PREPARED FOR:

The Manager

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A second UPDATED PHASE I HERITAGE IMPACT ASSESSMENT (HIA) STUDY FOR RHOVAN OPERATIONS IN THE CENTRAL BANKEVELD OF THE NORTH-WEST PROVINCE OF SOUTH AFRICA

Prepared by:

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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 Rhovan Vanadium Mine near Brits (Madibeng) in the Central Bankeveld of the North-West in December 2005. On request of the mine an updated Phase I Heritage Impact assessment study was conducted for Rhovan Vanadium Mine in September 2013. This second updated Phase I HIA was done for Rhovan Vanadium Mine as the mine intends demarcating the mining area with a fence which may have an impact on existing heritage resources within the mining area.

The aims with the second updated heritage report therefore were the following:

- To describe the types and ranges of heritage resources which have been identified in Rhovan Mine's premises.
- To re-asses the significance of these heritage resources and the significance of any possible impacts on these heritage resources.
- To make recommendations regarding the mitigation (conservation) of heritage resources that may be affected by the construction of the border fence and to propose management measures for those heritage resources which remain unaffected within the mining area.

This second updated HIA study for Rhovan revealed the following types and ranges of heritage resources as outlined in Section 3 of the National Heritage Resources Act (No 25 of 1999), namely:

- A single, isolated stone walled enclosure that may date from the Late Iron Age (Site LIA01).
- Approximately thirty seven hut foundations consisting of upright stones spatially organised on a circular ground plan (Site LIA02).
- A midden that dates from the Middle and/or Late Iron Age (Site MIA/LIA03) with possible associated site. Since the original survey was done in 2005 it was found during the 2013 survey that the site has collapsed as part of a wall of an open cast pit.
- Three Late Iron Age sites located between granite knolls on the southern perimeter of the mining area (Site LIA04, Site LIA05 and Site LIA06) whilst a seventh LIA site was discovered during the 2013 survey and coined Site LIA07.

These heritage sites were revisited, documented and re-assessed. All the heritage sites were geo-referenced and mapped and their coordinates were tabulated (Figure 4; Table 1).

All seven archaeological sites identified in the Rhovan mining area date from the Late Iron Age. At the time when the first survey (Pistorius 2005) was done some doubt existed as to whether Site MIA/LIA03 may have dated from the Middle Iron Age (Early Moloko, AD 1500). However, this site has collapsed as part of an open cast pit wall into the pit. Consequently, this site was not further discussed in the report. During one of the later surveys it was also found that Site LIA01 and Site LIA02 date from the Late Iron Age whilst Site LIA07 was uncovered as a previously unrecorded settlement (Pistorius 2013).

Site LIA01, Site LIA02 and Site LIA05 have high significance as it appears as if the first two sites are associated with specialist metal working such as the possible smelting and forging of iron. Site LIA05 was either part of a large village or may have served as a cattle station where large numbers of cattle were kept. Site LIA04, Site LIA06 and Site LIA07 were small sites which were probably occupied by small communities, do not have any archaeological deposits and resemble the same types and therefore have low significance. Site LIA07 was also partly damaged in the past.

The significance of the heritage resources

At least six LIA settlements were recorded in the mining area. The construction of the new border fence may impact on these heritage resources. Consequently, the significance of the heritage resources must be determined as well as the severity of any possible impact that may occur. This is necessary to propose mitigation measures for heritage resources which may be affected by the proposed development.

The heritage resources comprise archaeological remains which are older than sixty years and therefore are protected by the National Heritage Resources Act (No 25 of 1999).

The archaeological sites' significance was rated according to three rating (grading) schemes. The first two schemes consider the significance of the heritage sites according to their coherent (contextual) significance, namely:

- A scheme of criteria which outlines places and objects as part of the national estate as they have cultural-historical significance or other special value (outlined in Section 3 of the NHRA [Act No 25 of 1999] (see Box 1) (Table 4).
- A field rating scheme according to which heritage resources are graded in three tiers (levels) of significance based on the regional occurrence of heritage resources (Tables 4 & 5) (Section 7 of the NHRA [Act No 25 of 1999).

The third rating scheme determined the individual significance of each heritage site considering archaeological criteria such as:

- The size and extent of settlements.
- The quality and quantity of the deposits associated with the sites.
- The uniqueness of sites (repeated types or single types).
- The value added potential of the settlements (scientific, educational, etc.).

According to the criteria to qualify as part of the national estate the significance of the Late Iron Age remains is graded as of medium to high significance (Table 2).

According to the field rating scheme the Late Iron Age remains can be rated as of medium to high significance and should be recorded before destruction (Table 3).

According to the individual rating scheme Site LIA01, Site LIA02 and Site LIA05 are rate as of high significance and that these sites should be conserved. Sites LIA04 is rated as of medium significance and Site LIA06 and Site LIA07 are rated as of low significance. All three the latter sites are expendable or can be destroyed by developmental projects as they have been adequately documented (Table 4).

Possible impact on the heritage resources

The construction of the proposed new border fence will have the following impact on the heritage resources, namely:

- Site LIA07 will partly be effected when the new border fence is constructed.
- None of the other sites will be affected by the proposed construction of the border fence.

The alignment of the proposed new border fence indicate that the northern tip of Site LIA07 will be affected (destroyed) when the fence is constructed. However, the larger part of the site will remain intact and will note not be affected when the border fence is constructed. The significance of the impact on Site LIA07 therefore is low (Table 5).

Proposed mitigation measures

Site LIA07 was desribed and mapped in the report and therfore adequately documented. No mitigation measures are further required (Table 5).

Managing heritage resources that may remain unaffected

All the remaining settlements in the Rhovan Vanadium Mine (Site LIA01, LIA02, Site LIA04, Site LIA05 and Site LIA06) will not be affected by the construction of the proposed new border fence. Consequently, these sites, as well as the larger part of Site LIA07 which remain, have to be monitored every six months to determine condition (state of preservation) of these sites.

These inspections can be noted in a register. If any alterations to the sites have occurred, whether due to human or animal intrusion or as a result of natural weathering, these changes can be noted in the register and if deemed significantly negative can be reported to an archaeologist accredited with the Association of Southern African Professional Archaeologists (ASAPA).

General (disclaimer)

It must be pointed out that heritage resources can be found in the most unexpected places. It must also be borne in mind that surveys may not detect all the heritage resources in a given project area. While some remains may simply be missed during surveys (observations), others may occur below the surface of the earth and may only be exposed once mining development commences.

If any heritage resources of significance is exposed during the expansion of Rhovan's mining activities 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 notify in order to determine appropriate mitigation measures for the discovered finds. This may include obtaining the necessary authorisation (permits) from SAHRA to conduct the mitigation measures.

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
VDDC	Vandyksdrift Central
WUL	Water use licence

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 in order 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 16th century and the 19th 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 20th 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 in order 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

1 INTRODUCTION

1.1 Background and context

A Phase I Heritage Impact Assessment (HIA) study was done for Rhovan Vanadium Mine in December 2005, namely:

- Pistorius, J.C.C. 2005. A Phase I Heritage Impact Assessment (HIA) study for X Strata Alloys Rhovan Vanadium Mine in the Central Bankeveld of the North-West Province of South Africa. *Unpublished report prepared for X Strata Rhovan Vanadium Mine and JMA Associates.*

Since the original heritage survey was conducted Rhovan Vanadium Mine has changed ownership and the name of the mine has changed to Rhovan Operations. The mine also expanded its open cast mining activities and associated infrastructure. These developmental activities required that the heritage impact assessment study be updated as these developmental activities may have an influence on the heritage resources which have been identified in the mining area in December 2005. Consequently, Mr. Charl Botes, Manager for Mining at Rhovan Operations commissioned the author in June 2013 to update the 2005 heritage report and to propose mitigation measures for those heritage resources which may be affected as a result of the mine's expansion programme. The results of this study therefore were published in the following report:

- Pistorius, J.C.C. 2013. An updated Phase I Heritage Impact Assessment (HIA) study for Rhovan Operations in the Central Bankeveld of the North-West Province of South Africa. *Unpublished report prepared for Rhovan Operations.*

1.2 Aims with this second updated heritage report

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 Rhovan Vanadium Mine near Brits (Madibeng) in the Central Bankeveld of the North-West in December 2005. On request of the mine an updated Phase I Heritage Impact assessment study was conducted for Rhovan Vanadium Mine in September 2013.

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The aims with this second updated heritage report therefore were the following:

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- To re-asses the significance of these heritage resources and the significance of any possible impacts on these heritage resources.
- To make recommendations regarding the mitigation (conservation) of heritage resources that may be affected by the construction of the border fence and to propose management measures for those heritage resources which remain unaffected within the mining area.

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, available information and his ability to keep up with the physical and other comprehensive challenges that the project commanded. The author has a good understanding of the types and ranges of heritage resources that occur in the North West. He conducted research since 1983 into the origins and lifeways of Tswana and Ndebele farming communities who occupied the region during the last four hundred since and was also involved in several Heritage Impact Assessment studies for various mining companies and other developers in the region during the last thirty years (See Part 12, 'Bibliography relating to earlier heritage studies').

The report's findings are based on accepted archaeological survey and assessment techniques and methodologies considering the limitations present at the time (season) and under the circumstances (large surface area) that the survey was conducted.

The project area was also surveyed on at least two former occasions in the past when heritage surveys were done for the operational activities of the Rhovan Mine.

The author preserves the right to modify aspects of the report including the recommendations if and when new information becomes available particularly if this information may have an influence on the reports final results and recommendations. The heritage survey may also have missed other heritage resources as the latter's remains may occur in tall grass or thick clumps of vegetation whilst others may be located below the surface of the earth and may only be exposed once development commences.

It is also possible that heritage resources may simply have been missed as a result of human failure either to observe or to recognise them as such.

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-)

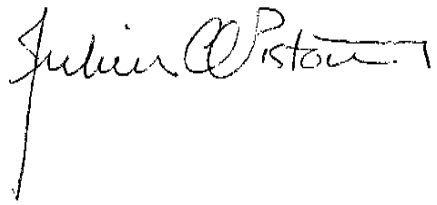
Accreditation: Member of the Association for Southern African Professional Archaeologists. (ASAPA)

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 Ekhurhuleni, 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 INDEPENDANCE

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 an offence in terms of regulation 48 and is punishable in terms of section 24F of the Act.



16 October 2020

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;

(a) its possession of uncommon, rare or endangered aspects of South Africa's natural or cultural heritage;

(b) its potential to yield information that will contribute to an understanding of South Africa's natural or cultural heritage;

(c) 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

4.1.1.1 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 in order 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).

4.1.1.2 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, as the case may be.

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^2 or which involve three or more existing erven or subdivisions thereof
- Re-zoning of a site exceeding 10 000 m^2
- 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. In the event that 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:

- 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. In order 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 the course of 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 with regard to 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 with regard to such development have been taken into account prior to the granting of the consent.

4.2 NEMA (Appendix Six requirements)

NEMA Regulations, 2014 (as amended 2107) **Appendix 6 Relevant section in report**	
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 Part 1.2. Aims with this report
An indication of the quality and age of base data used for the specialist report	Part 7. Approach and Methodology
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 7.1. 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. Heritage survey
An identification of any areas to be avoided, including buffers	Part 10.1 Possible impact on heritage resources Part 10.3 Significance of the impact

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;	Figures 4 and 61
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 11 Conclusion and recommendations
Any mitigation measures for inclusion in the EMPr	Part 10.3 Proposed mitigation measures Part 10.4 Management measures
Any conditions for inclusion in the environmental authorisation	Part 10.3 Proposed mitigation measures Part 10.4 Management measures
Any monitoring requirements for inclusion in the EMPr or environmental authorisation	Part 10.3 Proposed mitigation measures Part 10.4 Management measures
A reasoned opinion – • whether the proposed activity, activities or portions thereof should be authorised; • regarding the acceptability of the proposed activity or activities; and 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 11 Conclusion and recommendations
A description of any consultation process that was undertaken during the course of	Part 7.4 Consultation process undertaken and comments received

preparing the specialist report	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 RHOVAN VANADIUM MINE

5.1 Location

Rhovan Vanadium Mine is a Glencore operation and an open cast mine from which vanadium is mined. The mine is located between the towns of Berseba and Bethanië near Brits (Madibeng) in the Central Bankeveld of the North-West Province. The open cast mine (with several pits) and associated infrastructure is located directly to the east of the R555 which runs between the N4 in the south and to Sun City further to the north (Figure 1) (1:50 000; 2527DA Bapong).

