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

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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 Xstrata Alloys Rhovan Vanadium Mine near Brits (Madibeng) in the Central Bankeveld of the North-West Province of South Africa in December 2005. This Phase I Heritage Impact assessment study was conducted in September 2013 for Rhovan Operations in order to update the earlier Phase I Heritage Impact Assessment study which was done for Xstrata Alloys Rhovan Vanadium Mine in 2005.

The aims with the updated report re the following:

- To describe the types and ranges of heritage resources which have been identified in Rhovan's mining area.
- 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 future mining activities.

The Phase I 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) in December 2005, 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.
- Three Late Iron Age sites located between granite knolls on the southern perimeter of the mining area (Site LIA04, Site LIA05 and Site LIA06).

These heritage sites were revisited, documented and re-assessed. A seventh site which was newly discovered was added to the inventory of sites which occur in the Rhovan mining area (Site LIA07). All the heritage sites were geo-referenced and mapped and their coordinates were tabulated (Figure 4; Table 1).

The significance of the heritage resources

All seven archaeological sites identified in the Rhovan mining area date from the Late Iron Age although some doubt exist as to whether Site MIA/LIA03, which have disappeared in an open pit, may have dated to the Middle Iron Age (Early Moloko). During the earlier survey which was done for Rhovan it was thought that Site MIA/LIA01, Site MIA/LIA02 and Site MIA/LIA03 may have dated from the Middle Iron Age. However, this updated heritage report which entailed a more thorough investigation of the archaeological sites, has confirmed that the first two sites date from the Late Iron Age. It is therefore possible that Site MIA/LIA03, which no longer exists, may also have dated from the Late Iron Age although no stone walls were found in association with this site.

All the archaeological sites (except Site MIA/LIA03) do not contain substantial archaeological deposits - as was thought when the initial survey was conducted in mid-summer when all the sites were covered with tall grass. Archaeological deposits are usually associated with material such as pottery, animal bone waste, charcoal, possible iron tools, etc.. These remains are highly significant as they enable archaeologists to interpret the meaning of Iron Age sites from the past.

Nevertheless, Site LIA01, Site LIA02 and Site LIA05 have high significance as the first two sites are clearly associated with specialist metal working such as possible iron smelting and even with the 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. Cattle kept at Site LIA5 may have been part of stock that were raided during the Batswana wars or when the Ndebele occupied the Rustenburg region (AD1828 to AD1837). Both metal working and cattle raiding are associated with conflict and with militarization and were practised by men who often lived in seclusion, away from women and children and therefore in adapted military styled villages such as the Zulu's *ikhandla*. Metal working was also highly ritualised, associated with taboos and practised by specialists who amongst certain groups were shunned by other community members.

Sites LIA06 and Site LIA07 have little significance as these sites are simple in appearance whilst Site LIA07 also has been affected by development activities in the past. Site MIA/LIA03 has been destroyed when the wall of an open pit collapsed. Nevertheless, these sites must have had some meaning within the overall context of the large number of Late Iron Age stone walled sites which occur in this part of the Central Bankeveld.

The significance of the sites in Rhovan's mining area can be rated as follow using different criteria (Table 2).

The impact on the heritage resources

Heritage remains are non-renewable resources and are protected by the National Heritage Resources Act (No 25 of 1999). This implies that no heritage resources may be affected by any development project *prior* to their investigation by an archaeologist accredited with ASAPA (Association for Southern African Professional Archaeologists) and before the necessary demolishing permits has been obtained from the South African Heritage Resources Authority (SAHRA).

The significant heritage sites (Site LIA01, LIA02 and Site LIA05) are located on the western perimeter of the Rhovan mining area. Although mining expansion may proceed westwards to where these heritage resources are located it is not expected that these sites will be impacted by expanding activities in the near future.

Site LIA06 and Site LIA07 occur in the immediate proximity where Rhovan is focussing some of their mining activities. These sites therefore may be affected by mining activities in the short, medium or long term.

Proposed mitigation measures

The significant heritage sites

Considering the fact that Sites LIA01, LIA02 and Site LIA05 are classified as significant it is recommended that the sites be conserved. However, if these sites are inevitable being threatened by expanding mining activities it is recommended that these sites are subjected to a Phase II investigation *prior* to them being affected by the expanding mining activities.

A Phase II investigation implies that a permit must be obtained from the SAHRA in order to conduct excavations of Sites LIA01, LIA02 and Site LIA05 before these sites are destroyed by any mining activities.

The non-significant heritage sites

Considering the fact that Sites LIA04, LIA06 and Site LIA07 are considered to be of low significance these sites can be destroyed by future mining activities as they have been adequately described and documented in this report.

Monitoring and auditing

Sites LIA01, Site LIA02 and Site LIA05 will not be affected by expanding mining activities during the short term. Consequently, these sites have to be monitored every six months to determine the state of preservation (condition) of these sites.

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.

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1 INTRODUCTION

A Phase I Heritage Impact Assessment (HIA) study was done for X Strata Alloys 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 eight years ago X Strata Alloys Rhovan Vanadium Mine has changed ownership and the name of the mine has changed to Rhovan Operations. The mine also has expanded its open cast mining activities and associated infrastructure. These expansion activities are continuing and may have an influence on 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 to update the heritage report which was conducted in 2005 and to propose mitigation measures for those heritage resources which may be affected as a result of the mine's expansion programme.

Heritage resources in the North-West Province constitute a rich and diversified range (comprising the 'national estate') as outlined in Section 3 of the National Heritage Resources Act, 1999 (Act No 25 of 1999) (see Box 1, next page). Some of these heritage resources have been identified at X Strata Alloys Rhovan may be affected by the mine's expansion programme.

2 TERMS OF REFERENCE

This report represents an update of the original Phase I HIA study which was conducted for X Strata Alloys Rhovan Vanadium Mine in December 2005. The aims with the updated report are the following:

- To describe the types and ranges of heritage resources which have been identified in Rhovan's mining area.
- 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 future mining activities.

3 THE PROJECT AREA

3.1 Location

Rhovan Operations (Rhovan) is an open cast Vanadium Mine which is located near the towns of Berseba and Bethanië between Brits (Madibeng) in the Central Bankeveld of the North-West Province of South Africa. 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. The mine infrastructure which mainly comprise open cast pits, waste rock and other dumps, a plant, offices and haul roads are located on a slightly undulated and featureless landscape to the north of the series of syenite kopjes which run from Pretoria in the east to the Pilanesberg in the north-west (Figure 1) (1:50 000; 2527DA Bapong).

