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 RHOVAN OPERATIONS
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**PREPARED FOR:
XSTRATA ALLOYS RHOVAN**

**A PHASE-I HERITAGE IMPACT ASSESSMENT (HIA) STUDY
FOR XSTRATA ALLOYS - RHOVAN LOCATED IN THE
CENTRAL BANKEVELD OF THE NORTH-WEST PROVINCE OF
SOUTH AFRICA**

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EXECUTIVE SUMMARY

A 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 near Brits (Madibeng) in the Central Bankeveld of the North-West Province of South Africa. The aims with the HIA study were to establish if any of the types and ranges of heritage resources (the 'national estate') as outlined in the National Heritage Resources Act, 1999 (Act No 25 of 1999) do occur in the project areas (see Box 1).

The HIA study revealed the presence of Middle/Late Iron Age (Early Moloko Tradition) sites (Site MIA/LIA01, Site MIA/LIA02, Site MIA/LIA03) and three Late Iron Age sites (Site LIA04, Site LIA05, Site LIA06), respectively in the western and southern parts of the Xstrata Alloys Rhovan mining (peripheral) area.

Middle Iron Age (Early Moloko) sites in the North-West Province have not been studied thoroughly in the past. Only a few of these sites have been recorded in the Gauteng, North-West and Limpopo Provinces. No Early Moloko sites in particular have yet been found in the Central Bankeveld near Brits and Marikana. Sites MIA/LIA01, MIA/LIA02 and MIA/LIA03 therefore can be considered to be of high significance considering their rare occurrence, research value and the pristine nature of these sites.

The Late Iron Age sites contain substantial archaeological deposits 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. All three Late Iron Age sites therefore have research value. These sites also have cultural historical significance as they were probably occupied by Tswana clans whose descendants are still living in the Central Bankeveld. The sites are also in a pristine (unaffected) condition and therefore aesthetically pleasing. Site LIA04, Site LIA05 and Site LIA06 therefore can also be considered to be of outstanding significance.

The Middle/Late Iron Age sites (Sites MIA/LIA01, MIA/LIA02, MIA/LIA03) are located on the western perimeter of the Xstrata Alloys Rhovan mining area. Mining expansion is currently proceeding westwards towards these heritage sites. It is therefore possible that these sites may be impacted (destroyed) by mining expanding in the near future.

The Late Iron Age sites (Sites LIA04, LIA05, LIA06) occur on the southern perimeter of the Xstrata Alloys Rhovan mining area where no mining activities are planned in the short, medium or long term. These sites therefore need not to be affected by any mining development in the immediate or distant future.

Heritage remains are non-renewable resources and are protected by the National Heritage Resources Act (No 25 of 1999). Archaeological sites may not be destroyed before the necessary authorisation (permit) has been received from the North West Provincial Heritage Resources Authority (NW PHRA). Such a permit would also allow for Site MIA/LIA01, Site MIA/LIA02 and Site MIA/LIA03 to be subjected to a Phase-II investigation *prior* to their destruction by mining activities. Such a permit must be obtained by an archaeologist accredited with the Association of Southern African Professional Archaeologists (ASAPA).

A Phase-II investigation of Site MIA/LIA01, Site MIA/LIA02 and Site MIA/LIA03 implies that certain mitigation measures have to be undertaken before these sites may be destroyed by mining activities. These measures have been outlined in the report, whilst a cost estimate and a time line scheduling the completion of the work, were prepared for the EMP document.

The Late Iron Age sites (LIA04, LIA05, LIA06) need not to be affected by mining development in the short, medium or long term. Other possible uses for these sites, although not a legal requirement, are their utilization in educational programmes or in the tourism industry. Such ventures will enable Xsrata Alloys Rhovan to achieve excellence in the field of heritage conservation. These sites have to be monitored on an annual basis during which time checklists have to be completed detailing the state of preservation of these sites.

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1 INTRODUCTION

Focused archaeological research has been conducted in the Central Bankeveld of the North-West Province for at least four decades. This research consists of surveys and of excavations of Stone Age and Iron Age sites as well as of the recording of rock art sites and historical remains in the area.

Ecologically speaking, the Central Bankeveld is located between the northern savannah and the grass veldt of the highveld further to the south. This area has a rich heritage consisting of remains dating from both the prehistoric and the colonial periods of South Africa. These archaeological and historical remains include:

- Stone Age sites which may be associated with the San people and which date back hundreds of thousands of years;
- rock engraving sites along rocky outcrops dating from the last 20 000 years;
- a limited number of rock painting sites in the Magaliesberg and Pilanesberg which date from the last 10 000 years;
- Early Iron Age sites occupied by Bantu-Negroid agriculturists and possibly cattle herders which date back 1 500 years;
- Late Iron Age sites dating from the last 500 years;
- remains dating from the previous century when the first Immigrant Boers settled in various places to the north of the Magaliesberg from the 1838's onwards;
- block houses built by British troops during the Anglo-Boer War (1899-1900) on the Magaliesberg mountain range; and
- numerous other formal historical structures, remains and features.