The mine infrastructure mainly comprise open cast pits, waste rock and other dumps, a plant, offices and haul roads. This infrastructure is located on a slightly undulated and featureless landscape between Madibeng in the east and the Pilanesberg further to the west.

5.2 The nature of the Project Area

The Rhovan Vanadium Mine Project Area stretches across the level plains of the Central Bankeveld between the Magaliesberg in the south and a series of norite hills which run from the east towards the west. The south western boundary of the Project Area is constituted by the R555 which runs between the N4 and the town of Berseba.

The Project Area stretches across level turf veldt, parts of which have been used for agricultural activities since the first colonial farmers occupied this part of the Central Bankeveld after the 1840's. Parts of the Project Area which have not been affected by development activities are covered with *Rhus lancea* (Karee trees) and other smaller *acacia* trees. The central part of the Project Area has been disturbed by open cast mining operations whilst some undisturbed patches of land occur along the outer perimeter of the mine.

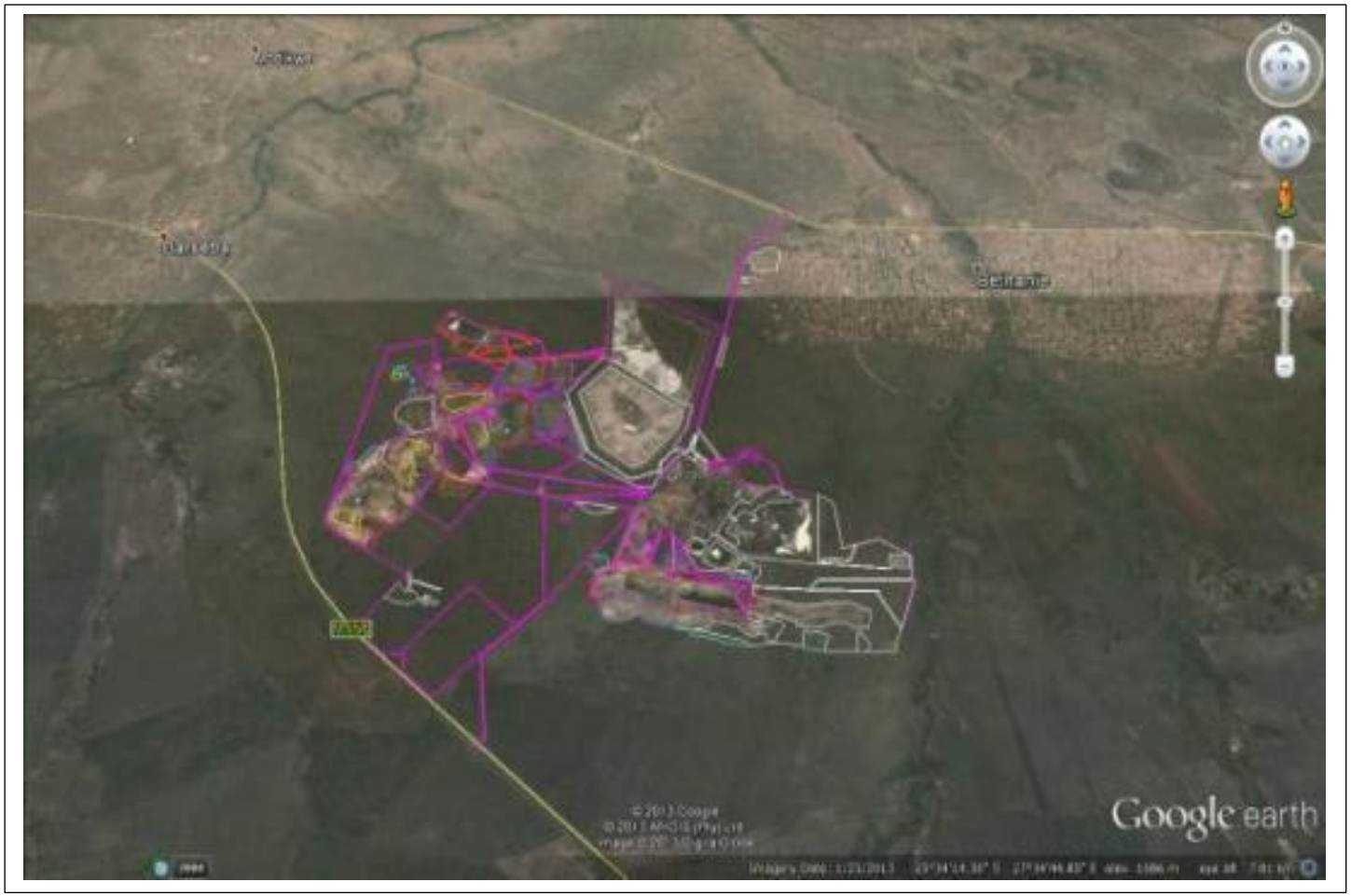


Figure 1- Regional setting for Rhovan Vanadium Mine between Berseba and Bethanië near Madibeng in the Central Bankeveld in the North-West Province (above).

5.3 In a cultural landscape

Rhovan Vanadium Mine is located in part of the Central Bankeveld where large numbers of stone walled sites occur which represent different Tswana spheres of influence which existed during the last four hundred years. This time period is also referred to as the Late Iron Age and the Historical Period. The archaeological and historical significance of this cultural landscape is described in more detail before the results of the updated Phase I HIA study is discussed (see Part 6, ‘Contextualising the Rhombus Vanadium Mine project area).

6 CONTEXTUALISING THE RHOMBUS VANADIUM MINE PROJECT AREA

6.1 The Central Bankeveld

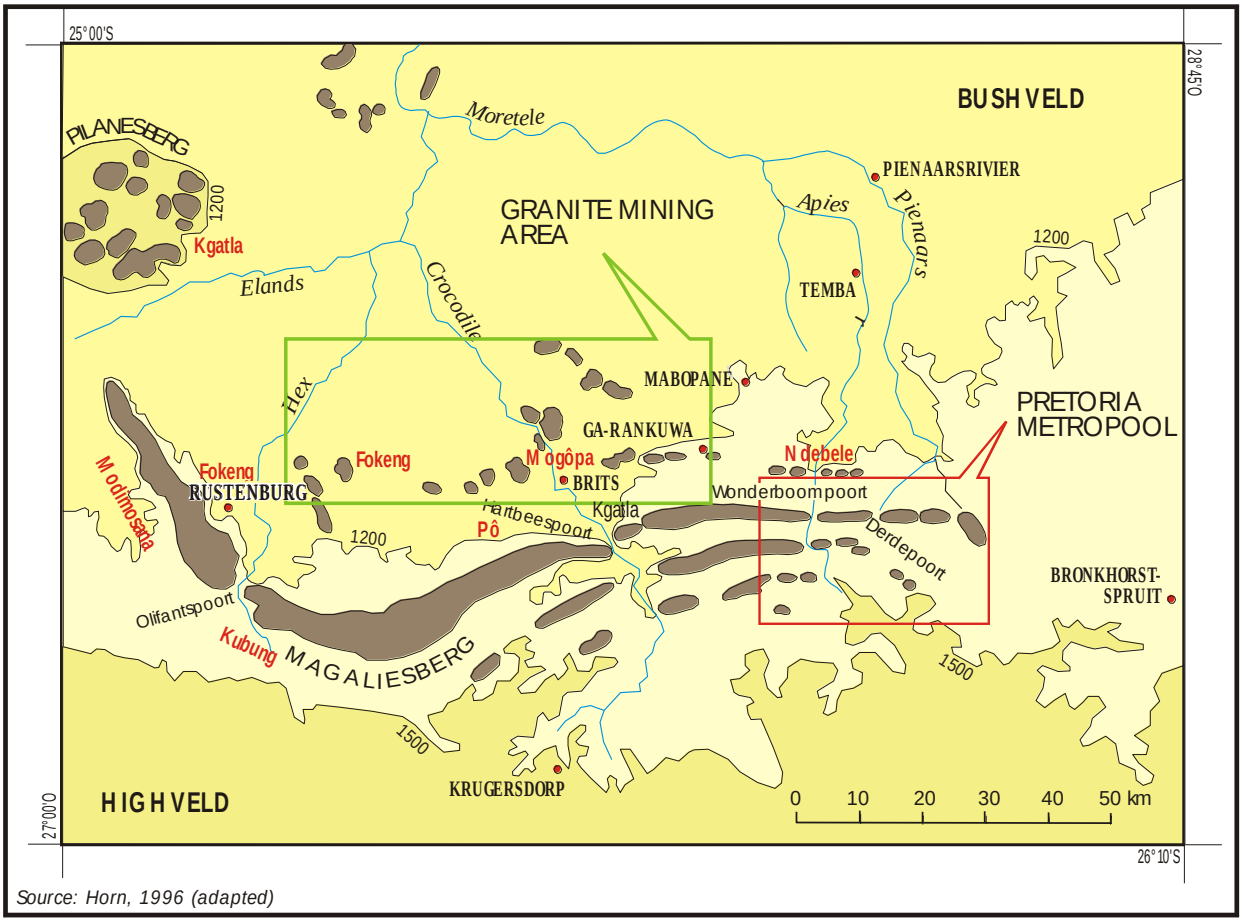
Rhovan is located in the Central Bankeveld of the North-West Province of South Africa. The Bankeveld is a narrow strip of land between the northern bushveldt savannah and the centrally situated Highveld and can be divided into the Western Bankeveld, the Central Bankeveld and the Eastern Bankeveld. Only the Central Bankeveld with its numerous centuries-old remains of ancient Tswana spheres of influence is important to this report.

The Central Bankeveld is covered by older grabbo penetrated by younger vulcanic magma which formed the series and chains of pyramid-shaped granite hills from the Pilanesberg in the north-west to Onderstepoort near Pretoria in the east. These hills, as part of the Magaliesberg valley, represent a unique ecozone characterised by grassveld, savannah veld and near wooded valleys. The region has abundant surface water supplies. The Pienaar, the Moretele, the Hex and the Apies Rivers all drain their waters into the Crocodile River (Horn 1996).

6.2 Pre-historical context

Rhovan's is located to the north of the Magaliesberg which is known for its rich and diverse range of heritage resources (De Beer 1975). Stone Age sites are scattered along the Magaliesberg and are also found in caves and rock shelters in the mountain. Rock engraving sites are located further towards Maanhaarrand and Rustenburg in the west. Blockhouses along the Magaliesberg and colonial farm homesteads are still common in Marikana and on the outskirts of Brits (Madibeng). The most abundant heritage, however, are those that date from the Late Iron Age and which are associated with the numerous Tswana chiefdoms who occupied this region during the last four centuries.

The interaction between the climate, geology, topography, and the fauna and flora of the Central Bankeveld established a milieu in which the first Tswana found a suitable living environment in order to practise herding, agriculture, metal working and trading. It was here that their chiefdoms flourished during AD1600 to AD1840 (Horn 1996; Pistorius 1995).



Source: Horn, 1996 (adapted)

Figure 2- The Central Bankeveld is characterised by a conspicuous chain of granite hills which stretch between Pretoria and the Pilanesberg. Stone walled settlements occur along these hills and represent the spheres of influence of several Tswana chiefdoms who emerged in this fertile eco-zone during the last four centuries (adapted from Horn 1996).

The settlements of these early Tswana chiefdoms are characterised by an impressive and elaborate stone-built tradition. Hundreds and perhaps thousands of sites were built along the bases of the granite hills. The most formidable of these chiefdoms close to Rhovan were the Kwena Môgôpa and the Kwena Môgale (Bapô) whose spheres of

influence overlapped with Rhovan's mining area. Further to the west, closer to Rustenburg was the Fôkeng chiefdom while several Kgatla spheres of influence emerged further to the west near Brits (Pistorius 2000). The Kgatla were subjected by Mzilikazi and were used as labourers to build one of the Ndebele's villages, probably known as emHlalandlela, which is located to the east of Rhovan (Pistorius 1998).

The Bapô, a people whose earliest ancestors were descended from the Amambô Nguni from Kwa Zulu/Natal, arrived in the Magaliesberg during the 16th or 17th centuries. They established a sphere of influence close to Rhovan. One of their capitals was Tlhôgôkgôlô (Wolhuterskop). Several of the chiefs of this clan where known by the name of Môgale. The name of the Magalies Mountains (Magaliesberg) was derived from the name Môgale (Breutz 1953, 1986).