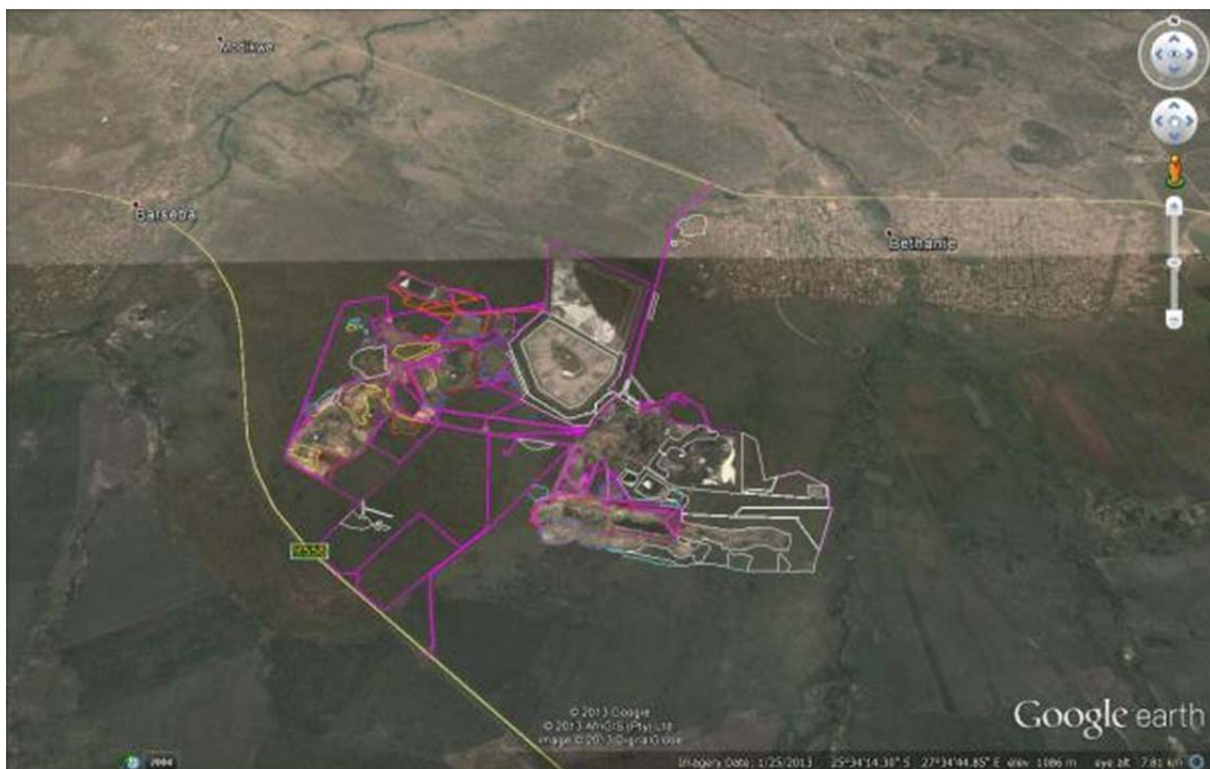


Figure 1- Regional setting for Rhovan Operations between Berseba and Bethanië near Madibeng in the Central Bankeveld in the North-West Province (above).

3.2 In a cultural landscape

Rhovan's mine lease area cover a 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 5).

4 METHODOLOGY

4.1 Approach followed in December 2005

The Phase I HIA study which was conducted in 2005 involved the following activities:

- Consulting archaeological data bases such as the ones kept at institutions such as African Window and the South African Heritage Resources Authority (SAHRA) (Cape Town [national] and Mafekeng [provincial]) to establish if any heritage resources of significance were recorded in or near the project area.
- The fieldwork survey which was undertaken covered a broad corridor along the outer perimeter of the mining activities and associated infrastructure. The survey was conducted with a vehicle whilst pedestrian surveys were done where rocky outcrops occurred as most of the heritage resources in the region are associated with these geological features.



Figure 2- Track log which was recorded when the heritage sites in Rhovan's mining area were revisited and documented in September 2013 (above).

- (The original survey did not include the recording of a GPS track log as this survey was conducted prior to SAHRA requiring GPS track logs for fieldwork. However, a track log was recorded when the sites were revisited and documented in order to update this report).
- 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').

4.2 Assumptions and limitations

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.

4.3 Some remarks on 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.
- Conservation (*in-situ*): The conservation and maintenance of ecosystems, natural habitats and cultural resources in their natural and original surroundings.
- Cultural (heritage) 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.
- Cultural (heritage) 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.
- Heritage resources: The various natural and cultural assets that collectively form the heritage. These assets are also known as cultural and natural resources. Heritage (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.
- Stone Age: Refers to the prehistoric past, although Late Stone Age peoples 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 300 years ago).

- 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.
- Historical period: Refers to the first appearance or use of 'modern' Western writing in a particular area or region of the world.
- 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.
- 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.
- Maintenance: Keeping something in good health or repair.
- Preservation: Conservation activities that consolidate and maintain the existing form, material and integrity of a cultural resource.
- 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.
- 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.
- 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 (refer to plan).
- Phase I 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.
- 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 involve permitting processes, require the input of different specialists and the co-operation and approval of SAHRA.

5 CONTEXTUALISING THE PROJECT AREA

5.1 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 volcanic 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).

5.2 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).