Heritage resources in the North-West Province therefore constitute a rich and wide 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).

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

The National Heritage Resources Act (Act No 25 of 1999, Section 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 paleontological 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 Tissue Act, 1983 (Act No 65 of 1983)
- (h) sites of significance relating to the history of slavery in South Africa;
- (i) moveable objects, including -
 - (i) objects recovered from the soil or waters of South Africa, including archaeological and paleontological 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;
- (b) its possession of uncommon, rare or endangered aspects of South Africa's natural or cultural heritage;
- (c) its potential to yield information that will contribute to an understanding of South Africa's natural or cultural heritage;
- (d) 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) 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

2 TERMS OF REFERENCE

Xstrata Alloys Rhovan is currently updating their Environmental Management Programme. Consequently, Xstrata Alloys Rhovan commissioned the author of this report to undertake a Phase-I Heritage Impact Assessment (HIA) study of the Xstrata Alloys Rhovan project area with the following aims:

- to establish whether any of the types and ranges of heritage resources as outlined in the National Heritage Resources Act, 1999 (Act No 25 of 1999) occur within the perimeters of Xstrata Alloys Rhovan project area and, if so;
- to determine the level (or degree) of significance of these heritage resources; and
- to make recommendations regarding the mitigation or the conservation of these heritage resources if they are to be affected by any mining or other developmental activities.

3 THE PROJECT AREA

3.1 Location

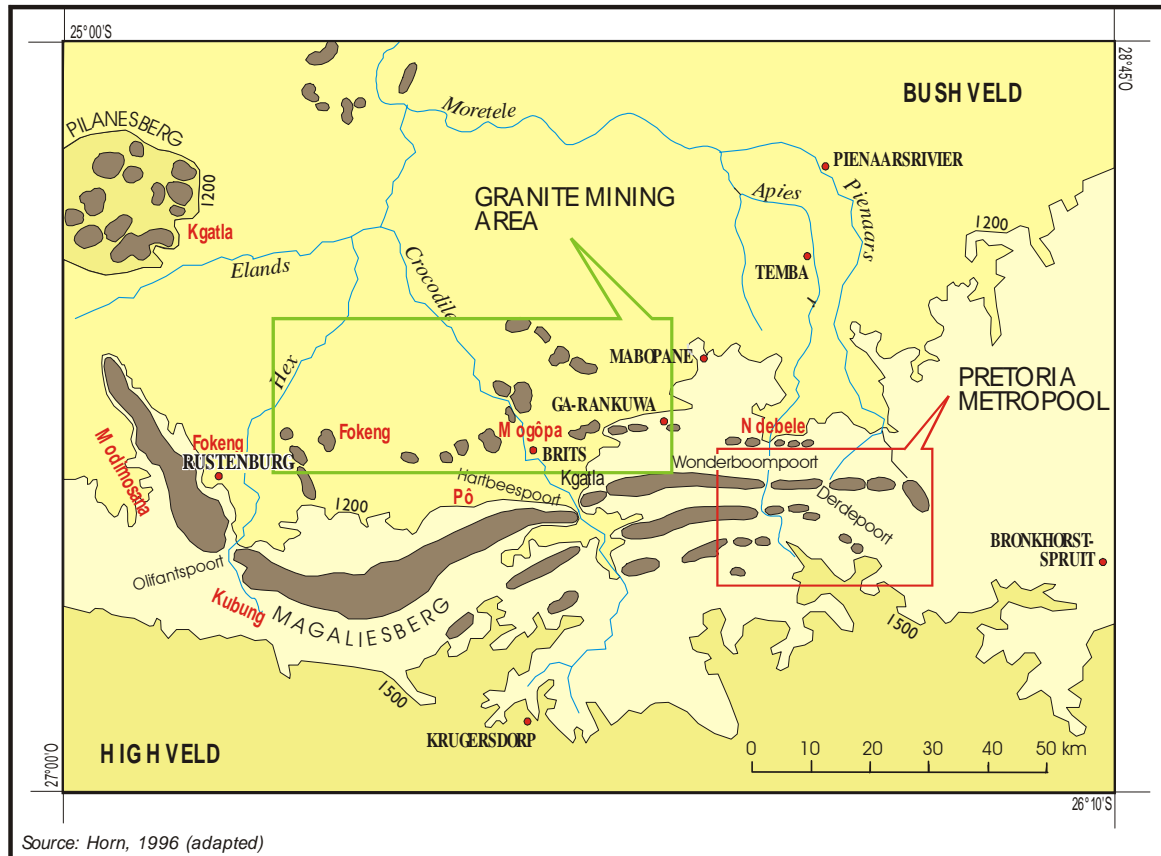
Xstrata Alloys Rhovan is located between the towns of Brits (Madibeng) and Marikana in the Central Bankeveld of the North-West Province of South Africa. The mining infrastructure is located on a rather featureless landscape to the north of the series of granite kopjes running from Pretoria in the east to the Pilanesberg in the north-west (Figure 1) (1:50 000; 2527DA Wolhuterskop).

