the project area has been indicated as well as avoidance (mitigation) measures to avoid these heritage sites.

Evaluation Component	Rating	Scale	Description / criteria
<b>MAGNITUDE of negative impact</b> (at the indicated spatial scale)	10	<b>Very high</b>	Bio-physical and/or social functions and/or processes might be <i>severely</i> altered.
	8	<b>High</b>	Bio-physical and/or social functions and/or processes might be <i>considerably</i> altered.
	6	<b>Medium</b>	Bio-physical and/or social functions and/or processes might be <i>notably</i> altered.
	4	<b>Low</b>	Bio-physical and/or social functions and/or processes might be <i>slightly</i> altered.
	2	<b>Very low</b>	Bio-physical and/or social functions and/or processes might be <i>negligibly</i> altered.
	0	<b>Zero</b>	Bio-physical and/or social functions and/or processes will remain <i>unaltered</i> .
<b>MAGNITUDE of POSITIVE IMPACT</b> (at the indicated spatial scale)	10	<b>Very high</b>	Positive: Bio-physical and/or social functions and/or processes might be <i>substantially</i> enhanced.
	8	<b>High</b>	<b>Positive:</b> Bio-physical and/or social functions and/or processes might be <i>considerably</i> enhanced.
	6	<b>Medium</b>	<b>Positive:</b> Bio-physical and/or social functions and/or processes might be <i>notably</i> enhanced.
	4	<b>Low</b>	<b>Positive:</b> Bio-physical and/or social functions and/or processes might be <i>slightly</i> enhanced.
	2	<b>Very low</b>	<b>Positive:</b> Bio-physical and/or social functions and/or processes might be <i>negligibly</i> enhanced.

	0	Zero	<b>Positive:</b> Bio-physical and/or social functions and/or processes will remain <i>unaltered</i> .
<b>DURATION</b>	5	<b>Permanent</b>	<b>Impact in perpetuity. –</b>
	4	<b>Long term</b>	Impact ceases after operational phase/life of the activity > 60 years.
	3	<b>Medium term</b>	Impact might occur during the operational phase/life of the activity – 60 years.
	2	<b>Short term</b>	Impact might occur during the construction phase - < 3 years.
	1	<b>Immediate</b>	<b>Instant impact.</b>
<b>EXTENT</b> (or spatial scale/influence of impact)	5	<b>International</b>	<b>Beyond the National boundaries.</b>
	4	<b>National</b>	Beyond provincial boundaries, but within National boundaries.
	3	<b>Regional</b>	Beyond 5 km of the project and within the provincial boundaries.
	2	<b>Local</b>	Within a 5 km radius of the project.
	1	<b>Site-specific</b>	<b>On site or within 100 meters of the site boundaries.</b>
	0	<b>None</b>	<b>Zero extent.</b>
<b>IRREPLACEABLE</b> loss of resources	5	<b>Definite</b>	<b>Definite</b> loss of irreplaceable resources.
	4	<b>High potential</b>	<b>High potential</b> for loss of irreplaceable resources.
	3	<b>Moderate potential</b>	<b>Moderate potential</b> for loss of irreplaceable resources.
	2	<b>Low potential</b>	<b>Low potential</b> for loss of irreplaceable resources.
	1	<b>Very low potential</b>	<b>Very low potential</b> for loss of irreplaceable resources.
	0	<b>None</b>	<b>Zero potential.</b>
<b>REVERSIBILITY</b> of impact	5	<b>Irreversible</b>	Impact <b>cannot</b> be reversed.
	4	<b>Low irreversibility</b>	<b>Low potential</b> that impact might be reversed.
	3	<b>Moderate reversibility</b>	<b>Moderate potential</b> that impact might be reversed.
	2	<b>High reversibility</b>	<b>High potential</b> that impact might be reversed.
	1	<b>Reversible</b>	Impact <b>will be</b> reversible.
	0	<b>No impact</b>	No impact.
<b>PROBABILITY</b> (of occurrence)	5	<b>Definite</b>	>95% chance of the potential impact occurring.
	4	<b>High probability</b>	75% - 95% chance of the potential impact occurring.
	3	<b>Medium probability</b>	25% - 75% chance of the potential impact occurring.
	2	<b>Low probability</b>	5% - 25% chance of the potential impact occurring.
	1	<b>Improbable</b>	<5% chance of the potential impact occurring.
	0	<b>No probability</b>	<b>Zero probability.</b>
<b>Evaluation Component</b>	<b>Rating scale and description / criteria</b>		
<b>CUMULATIVE</b> impacts	<p><b>High:</b> The activity is one of several similar past, present or future activities in the same geographical area, and might contribute to a very significant combined impact on the natural, cultural, and/or socio-economic resources of local, regional or national concern.</p> <p><b>Medium:</b> The activity is one of a few similar past, present or future activities in the same geographical area, and might have a combined impact of moderate significance on the natural, cultural, and/or socio-economic resources of local, regional or national concern.</p> <p><b>Low:</b> The activity is localised and might have a negligible cumulative impact.</p> <p><b>None:</b> No cumulative impact on the environment.</p>		