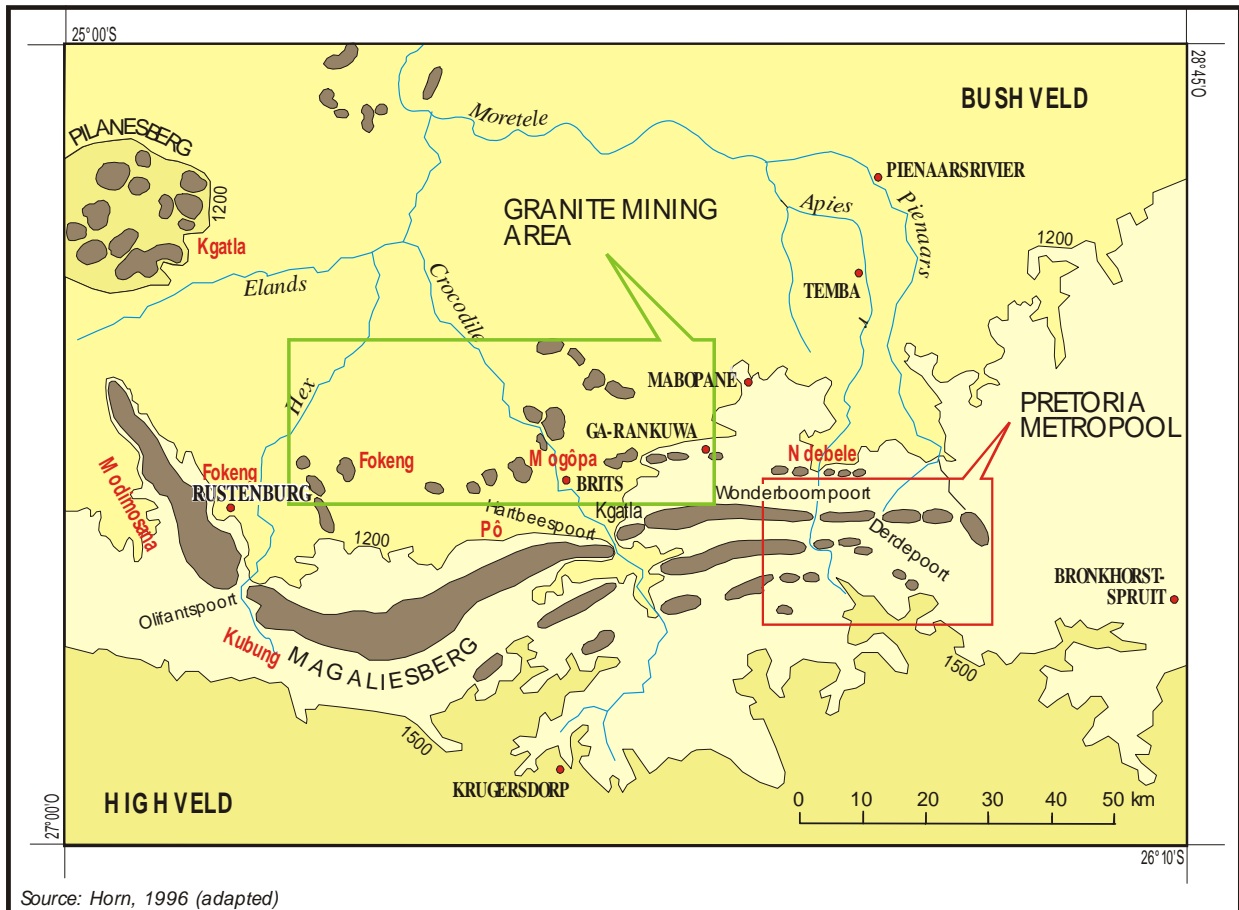


Figure 3- The Central Bankeveld is characterised by a conspicuous chain of granite hills which stretch between Pretoria and the Pilanesberg. Stone walled settlements occur along these hills and represent the spheres of influence of several Tswana chiefdoms who emerged in this fertile eco-zone during 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 M^ôgôpa and the Kwena M^ôgale (Bap^ô) 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 were 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.

5.3 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.

5.4 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 THE PHASE I HERITAGE IMPACT ASSESSMENT

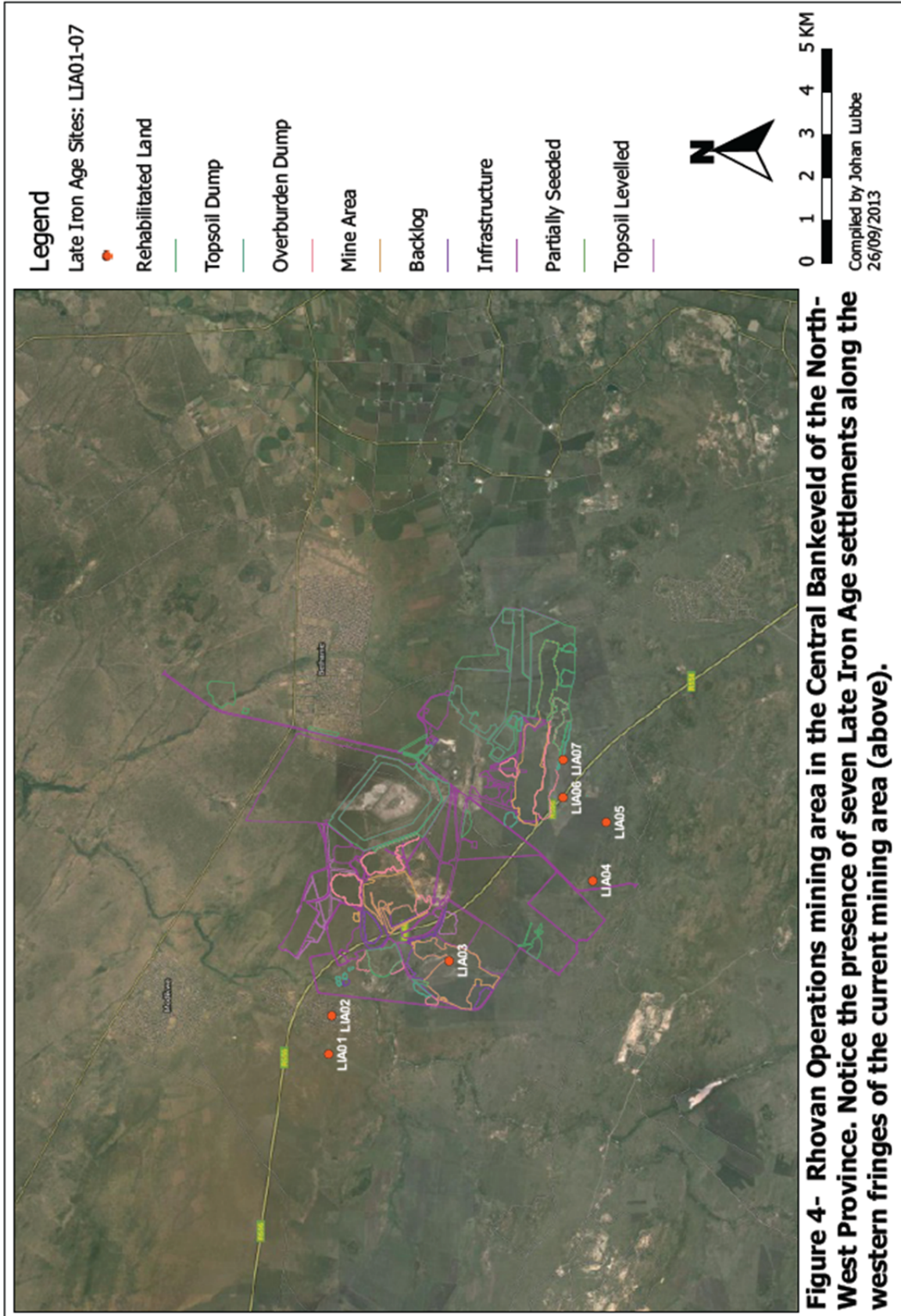
6.1 Types and ranges of heritage resources

The Phase I 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) in December 2005, namely:

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- A midden that dates from the Middle and/or Late Iron Age (Site MIA/LIA03) with possible associated site.
- Three Late Iron Age sites located between granite knolls on the southern perimeter of the mining area (Site LIA04, Site LIA05 and Site LIA06).

These heritage sites were revisited, documented and re-assessed. A seventh site which was newly discovered was added to the inventory of sites which occur in the Rhovan mining area (Site LIA07). 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.



6.2 Stone walled sites in the north-west

6.2.1 A stone walled enclosure (Site LIA01)

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.