3.2 On the fringes of a cultural landscape

Xstrata Alloys Rhovan mining and project areas cover parts of the previous Bophuthatswana homeland where large numbers of archaeological sites, representing numerous Tswana spheres of influence dating from the last four hundred years have been discovered during archaeological surveys in the recent past (see Part 9, 'Select Bibliography'). This time period is also referred to as the Late Iron Age.

It is therefore necessary that the archaeological and historical significance of this cultural landscape be described and explained in more detail before the results of the Phase-I HIA study is discussed (see Part 5).

Figure 1 - The Central Bankeveld is characterised by a conspicuous chain of granite hills where the heritage of numerous ancient Tswana chiefdoms which emerged in this fertile eco-zone existed during the last four centuries (adapted from Horn 1996).



4 METHODOLOGY

4.1 Method

This survey was conducted by means of consulting archaeological data bases; doing a survey on foot of the project area; studying maps of the project area and by means of utilizing evidence derived from numerous previous surveys and excavations done by the author in the Central Bankeveld during the past two decades.

- Archaeological data bases kept at institutions such as African Window and the South African Heritage Resources Authority (SAHRA) (Cape Town [national] and Mafekeng [provincial]) were consulted to establish if any heritage resources of significance occur in or near the project area.
- Selected spots in the project area were surveyed on foot as time restrictions would not allow for an in-depth foot survey of the total mining area.
- The 1: 50 000 and 1: 250 000 maps were also used to study the project area.
- Large areas to the south of Xstrata Alloys Rhovan have been surveyed by the author in the past. Numerous sites have been recorded and at least twenty sites have been excavated (See Part 9, 'Select Bibliography').

4.2 Assumptions and limitations

It is possible that this HIA study may have missed heritage resources in the project area as heritage remains may occur in thick clumps of vegetation while others may lie below the surface of the earth and may only be exposed once development (such as mining) commences.

4.3 Some remarks on terminology

Box 2. Terminologies that may be used in this report

The Heritage Impact Assessment (HIA) referred to in the title of this report includes a survey of heritage resources as outlined in the National Heritage Resources Act, 1999 (Act No 25 of 1999) (See Box 1).

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.

The term '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 Brits, Marikana and Rustenburg areas by the first Colonists who settled in this area during the 1830's.

The term 'relatively 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.

It is not always possible, based on observations alone, to distinguish clearly between archaeological remains and historical remains, or between historical remains and remains from the relatively recent past. Although certain criteria may help to make this distinction possible, these criteria are not always present, or, when they are present, they are not always clear enough to interpret with great accuracy. Criteria such as square floor plans (a historical feature) may serve as a guideline. However, circular and square floors may occur together on the same site.

The term 'sensitive remains' is sometimes used to distinguish graves and cemeteries as well as ideologically significant features such as holy mountains, initiation sites or other sacred places. Graves in particular are not necessarily heritage resources if they date from the recent past and do not have head stones that are older than sixty years. The distinction between 'formal' and 'informal' graves in most instances also refers to graveyards that were used by colonists and by indigenous people. This distinction may be important as different cultural groups may uphold different traditions and values with regard to their ancestors. These values have to be recognised and honoured whenever graveyards are exhumed and relocated.

The term '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 200 years ago).

The term 'Late Iron Age' refers to the period between the 17th century and the 19th century and can therefore include the historical period.

Mining heritage sites refer to old, abandoned mining activities, underground or on the surface, which may date from the pre-historical, historical or the relatively recent past.

The term 'study area', or 'project area' refers to the area 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 of heritage resources in any given 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 bodies and the relocation of graveyards, etc. Phase II work may require the input of specialists and requires the co-operation and approval of SAHRA.

5 CONTEXTUALISING THE PROJECT AREA

5.1 The Central Bankeveld

Xstrata Alloys 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 gabbro 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 (Figures 1 & 2).