Once the Environmental Risk Ratings have been evaluated for each potential environmental impact, the Significance Score of each potential environmental impact is calculated by using the following formula:

- **SS (Significance Score) = (magnitude + duration + extent + irreplaceable + reversibility) x probability.**

The maximum Significance Score value is 150.

The Significance Score is then used to rate the Environmental Significance of each potential environmental impact as per Table below. The Environmental Significance

rating process is completed for all identified potential environmental impacts both before and after implementation of the recommended mitigation measures.

Significance Score	Environmental Significance	Description / criteria
125 – 150	Very high (VH)	An impact of very high significance will mean that the project cannot proceed, and that impacts are irreversible, regardless of available mitigation options.
100 – 124	High (H)	An impact of high significance which could influence a decision about whether or not to proceed with the proposed project, regardless of available mitigation options.
75 – 99	Medium-high (MH)	If left unmanaged, an impact of medium-high significance could influence a decision about whether or not to proceed with a proposed project. Mitigation options should be relooked at.
40 – 74	Medium (M)	If left unmanaged, an impact of moderate significance could influence a decision about whether or not to proceed with a proposed project.
<40	Low (L)	An impact of low is likely to contribute to positive decisions about whether or not to proceed with the project. It will have little real effect and is unlikely to have an influence on project design or alternative motivation.
+	Positive impact (+)	A positive impact is likely to result in a positive consequence/effect, and is likely to contribute to positive decisions about whether or not to proceed with the project.



## 8 HERITAGE SURVEY FOR BOSVELD PHOSPHATES

### 8.1 The field survey

As noted earlier the project area is not a pristine piece of land any longer. I was affected by developmental activities during the past decades. The veld is typical Olifants River rugged veld although softer soils were laid along the banks of the Selati River in the south.



**Figure 5- The project area is in Olifants River rugged veld. One of many two-track dirt roads which criss-cross the project area (above).**



**Figure 6- Note the general nature and appearance of the project area which is flat and covered with tall grass and clusters of indigenous trees (above).**



**Figure 7- The western perimeter of the project area is bordered with three parallel running Eskom power lines (above).**



**Figure 8- A shallow quarry located in the project area. Otherwise, little evidence for large- scale disturbance of the project area is visible (above).**



**Figure 8- One of several large anthills covered with grass in the project area (above).**



**Figure 9 A drinking hole for wild game roaming the project area (above).**



## **8.2 Types and ranges of heritage resources**

The Phase I HIA study revealed none of the types and ranges of heritage resources as outlined in Section 3 of the National Heritage Resources Act (No 25 of 1999) for the Project Area. There is consequently no reason from a heritage point of view why the proposed Bosveld Phosphates Project cannot proceed. Nevertheless, chance-find procedures are outlined if any heritage resources of significance or graves may be uncovered by the proposed Bosveld Phosphates Project.

## **8.3 Chance-find procedures**

It is most likely that heritage surveys that were done may have missed heritage resources due to various reasons outlined in the report. Therefore chance-find procedures must be implemented during the implementation of the Bosveld Phosphates Project, which are applicable during the construction, operation, or closure phases of the project.

The chance-find procedures apply to all contractors, subcontractors, subsidiaries, or service providers. If any of these institutions' employees find any heritage resources during any developmental activity all work at the site must be stopped and kept on hold. Chance-finds must be reported to supervisors and through supervisors to the senior manager on site. Chance-find procedures are summarized for heritage resources and graveyards.

### **8.3.1 Chance-find procedures for heritage resources**

The initial procedure to follow whenever heritage resources are uncovered during development is aimed at avoiding any further possible damage to the heritage resources, namely:

- The person or group (identifier) who identified or exposed the heritage resource or graves must cease all activity in the immediate vicinity of the site.
- The identifier must immediately inform the senior on-site manager of the discovery.

- The senior on-site manager must make an initial assessment of the extent of the find and confirm that further work has stopped and ensure that the site is secured, and that controlled access is implemented.
- The senior on-site manager will inform the Environmental Officer (EO) and Health and Safety (HS) officers of the chance-find and its immediate impact on the Bosveld Phosphates Project. The EO will then contact the project archaeologist.
- The project archaeologist will do a site inspection and confirm the significance of the discovery, recommend appropriate mitigation measures to the industry and notify the relevant authorities.
- Based on the comments received from the authorities the project archaeologist will provide the mine with a Terms of References Report and associated costs if mitigation measures must be implemented.

### **8.3.2 Chance-find Procedures for graves**

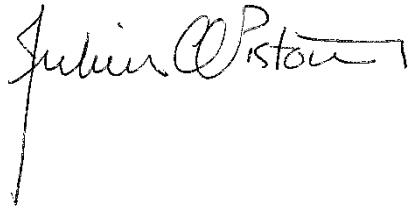
If previously unidentified graves are uncovered and/or exposed during any of the developmental phases of the Bosveld Phosphate Project, the following steps must be implemented after those outlined above:

- The project archaeologist must confirm the presence of graveyards and graves and follow the following procedures.
- Inform the local South African Police Service (SAPS) and traditional authority.
- The project archaeologist in conjunction with the SAPS and traditional authority will inspect the possible graves and make an informed decision whether the remains are of forensic, recent, cultural-historical or of archaeological significance.
- Should it be concluded that the find is of heritage significance and therefore protected in terms of heritage legislation the project archaeologist will notify the relevant authorities.
- The project archaeologist will provide advice about mitigation measures for the graveyards and graves.

## **9 CONCLUSION AND RECOMMENDATIONS**

The Phase I HIA study revealed none of the types and ranges of heritage resources as outlined in Section 3 of the National Heritage Resources Act (No 25 of 1999) for the Project Area.

There is consequently no reason from a heritage point of view why the proposed Bosveld Phosphates Project cannot proceed. Nevertheless, chance-find procedures are outlined if any heritage resources of significance or graves may be uncovered by the proposed Bosveld Phosphates Project.

A handwritten signature in black ink, appearing to read 'Julius CC Pistorius'. The signature is written in a cursive style with a long vertical line extending downwards from the start.

**DR JULIUS CC PISTORIUS**  
**Archaeologist & Heritage Consultant**  
**Member of ASAPA**

## 10 SELECT BIBLIOGRAPHY

Du Toit, A.P. 1967. Historiese oorsig van die Phalaborwa van die Laeveld. Publikasies van die Universiteitskollege van die noorde. Reeks A, No 7. Universiteitskollege van die noorde: Pietersburg.

Friede, H.M. 1980. Iron Age mining in the Transvaal. Journal of the SA Institute of Mining and Metallurgy. 80. (4) pp156-165.

Friede, H.M. & Steel, R.H. 1975. Notes on Iron Age copper smelting technology in the Transvaal. Journal of the SA Institute of Mining and Metallurgy. 76 pp221-231.

Herbert, E. W. 1984. Red gold of Africa. Wisconsin Press: London.

Krige, J.D. 1937. Traditional origins and tribal relationships of the Sotho of the Northern Transvaal. Bantu Studies. 1 pp.321-356.

Mason, R.J. 1986. Origins of black people of Johannesburg and the southern Western Central Transvaal AD350-AD1880.

Moore, C. 1966. Phalaborwa: enkele voorlopige aantekeninge i.v.m. die etnologie en die argeologie. Ongepubliseerde manuskrip. Foskor Museum: Phalaborwa.

Pistorius, J.C.C. 1989. *Die metaalbewerkers van Phalaborwa*. Ongepubliseerde D. Phil. proefskrif. Universiteit van Pretoria.

Pistorius, J.C.C. 2007. *A Phase I Heritage Impact Assessment (HIA) study for Palabora Mining Company's main tailings dam east paddock in the Limpopo Province of South Africa*. Unpublished report for Golder Associates.

Pistorius, J.C.C. 2007. *A Phase II Heritage Impact Assessment (HIA) study for a possible copper reduction furnace in Palabora Mining Company's (PMC) main tailings dam new*

*east paddock in the Limpopo Province of South Africa.* Unpublished report for the South African Heritage Resources Authority.

Pistorius, J.C.C. 1998. *Archaeological survey and assessment of Foskor's mining areas in Phalaborwa, Northern Province of South Africa. An addendum to Foskor's Environmental Management Programme Report.* Unpublished report: Foskor).

Pistorius, J.C.C. 1998. Archaeological survey and assessment of Palabora Mining Company's mining areas in Phalaborwa, Northern Province of South Africa. An addendum to Palabora Mining Company's Environmental Management Programme Report. Unpublished report prepared for Palabora Mining Company.

Pistorius, J.C.C. 1998. Archaeological survey and assessment of Fedmis's mining areas in Phalaborwa, Northern Province of South Africa. An addendum to Fedmis's Environmental Management Programme Report. Unpublished report prepared for Steffen, Robertson, and Kirsten Environmental Scientists and Fedmis.

Pistorius, J.C.C. 1998. Report on a preliminary survey and excavation at Modimôlle, Phalaborwa. Unpublished report prepared for Foskor.

Pistorius, J.C.C. 1998. African metal working, metaphors, and medicines. *South African Journal of Ethnology.* 21(4). pp198-202.

Pistorius, J.C.C. 2007. Extension of a Phase I Heritage Impact Assessment (HIA) study for Palabora Mining Company's (PMC's) main tailings dam new east paddock in the Limpopo Province. Unpublished report for Golder Associates.

Pistorius, J.C.C. 2016. A Phase I Heritage Impact Assessment (HIA) study for Palabora Copper's proposed magnetite railway siding in Phalaborwa in the Limpopo Province. Unpublished report for Golder Associates.

Plug, I. & Pistorius, J.C.C. 1999. Animal remains from industrial Iron Age communities in Phalaborwa, South Africa. *African Archaeological Review.* 16, (3): 155-184.



Van der Merwe, N.J. 1971. An interim report to the National Monuments Council of South Africa on archaeological investigations at Phalaborwa. National Monuments Council: Cape Town.

Van Der Merwe, N. J. n.d. Iron Age history of the Palabora region, Transvaal, South Africa. Preliminary report to the National Monuments Council. National Monuments Council: Cape Town.

Van der Merwe, N.J. & Gordon, R. 1984. A metallographic study of the iron artefacts from the Eastern Transvaal, South Africa. *Archaeometry*. 26. pp108-130.

Van der Merwe, N.J. & Killick, D.J. 1979. Square: an iron smelting site near Phalaborwa. *S. Afr. Archaeol. Soc. Goodwin Series 3*. Pp86-93.

Scully, R.T.K. 1978. Phalaborwa oral traditions. Unpublished PhD thesis. State University of New York: New York.

Series of pamphlets compiled by JCC Pistorius in conjunction with the Palabora Heritage Committee:

*The Metal workers of Phalaborwa.*

*Metal working in Phalaborwa.*

*Metal workers and trade in Phalaborwa.*

*The Makušane and Masêkê-Malatji spheres of influence in Phalaborwa.*

## **11 SPOKESPERSONS CONSULTED**

Mr Wikus Erasmus. Consultant for MP2.