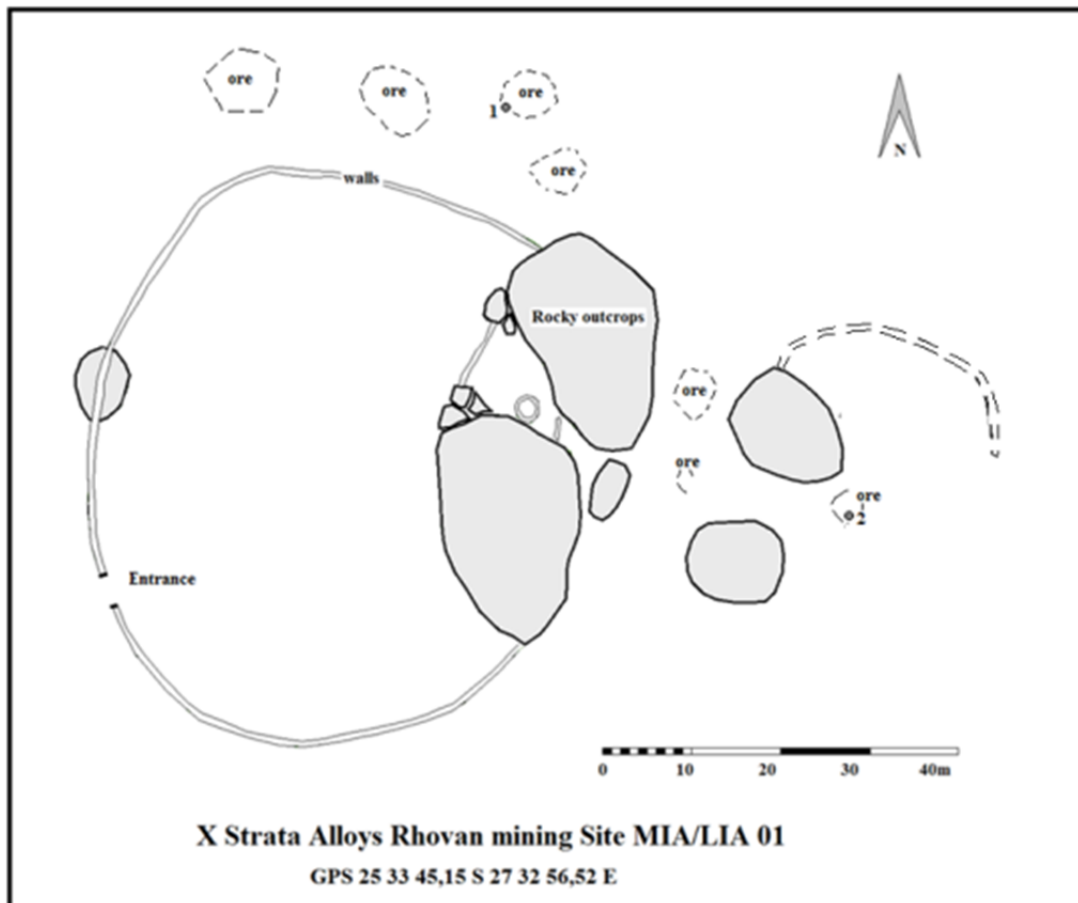
Conspicuous features which are associated with Site LIA01 are the presence of clusters of magnetite ore. It is most likely that this magnetite pebbles were collected elsewhere in the region (where outcrops of magnetite are common) and that the magnetite pebbles were carried to the site where the pebbles 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 LIA01 is 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 hammer 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).

6.2.2 Hut foundations (Site LIA02)

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).

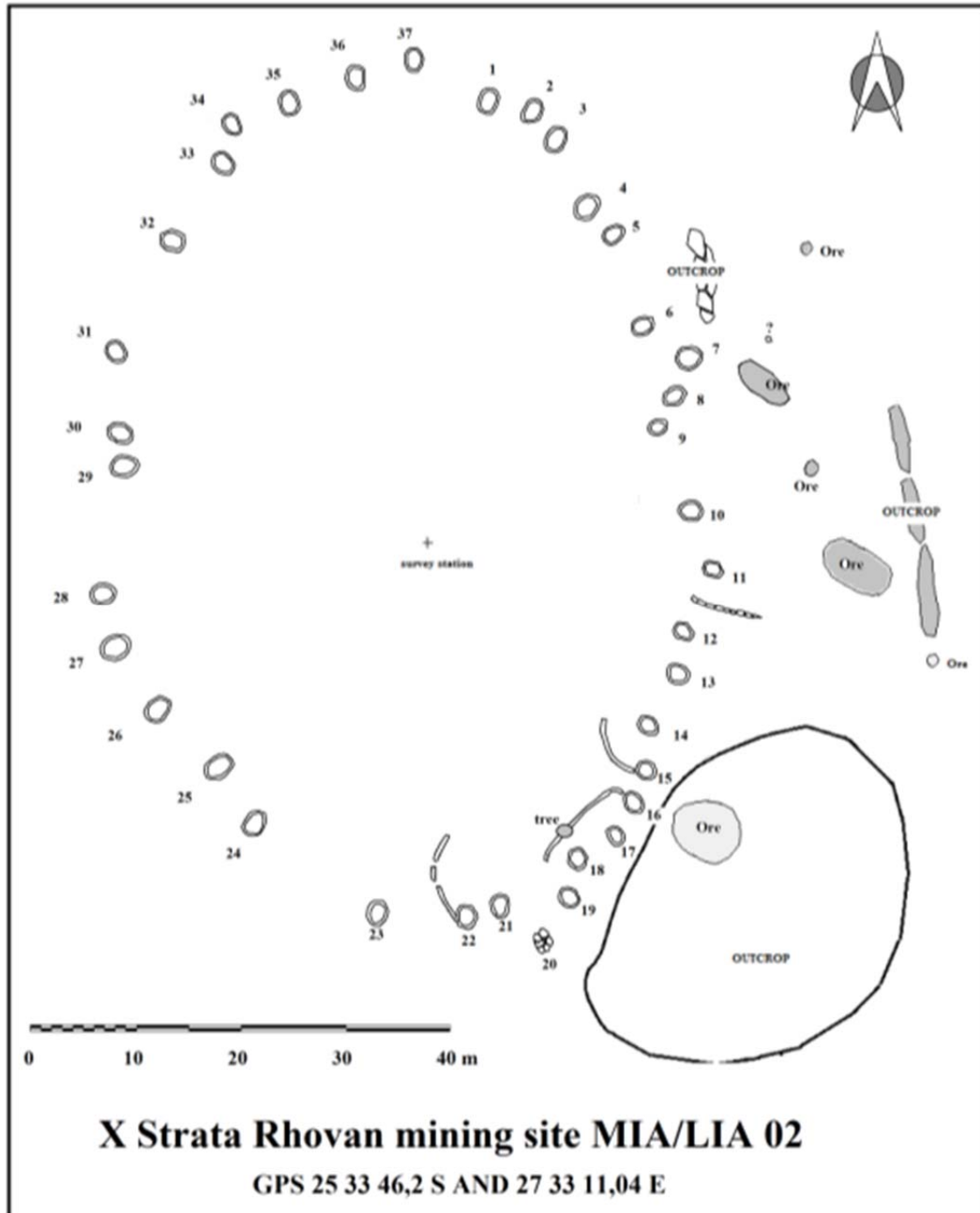


Figure 15- Site LIA02 comprises approximately thirty six huts constructed with foundations consisting of double lines with upright stones arranged around a central open space. Also note collections (heaps) of magnetite pebbles along the site's eastern perimeter (above).