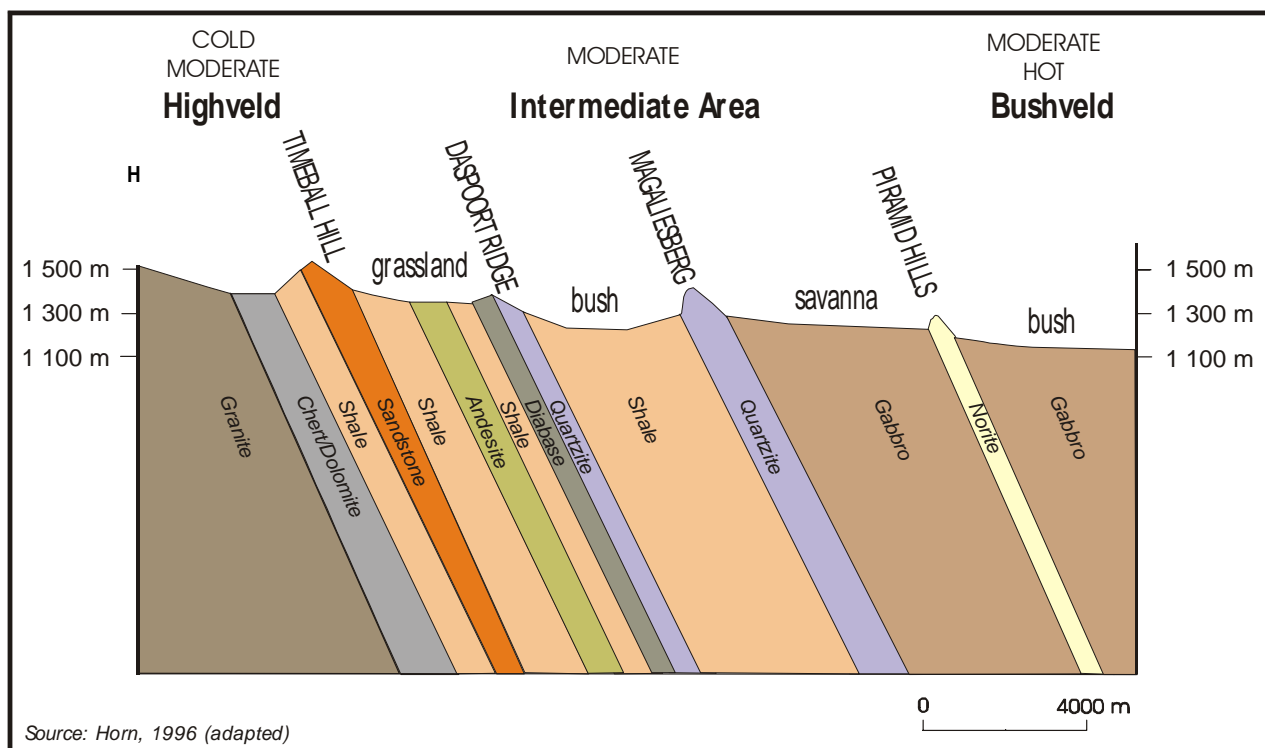


Figure 2 - The topography, geology and climatic features of the Central Bankeveld where Late Iron Age Tswana spheres of influence flourished during the last four centuries (adapted from Horn, 1996).

5.2 Pre-historical context

Xstrata Alloys Rhovan mining area is located to the north of the Magaliesberg which is known for its rich and diverse range of heritage resources. 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 1840.

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 were the Kwena Môngôpa and the Kwena Môngale (Bapô) in close proximity of the Xstrata Alloys Rhovan 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. The Kgatla were subjected by Mzilikazi and were used as labourers to build one of the Ndebele's villages, probably known as emHlalandlela.

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 Xstrata Alloys Rhovan. One of their capitals was Tlhôgôkgôlô (Wolhuterskop). Several of the chiefs of this clan were known by the name of Môngale. The name of the Magalies Mountains (Magaliesberg) was derived from the name Môngale.

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 Môngôpa, 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.

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.

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.

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. One year later, in December 1836, Cornwallis Harris also visited the Central Bankeveld where he painted emHlalandlela near Brits.

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.

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 the Xstrata Alloys Rhovan mining area.

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 adjacent to the study 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.

Xstrata Alloys Rhovan 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 can not be smelted in a blast furnace as can ordinary iron ores since titanium carbides and nitrites 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. Xstrata Alloys' predecessor, Rhovan came on stream in 1995.

6 THE HERITAGE IMPACT ASSESSMENT (HIA) STUDY

6.1 Types and ranges of heritage resources discovered

The HIA study of the Xstrata Alloys Rhovan project area revealed the following types and ranges of heritage resources in the western and southern parts of the mining (peripheral) area:

- A single, isolated stone walled enclosure that may date from the MIA and/or Late Iron Age (Site MIA/LIA01).
- Approximately forty hut foundations consisting of upright stones spatially organised on a circular ground plan (Site MIA/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 geo-referenced and mapped while their coordinates were tabulated (Figure 3; Table 1). These sites are now briefly discussed.