Numerous *difaqane* wars were fought during the last quarter of the 18th century and during the first quarter of the 19th century in the Central Bankeveld. These wars led to the displacement of large numbers of Tswana in the Bankeveld. The *difaqane* wars were caused by the Ndebele (Matabele) of Mzilikazi who arrived from the Vaal River region to occupy the Bankeveld in August 1827. The Ndebele destroyed the Kwena Môgôpa, the Kgatla and what had remained of the Bapô after an earlier defeat by the Pedi of Thulare. These wars exacerbated the havoc started earlier in the Bankeveld and gradually became a characteristic feature of historical events in this region during the early 19th century (Rasmussen 1978).

The Ndebele established several settlement complexes in the Central Bankeveld from whence they maintained their grip on the indigenous population. Four of these Zulu/Nguni residences (*imisi*) and military kraals (*amakhanda*) have been discovered during the course of earlier archaeological surveys (Pistorius 1997a, 1997b & 1998).

Internal strife between the various Tswana chiefdoms also seems to have been on the increase from the latter half of the 18th century onwards. Paternal relatives fought against each other to attain the chieftaincy of the various Tswana chiefdoms. Succession disputes also led to the splintering of the existing chiefdoms into a growing

number of independent spheres of influence in the Bankeveld (Manson and Bhenga 2000).

During the early 19th century travellers, traders and missionaries visited the Central Bankeveld where they encountered the devastated Tswana chiefdoms. They also mentioned that numerous Tswana tribes were displaced. These travellers included the traders Robert Schoon and William McLuckie in August 1829. They were soon followed by the missionary Robert Moffat who visited Mzilikazi in an *umuzi* near what is today Pretoria. In June 1835 Charles Bell and other members of Andrew Smith's expedition visited a Ndebele village near Rustenburg which Bell subsequently painted (Lye (ed.) 1975). One year later, in December 1836, Cornwallis Harris also visited the Central Bankeveld where he painted the village of emHlalandlela (Harris 1963).

The Bankeveld was rich in fauna which attracted the Griqua and the first white hunters to the region. Ivory was plentiful, with herds of elephants roaming the area. Ivory and the skins of the wide variety of fauna were sought after as precious trade commodities. Although the Tswana hunted the fauna of the Bankeveld, they were more renowned as agriculturists and cattle herders than as hunters.

Complex causes led to the unfolding of the numerous Tswana chiefdoms and their spheres of influence throughout the Bankeveld during the last decades of the 18th century and during the first decades of the 19th century. These causes were multidimensional and included the ecological potential of the region, the social and political formation and expansion of different spheres of influence, the establishment of short and long distance trade relations and local and regional wars. These causes and historical events were complex and are not fully recorded in oral traditions or in any other records.

6.3 Historical context

The first immigrant Boers established themselves to the north of the Magaliesberg in the late 1840's. Colonial farmsteads were established along the southern and the northern foot of the Magaliesberg. Early colonial farm homesteads also arose near

Marikana (Schaapkraal), in the Selons River valley to the west of Rustenburg and at Tierpoort and Garsfontein near Pretoria (Bergh 1992; Pretorius 1967).

During the Second/Anglo Transvaal Boer War (1899-1902) British blockhouses were built along the ridge of the Magaliesburg, from Pretoria in the east to Rustenburg in the west. Several of these structures are located in Kommandonek and in Pampoennek in the Magaliesberg, to the south of Rhovan.

Since the second half of the 19th century farmers and workers occupied the Mooinooi and Marikana areas. Tobacco and citrus farming together with cattle herding became a subsistence pattern that has lasted to this day. Old farm homesteads, agricultural implements and other infrastructure such as tobacco drying sheds still exist on farms in the area.

6.4 Mining

What started as small scale mining activities north of the Magaliesberg during the 20th century was soon eclipsed by the rise of the platinum mining complex near Rustenburg. The discovery of the Merensky Reef and the accompanying platinum boom was soon followed by the establishment of numerous chrome and other mines in the North-West Province.

Rhovan Operations had its origins in the establishment of a vanadium mine during the 1990's. The superior quality of vanadium in the iron manufacturing process was recognised as early as 1831 when the Swedish chemist N.G. Sefström proclaimed: 'The iron from Taberg passes for the most flexible and tenacious that we have'.

Vanadium became important in the metallurgical industry many years later when processes were developed for the production of the metal and its alloys. Large-scale commercial production only began with the development of the renowned Sheffield tool steels at the beginning of the 20th century. Vanadium steels were used exclusively for automobile parts in the early 20th century. The famous Model T Ford incorporated different grades of vanadium steel in the axles and suspension, gears, connecting rods

and frames. Henry Ford wrote in 1910: ‘The fine even distribution of the elements – the uniformity of structure indicates the superior quality of vanadium’.

Until the early 1960’s most of the world’s vanadium was produced as a co-product of uranium mining operations. However, since then the emphasis has changed to ores containing titaniferous magnetite (an iron oxide of iron and titanium) as the primary sources.

The world’s largest reserves of vanadium are concentrated in the Upper Zone of the Bushveldt Complex where the coarse-grained, black, heavy and highly magnetic titaniferous magnetite occurs as seams and plugs. The main magnetite seam can be traced for hundreds of kilometres around the rim of the complex. It has remarkable uniform vanadium content of about 1, 6 %.

Vanadium is easily mined and contains few impurities. It cannot be smelted in a blast furnace as can ordinary iron ores since titanium carbides and nitrides form and choke the furnace.

Production of vanadium from the Bushveld ores started in 1957 when the American owned Minerals Engineering Company established a mine at Kennedy’s Vale in the Steelpoort Valley. The Anglo American Corporation took over the small and unprofitable project in 1959. Anglo realised that the methods used did not fully exploit the potential of the ore. This realisation was supported by Dr. William Bleloch the ‘father’ of South Africa’s ferrochromium industry. He proved on a small scale that although the ore was unsuitable for blast furnaces it could be smelted in a submerged-arc electric furnace. The vanadium-rich pig iron that was produced could be ‘blown’ in a converter to recover a slag rich in vanadium pentoxide.

The fully integrated plant that came into being was called Highveld Steel and Vanadium. Many problems had to be overcome, including the securing of ore reserves and a supply of scarce metallurgical-grade coal. New technologies had to be adapted and tested at a pilot-plant scale, such as methods for pre-reduction of the ore to save electric energy, and a method of blowing the pig iron that would leave enough carbon in

the metal to be converted into steel. A new development from Sweden, the ‘shaking ladle’, was employed to agitate the molten iron while it was being blown.

From the commissioning of its works in 1968 Highveld Steel and Vanadium became the largest privately–owned steel company in Africa as well as the world’s largest vanadium producer. The steelworks, which manufactured billets (semi-finished bars), structural sections, and rails, was expanded to include the production of steel plates, sheets and coils. A second iron plant was commissioned in 1985.

A world shortage of vanadium developed during 1988-1989. Prices soared and prompted new producers to enter the market. However, since then the prices have dropped by more than 50% and many producers were forced to cut back or curtail their productions. Two companies, Vantech and Vametco have continued with operations. X Strata Alloys’ predecessor, Rhovan came on stream in 1995 (Viljoen. & Reinhold 1999; Wilson & Anhaeuser 1998).

6.5 Heritage character of the region: earlier heritage studies

The Rhovan Mining Area is part of the Central Bankeveld where this author has spent close to forty years of archaeological research into the origins of the Tswana and where he did numerous heritage impact assessment studies for various developing agencies such as mines and town developers. Consequently, the author is well acquainted with the heritage character of the region as is attested by some of the publications and heritage studies which is listed in Part 12, ‘Select Bibliography’ and Part 13, Bibliography relating to earlier heritage studies’.

A wide range of heritage resources occur across the region. However, the most significant and dominant in the immediate surroundings of the Rhovan Vanadium Mine comprise Late Iron Age stone walled sites which can historically be associated with the Tswana. Different Tswana communities occupied these ruins since the middle of the seventeenth century and abandoned these sites during the difaqane wars which raged during the first three decades of the nineteenth century.

7 APPROACH AND METHODOLOGY

This heritage survey and impact assessment study was conducted by means of the following:

7.1 Field survey

Field surveys were conducted during December 2005 and September 2013 for the Rhovan Vanadium Mine. During the later survey the author were accompanied by two officials from Rhovan Vanadium Mine as well as Mr. Loftus Versfeld and Mr. Sidney Miller who assisted with the mapping and drawing of plans for all the heriatge sites which were recorded. During the present heritage survey conducted in September 2020 the author was accompanied by another two officials from the mine (see Part 12, ‘Spokespersons consulted).

Archaeological visibility in general was good as the survey was conducted towards the end of winter when vegetation has receded across the veld.

Figure 3- Some of the pedestrian routes travelled by the surveyors when covering the project area.

The field surveys were conducted by means of following mine roads whilst other accessible pathways such as ‘two spoor’ field tracks were also utilized in order to gain access to the proposed mine footprint and particularly the route which the proposed new border fence will follow. Only Site LIA07 occurs near the proposed new border fence. Consequently, this site particularly received attention during the present survey. Pedestrian surveys were also undertaken wqhere it was thought necessary, particularly along the feet of the few norite kopjes that occur towards the western border of the mining area (Figure 3).

The central part of the project area is intensely disturbed as a result of mining activities. Undisturbed patches of land still occur along the periphery of the mine.

Google Earth imagery served as a supplementary source (*prior* and after fieldwork) to establish the presence of heritage resources such as stone walled sites along the feet of the norite kopjes in the mining area.

All coordinates for heritage resources recorded by the author were done with a Garmin Etrex hand set Global Positioning System (instrument) with an accuracy of < 15m.

The nature and character of the project area is further illuminated with descriptions and photographs (see Part 5.4 ‘Human intervention from the earliest times’).

7.2 Databases, literature surveys and maps

Databases kept and maintained at institutions such as the PHRA, the Archaeological Data Recording Centre at the National Flagship Institute (Museum Africa) in Pretoria and SAHRA’s national archive (referred to as the South African Heritage Resources Information System, (SAHRIS) were consulted by the author to determine whether any heritage resources of significance had been identified during earlier heritage surveys in or near the project area.

Maps such as the 1: 50 000 topographical map and the 1: 250 000 map as well as maps which the mine provided were also used to study the project area (2527DA Bapong 1:50 000 topographical map and Rustenburg 1:250 000 map).

Large areas to the south and west of Rhovan have been surveyed by the author in the past. Numerous sites have been recorded in this part of the Central Bankeveld while at least twenty sites have been excavated by the author (See Part 9, 'Select Bibliography').

7.3 Spokesperson consulted

Mine officials and the cartographer accompanied the author in the veld during all three surveys. The mining officials in particular were helpful with the identifying of heritage resources as they all are acquainted with the mining area (see Part 11, 'Spokespersons consulted').

7.4 Consultation process undertaken and comments received from stakeholders

No specific consultation process was undertaken for the purposes of the heritage study.

7.5 Significance ratings

The significance of possible impacts on the heritage resources was determined using a ranking scale based on the following:

Evaluation Component	Rating	Scale	Description / criteria
MAGNITUDE of negative impact (at the indicated spatial scale)	**10**	**Very high**	Bio-physical and/or social functions and/or processes might be *severely* altered.
	8	**High**	Bio-physical and/or social functions and/or processes might be *considerably* altered.
	6	**Medium**	Bio-physical and/or social functions and/or processes might be *notably* altered.
	4	**Low**	Bio-physical and/or social functions and/or processes might be *slightly* altered.