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).



6.2.3 A midden

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.



Figure 26- A relatively large midden (Site MIA/LIA03) before it has collapsed into one of Rhovan's open cast pits. (Mr Tony Mills, previous resident mine geologist with Rhovan is kneeling on top of the midden).

6.3 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.

6.3.1 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 by individuals with lower 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. 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 perhaps by individuals of lower standing as those on the eastern side (above).

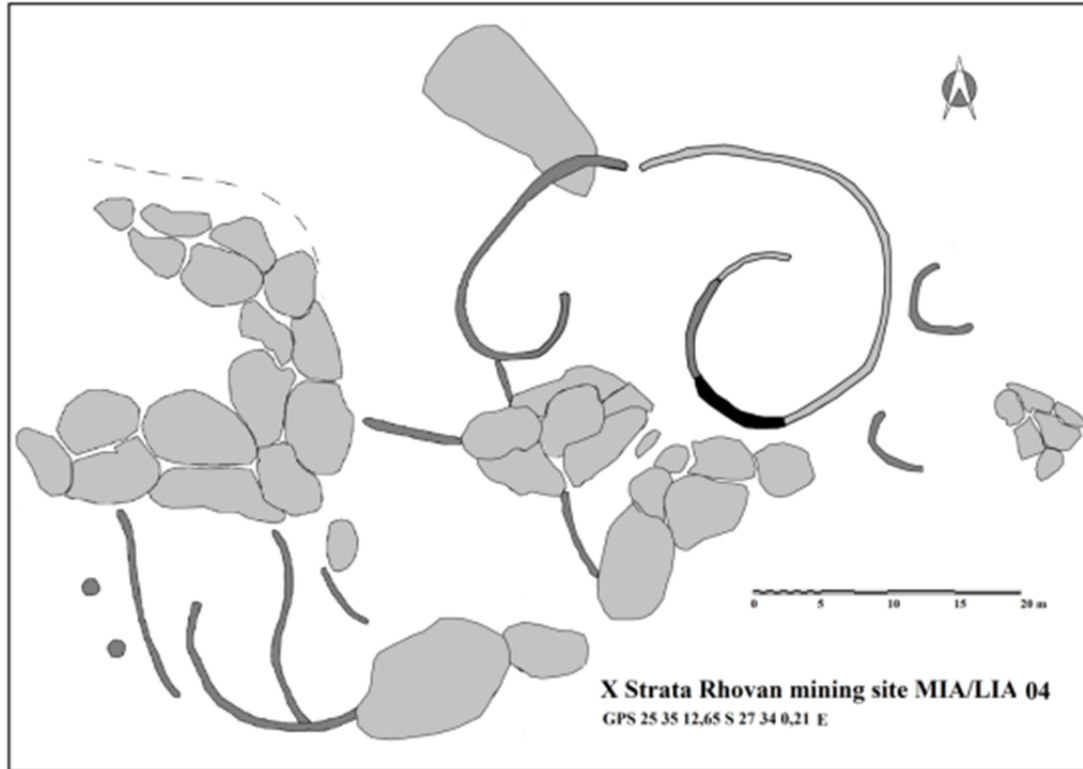


Figure 29- Ground plan drawing for Site LIA04 with two possible residential components, east and west of the outcrop (above).



Figure 30- Outer wall of half-circular residential component 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 and that dwellings may have been erected in both parts of the site. However, it appears as if the half-circular component with a single entrance in the outer wall 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.

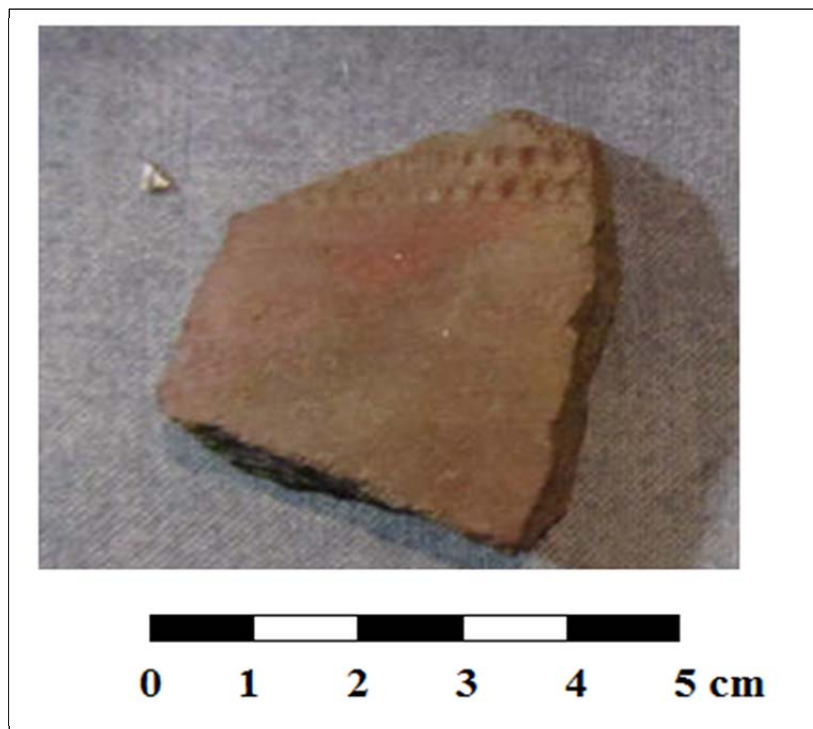


Figure 31- A single potsherd with comb stamping decoration from the surface of Site LIA04 (above).



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).

6.3.2 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).