Heritage resources	Coordinates	Level of significance
Site MIA/LIA01	25° 33.752'; 27° 32.942' (enclosure)	HIGH
Site MIA/LIA02	25° 33.770'; 27° 33.184' (hut circles)	HIGH
Site MIA/LIA03	25° 34.437'; 27° 33.529' (midden)	HIGH
Site LIA04	25° 35.253'; 27° 34.034' (stone walls)	HIGH
Site LIA05	25° 35.329'; 27° 34.403' (stone walls)	HIGH
Site LIA06	25° 35.084'; 27° 34.559' (stone walls)	HIGH

Table 1 - Coordinates for Middle and Late Iron Age sites on the western and southern perimeters of the Xstrata Alloys Rhovan mining (peripheral) area. Also note the significance of these heritage resources.

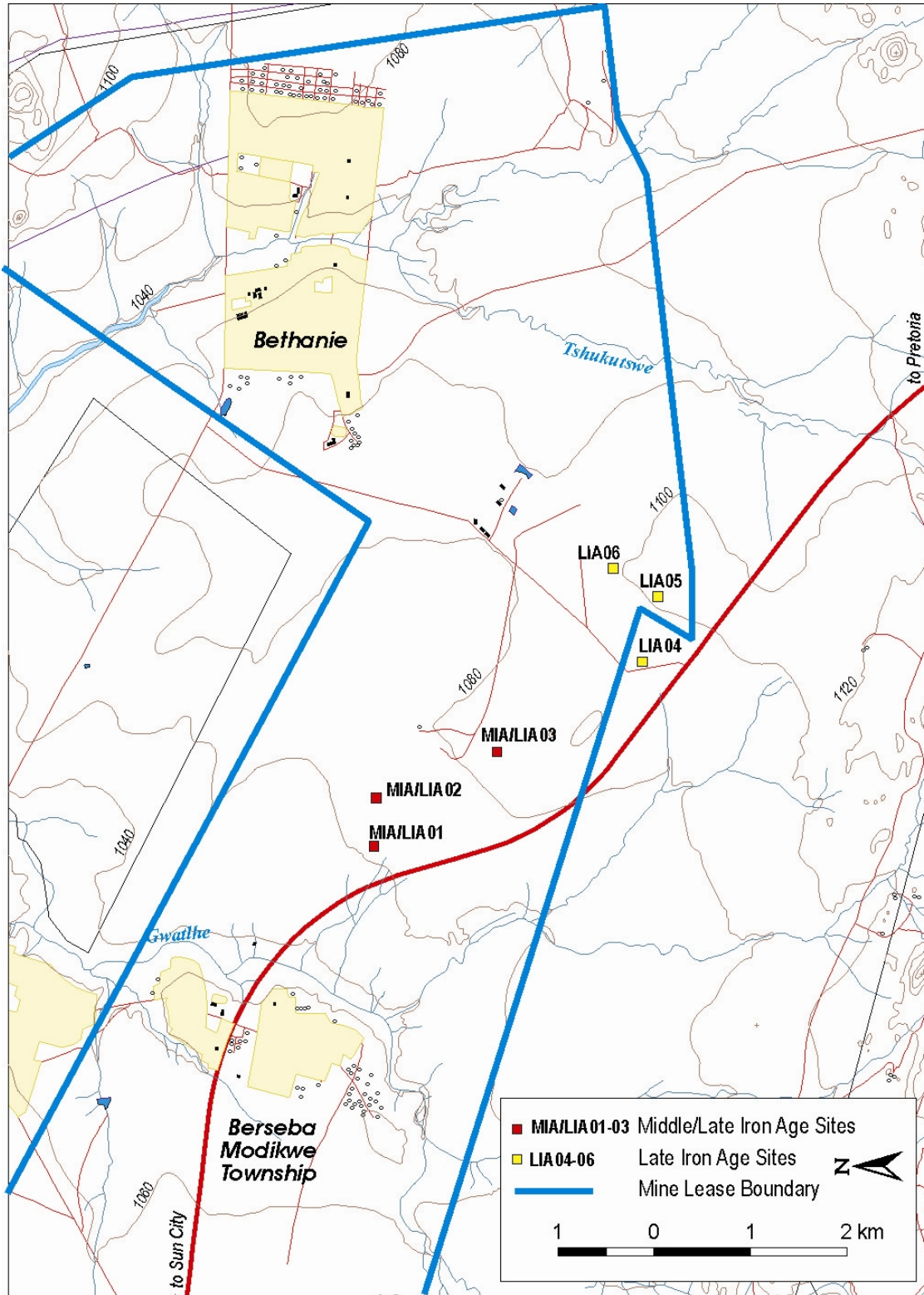


Figure 3- X Strata Alloys Rhovan mining area in the Central Bankeveld of the North-West Province. Note the presence of Middle/Late Iron Age sites (Site MIA/LIA01 to Site MIA/LIA03) and three Late Iron Age sites (Site LIA04 to Site LIA06) on the western and southern perimeters (peripheral area) of the mining area.