	2	**Very low**	Bio-physical and/or social functions and/or processes might be *negligibly* altered.
	0	**Zero**	Bio-physical and/or social functions and/or processes will remain *unaltered.*
MAGNITUDE of POSITIVE IMPACT (at the indicated spatial scale)	**10**	**Very high**	Positive: Bio-physical and/or social functions and/or processes might be *substantially* enhanced.
	8	**High**	**Positive**: Bio-physical and/or social functions and/or processes might be *considerably* enhanced.
	6	**Medium**	**Positive**: Bio-physical and/or social functions and/or processes might be *notably* enhanced.
	4	**Low**	**Positive**: Bio-physical and/or social functions and/or processes might be *slightly* enhanced.
	2	**Very low**	**Positive**: Bio-physical and/or social functions and/or processes might be *negligibly* enhanced.
	0	**Zero**	**Positive**: Bio-physical and/or social functions and/or processes will remain *unaltered.*
DURATION	**5**	**Permanent**	**Impact in perpetuity. –**
	4	**Long term**	Impact ceases after operational phase/life of the activity > 60 years.
	3	**Medium term**	Impact might occur during the operational phase/life of the activity – 60 years.
	2	**Short term**	Impact might occur during the construction phase - < 3 years.
	1	**Immediate**	**Instant impact.**
EXTENT (or spatial scale/influence of impact)	**5**	**International**	**Beyond the National boundaries.**
	4	**National**	Beyond provincial boundaries, but within National boundaries.
	3	**Regional**	Beyond 5 km of the project and within the provincial boundaries.
	2	**Local**	Within a 5 km radius of the project.
	1	**Site-specific**	**On site or within 100 meters of the site boundaries.**
	0	**None**	**Zero extent.**
IRREPLACEABLE loss of resources	**5**	**Definite**	**Definite** loss of irreplaceable resources.
	4	**High potential**	**High** potential for loss of irreplaceable resources.
	3	**Moderate potential**	**Moderate** potential for loss of irreplaceable resources.
	2	**Low potential**	**Low** potential for loss of irreplaceable resources.
	1	**Very low potential**	**Very low** potential for loss of irreplaceable resources.
	0	**None**	**Zero potential.**
REVERSIBILITY of impact	**5**	**Irreversible**	Impact **cannot** be reversed.
	4	**Low irreversibility**	**Low** potential that impact might be reversed.
	3	**Moderate reversibility**	**Moderate** potential that impact might be reversed.
	2	**High reversibility**	**High** potential that impact might be reversed.
	1	**Reversible**	Impact **will be** reversible.
	0	**No impact**	No impact.
PROBABILITY (of occurrence)	**5**	**Definite**	>95% chance of the potential impact occurring.
	4	**High probability**	75% - 95% chance of the potential impact occurring.
	3	**Medium probability**	25% - 75% chance of the potential impact occurring
	2	**Low probability**	5% - 25% chance of the potential impact occurring.
	1	**Improbable**	<5% chance of the potential impact occurring.
	0	**No probability**	**Zero probability.**
Evaluation Component	**Rating scale and description / criteria**		
CUMULATIVE impacts	**High**: 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. ***Medium****:* 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. ***Low****:* The activity is localised and might have a negligible cumulative impact. ***None****:* No cumulative impact on the environment.		

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 THE PHASE I HERITAGE IMPACT ASSESSMENT

8.1 Types and ranges of heritage resources

This second updated HIA study for Rhovan revealed the following types and ranges of heritage resources as outlined in Section 3 of the National Heritage Resources Act (No 25 of 1999), namely:

- A single, isolated stone walled enclosure that may date from the Late Iron Age (Site LIA01).
- Approximately thirty seven hut foundations consisting of upright stones spatially organised on a circular ground plan (Site LIA02).
- A midden that dates from the Middle and/or Late Iron Age (Site MIA/LIA03) with possible associated site. Since the original survey was done in 2005 it was found during the 2013 survey that the site has collapsed as part of a wall of an open cast pit.
- Three Late Iron Age sites located between granite knolls on the southern perimeter of the mining area (Site LIA04, Site LIA05 and Site LIA06) whilst a seventh LIA site was discovered during the 2013 survey and coined Site LIA07.

These heritage sites were revisited, documented and re-assessed. All the heritage sites were geo-referenced and mapped and their coordinates were tabulated (Figure 4; Table 1).

These sites are now discussed and illustrated with photographs.

Figure 4- Late Iron Age sites along the northern and south-western perimeter of Rhovan Vanadium Mine near Berseba and Bethanië in the North-West Province (above).

8.2 Stone walled sites in the north-west

8.2.1 Site LIA01 (Stone wall enclosure)

This site comprises a single low stone walled enclosure measuring approximately 60m in diameter. This wall was not constructed continuous but most probably served as an outer enclosing wall which encircled an area where activities relating to pre-historical iron working were conducted. It is also possible that temporary shelters which were manufactured from perishable material such as branches and grass may also have occurred within the confines of the outer wall. A second smaller enclosure occurs next to Site LIA01.

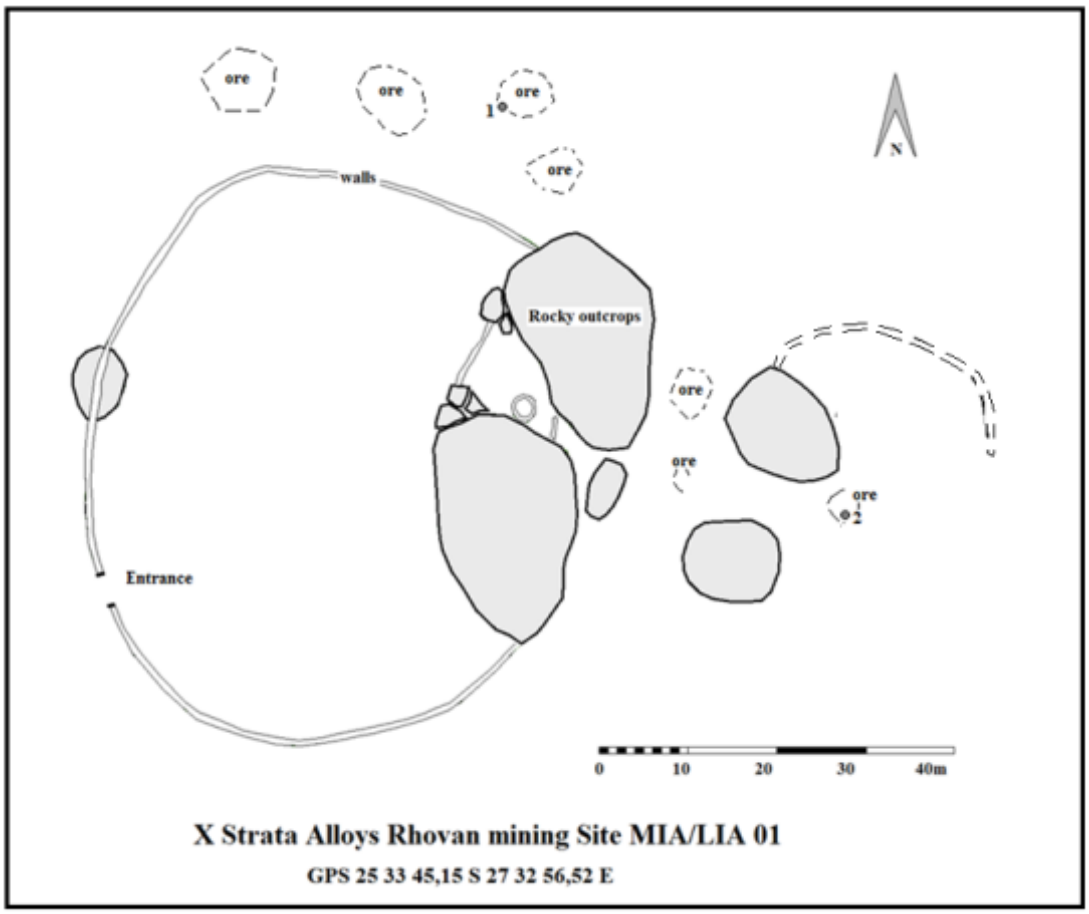
Site LIA01's low stone wall (50cm at its highest point) was constructed near a low, inconspicuous dolerite protrusion Site LIA01 is located approximately two hundred meters to the west of Site LIA02 and the spatial association between these two sites clearly indicate that the two sites are contextually and functionally interrelated with each other.

Conspicuous features which are associated with Site LIA01 are the presence of clusters of magnetite ore. It is most likely that this magnetite pebbles were collected elsewhere in the region (where outcrops of magnetite are common) and that the magnetite pebbles were carried to the site where the pebbles may have been kept in transit before being moved (traded) to an area where the magnetite were utilized by specialist iron workers, e.g. for smelting the magnetite ore in furnaces.

This enclosure was designated Site LIA01 as it dates from the Late Iron Age. It is highly likely that the circular enclosure may have served as the outer boundary wall for a village in which residences such as temporary grass huts were erected. Site LIA01is not associated with any visible archaeological deposit or with any archaeological material except what seems to be hammer stones and possible anvil stone

It is highly likely that Site LIA01 represents a village which was occupied by male workers who were involved in the iron working industry.

Figures 5 & 6- Site LIA01 as presented on a Google image (above) and after the site was surveyed and mapped (above and below).



Figures 7, 8 & 9- Part of Site LIA01's outer wall (above and centre) and a possible entrance in the enclosing wall (Scale 1.5m) (below).

Figures 10, 11 & 12- One of several heaps of collected magnetite pebbles (above). Two hammers stones respectively composed of quartzite (centre) and dolerite (below). Note patterns of wear on both these artefacts. (Scale 1.5m)

Figure 13- The dolerite hammer stone on the surface of a possible concave shaped anvil stone (Scale, 10cm intervals) (above).

8.2.2 Site LIA02 (Hut foundations)

Approximately forty circles built with single and/or double lines of stone which are spatially organised on a circular ground plan occur approximately 200m from the single, isolated enclosure (Site LIA01). The two sites were probably part of the same larger settlement. It is interesting to note that a large area around these two sites has been depleted from trees and that these have not regenerated during the last two hundred or more years. The tree cover around the two sites therefore have been used for building material, fuel and perhaps even for iron smelting although no traces of these activities have yet been found.

The upright stone circles each with a clear opening measure approximately 1,5m in diameter although the sizes of these structures differ. The upright stone circles served as the foundations of huts. The two ends of branches were wedged between the double row foundations stones and were bend across the foundation in order to construct hemi-circular branch frameworks which were thatched with grass. The dwellings probably roughly resembled commoner Nguni-styled huts.

Site LIA02 represents a small village with an oval plan form, approximately 100m in diameter. It lacks an outer (stone) wall which most likely was constructed with branches. It is not impossible that the large central open part of the village, which is encircled by dwellings, may have served as a space in which stock (cattle, sheep or goat) may have been penned in an enclosure which walls was constructed with a wooden stockade.

The individual structures in Site LIA02 most probably served as dwellings or as shelters in which people lived. The general absence of domestic waste such as middens with household refuse (potsherds, animal bone waste material, ash, etc.) in Site LIA02 makes it tempting to suggest that these structures may only have been utilized by specialist metal workers. These metal workers lived in seclusion without the presence of any women as they were involved in ritually specialised metal (iron smelting?) practises.

Figure 14- Site LIA02 outlined on a Google image (above). The site is located next to a magnetite outcrop covered by a thicket of trees (above).

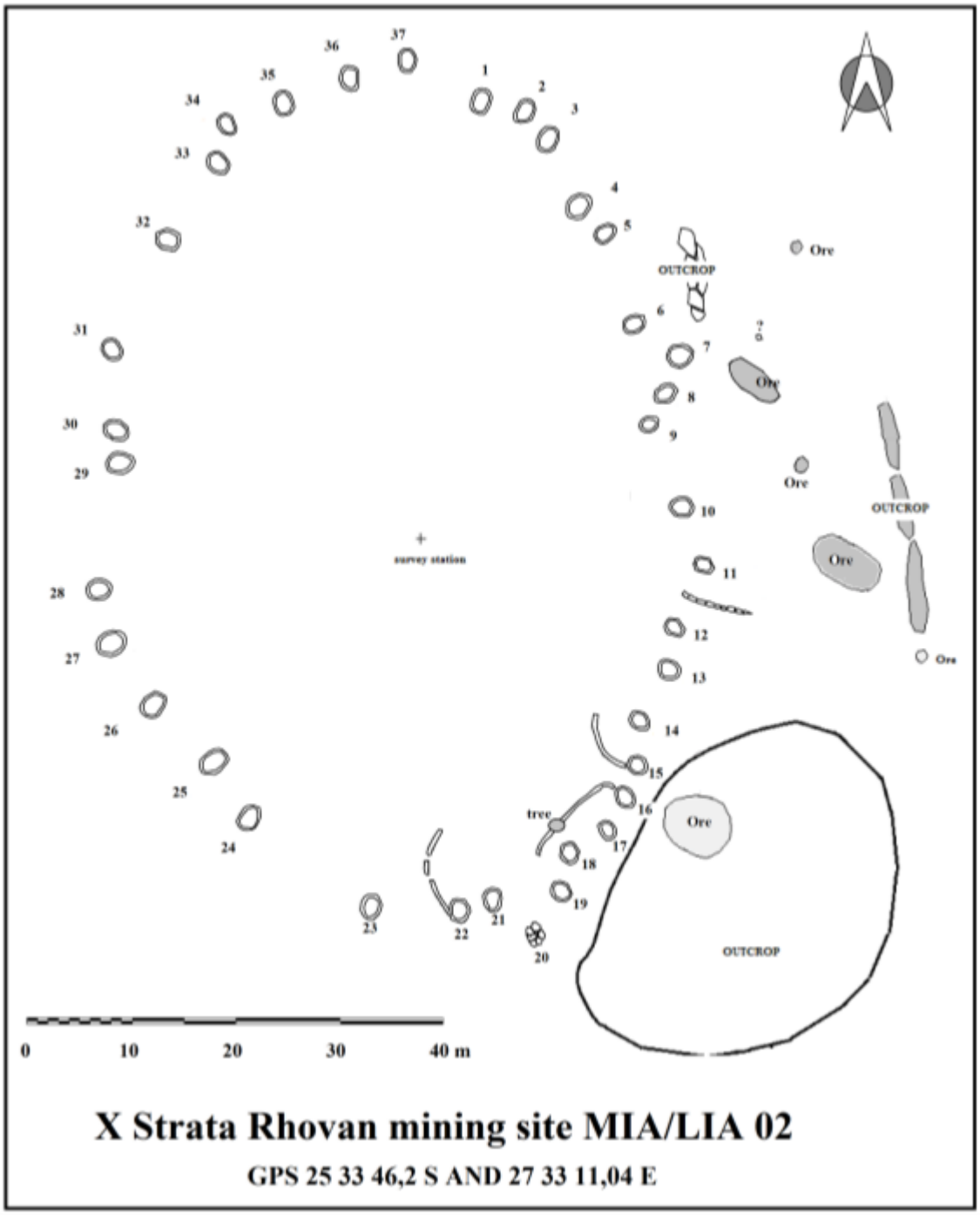


Figure 15- Site LIA02 comprises approximately thirty six huts constructed with foundations consisting of double lines with upright stones arranged around a central open space. Also note collections (heaps) of magnetite pebbles along the site's eastern perimeter (above).

Site LIA02 was constructed next to a low magnetite outcrop with a plug-like body where the most elaborately constructed huts with retaining walls were built. Heaps with magnetite pebbles together with a dolerite dyke occur along the eastern perimeter of the site.

Figure 16 & 17- Two of approximately thirty six hut foundations on an oval ground plan which constitute Site LIA02. Note the double row of foundation stones between which flexible laths could be wedged to construct commoner hemi-circular Nguni styled huts. (Diameters approx. 1.7m) (above and below).

Figure 18 & 19- Hut numbers 16 to 20 close to magnetite outcrop (above) with closer view on two doorposts demarcating entrance which leads into one of the dwellings (Scale in 10cm intervals) (below).

Figures 20 & 21- One of several magnetite scatters where magnetite pebbles were crushed into smaller pellets to be used in smelting furnaces (above). Magnetite crushing spot at the foot of magnetite outcrop (below).

Figures 22 & 23- The remains of a possible iron reduction furnace with scatters of magnetite pebbles, black soil colour and part of furnace wall represented by upright stone (above and below).

Figures 24 & 25- The remains of a second possible iron reduction furnace with buried stone which is part of furnace structure and fine scatters of magnetite (above and below).

8.2.3 A midden (which collapsed into an open cast mine pit)

A substantial midden and possible associated site measuring approximately 35m in diameter and designated Site MIA/LIA03 used to occur to the west of a magnetite outcrop (Figure 5).

At the time of the survey in 2005 at least three potsherds with multi-chrome panels and comb stamp decoration were observed on the midden. These potsherds may date to the Early Moloko (AD1400 to AD1500).

The midden was accidentally destroyed when an open cast pit expanded towards Site LIA03 and the wall of the open cast pit, together with part of Site MIA/LIA03 collapsed into the mine.

Site MIA/LIA03 therefore does not exist any longer.

8.3 Stone walled sites in the south-west

At least four Late Iron Age stone walled sites are located between granite outcrops on the south-western perimeter of Rhovan. These sites were designated Site LIA04, Site LIA05, Site LIA06 and Site LIA07.

8.3.1 Site LIA04

Site LIA04 is a small village which was established along the eastern foot of a low syenite protrusion near the south-western perimeter of Rhovan. The site is composed of two main spatial components, namely:

- A half-circular structure with two opposing ends that curl inwards towards the central part of the half-circular structure. This part of the settlement joins the eastern side of the hill. Two short curved pieces of wall are located next to this half-circular part of Site LIA04.

Figure 27- Site LIA04 adjoins a low syenite protrusion along the western perimeter of the Rhovan mining area (above).

- A few stone walls that run along the western end of the syenite protrusion. This part of the settlement may have extended across a two track road into what now is an agricultural field and may have been as large as the remaining part which has been mapped. It is most likely that this component also represented a residential unit but perhaps occupied be individuals with alower ranking than those on the eastern side.

No archaeological remains such as middens are associated with the site. A single potsherd from the surface reveals a comb stamping decoration.

Figure 28- Site LIA04 outlined on a Google image (above). The site is located on opposing sides of a syenite outcrop. A half-circular component (residential) is located along the eastern side of the outcrop. Short stretches of stone walls without any clear pattern runs along the western side of the outcrop and may have stretched across the two track road into what is now an agricultural field. It is most likely that this component was also utilized as a living area but was partly destroyed when the dirt road was constructed across this end of the site (above).

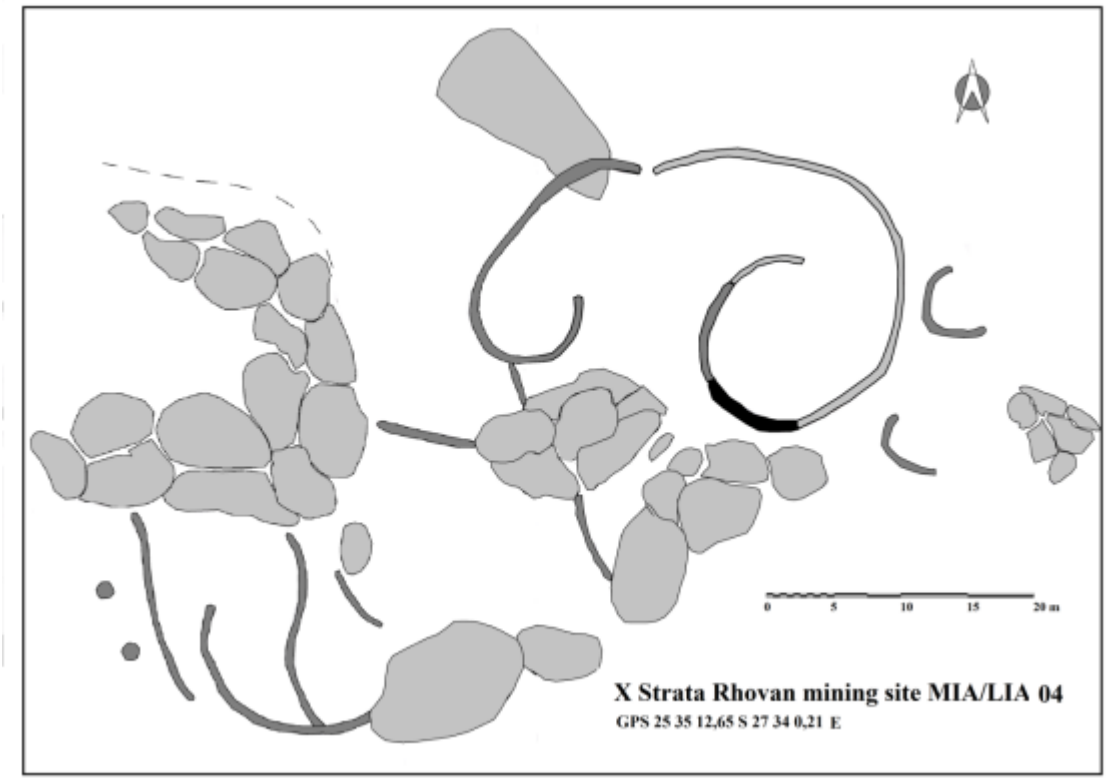


Figure 29- Ground plan drawing for Site LIA04 with two possible residential components, east and west of the outcrop (above).

Figure 30- Outer wall of half-circular residential component on east side of the granite knoll comprises double row upright stones between which branches were made to stand upright (above).

It is highly likely that both components of Site LIA04 were utilized as residential areas and that dwellings may have been erected in both parts of the site. It appears as if the eastern half-circular component with a single entrance is more elaborate than the western component. It is also located on the northern (high status) side of the protrusion and seems to be smaller in size than the western component. It is therefore possible that this residential quarters incorporated lesser individuals but with a higher social standing than those who lived on the western side of the kopje.

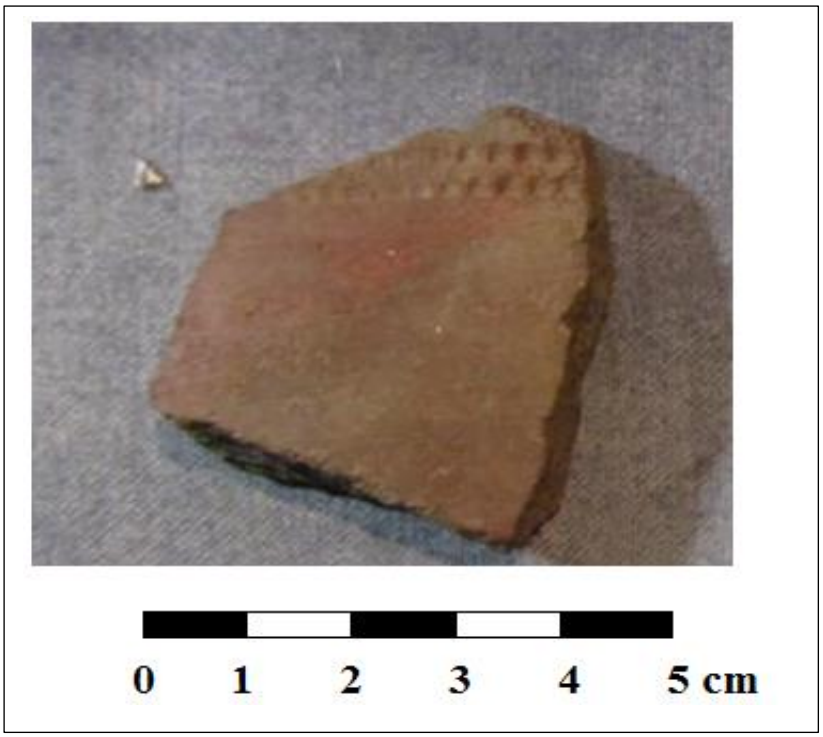


Figure 31- A single potsherd with stamped decoration from the surface of Site LIA04 (above).

Figures 32, 33 & 34- Outer boundary wall of Site LIA04 constructed by means of incorporating natural boulders in constructed walls (above); utilising single lines of stone to demarcate spaces and the construction of double rows of stone in which branches were wedged in an upright position in order to increase the height of walls (Scale 1.5m) (above).

8.3.2 Site LIA05

Site LIA05 comprises a large stone walled complex located on and in association with low syenite protrusions whilst certain components (settlements) in this complex are located on level ground further to the north of the syenite protrusions.

Site LIA05 is composed of at least three separate geographical units (here referred to as settlements) that are broadly characterized by varying numbers and sizes of enclosures, structures and features.

These individual components of Site LIA05 are now briefly discussed and illustrated with photographs.

Figure 35- Google image indicates that Site LIA05 is composed of three geographical units each representing a complex of structures and features mainly consisting of varying numbers and sizes of enclosures and arrangements of stone walls (above).

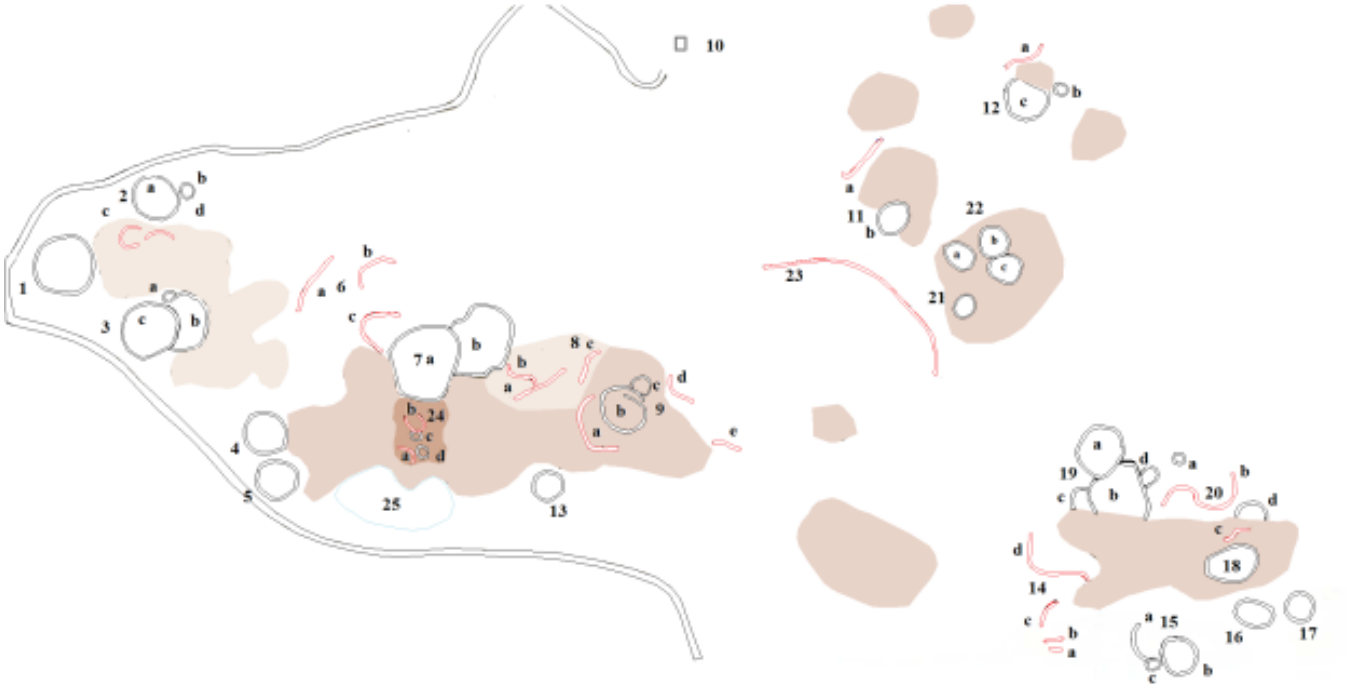


Figure 36- Numerical order for complex of enclosures and structures associated with Site LIA05 (above).

Site LIA05.1

This site represents the western and most elaborate part of the complex and incorporates at least seven large enclosures of which three adjoins half-circular walls. To this complex are added smaller enclosures, a number of walls and a large depression on the southern side of the syenite protrusion (Numbers 1- 9 & 13 in Figure 36).

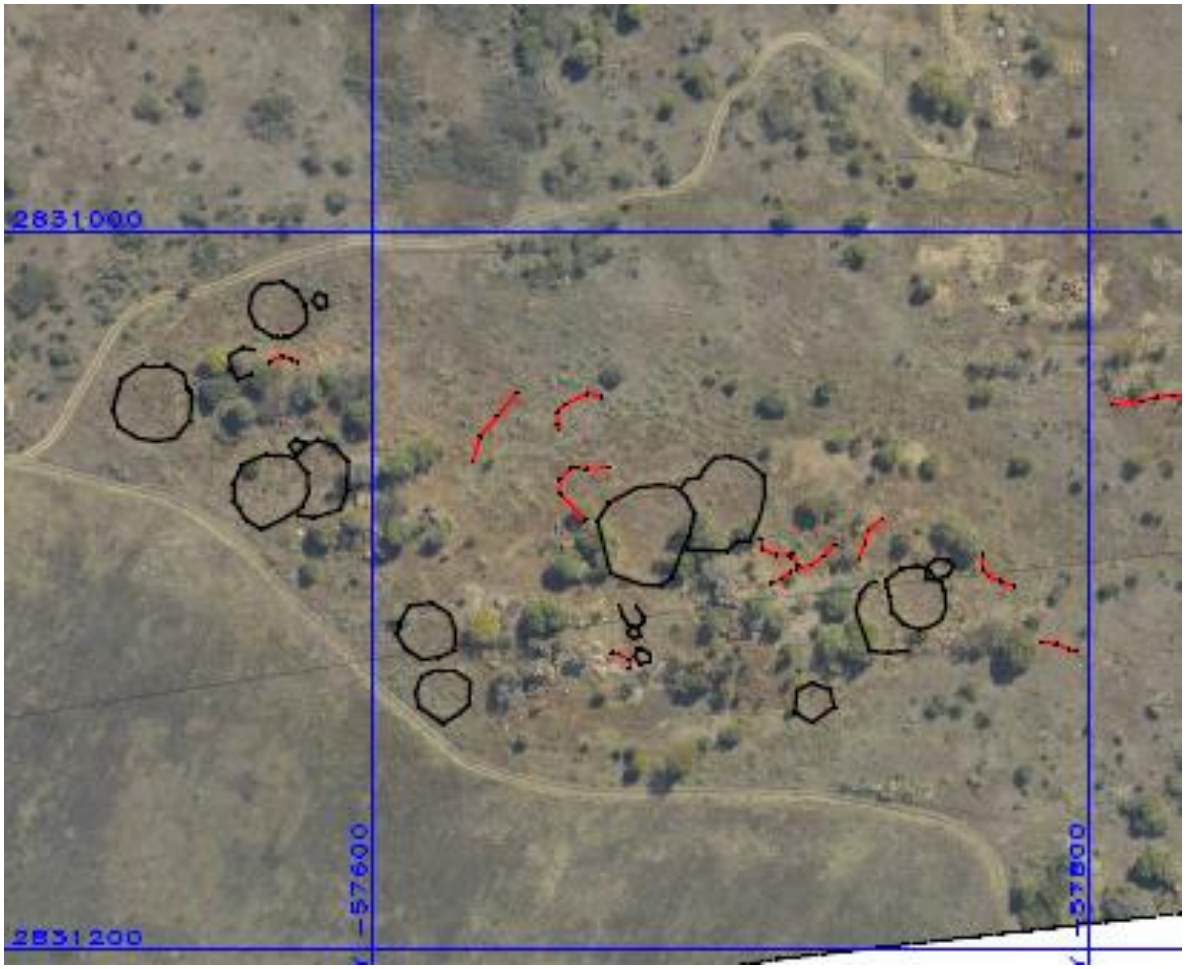


Figure 37- Site LIA05.1 is composed of at least seven large enclosures, smaller enclosures, a number of walls and a large depression note-able between the two track road and the syenite protrusion. Part of the original site may have extended to the south of the dirt road in the adjacent agricultural field.

Figure 38- Structure 01 is a large enclosure which probably served as a cattle enclosure with a diameter of approximately 30m (above).

Figures 39 & 40- Structures 03a and 03b in Site LIA05.1 probably represents the foundation stones for circular dwellings which occur in close proximity or next to cattle enclosures. (Scale 1.5m) (above).

Figure 41- Structure 02a is a medium-sized enclosure which is located on level ground to the north of the low syenite protrusion. Diamter of enclosure approximately 18m (above).

Figure 42- Structure 03b and 03c which comprise two enclosures which are linked together with a communal wall between these two enclosures. Northern enclosure located slightly lower than southern enclosure (above).

Figure 43 & 44- View from the south on Structure 4 which comprises an enclosure with diameter of approximately 15m (above). Note the height of this structure's northern wall (below).

Figure 45 & 46- View from the south and from the north on Structure 7 which comprises an enclosure with a diameter of approximately 18m (above and centre).

Figure 47- Cross section of Structure 07's wall indicates two parallel constructed lines of stone with rubble infill (Scale in 10cm intervals) (below).

Figure 48- A large depression on the southern side of the low syenite outcrop may have served as a quarry where clay was mined. It is also possible that running water from a fountain may have collected at the base of the syenite outcrop (above).

Site LIA05.2

This site comprises at least five enclosures which are located on the bare surfaces of syentite protrusions together with a half-circular wall and a small-sized enclosure further towards the north.

A long curved line with stones (wall) occurs to the south side of this complex of structures (Numbers 11, 12, 21, 22 & 23 in Figure 37). .

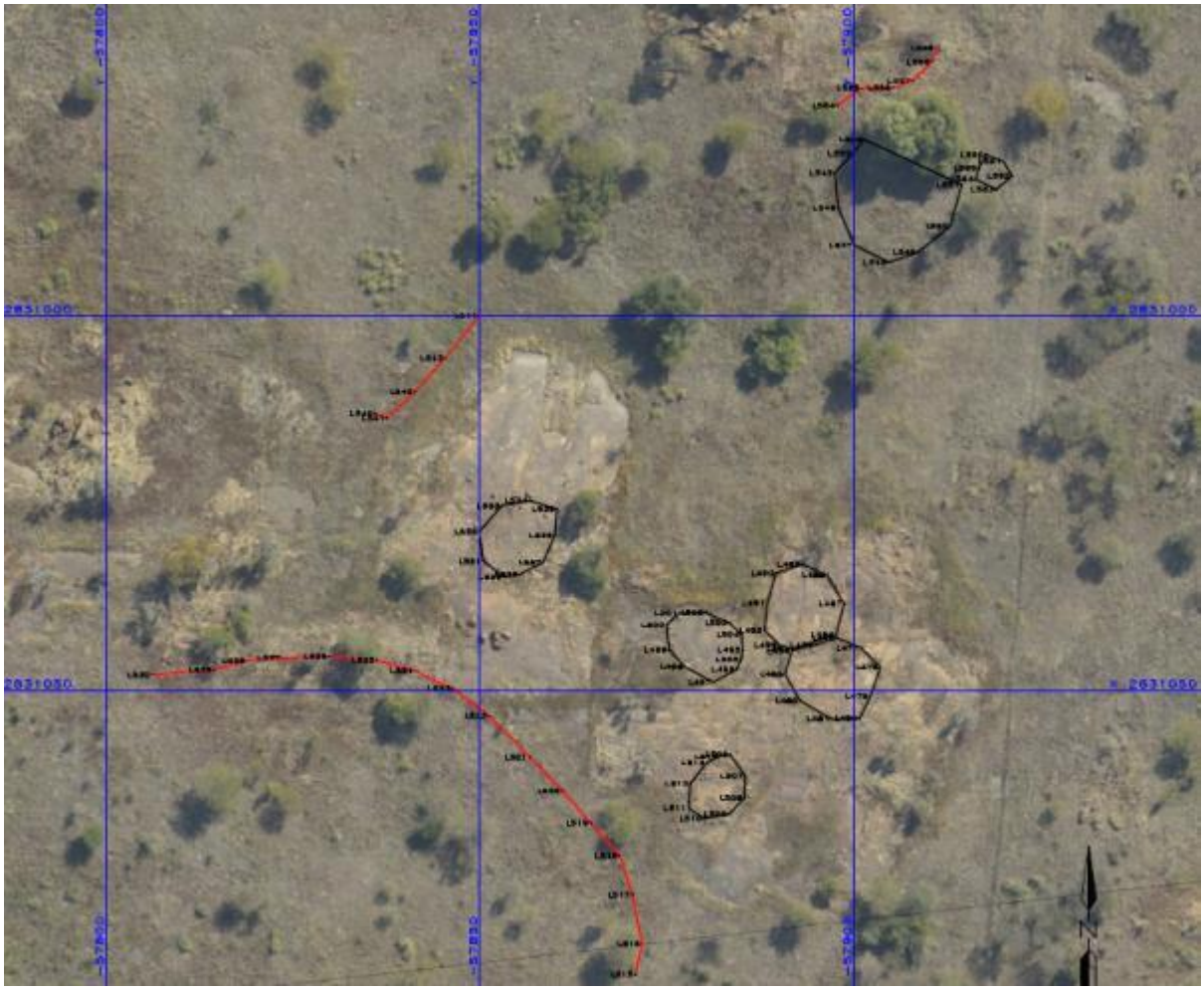


Figure 49- Site LIA05.2 is composed of at least five medium-sized enclosures which are located on the bare surface of syenite protrusions, a half circular wall and a long curved wall (above).