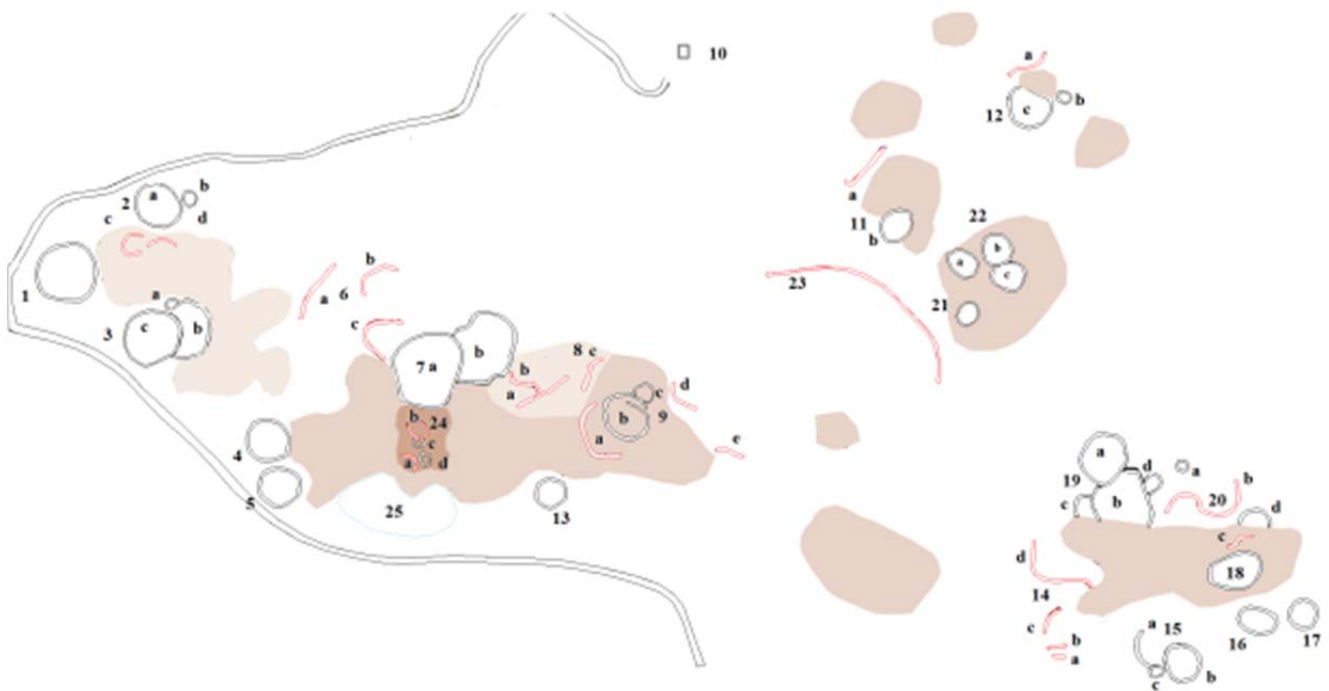


Figure 36- Numerical order for complex of enclosures and structures associated with Site LIA05 (above).

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. Diameter 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 infilling. (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 syentite protrusions, a half circular wall and a long curved wall (above).



Figures 50, 51 & 52- 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.

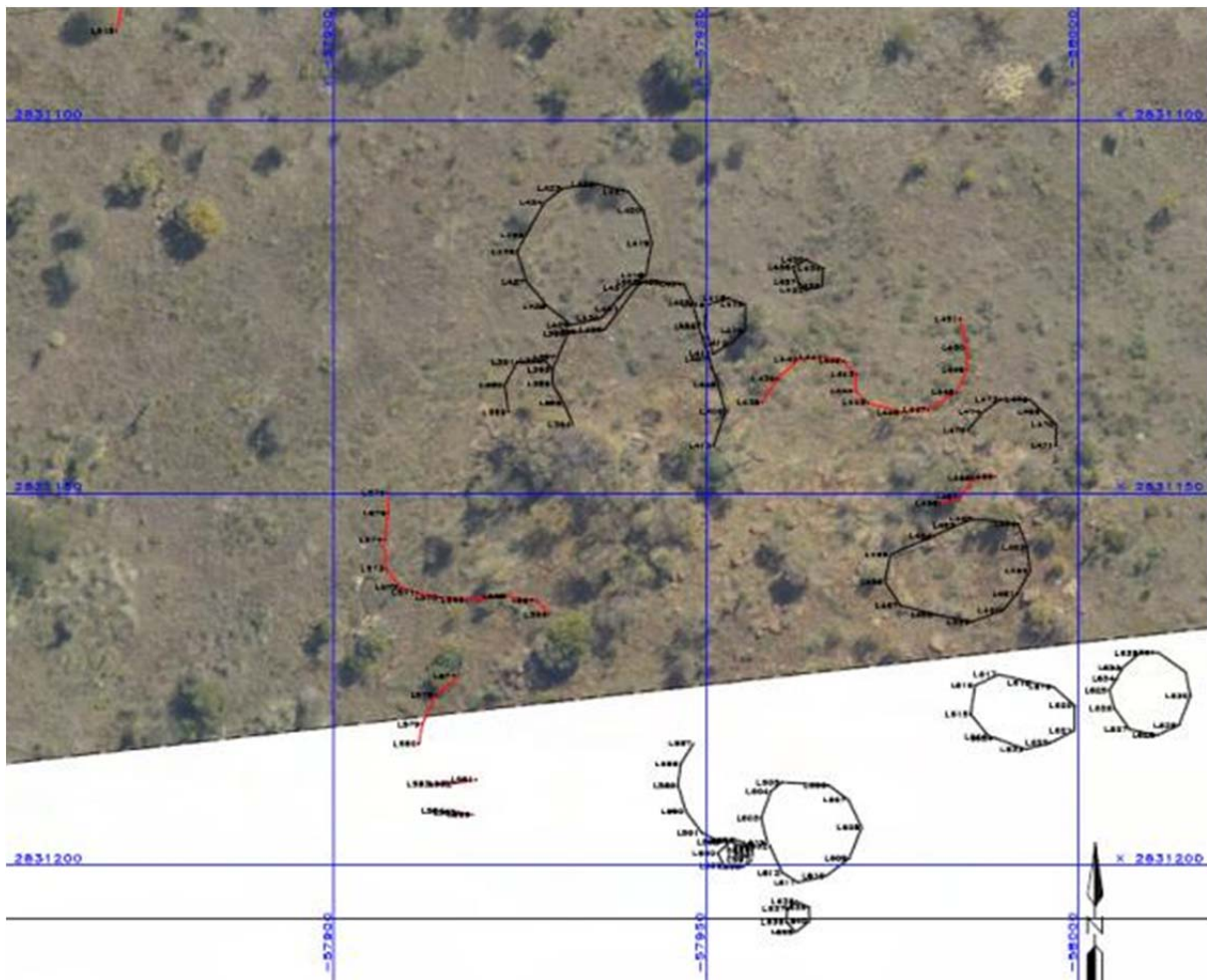


Figure 53- Site LIA05.4 is composed of six large enclosures and a number of walls. Part of the original site may have extended into the agricultural fields.



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).

6.3.3 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 & 58- Site LIA06 comprises a single enclosure which is located on the lower foot of a syentite protrusion. No function can be attributed to the site (above below).



6.3.4 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 59- 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 60 & 61- 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).



6.4 Tables

The archaeological sites in Rhovan was geo-referenced (Table 1) and these sites were also mapped (Figures 4 & 63).

Heritage resources	Coordinates
Site LIA01	25° 33.752's 27° 32.942'e (enclosure)
Site LIA02	25° 33.770's 27° 33.184'e (hut circles)
Site LIA03	25° 34.437's 27° 33.529'e (midden)
Site LIA04	25° 35.253's 27° 34.034'e (stone walls)
Site LIA05	25° 35.329's 27° 34.403'e (stone walls)
Site LIA06	25° 35.084's 27° 34.559'e (stone walls)
Site LIA07	25° 35 05.08's; 27° 34 47.84'e (stone walls)

Table 1- Coordinates for Late Iron Age sites on the western and southern perimeters of the X Strata Alloys Rhovan mining area.