6.2 The western perimeter of Xstrata Alloys Rhovan

Three structures and features occur near the western perimeter of the Xstrata Alloys Rhovan mining area, namely:

- A single isolated stone walled enclosure (Site MIA/LIA01).
- Approximately forty hut foundations (Site MIA/LIA02).
- A substantial midden and a possible site associated with the midden (Site MIA/LIA03).

These structures and features are now discussed and illustrated with photographs.

6.2.1 The single enclosure

A single stone walled enclosure measuring approximately 70m in diameter and associated with a low granite protrusion occurs on level terrain some distance to the west of the Xstrata Alloys Rhovan mining area. This enclosure was designated Site MIA/LIA01 as it may date from either the Middle or the Late Iron Age.

Site MIA/LIA01 may have served as the outer boundary wall for a village in which residences (huts) may have been constructed. The enclosure is not associated with any visible archaeological deposit or with any archaeological material such as potsherds.

6.2.2 The 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.

These upright stone circles, each with an opening and measuring approximately 1,5m in diameter, were the foundations of huts and represent a small village, approximately 50m in diameter. The central open part of the village which is embraced by the stone circles may have served as a space in which a cattle enclosure with walls constructed with a wooden stockade may have been erected.

This site was designated Site MIA/LIA02 and may date from the Middle Iron Age or the Late Iron Age.



Figure 4 - One of approximately forty stone circles (hut foundations) constructed with upright stones around a central open space (above).

6.2.3 The midden and possible associated site

A substantial midden and possible associated site measuring approximately 35m in diameter and designated Site MIA/LIA03 occur to the west of a magnetite outcrop (Figure 5). The midden is associated with potsherds, some of which have multi-chrome panels and comb stamp decoration. These potsherds may date from the Middle Iron Age (Early Moloko Tradition).

It is possible that the midden and associated deposit may have existed into the Late Iron Age although the remains are not associated with any stone walls. (Middle Iron Age sites are usually without stone walls whilst Late Iron Age sites are mostly characterised by stone walling).



Figure 5 - The Middle/Late Iron Age midden (Site MIA/LIA03) near the western perimeter of Xstrata Alloys Rhovan mining area. (Mr. Tony Mills, the resident mine geologist, is kneeling on top of the midden).

6.3 The southern perimeter of Xstrata Alloys Rhovan

At least three Late Iron Age sites are located between granite outcrops on the southern perimeter of Xstrata Alloys Rhovan mining area. These sites were designated Site LIA04, Site LIA05 and Site LIA06 (Figures 6, 7 & 8).

6.3.1 The Late Iron Age sites

Site LIA04 and Site LIA05 cover large surfaces and were established between granite protrusions which can be described as small, low-rising granite kopjes. Site LIA04 is slightly smaller than Site LIA05 which is composed of several components (terraces) that are located on slightly different levels between the granite protrusions in this cluster.

Both these sites are associated with undecorated pottery, middens, low stone walls and possible residential deposits. Both sites are also in a pristine condition (Figures 6 & 7).

Site LIA06 is located some distance to the north of Site LIA04 and Site LIA05. This site is associated with two low kopjes – one composed of vanadium and the other of granite. The remains on this site are limited to rudimentary stone lines close to the granite kopje and a few scattered undecorated potsherds (Figure 8).

Site LIA06 is in a pristine condition.



Figure 6 - Site LIA04 is located to the north of a small granite protrusion. The thick short grass cover serves as an ecological indicator of a substantial archaeological deposit which collected next to the granite protrusion .



Figure 7 - Site LIA05 is located on various terraces between granite knolls and covers a substantial surface.



Figure 8 - An upright line of stones (foreground) associated with Site LIA06.

7 IMPACT OF THE DEVELOPMENT ON THE HERITAGE RESOURCES

7.1 Heritage resources in the project area

The following types and ranges of heritage resources were discovered in the western and southern parts of the Xstrata Alloys Rhovan mining (peripheral) area (Figure 3):

- A single, isolated stone walled enclosure that may date from the MIA and/or Late Iron Age (Site MIA/LIA01).
- Approximately forty hut foundations consisting of upright stones spatially organised on a circular ground plan (Site MIA/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).

7.2 The significance of the heritage resources

Heritage remains are non-renewable resources and are protected by the National Heritage Resources Act (No 25 of 1999) which determines that no heritage resources may be affected by any development before the necessary permission (permits) has been obtained from the North West Provincial Heritage Resources Authority (NW PHRA).

As the heritage resources in the Xstrata Alloys Rhovan mining area may be affected by mining activities in the medium or long term the significance of the heritage resources have been established in order to determine whether these sites are worth conserving for the future (Table 1).

7.2.1 The Middle/Late Iron Age sites

Middle Iron (Early Moloko Tradition) sites in the North-West Province have not yet been studied thoroughly. Only a few of these sites have been recorded near the Hartebeestpoort Dam, Rustenburg, Marico and at Rooiberg near Bela Bela. No Early Moloko sites have yet been found in the Central Bankeveld near Brits or Marikana.