Figures 50 (top), 51 (centre) & 52 (below) - Structures 11, Structure 22 and Structure 23 comprise enclosures which were constructed on the bare surfaces of dolerite protrusions (above, centre and below).

Site LIA05.3

This complex of structures represents a haphazard arrangement or cluster of structures comprising of the following:

- A single large enclosure which is linked to an extended wall and which is associated with two medium-sized enclosures.
- A half-circular walls and an enclosure towards the central part of the site.
- Three enclosures of which one is linked with a wall and two small enclosures.

A number of haphazard occurring walls are located towards the central part of the site.

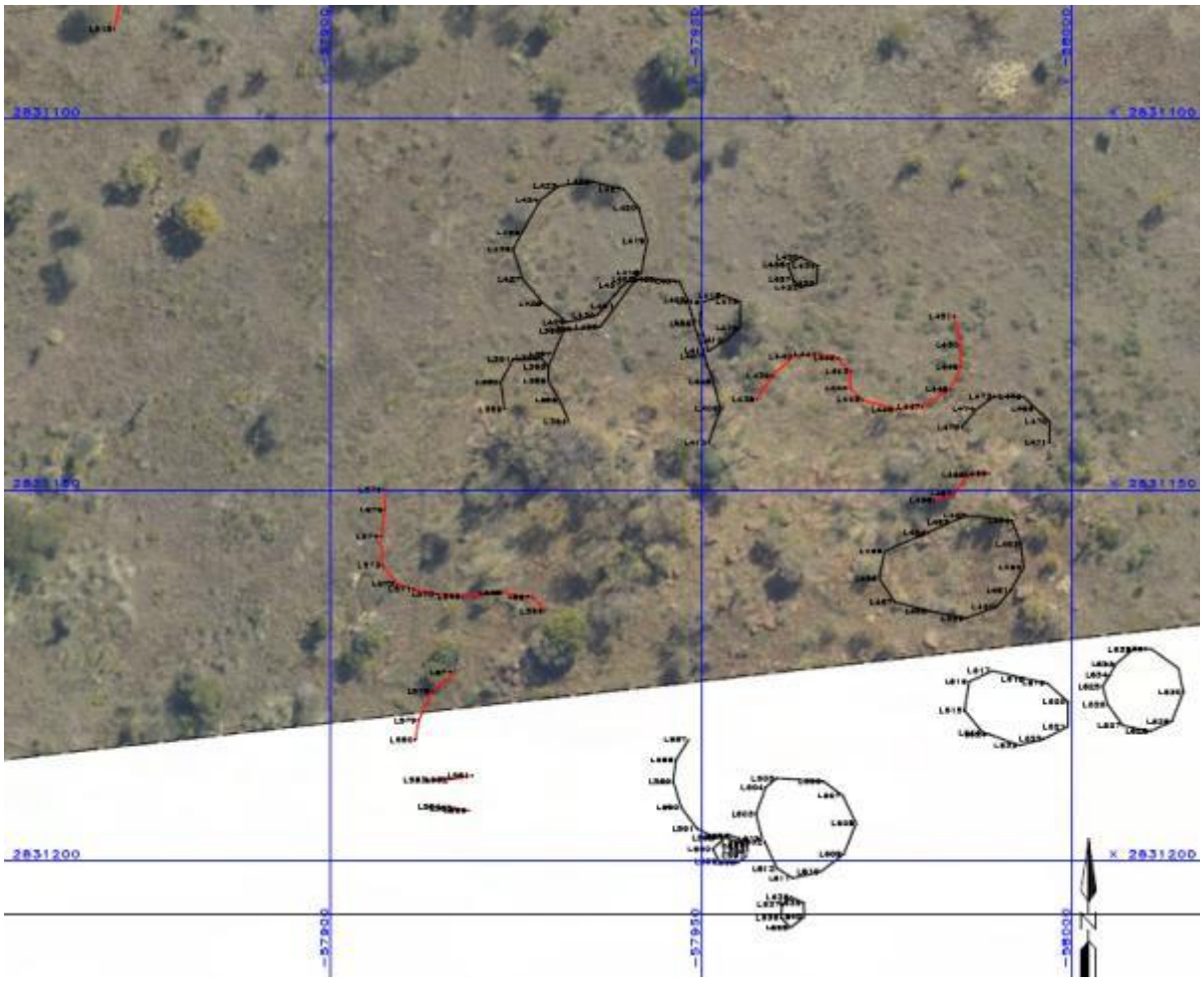


Figure 53- Site LIA05.4 is composed of six large enclosures and a number of walls. Part of the original site may have extended into the agricultural fields.

Figure 54- Structure 15 comprises an enclosure with a diameter of approximately 22m (above).

Figure 55- Structure 18 comprises an enclosure with a diameter of approximately 20m. Note the massive stones in the wall of the enclosure (above).

8.3.3 Site LIA06

Site LIA06 is located to the south-east of Site LIA04 and Site LIA05. This site is associated with two low kopjes, one composed of magnetite (east) and the other of syenite (west). The remains of Site LIA06 are limited to a single enclosure which has been constructed against the lower slope of the syenite kopje. The enclosure has a diameter of approximately 25m.

Evidence occurs that a few shelters which served as dwellings were established in the central part of the kopje where it is flat. This evidence comprises at least two to three single line circular structures which may have served as foundations for huts.

Figure 56- Site LIA06 comprises a single enclosure with a diameter of approximately 25m which is located on the barren southern slope of a low syenite outcrop (north is at the top of figure) (above).

No archaeological material except one undecorated potsherd was found along the northern base of the syenite kopje.

Site LIA06 is located closest to Site LIA05 and must have had some function and meaning within the spatial and temporal context of these two settlements.

Figures 57- Site LIA06 comprises a single enclosure which is located on the lower foot of a syenite protrusion. No function can be attributed to the site (above).

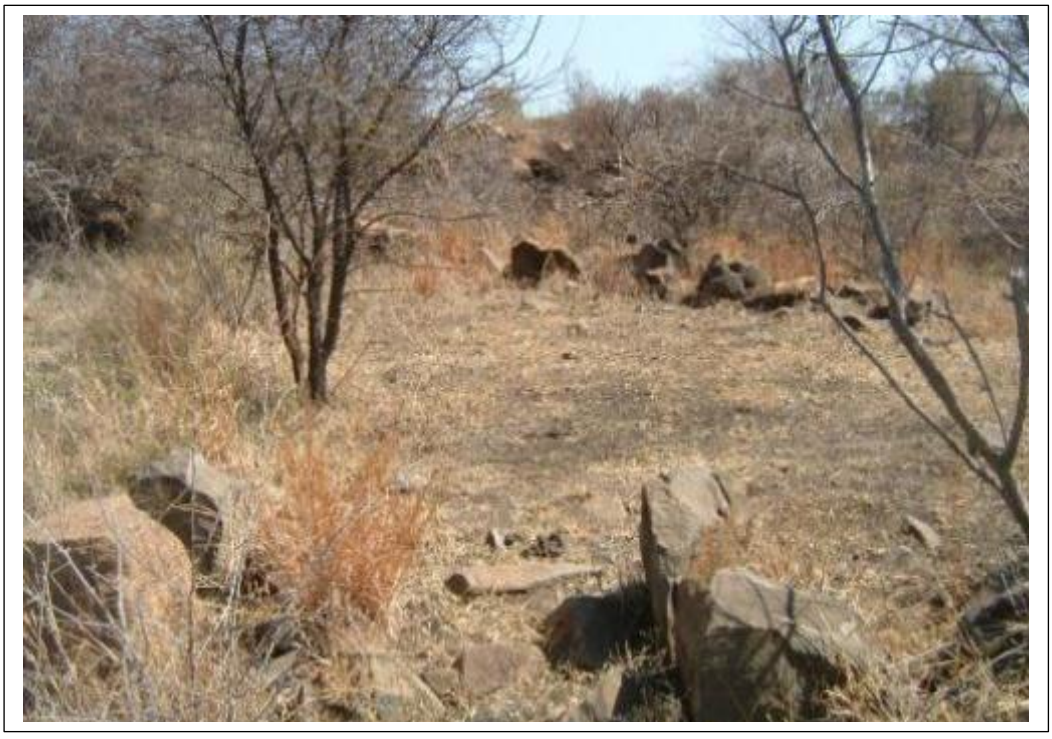
8.3.4 Site LIA07

Site LIA07 comprises the remains of a few walls against the foot of a syentite protrusion. The original plan form of this site is not distinguishable any longer as this site was damaged when a path was cleared in order to erect a fence and when a dirt road was bulldozed through the perimeter of the site.

Figure 58- Site LIA07 comprises a single intact enclosure and a second enclosure which was damaged. A single wall with an opening abuts against the smaller enclosure (above).

Site LIA07 is relatively small and probably served as a village occupied by a few families. A few undecorated potsherds were observed in association with the site.

Figures 59 & 60- Some of the remaining walls of Site LIA07 (above) include the entrance between a long wall and the intact enclosure. This feature is quite elaborate and may be associated with a structure of importance such as the court (*kgotla*) of the village (below).



8.4 Summary

All seven archaeological sites identified in the Rhovan mining area date from the Late Iron Age. At the time when the first survey (Pistorius 2005) was done some doubt existed as to whether Site MIA/LIA03 may have dated from the Middle Iron Age (Early Moloko, AD 1500). However, this site has collapsed as part of an open cast pit wall into the pit. Consequently, this site was not further discussed in the report. During one of the later surveys it was also found that Site LIA01 and Site LIA02 date from the Late Iron Age whilst Site LIA07 was uncovered as a previously unrecorded settlement (Pistorius 2013).

Site LIA01, Site LIA02 and Site LIA05 have high significance as it appears as if the first two sites are associated with specialist metal working such as the possible smelting and forging of iron. Site LIA05 was either part of a large village or may have served as a cattle station where large numbers of cattle were kept. Site LIA04, Site LIA06 and Site LIA07 were small sites which were probably occupied by small communities, do not have any archaeological deposits and resemble the same types and therefore have low significance. Site LIA07 was also partly damaged in the past.

8.5 Tables

Coordinates for settlements in the Rhovan Vanadium Mine (Table 1).

Heritage resources	Coordinates
Site LIA01	25º 33.752's 27º 32.942'e (enclosure)
Site LIA02	25º 33.770's 27º 33.184'e (hut circles)
Site LIA03	25º 34.437's 27º 33.529'e (midden) (don't exist any longer)
Site LIA04	25º 35.253's 27º 34.034'e (stone walls)
Site LIA05	25º 35.329's 27º 34.403'e (stone walls)
Site LIA06	25º 35.084's 27º 34.559'e (stone walls)
Site LIA07	25º 35 05.08's; 27º 34 47.84'e (stone walls)

Table 1- Coordinates for Late Iron Age sites on the western and southern perimeters of the Rhovan Vanadium Mine (above).

9 THE SIGNIFICANCE AND POSSIBLE IMPACT UPON THE HERITAGE RESOURCES

9.1 The significance of the heritage resources

At least six LIA settlements were recorded in the mining area. The construction of the new border fence may impact on these heritage resources. Consequently, the significance of the heritage resources must be determined as well as the severity of any possible impact that may occur. This is necessary to propose mitigation measures for heritage resources which may be affected by the proposed development.

The heritage resources comprise archaeological remains which are older than sixty years and therefore are protected by the National Heritage Resources Act (No 25 of 1999).

The archaeological sites' significance was rated according to three rating (grading) schemes. The first two schemes consider the significance of the heritage sites according to their coherent (contextual) significance, namely:

- A scheme of criteria which outlines places and objects as part of the national estate as they have cultural-historical significance or other special value (outlined in Section 3 of the NHRA [Act No 25 of 1999] (see Box 1) (Table 4).
- A field rating scheme according to which heritage resources are graded in three tiers (levels) of significance based on the regional occurrence of heritage resources (Tables 4 & 5) (Section 7 of the NHRA [Act No 25 of 1999).

The third rating scheme determined the individual significance of each heritage site considering archaeological criteria such as:

- The size and extent of settlements.
- The quality and quantity of the deposits associated with the sites.
- The uniqueness of sites (repeated types or single types).
- The value added potential of the settlements (scientific, educational, etc.).

9.1.1 Criteria to be part of the national estate

The NHRA (No 25 of 1999) distinguishes nine criteria for places and objects to be 'part of the national estate' if they have cultural significance or other special value, namely (also see Box 1):

- **Its importance in/to the community, or pattern of South Africa's history;**
- **Its possession of uncommon, rare or endangered aspects of South Africa's natural or cultural heritage;**
- **Its potential to yield information that will contribute to an understanding of South Africa's natural or cultural heritage;**
- Its importance in demonstrating the principal characteristics of a particular class of South Africa's natural or cultural places or objects;
- Its importance in exhibiting particular aesthetic characteristics valued by a community or cultural group;
- Its importance in demonstrating a high degree of creative or technical achievement at a particular period;
- **Its strong or special association with a particular community or cultural group for social, cultural or spiritual reasons;**
- **Its strong or special association with the life or work of a person**, **group or organisation of importance in the history of South Africa**; and
- Sites of significance relating to the history of slavery in South Africa.

Low	**Medium**	**High**
Historical significance		**x**
Social significance	**X**	
Spiritual significance	**X**	
Scientific significance (research, use, application, e.g. in tourism industry)		**x**

Table 2- Rating the significance of the Late Iron Age remains according to criteria outlined in the NHRA (No 25 of 1990) (above).

The highlighted criteria reflect aspects of the social, historical, spiritual and scientific significance (research, use and application, e.g. in tourism industry) of the Late Iron Age remains.

According to criteria to qualify as part of the national estate the significance of the Late Iron Age remains is graded as of medium to high significance (Table 2).

9.1.2 Field rating scheme for heritage resources

Grading of heritage resources remains the responsibility of heritage resources authorities. However, in terms of minimum standards SAHRA requires that heritage reports include field ratings in order to comply with Section 38 of the NHRA (No 25 of 1999). The NHRA (No 25 of 1999, Section 7) provides for a three-tier grading system for heritage resources. The field rating process is designed to provide a qualitative and quantitative rating of heritage resources. The rating system distinguishes three categories of heritage resources:

- Grade I Heritage resources hold qualities so exceptional that they are of special national significance.
- Grade II Heritage resources hold qualities which make them significant within the context of a province or a region.
- Grade III heritage resources are worthy of conservation, i.e. are generally protected in terms of Sections 33 to 37 of the NHRA (No 25 of 1999).

Field rating	**Grade**	**Significance**	**Recommended mitigation**
National significance	Grade 1	High significance	Nominate national site. Conservation
Provincial significance	Grade 2	High significance	Nominate provincial site. Conservation
Local significance	Grade 3A	High significance	Conservation. Mitigation not advised.
Local significance	Grade 3B	High significance	Mitigation (part of site should be retained)
Generally	**-**	**Medium to High**	**Mitigation before**

Protected (GP.A)		**significance**	**destruction**
Generally Protected (GP.B)	**-**	**Medium significance**	**Recording before destruction**
Generally Protected (GP.C)	-	Low significance	Destruction

Table3- Field rating (grading) of the archaeological remains in the project area (above).

According to the field rating scheme the Late Iron Age remains can be rated as of medium to high significance and should be recorded before destruction(Table 3).

9.1.3 Individual significance of sites

Various criteria can be used to rate the significance of individual sites when they are not evaluated as a coherent whole or even in a regional context.

The criteria that were used include the following:

- The size of settlements which refers to the surface area sites occupy as well as the number of structures and features which can be associated with the sites.
- The quantity and quality of archaeological deposits which can be associated with the settlements.
- The uniqueness or repeated occurrence of settlements. This implies whether settlements are unique to a specific type (in the area or broader) or are some of the sites the same type.
- The value which sites can add when they are further investigated. This refers to the fact that sites can contribute to the following fields when they are further investigated, namely, knowledge, education and tourism when thoroughly researched.

Site	Criteria (Values)	Rating: High (3) Medium (2) Low (1)	Mitigation measures Conserve (C) Expendable (E)
LIA01	Size (surface, structures & features)	3	**Conserve (C)**
	Deposits (material)	3	
	Uniqueness (types)	2	
	Added value	2	
LIA02	Size (surface, structures & features)	3	**Conserve (C)**
	Deposits (material)	3	
	Uniqueness (types)	2	
	Added value	2	
LIA04	Size (surface, structures & features)	2	**Expendable (E) Adequately documented**
	Deposits (material)	2	
	Uniqueness (types)	2	
	Added value	2	
LIA05	Size (surface, structures & features)	3	**Conserve (C)**
	Deposits (material)	3	
	Uniqueness (types)	3	
	Added value	3	
LIA06	Size (surface, structures & features)	1	**Expendable (E) Adequately documented**
	Deposits (material)	1	
	Uniqueness (types)	1	
	Added value	1	
LIA07	Size (surface, structures & features)	1	**Expendable (E) Adequately documented**
	Deposits (material)	1	
	Uniqueness (types)	1	
	Added value	1	

Table 4- Rating the significance of individual heritage sites in the Rhovan Vanadium Mine (above).

According to the individual rating scheme Site LIA01, Site LIA02 and Site LIA05 are rate as of high significance and that these sites should be conserved. Sites LIA04 is rated as of medium significance and Site LIA06 and Site LIA07 are rated as of low significance. All three the latter sites are expendable or can be destroyed by developmental projects as they have been adequately documented (Table 4).

10 POSSIBLE IMPACT AND SIGNIFICANCE OF THE IMPACT ON THE HERITAGE RESOURCES

10.1 Possible impact on the heritage resources

The construction of the proposed new border fence will have the following impact on the heritage resources, namely:

- Site LIA07 will partly be effected when the new border fence is constructed.
- None of the other sites will be affected by the proposed construction of the border fence.

The alignment of the proposed new border fence indicate that the northern tip of Site LIA07 will be affected (destroyed) when the fence is constructed. However, the larger part of the site will remain intact and will note not be affected when the border fence is constructed. The significance of the impact on Site LIA07 therefore is low (Table 5).

Figure 61- The construction of the new border fence will impact on the northern tip of Site LIA07 (above).

10.2 Significance of the impact on Site LIA07

The impact of the construction of the proposed border fence on Site LIA07 is of low significance (Table 5).

Site LIA07	M	D	E	I	R	P	SS	Environ Signific	Heritage Signific	Mitigation Required	Significance after mitigation
	2	1	1	2	4	4	40	Low	Medium to high in context; Low as individual site	Already documented	Low

Table 5- The significance of the impact on Site LIA07 is low (above).

10.3 Proposed mitigation measures

Site LIA07 was desribed and mapped in the report and therfore adequately documented. No mitigation measures are further required (Table 5).

10.4 Managing heritage resources that may remain unaffected

All the remaining settlements in the Rhovan Vanadium Mine (Site LIA01, LIA02, Site LIA04, Site LIA05 and Site LIA06) will not be affected by the construction of the proposed new border fence. Consequently, these sites, as well as the larger part of Site LIA07 which remain, have to be monitored every six months to determine condition (state of preservation) of these sites.

These inspections can be noted in a register. If any alterations to the sites have occurred, whether due to human or animal intrusion or as a result of natural weathering, these changes can be noted in the register and if deemed significantly negative can be reported to an archaeologist accredited with the Association of Southern African Professional Archaeologists (ASAPA).

11 CONCLUSION AND RECOMMENDATIONS

This second updated HIA study for Rhovan revealed the following types and ranges of heritage resources as outlined in Section 3 of the National Heritage Resources Act (No 25 of 1999), namely:

- A single, isolated stone walled enclosure that may date from the Late Iron Age (Site LIA01).
- Approximately thirty seven hut foundations consisting of upright stones spatially organised on a circular ground plan (Site LIA02).
- A midden that dates from the Middle and/or Late Iron Age (Site MIA/LIA03) with possible associated site. Since the original survey was done in 2005 it was found during the 2013 survey that the site has collapsed as part of a wall of an open cast pit.
- Three Late Iron Age sites located between granite knolls on the southern perimeter of the mining area (Site LIA04, Site LIA05 and Site LIA06) whilst a seventh LIA site was discovered during the 2013 survey and coined Site LIA07.

These heritage sites were revisited, documented and re-assessed. All the heritage sites were geo-referenced and mapped and their coordinates were tabulated (Figure 4; Table 1).

All seven archaeological sites identified in the Rhovan mining area date from the Late Iron Age. At the time when the first survey (Pistorius 2005) was done some doubt existed as to whether Site MIA/LIA03 may have dated from the Middle Iron Age (Early Moloko, AD 1500). However, this site has collapsed as part of an open cast pit wall into the pit. Consequently, this site was not further discussed in the report. During one of the later surveys it was also found that Site LIA01 and Site LIA02 date from the Late Iron Age whilst Site LIA07 was uncovered as a previously unrecorded settlement (Pistorius 2013).

Site LIA01, Site LIA02 and Site LIA05 have high significance as it appears as if the first two sites are associated with specialist metal working such as the possible smelting and forging of iron. Site LIA05 was either part of a large village or may have served as

a cattle station where large numbers of cattle were kept. Site LIA04, Site LIA06 and Site LIA07 were small sites which were probably occupied by small communities, do not have any archaeological deposits and resemble the same types and therefore have low significance. Site LIA07 was also partly damaged in the past.

The significance of the heritage resources

At least six LIA settlements were recorded in the mining area. The construction of the new border fence may impact on these heritage resources. Consequently, the significance of the heritage resources must be determined as well as the severity of any possible impact that may occur. This is necessary to propose mitigation measures for heritage resources which may be affected by the proposed development.

The heritage resources comprise archaeological remains which are older than sixty years and therefore are protected by the National Heritage Resources Act (No 25 of 1999).

The archaeological sites' significance was rated according to three rating (grading) schemes. The first two schemes consider the significance of the heritage sites according to their coherent (contextual) significance, namely:

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The third rating scheme determined the individual significance of each heritage site considering archaeological criteria such as:

- The size and extent of settlements.
- The quality and quantity of the deposits associated with the sites.
- The uniqueness of sites (repeated types or single types).
- The value added potential of the settlements (scientific, educational, etc.).

According to the criteria to qualify as part of the national estate the significance of the Late Iron Age remains is graded as of medium to high significance (Table 2).

According to the field rating scheme the Late Iron Age remains can be rated as of medium to high significance and should be recorded before destruction (Table 3).

According to the individual rating scheme Site LIA01, Site LIA02 and Site LIA05 are rate as of high significance and that these sites should be conserved. Sites LIA04 is rated as of medium significance and Site LIA06 and Site LIA07 are rated as of low significance. All three the latter sites are expendable or can be destroyed by developmental projects as they have been adequately documented (Table 4).

Possible impact on the heritage resources

The construction of the proposed new border fence will have the following impact on the heritage resources, namely:

- Site LIA07 will partly be effected when the new border fence is constructed.
- None of the other sites will be affected by the proposed construction of the border fence.

The alignment of the proposed new border fence indicate that the northern tip of Site LIA07 will be affected (destroyed) when the fence is constructed. However, the larger part of the site will remain intact and will note not be affected when the border fence is constructed. The significance of the impact on Site LIA07 therefore is low (Table 5).

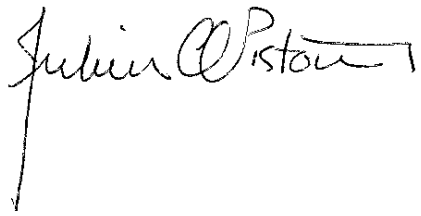
Proposed mitigation measures

Site LIA07 was desribed and mapped in the report and therfore adequately documented. No mitigation measures are further required (Table 5).

Managing heritage resources that may remain unaffected

All the remaining settlements in the Rhovan Vanadium Mine (Site LIA01, LIA02, Site LIA04, Site LIA05 and Site LIA06) will not be affected by the construction of the proposed new border fence. Consequently, these sites, as well as the larger part of Site LIA07 which remain, have to be monitored every six months to determine condition (state of preservation) of these sites.

These inspections can be noted in a register. If any alterations to the sites have occurred, whether due to human or animal intrusion or as a result of natural weathering, these changes can be noted in the register and if deemed significantly negative can be reported to an archaeologist accredited with the Association of Southern African Professional Archaeologists (ASAPA).



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Mr Sidney Miller. Surveyor and cartographer.