Figure 62- The spatial location of the Late Iron Age sites along the northern and south-western perimeter of Rhovan near Berseba and Bethanië in the North-West Province (above).

7 THE SIGNIFICANCE, POSSIBLE IMPACT UPON AND THE MITIGATION OF THE HERITAGE RESOURCES

7.1 The significance of the heritage resources

All seven archaeological sites identified in the Rhovan mining area date from the Late Iron Age although some doubt exist as to whether Site MIA/LIA03, which have disappeared in an open pit, may have dated to the Middle Iron Age (Early Moloko). During the earlier survey which was done for Rhovan it was thought that Site MIA/LIA01, Site MIA/LIA02 and Site MIA/LIA03 may have dated from the Middle Iron Age. However, this updated heritage report which entailed a more thorough investigation of the archaeological sites, has confirmed that the first two sites date from the Late Iron Age. It is therefore possible that Site MIA/LIA03, which no longer exists, may also have dated from the Late Iron Age although no stone walls were found in association with this site.

All the archaeological sites (except Site MIA/LIA03) do not contain substantial archaeological deposits - as was thought when the initial survey was conducted in mid-summer when all the sites were covered with tall grass. Archaeological deposits are usually associated with material such as pottery, animal bone waste, charcoal, possible iron tools, etc.. These remains are highly significant as they enable archaeologists to interpret the meaning of Iron Age sites from the past.

Nevertheless, Site LIA01, Site LIA02 and Site LIA05 have high significance as the first two sites are clearly associated with specialist metal working such as possible iron smelting and even with the 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. Cattle kept at Site LIA5 may have been part of stock that were raided during the Batswana wars or when the Ndebele occupied the Rustenburg region (AD1828 to AD1837). Both metal working and cattle raiding are associated with conflict and with militarization and were practised by men who often lived in seclusion, away from women and children

and therefore in adapted military styled villages such as the Zulu's *ikhandla*. Metal working was also highly ritualised, associated with taboos and practised by specialists who amongst certain groups were shunned by other community members.

Sites LIA06 and Site LIA07 have little significance as these sites are simple in appearance whilst Site LIA07 has been affected by development activities in the past. Site MIA/LIA03 has been destroyed when the wall of an open pit collapsed. Nevertheless, these sites must have had some meaning within the overall context of the large number of Late Iron Age stone walled sites which occur in this part of the Central Bankeveld.

The significance of the sites in the Rhovan mining area can be rated as follow using the following criteria:

Site	Criteria (Values)	Rating: High (3) Medium (2) Low (3)	Mitigation measures Conserve (C) Expendable (E)
LIA01	Research	3	Conserve (C)
	Educational	3	
	Tourism	2	
	Aesthetic	2	
LIA02	Research	3	Conserve (C)
	Educational	3	
	Tourism	2	
	Aesthetic	2	
LIA04	Research	2	Expendable (E) Adequately documented
	Educational	2	
	Tourism	2	
	Aesthetic	2	
LIA05	Research	3	Conserve (C)
	Educational	3	
	Tourism	3	
	Aesthetic	3	
LIA06	Research	1	Expendable (E) Adequately documented
	Educational	1	
	Tourism	1	
	Aesthetic	1	

LIA07	Research	1	Expendable (E) Adequately documented
	Educational	1	
	Tourism	1	
	Aesthetic	1	

Table 2- Rating significance for heritage sites in the Rhovan mining area (above).

7.2 The impact on the heritage resources

Heritage remains are non-renewable resources and are protected by the National Heritage Resources Act (No 25 of 1999). This implies that no heritage resources may be affected by any development project *prior* to their investigation by an archaeologist accredited with ASAPA (Association for Southern African Professional Archaeologists) and before the necessary demolishing permits has been obtained from the South African Heritage Resources Authority (SAHRA).

The significant heritage sites (Site LIA01, LIA02 and Site LIA05) are located on the western perimeter of the Rhovan mining area. Although mining expansion may proceed westwards to where these heritage resources are located it is not expected that these sites will be impacted by expanding activities in the near future.

Site LIA06 and Site LIA07 occur in the immediate proximity where Rhovan is focussing some of their mining activities. These sites therefore may be affected by mining activities in the short, medium or long term.

7.3 Proposed mitigation measures

7.3.1 The significant heritage sites

Considering the fact that Sites LIA01, LIA02 and Site LIA05 are classified as significant it is recommended that the sites be conserved. However, if these sites are inevitable being threatened by expanding mining activities it is recommended that these sites are subjected to a Phase II investigation *prior* to them being affected by the expanding mining activities.

A Phase II investigation implies that a permit must be obtained from the SAHRA in order to conduct excavations of Sites LIA01, LIA02 and Site LIA05 before these sites are destroyed by any mining activities.

7.3.2 The non-significant heritage sites

Considering the fact that Sites LIA04, LIA06 and Site LIA07 are considered to be of low significance these sites can be destroyed by future mining activities as they have been adequately described and documented in this report.

7.4 Monitoring and auditing

Sites LIA01, Site LIA02 and Site LIA05 will not be affected by expanding mining activities during the short term. Consequently, these sites have to be monitored every six months to determine the state of preservation (condition) of these sites.

8 CONCLUSION AND RECOMMENDATIONS

The Phase I 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) in December 2005, 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.
- Three Late Iron Age sites located between granite knolls on the southern perimeter of the mining area (Site LIA04, Site LIA05 and Site LIA06).

These heritage sites were revisited, documented and re-assessed. A seventh site which was newly discovered was added to the inventory of sites which occur in the Rhovan mining area (Site LIA07). All the heritage sites were geo-referenced and mapped and their coordinates were tabulated (Figure 4; Table 1).

The significance of the heritage resources

All seven archaeological sites identified in the Rhovan mining area date from the Late Iron Age although some doubt exist as to whether Site MIA/LIA03, which have disappeared in an open pit, may have dated to the Middle Iron Age (Early Moloko). During the earlier survey which was done for Rhovan it was thought that Site MIA/LIA01, Site MIA/LIA02 and Site MIA/LIA03 may have dated from the Middle Iron Age. However, this updated heritage report which entailed a more thorough investigation of the archaeological sites, has confirmed that the first two sites date from the Late Iron Age. It is therefore possible that Site MIA/LIA03, which no longer exists, may also have dated from the Late Iron Age although no stone walls were found in association with this site.

All the archaeological sites (except Site MIA/LIA03) do not contain substantial archaeological deposits - as was thought when the initial survey was conducted in mid-summer when all the sites were covered with tall grass. Archaeological deposits are usually associated with material such as pottery, animal bone waste, charcoal, possible iron tools, etc.. These remains are highly significant as they enable archaeologists to interpret the meaning of Iron Age sites from the past.