The three Middle/Late Iron Age sites (Site MIA/LIA01, Site MIA/LIA02, Site MIA/LIA03) therefore can be considered to be of high significance considering their rare occurrence, research value and the pristine nature of these sites.

7.2.2 The Late Iron Age sites

The Late Iron Age sites between the granite protrusions contain substantial archaeological deposits 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. All three Late Iron Age sites therefore have research value.

All three Late Iron Age sites also have cultural historical significance as they were probably occupied by Tswana clans whose descendants are still living in the Central Bankeveld. The sites are also in a pristine (unaffected) condition and therefore aesthetically pleasing.

7.3 The impact on the heritage resources

The Middle/Late Iron Age sites (Site MIA/LIA01, MIA/LIA02, MIA/LIA03) are located on the western perimeter of the Xstrata Alloys Rhovan mining area. Mining expansion is currently proceeding westwards to where these heritage resources are located. It is therefore possible that these sites may be impacted (destroyed) by these expanding activities in the near future.

The Late Iron Age sites (Site LIA04, Site LIA05, Site LIA06) occur on the southern perimeter of the Xstrata Alloys Rhovan mining area where no mining activities are planned in the short, medium or long term. These sites therefore need not to be affected by any mining development in the immediate or distant future.

8 PROPOSED MANAGEMENT MEASURES

Any impact on Site MIA/LIA01, Site MIA/LIA02 and Site MIA/LIA03 will be a transgression of the South African Heritage Resources Act (Act 25 of 1999). Archaeological sites may not be destroyed before the necessary authorisation has been received from the North West Provincial Heritage Resources Authority (NW PHRA). Such a permit would also allow for the sites to be subjected to a Phase-II investigation before they may be destroyed by mining activities.

Considering the fact that these sites are being classified as highly significant it is recommended that the sites be subjected to a Phase-II investigation *prior* to them being affected (destroyed) by expanding mining activities.

A Phase-II investigation implies that the following activities must be undertaken:

- A desk top study of the Iron Age archaeology of the Central Bankeveld to be done.
- Applying for a permit from the NW PHRA allowing for the destruction of the sites (after the sites have been subjected to a Phase-II investigation).
- The sites must be cleared from vegetation.
- The sites must be mapped.
- Test (small) excavations have to be conducted in some of the spatial components of the sites.
- Archaeological material retrieved from the sites must be cleaned and analysed in laboratories and then stored in a museum's store room.
- A report tabling the findings of the Phase-II investigations must be prepared for the NW PHRA.

The Late Iron Age sites (LIA04, LIA05, LIA06) need not to be affected by mining development in the short, medium or long term. Other possible uses for these sites, although not a legal requirement are their utilization in educational programmes or for tourism purposes. Such ventures can promote Xstrata Alloys Rhovan's chances to achieve excellence in the field of heritage conservation.

9 MONITORING AND AUDITING

As the Late Iron Age sites (Site LIA04, Site LIA05, Site LIA06) will be left unaffected by Xstrata Alloys Rhovan mining activities in the short, medium or long term, these sites have to be monitored on an annual basis during which checklists have to be completed detailing the state of preservation of these sites.

10 CONCLUSION AND RECOMMENDATIONS

A 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 near Brits (Madibeng) in the Central Bankeveld of the North-West Province of South Africa. The aims with the HIA study were to establish if any of the types and ranges of heritage resources (the 'national estate') as outlined in the National Heritage Resources Act, 1999 (Act No 25 of 1999) do occur in the project areas (see Box 1).

The HIA study revealed the presence of Middle/Late Iron Age sites (Early Moloko Tradition) (Site MIA/LIA01, Site MIA/LIA02, Site MIA/LIA03) and three Late Iron Age sites (Site LIA04, Site LIA05, Site LIA06) respectively in the western and southern parts of the Xstrata Alloys Rhovan mining (peripheral) area.

Middle Iron Age (Early Moloko) sites in the North-West Province have not been studied thoroughly in the past. Only a few of these sites have been recorded in the Gauteng, North-West and Limpopo Provinces. No Early Moloko sites in particular have yet been found in the Central Bankeveld near Brits and Marikana. Sites MIA/LIA01, MIA/LIA02 and MIA/LIA03 therefore can be considered to be of high significance considering their rare occurrence, research value and the pristine nature of these sites.

The Late Iron Age sites contain substantial archaeological deposits 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. All three Late Iron Age sites therefore have research value. These sites also have cultural historical significance as they were probably occupied by Tswana clans whose descendants are still living in the Central Bankeveld. The sites are also in a pristine (unaffected) condition and therefore aesthetically pleasing. Site LIA04, Site LIA05 and Site LIA06 therefore can also be considered to be of outstanding significance.

The Middle/Late Iron Age sites (Site MIA/LIA01, MIA/LIA02, MIA/LIA03) are located on the western perimeter of the Xstrata Alloys Rhovan mining area. Mining expansion is currently proceeding westwards towards these heritage sites. It is therefore possible that these sites may be impacted (destroyed) by mining expanding in the near future.

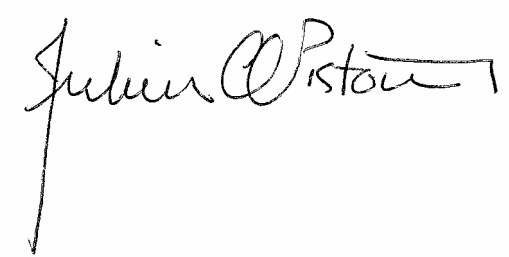
The Late Iron Age sites (Site LIA04, Site LIA05, Site LIA06) occur on the southern perimeter of the Xstrata Alloys Rhovan mining area where no mining activities are planned in the short, medium or long term. These sites therefore need not to be affected by any mining development in the immediate or distant future.

Heritage remains are non-renewable resources and are protected by the National Heritage Resources Act (No 25 of 1999). Archaeological sites may not be destroyed before the necessary authorisation (permit) has been received from the North West Provincial Heritage Resources Authority (NW PHRA). Such a permit would also allow for Site MIA/LIA01, Site MIA/LIA02 and Site MIA/LIA03 to be subjected to a Phase-II investigation *prior* to their destruction by mining activities. Such a permit must be obtained by an archaeologist accredited with the Association of Southern African Professional Archaeologists (ASAPA).

A Phase-II investigation of Site MIA/LIA01, Site MIA/LIA02 and Site MIA/LIA03 implies that the certain mitigation measures have to be undertaken before these sites may be destroyed by mining activities. These measures have been outlined in the report.

The Late Iron Age sites (LIA04, LIA05, LIA06) need not to be affected by mining development in the short, medium or long term. Other possible uses for these sites, although not a legal requirement, are their utilization in educational programmes or in the tourism industry. Such ventures will enable Xstrata Alloys Rhovan to achieve excellence in the field of heritage conservation. These sites have to be monitored on an annual basis during

which time checklists have to be completed detailing the state of preservation of these sites.

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

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11 SELECT BIBLIOGRAPHY

Horn, A. C. 1996. Okkupasie van die Bankeveld voor 1840 n.C.: 'n sintese. *Suid Afrikaanse Tydskrif vir Etnologie*. 19(1):17-27.

Harris, C. 1963. *The wild sports of Southern Africa*. London:John Murray.

Lye, W.F. (ed.) 1975. *Andrew Smith's journal of his expedition into the interior of South Africa, 1834-1836*. Cape Town:Balkema.

Mining and metallurgy in South Africa. A pictorial history. 19994. Published by Mintek in association with Phase 4.

Pistorius, J.C.C. 1995. Rathateng and Mabyanamatsywaana: cradles of the Kwena and Kgatla. *South African Journal of Ethnology*. 18(2). pp49-62.

Pistorius, J.C.C. 1997. The Matabele village which eluded history, Part I. *South African Journal of Ethnology*. 20(1). pp26-38.

Pistorius, J.C.C. 1997. The Matabele village which eluded history, Part II. *South African Journal of Ethnology*. 20(2). pp43-55.

Pistorius, J.C.C. 1997. Mmatshetshele, the settlement of a displaced group in the Bankeveld. *South African Journal of Ethnology*. 20(4). pp191-206.

Pistorius, J.C.C. 1998. EmHlalandlela, a Matabele settlement in the Bankeveld. *South African Journal of Ethnology*. 21(2). pp55-65.

Pistorius, J.C.C., Steyn, M. & Nienaber, W.C. 1998. Two burials from Makgope, a Late Iron Age Batswana settlement in the Bankeveld. *South African Journal of Ethnology*. 21(3). pp115-124.

Pistorius, J.C.C. 2000. New Late Iron Age spatial identities in the Bankeveld. *South African Journal of Ethnology*. 23 (4),150-163.

Pistorius, JCC 2001. Late Iron Age sites of Mmatshetshele Mountain in the Central Bankeveld of the North-West Province, South Africa. *South African Archaeological Bulletin*. 56 (173&174), 45-56.

Pistorius, JCC, Steyn, M. & Nienaber, W.C. 2002. Two burials at Malle, a Late Iron Age settlement in the Bankeveld in the North-West Province. *South African Archaeological Bulletin*. 57(176), 55-62.

Viljoen, M.J. & Reinhold, W.U. 1999. *An introduction to South Africa's geological and mining heritage*. Mintek: Randburg.

Wilson, M.G.C. & Anhaeuser, S.C.R. (eds.) 1998. The mineral resources of South Africa. 6th Edition. The department of Geoscience.