Nevertheless, Site LIA01, Site LIA02 and Site LIA05 have high significance as the first two sites are clearly associated with specialist metal working such as possible iron smelting and even with the 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. Cattle kept at Site LIA5 may have been part of stock that were raided during the Batswana wars or when the Ndebele occupied the Rustenburg region (AD1828 to AD1837). Both metal working and cattle raiding are associated with conflict and with militarization and were practised by men who often lived in seclusion, away from women and children and therefore in adapted military styled villages such as the Zulu's *ikhandla*. Metal working was also highly ritualised, associated with taboos and practised by specialists who amongst certain groups were shunned by other community members.

Sites LIA06 and Site LIA07 have little significance as these sites are simple in appearance whilst Site LIA07 has been affected by development activities in the past. Site MIA/LIA03 has been destroyed when the wall of an open pit collapsed. Nevertheless, these sites must have had some meaning within the overall context of the large number of Late Iron Age stone walled sites which occur in this part of the Central Bankeveld.

The significance of the sites in Rhovan's mining area can be rated as follow using different criteria (Table 2).

The impact on the heritage resources

Heritage remains are non-renewable resources and are protected by the National Heritage Resources Act (No 25 of 1999). This implies that no heritage resources may be affected by any development project *prior* to their investigation by an archaeologist accredited with ASAPA (Association for Southern African Professional Archaeologists)

and before the necessary demolishing permits has been obtained from the South African Heritage Resources Authority (SAHRA).

The significant heritage sites (Site LIA01, LIA02 and Site LIA05) are located on the western perimeter of the Rhovan mining area. Although mining expansion may proceed westwards to where these heritage resources are located it is not expected that these sites will be impacted by expanding activities in the near future.

Site LIA06 and Site LIA07 occur in the immediate proximity where Rhovan is focussing some of their mining activities. These sites therefore may be affected by mining activities in the short, medium or long term.

Proposed mitigation measures

The significant heritage sites

Considering the fact that Sites LIA01, LIA02 and Site LIA05 are classified as significant it is recommended that the sites be conserved. However, if these sites are inevitable being threatened by expanding mining activities it is recommended that these sites are subjected to a Phase II investigation *prior* to them being affected by the expanding mining activities.

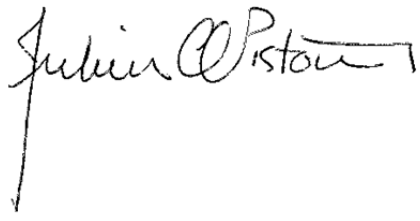
A Phase II investigation implies that a permit must be obtained from the SAHRA in order to conduct excavations of Sites LIA01, LIA02 and Site LIA05 before these sites are destroyed by any mining activities.

The non-significant heritage sites

Considering the fact that Sites LIA04, LIA06 and Site LIA07 are considered to be of low significance these sites can be destroyed by future mining activities as they have been adequately described and documented in this report.

Monitoring and auditing

Sites LIA01, Site LIA02 and Site LIA05 will not be affected by expanding mining activities during the short term. Consequently, these sites have to be monitored every six months to determine the state of preservation (condition) of these sites.

A handwritten signature in black ink, reading "Julius CC Pistorius". The signature is written in a cursive style with a long vertical line extending downwards from the 'J'.

DR JULIUS CC PISTORIUS

Archaeologist & Heritage Consultant

Member of ASAPA

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APPENDIX A: DETAILS OF THE SPECIALIST

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

Qualifications:

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

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

MA Archaeology (distinction) (UP, 1985)

D Phil Archaeology (UP, 1989)

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

Work experience:

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

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

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

Independent Archaeologist and Heritage Consultant (2003-)

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

Summary: Julius Pistorius is a qualified archaeologist and heritage specialist with extensive experience as a university lecturer, museum scientist, researcher and heritage consultant. His research focussed on the Late Iron Age Tswana and Lowveld-Sotho (particularly the Bamalatji of Phalaborwa). He has published a book on early Tswana settlement in the North-West Province and has completed an unpublished manuscript on the rise of Bamalatji metal workings spheres in Phalaborwa during the last 1 200 years. He has excavated more than twenty LIA settlements in North-West and twelve IA settlements in the Lowveld and has mapped hundreds of stone walled sites in the North-West. He has written a guide for Eskom's field personnel on heritage management. He has published twenty scientific papers in academic journals and several popular articles on archaeology and heritage matters. He collaborated with environmental companies in compiling State of the Environmental Reports for Ekurhuleni, Hartebeespoort and heritage management plans for the Magaliesberg and Waterberg. Since acting as an independent consultant he has done approximately 800 large to small heritage impact assessment reports. He has a longstanding working relationship with Eskom, Rio Tinto (PMC), Rio Tinto (EXP), Impala Platinum, Angloplats (Rustenburg), Lonmin, Sasol, PMC, Foskor, Kudu and Kelgran Granite, Bafokeng Royal Resources etc. as well as with several environmental companies.

APPENDIX B: DECLARATION OF INDEPENDENCE

I, Julius CC Pistorius, declare that:

- I act as the independent environmental practitioner in this application
- I will perform the work relating to the application in an objective manner, even if this results in views and findings that are not favourable to the applicant
- I declare that there are no circumstances that may compromise my objectivity in performing such work;
- I have expertise in conducting environmental impact assessments, including knowledge of the National Heritage Resources Act (No 25 of 1999) and any guidelines that have relevance to the proposed activity;
- I will comply with the Act, regulations and all other applicable legislation;
- I will take into account, to the extent possible, the matters listed in regulation 8 of the regulations when preparing the application and any report relating to the application;
- I have no, and will not engage in, conflicting interests in the undertaking of the activity;
- I undertake to disclose to the applicant and the competent authority all material information in my possession that reasonably has or may have the potential of influencing - any decision to be taken with respect to the application by the competent authority; and - the objectivity of any report, plan or document to be prepared by myself for submission to the competent authority;
- I will ensure that information containing all relevant facts in respect of the application is distributed or made available to interested and affected parties and the public and that participation by interested and affected parties is facilitated in such a manner that all interested and affected parties will be provided with a reasonable opportunity to participate and to provide comments on documents that are produced to support the application;
- I will ensure that the comments of all interested and affected parties are considered and recorded in reports that are submitted to the competent authority in respect of the application, provided that comments that are made by interested and affected parties in respect of a final report that will be submitted to the competent authority may be attached to the report without further amendment to the report;
- I will keep a register of all interested and affected parties that participated in a public participation process; and
- I will provide the competent authority with access to all information at my disposal regarding the application, whether such information is favourable to the applicant or not
- all the particulars furnished by me in this form are true and correct;
- I will perform all other obligations as expected from an environmental assessment practitioner in terms of the Regulations; and
- I realise that a false declaration is an offence in terms of regulation 71 and is punishable in terms of section 24F of the Act.

Disclosure of Vested Interest

I do not have and will not have any vested interest (either business, financial, personal or other) in the proposed activity proceeding other than remuneration for work performed in terms of the Environmental Impact Assessment Regulations, 2010.



Signature of the environmental practitioner:
Private Consultant

Name of company:
30 September 2013

Date:

Signature of the Commissioner of Oaths:

Date:

Designation: