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A PHASE I ARCHAEOLOGICAL AND HERITAGE IMPACT ASSESSMENT (HIA) STUDY FOR BOOYSENSDAL SOUTH EXPANSION ENVIRONMENTAL AUTHORISATIONS

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EXECUTIVE SUMMARY

This document contains the report on a Phase I HIA study which was done according to Section 38 of the National Heritage Resources Act (No 25 of 1999) for the Booysensdal South Expansion Project which straddles the Mpumalanga and Limpopo Provinces in the Groot Dwars River Valley in the Steenkampsberge. The study comprises a heritage survey (Part 8) and a heritage impact assessment (Part 9) for the Booysendal South Expansion Project. It includes heritage surveys and assessments for the BS1/2 and BS3 areas which was conducted by HCAC and for the BS4 (former Everest) area which was conducted by the author. Both studies were done during 2016. It also includes a heritage survey for S24G activities as well as for the Merensky Portals which were done by the author in 2016.

The aims with the heritage surveys and assessments were the following:

- To establish whether any of the types and ranges of heritage resources as outlined in Section 3 of the (see Box 1) are present in the Booysendal South Expansion Project area and, if so, to determine the nature, the extent and the significance of these heritage remains.
- To establish if any of these heritage resources will be affected by the proposed Booysendal South Expansion Project and, if so, to evaluate the nature and extent to which the resources will be impacted and determine and develop appropriate mitigation measures to be taken if any of the types and ranges of heritage resources will be affected by the project.
- To establish whether any of the heritage resources in the vicinity where the S24G activities are taking place have been or will potentially be compromised.
- To propose management measures to ensure the protection of heritage resources where construction activities have commenced or where heritage resources remain unaffected for the unforeseeable future.

Two heritage surveys and assessments were conducted for the Booysendal South Expansion Project. The first study for the BS1/BS2 and BS3 areas was done by HCAC in 2016 whilst the author conducted a survey for the BS4 (Everest) development in November 2016. A second survey by the author in November 2016 was aimed at establishing whether any heritage resources may have been negatively influenced as a result of the early commencement of development activities (S24G activities) *prior* to environmental authorisation for the Booysendal South Expansion Project. This survey also focussed on the Merensky Portal areas. The results of these three surveys are discussed.

Heritage resources that were impacted as a result of the premature implementation of developmental activities are the following, namely (Tables 4 & 7):

- Historical ruins (355 and 356) were destroyed.
- Iron Age features 610, 612[a], 612[b], 611,614, 615, 616, 617 have been destroyed

Heritage surveys

The heritage resources which were uncovered by Van Der Walt & Celliers and the author are similar in types and ranges than those which have been identified during earlier heritage surveys in the Steenkampsberge where the proposed Booysendal South Expansion Project is being established.

All the heritage resources (including graveyards) that were documented during these surveys are illustrated in Figure 32.

Heritage impact assessment

The various developmental activities for the Booysendal South Expansion Project (outlined in Part 5.2, 'The nature of the Booysendal South Expansion Project') which are associated with these developmental areas comprise the following broad categories for the purposes of this report, namely:

- Activities which are associated with the nornmal EIA/EMP process to be followed for the Booysendal South Expansion Project.
- S24G activities which have commenced *prior* to environmental authorisation for the Booysendal South Expansion Project and those which still must be completed for the project.

Impacts as a result of the normal EIA/EMP process

It appears that no heritage resources which are of significance will be impacted by the normal EIA/EMP process.

Impacts as a result of implemented S24G activities

Heritage resources which have been destroyed as a result of S24G activities include the following (Tables 4 & 7):

- Historical ruins (355, 356) have been destroyed.
- Iron Age features 610, 612, 611,614, 615, 616, 617 have been destroyed.

The historical ruin and Iron Age features are assessed as a single type (range) of heritage resource as these remains in many instances straddle the Iron Age and the Historical Period and therefore cannot always with great certainty be classified into one of these categories.

Impacts as a result of future S24G activities

The following heritage resources will be indirectly impacted as the remaining S24G activities are fully implemented (Table 7).

- Historical village 02 (HV02) will be impacted when the ARS is constructed. The impact on this heritage source may be indirect as the ARS crosses above the site. A pylon may be constructed in the site and may affect archaeological remains on surface or remains which occur subsurface.

The significance of the Iron Age and/or Historical remains

The heritage resources which have been impacted by the Booysendal South Expansion Project and those that will be impacted by future S24G activities comprise the following category, namely (Table 7):

- Remains which date from the Iron Age and/or the Historical Period.

The significance of these remains is established in order to determine the severity of the impact on these remains.

These remains are older than 60 years and therefore are protected by the National Heritage Resources Act (No 25 of 1999).

The historical remains are rated as of low-medium significance. This rating is based on the use of 2 rating (grading) schemes, namely:

- A scheme of criteria which outline places and objects as part of the national estate as they have cultural-historical significance or other special value (outlined in Section 3 of the NHRA [Act No 25 of 1999] (see Box 1) (Table 8).
- A field rating scheme according to which heritage resources are graded in three tiers (levels) of significance based on the regional occurrence of heritage resources (Table 9) (Section 7 of the NHRA [Act No 25 of 1999).

According to these criteria, the cultural historical significance of the Historical/Iron Age remains is graded as low to medium significance. When considering the integrity of the heritage sites in conjunction with its cultural-historical significance judging factors such as the preservation (condition); extensiveness (archaeological deposits present/absent) and representative (unique/repetitive) nature of the sites these factors can also be rated as of low to medium significance (Table 7).

Grading of heritage resources remains the responsibility of heritage resources authorities. However, in terms of minimum standards SAHRA, it requires that heritage reports include field ratings in order to comply with Section 38 of the NHRA (No 25 of 1999). The NHRA (No 25 of 1999, Section 7) provides for a 3-tier grading system for heritage resources. The field rating process is designed to provide a qualitative and quantitative rating of heritage resources. The rating system distinguishes Grade 1, Grade 2 and Grade 3 heritage resources.

According to the highlighted field rating scheme the Historical/ Iron Age remains can be rated as of low to medium significance (Table 8).

Significance of the impact on the heritage resources

The significance of the impact on the Historical/Iron Age remains is the following:

The significance of impacts on the Historical /Iron Age remains which have been destroyed as a result of the implementation of S24G activities is high (Table 9).

The significance of the impact of S24G activities to be implemented on Historical/Iron Age remains will be medium. If mitigation measures are implemented the impacts will be reduced to a low impact level.

Mitigating and managing the heritage resources

The following mitigation and management measures are outlined for the Historical/Iron Age remains which have been destroyed by S24G activities and those that will be affected when the remaining S24G activities are implemented, namely:

Mitigating implemented S24G activities

No mitigation measures can be implemented as the Historical/Iron Age remains have been destroyed.

Mitigating future S24G activities

Although HV02 (historical village) has been slightly altered as a result of developmental activities, the core of the complex is still intact and may inform the historical significance and meaning of these structures before they are affected when the ARS is constructed.

HV02 has to be documented by means of compiling a ground plan, taking photographs and describing the spatial composition and features of the village.. This task must be undertaken by an archaeologist that is accredited with the ASAPA. SAHRA will require that V02 be studied and documented before SAHRA will make any recommendations regarding the future existence of the village.

The significance of any impact on HV02 (historical village) will be low once the mitigation measures have been implemented (Table 9).

Managing heritage resources that remain unaffected

The historical remains

Historical remains must at all costs be avoided in order to ensure that these remains are not deliberately or coincidentally damaged or destroyed by mine personnel and vehicles. This can be achieved by means of erecting signposts where such historical remains are situated with notices such as the following: *"Please avoid historical remains: Protected by the National Heritage Resources Act (No 25 of 1999)* Damage caused may lead to prosecution".

Heritage resources should be managed in the following way:

- All heritage resources must be registered in a heritage register. A uniform standard must be used to register (number) all the types and ranges of heritage resources.
- Heritage resources must be inspected on a regular basis using periodic intervals not exceeding a 6 month period.
- Inspections and findings thereof should be recorded noted in an inspection register. The register should outline the state of the heritage resources during each inspection. Reports on damages to any of the heritage resources should be followed with the necessary mitigation measures.
- Permits must be obtained from SAHRA to conduct mitigation work. The nature of the mitigation work should be recorded in the inspection register.
- Corridors of at least 30 m should be maintained between the outer edges or perimeters of heritage resources and any developmental components such as roads or other infrastructure that may be developed in the future.

Graveyards and graves

Graveyards and graves that remain unaffected should be managed according to a management plan to ensure that they are adequately protected against any ongoing operations and preserved. The following management measures are recommended:

- Graveyards and graves must be demarcated with fences and/or with walls and should be fitted with access gates.
- Regulated visitor hours should be implemented that is compatible with the existing or future mine safety rules. This will not be necessary when graveyards and graves are located next to national roads.
- Corridors of at least 30 m should be erected and maintained between graveyard and grave's fences and any developmental components such as roads or other infrastructure that may be developed in the future.
- Graveyards and graves should be inspected on a regular basis using periodic intervals not exceeding every 3 months. Inspections and findings thereof should be recorded and noted in an inspection register. The register should outline the state of the graveyards and graves during each inspection.
- Reports on damages to any of the graves or to the graveyards (fences, walls, gates) should be followed with the necessary mitigation work which must be registered in the inspection register.
- Mitigation done to graves older than sixty years can only be done after SAHRA has issued the necessary permit
- Graveyards and graves should be kept tidy from any invader weeds and any other refuse.

Cumulative impacts

The Booysendal South Expansion Project potentially contributes to cumulative impacts in the larger area as a result of the following:

- An increase in population numbers as a result of job creation whether in formal or informal settlements as these settlements may expand and further expose or damage heritage resources. This also includes the possible looting of archaeological sites whether to be utilized for building material or for the illegal collecting of artefacts.
- The Booysendal South Expansion Project is but one of a number of developmental projects in the Groot Dwars River Valley which all have a detrimental influence on the archaeological record and cultural landscape of this ecozone.
- Due to the magnitude, size and surface area to be covered by the project and probably to be increased in the future the archaeological record of the mining area can be obliterated. This increasing the importance of managing the recorded heritage resources in a responsible manner.
- Heritage resources deliberately destroyed by the project as well as those of low significance which are studied before they are destroyed all contribute to the context and significance of the larger cultural landscape.
- Cultural historical landscapes and heritage resources are non- renewable and cannot be replaced once they have been altered or destroyed.

Summary

The cultural-historical remains in the Booysendal South Expansion Project Area do not have outstanding heritage significance. Most of the remains have been recorded and have been briefly described. It seems as if no graves or graveyards will be impacted by the development. These remains have high significance and may not be affected by the project *prior* to alternative legal arrangements and approval.

A limited number of historical remains have been destroyed as a result of S24G activities whilst a historical village may be affected when the ARC system is constructed. Mitigation measures have been proposed and management measures have been outlined in the Environmental Management Program report (EMPr) for the remaining heritage resources in the Booysendal South Expansion Project Area.

There is no reason from a heritage point of view why the proposed Booysendal South Expansion Project considering all alternatives discussed herein, cannot proceed if the mitigation and management measures recommended in this report and in the EMPr have been implemented.

Disclaimer

It is possible that this and earlier heritage surveys and assessments may have missed heritage resources in the project area as heritage sites may occur in tall grass or thick clumps of vegetation while others may be located below the surface of the earth and may only be exposed once development commences. Heritage sites may also be missed as a result of human failure to observe or to recognise them.

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

ACRONYMS AND ABBREVIATIONS

AIA Archaeological Impact Assessment

ASAPA Association of South African Professional Archaeologists

ARS Aerial Ropeway System

CRM Cultural Resource Management

EAP Environmental Assessment Practitioner

ECO Environmental Control Officer

EIA Environmental Impact Assessment

EMP Environmental Management Plan

EPS Environmental Performance Standards

EIA Early Iron Age

ESA Early Stone Age

GPS Global Positioning System

HIA Heritage Impact Assessment

IEM Integrated Environmental Management

I & Aps Interested and Affected Parties

LIA Late Iron Age

LSA Late Stone Age

MIA Middle Iron Age

MPRDA Mineral and Petroleum Resources Development Act, 28 of 2002

MSA Middle Stone Age

NEMA National Environmental Management Act, 107 of 1998

NEMBA National Environmental Management: Biodiversity Act, 10 of 2004

NEMAQA National Environmental Management: Air Quality Act, 39 of 2004

NEMWA National Environmental Management: Waste Act, 59 of 2008

NHRA National Heritage Resources Act, 25 of 1999

NWA National Water Act, 36 of 1998

OSHA Occupational Health and Safety Act, 85 of 1993

PHRA Provincial Heritage Resource Agency

RSA Republic of South Africa

SAHRA South African Heritage Resources Agency

SAHRIS

ToR Terms of Reference

TERMINOLOGY

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

- Conservation: The act of maintaining all or part of a resource (whether renewable or non-renewable) in its present condition in order to provide for its continued or future use. Conservation includes sustainable use, protection, maintenance, rehabilitation, restoration and enhancement of the natural and cultural environment.

- Cultural resource management: A process that consists of a range of interventions and provides a framework for informed and value-based decision-making. It integrates professional, technical and administrative functions and interventions that impact on cultural resources. Activities include planning, policy development, monitoring and assessment, auditing, implementation, maintenance, communication, and many others. All these activities are (or will be) based on sound research.

- Cultural resources: A broad, generic term covering any physical, natural and spiritual properties and features adapted, used and created by humans in the past and present. Cultural resources are the result of continuing human cultural activity and embody a range of community values and meanings. These resources are non-renewable and finite. Cultural resources include traditional systems of cultural practice, belief or social interaction. They can be, but are not necessarily identified with defined locations.

- Heritage resources: The various natural and cultural assets that collectively form the heritage. These assets are also known as cultural and natural resources. Heritage resources (cultural resources) include all human-made phenomena and intangible products that are the result of the human mind. Natural, technological or industrial features may also be part of heritage resources, as places that have made an outstanding contribution to the cultures, traditions and lifestyles of the people or groups of people of South Africa.

- In-Situ Conservation: The conservation and maintenance of ecosystems, natural habitats and cultural resources in their natural and original surroundings.

- Iron Age: Refers to the last two millennia and 'Early Iron Age' to the first thousand years AD. 'Late Iron Age' refers to the period between the 16th century and the 19th century and can therefore include the Historical Period.

- Maintenance: Keeping something in good health or repair.

- Pre-historical: Refers to the time before any historical documents were written or any written language developed in a particular area or region of the world. The historical period and historical remains refer, for the Project Area, to the first appearance or use of 'modern' Western writing brought to the Eastern Highveld by the first Colonists who settled here from the 1840's onwards.

- Preservation: Conservation activities that consolidate and maintain the existing form, material and integrity of a cultural resource.

- Recent past: Refers to the 20th century. Remains from this period are not necessarily older than sixty years and therefore may not qualify as archaeological or historical remains. Some of these remains, however, may be close to sixty years of age and may, in the near future, qualify as heritage resources.

- Protected area: A geographically defined area designated and managed to achieve specific conservation objectives. Protected areas are dedicated primarily to the protection and enjoyment of natural or cultural heritage, to the maintenance of biodiversity, and to the maintenance of life-support systems. Various types of protected areas occur in South Africa.

- Reconstruction: Re-erecting a structure on its original site using original components.

- Replication: The act or process of reproducing by new construction the exact form and detail of a vanished building, structure, object, or a part thereof, as it appeared at a specific period.

- Restoration: Returning the existing fabric of a place to a known earlier state by removing additions or by reassembling existing components.

- Stone Age: Refers to the prehistoric past, although Late Stone Age people lived in South Africa well into the Historical Period. The Stone Age is divided into an Earlier Stone Age (3 million years to 150 000 thousand years ago) the Middle Stone Age (150 000 years to 40 000 years ago) and the Late Stone Age (40 000 years to 200 years ago).

- Sustainability: The ability of an activity to continue indefinitely, at current and projected levels, without depleting social, financial, physical and other resources required to produce the expected benefits.

- Translocation: Dismantling a structure and re-erecting it on a new site using original components.

- Project Area: refers to the area (footprint) where the developer wants to focus its development activities.

- Phase I studies refer to surveys using various sources of data in order to establish the presence of all possible types and ranges of heritage resources in any given Project Area (excluding paleontological remains as these studies are done by registered and accredited palaeontologists).

- Phase II studies include in-depth cultural heritage studies such as archaeological mapping, excavating and sometimes laboratory work. Phase II work may include the documenting of rock art, engraving or historical sites and dwellings; the sampling of archaeological sites or shipwrecks; extended excavations of archaeological sites; the exhumation of human remains and the relocation of graveyards, etc. Phase II work involves permitting processes,

requires the input of different specialists and the co-operation and approval of the SAHRA.

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1 INTRODUCTION

1.1 Background and context

Booysendal (Pty) Ltd (Booysendal) is a wholly owned subsidiary of Northam Platinum Limited (Northam). Its operations are located on the Eastern Platinum Limb, approximately 35 km from the town of Mashishing (formerly Lydenburg), which lies between the border of Limpopo and Mpumalanga Provinces in South Africa. For operational purposes, the Booysendal operations are divided into Booysendal North (BN) and Booysendal South (BS) with BS further divided into BS1, BS2, BS3 and BS4.

Booysendal has commenced with the Booysendal South Expansion Project to ramp up its production and capitalise on unanticipated short and medium term opportunities for platinum demand. During an initial site visit to BS4 in September 2016, Amec Foster Wheeler observed that some of the activities for the Booysendal South Expansion Project, including some linear infrastructure, had already commenced and advised Booysendal that these activities require authorization. Since the project has commenced Booysendal was advised to commence with a Section 24G application. Booysendal sought legal counsel and during late October 2016 Booysendal was advised to apply for a Section 24G authorisation for the project.

The developmental activities associated with the Booysendal South operations, whether S24G activities or those associated with the normal EIA/EMP process, may have an influence on any of the types and ranges of heritage resources as outlined in Section 3 of the NHRA The Mpumalanga and Limpopo Provinces have a rich heritage comprised of remains dating from the pre-historical past into the historical recent time period. These heritage resources resemble a record of the heritage of most groups living in South Africa today and therefore constitute a rich and wide diversified range (comprising the ‘national estate’) as outlined in Section 3 of the NHRA(see Part 4, Box 1)

Amec, Foster and Wheeler, the environmental consultant who is responsible for the amendment of the existing EMP and submission of an Integrated Water Use License

Application to the Department of Water and Sanitation therefore commissioned the author to undertake a heritage survey and assessment for the BS4 (former Everest) area incorporating the results of an earlier heritage survey and assessment that was done by Heritage Contracts and Archaeological Consulting CC (HCAC) for the central part of the Booysendal South Expansion Project (BS1/BS2 and BS3).

1.2 Aims with this report

This study comprises a heritage survey (Part 8) and a heritage assessment (Part 9) for the Booysendal South Expansion Project. It includes heritage surveys and assessments for the BS1/2 and BS3 areas which was conducted by HCAC and for the BS4 (former Everest) area which was conducted by the author. Both studies were done during 2016. It also includes a heritage survey for S24G activities as well as for the Merensky Portals which were done by the author in 2016. The aims with the heritage surveys and assessments were the following:

- To establish whether any of the types and ranges of heritage resources as outlined in Section 3 of the (see Box 1) are present in the Booysendal South Expansion project area and, if so, to determine the nature, the extent to which the expansion project would impact the sources when considering the significance of these remains.
- To establish if any of these heritage resources present will be affected by the proposed Booysendal South Expansion Project and, if so, to evaluate and develop appropriate mitigation measures that must be taken and implemented.
- To establish whether any of the heritage resources in the vicinity where the S24G activities are to occur have been compromised.
- To propose management measures to ensure the protection of heritage resources where construction activities have commenced or where heritage resources remain unaffected for the unforeseeable future.

1.3 Assumptions and limitations

The findings, observations, conclusions and recommendations reached in this report are based on the author's best scientific and professional knowledge, available

information and his ability to keep up with the physical and other comprehensive challenges that the project commanded.

This report is an integration of the field surveys done by several fieldworkers over a period of longer than ten years. These field results were first utilized and synthesised by HCAC whilst the author also made use of these integrated results. The author therefore did not observe all the heritage resources first hand. However, he has a good understanding of the types and ranges of heritage resources that occur in the Steenkampsberge as he was involved in several heritage impact assessment studies in the area during the last fifteen years.

The report is based on accepted archaeological survey and assessment techniques and methodologies. The latter were adapted according to challenges posed by a very rugged and demanding terrain which could not be surveyed in totality due to inaccessible parts of the terrain, limited time and budgetary constraints. However, the survey is considered appropriate for the nature and the level of investigation required. In addition earlier surveys were conducted which identified the footprints of the various development components of the Booysendal Project, this provided additional data and guidance for the field survey.

The GPS track log provided does not reflect the totality of the areas that were coverd with a four track vehicle and on foot as the GPS frequently experienced signal loss due to the low altitude in which the fieldwork was done.

The author preserves the right to modify aspects of the report including the recommendations if and when new information becomes available particularly if this information may have an influence on the reports final results and recommendations.

This heritage survey may have missed heritage resources in the project area as heritage sites may occur in in tall grass or thick clumps of vegetation while others may be located below the surface of the earth and may only be exposed once development commences.

It is also possible that heritage resources may simply have been missed as a result of human failure.

2 DETAILS OF THE SPECIALIST

Specialist Details: Dr Julius Pistorius

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 written a guide for Eskom's field personnel on heritage management. He has published twenty scientific papers in academic journals and several popular articles on archaeology and heritage matters. He collaborated with environmental companies in compiling State of the Environmental Reports for Ekhurhuleni, Hartebeespoort and heritage management plans for the Magaliesberg and Waterberg. Since acting as an independent consultant he has done approximately 800 large to small heritage impact assessment reports. He has a longstanding working relationship with Eskom, Rio Tinto (PMC), Rio Tinto (EXP), Impala Platinum, Angloplats (Rustenburg), Lonmin, Sasol, PMC, Foskor, Kudu and Kelgran Granite, Bafokeng Royal Resources, Pilanesberg Platinum Mine etc. as well as with several environmental companies.

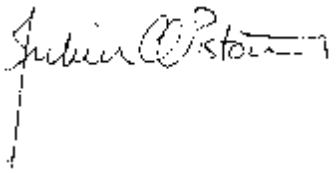
3 DECLARATION OF INDEPENDENCE

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;
•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

_____

1 March 2017

_____

Date:

4 LEGAL FRAMEWORK

South Africa's heritage resources ('national estate') are protected by international, national, provincial and local legislation which provides regulations, policies and guidelines for the protection, management, promotion and utilization of heritage resources. South Africa's 'national estate' includes a wide range of various types of heritage resources as outlined in Section 3 of the National Heritage Resources Act (NHRA, Act No 25 of 1999) (see Box 1).

At a national level heritage resources are dealt with by the National Heritage Council Act (Act No 11 of 1999) and the National Heritage Resources Act (NHRA, Act No 25 of 1999). According to the NHRA (Act No 25 of 1999) heritage resources are categorized using a three-tier system, namely Grade I (national), Grade II (provincial) and Grade III (local) heritage resources.

At the provincial level, heritage legislation is implemented by Provincial Heritage Resources Agencies (PHRA's) which apply the National Heritage Resources Act (Act 25 of 1999) together with provincial government guidelines and strategic frameworks. Metropolitan or Municipal (local) policy regarding the protection of cultural heritage resources is also linked to national and provincial acts and is implemented by the South African Heritage Resources Agency (SAHRA) and the Provincial Heritage Resources Agencies (PHRA's).

4.1 Legislation relevant to heritage resources

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

- National Environmental Management Act (NEMA) Act 107 of 1998
- Minerals and Petroleum Resources Development Act (MPRDA) Act 28 of 2002
- National Heritage Resources Act (NHRA) Act 25 of 1999
- Development Facilitation Act (DFA) Act 67 of 1995

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

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

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

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

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

4.1.1 NEMA

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

4.1.2 MPRDA

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

4.1.3 NHRA

According to Section 3 of the NHRA (Act No 25 of 1999) the 'national estate' comprises a wide range and various types of heritage resources (see Box 1).

4.1.3.1 Heritage Impact Assessment studies

According to Section 38 of the National Heritage Resources Act (Act No 25 of 1999) a Heritage Impact Assessment (HIA) process must be followed under the following circumstances:

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

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

4.1.3.2 Section 34 (Buildings and structures)

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

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

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

Most importantly, Section 34(1) clearly states that no structure or part thereof may be altered or demolished without a permit issued by the relevant Provincial Heritage Resources Authority (PHRA). These permits will not be granted without a HIA being completed.

A destruction permit will thus be required before the removal and/or demolition of a heritage resource, unless such removal and/or demolition is exempt by the PHRA according to Section 34(2) of the NHRA.

4.1.3.3 Section 35 (Archaeological and palaeontological resources and meteorites)

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

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

Heritage resources may only be disturbed or moved by an archaeologist after being issued with a permit received from the South African Heritage Resources Agency (SAHRA). In order to demolish heritage resources, the developer has to obtain a destruction permit from the SAHRA.

4.1.3.4 Section 36 (Burial grounds and graves)

Section 36 of the NHRA provides for the general protection of burial grounds and graves. In the event that burial grounds or graves are found during the course of development, Section 36(6) stipulates that such development activities must cease immediately and that such discovery of the burial grounds be reported to the

responsible heritage resources authority and the South African Police Service (SAPS). Section 36 also stipulates that no person without a permit issued by the relevant heritage resources authority may:

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

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

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

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

Unidentified graves are treated and handles as though they are older than 60 years until proven otherwise.

Permission for the exhumation and relocation of graves older than sixty years must also be gained from descendants of the deceased (where known), the National Department of Health, Provincial Department of Health, Premier of the Province and local police. Furthermore, permission must also be gained from the various landowners (i.e. where the graves are located and where they are to be relocated) before exhumation can take place.

Human remains can only be handled by a registered undertaker or an institution declared under the Human Tissues Act (Act 65 of 1983 as amended).

4.1.3.5 Section 37 (Public monuments and memorials)

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

4.1.3.6 Section 38 (HRM)

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

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

4.4.4 NEMA Appendix 6 requirements

NEMA Regulations (2014) - Appendix 6	Relevant section in report
Details of the specialist who prepared the report	Dr Julius CC Pistorius
The expertise of that person to compile a specialist report including a curriculum vitae	Part 2. Details of the specialist
A declaration that the person is independent in a form as may be specified by the competent authority	Part 3. Declaration of independence
An indication of the scope of, and the purpose for which, the report was prepared	Part 1. Introduction
The date and season of the site investigation and the relevance of the season to the outcome of the assessment	Part 6. Approach and Methodology Part 6.1. Field survey
A description of the methodology adopted in preparing the report or carrying out the specialised process	Part 6. Approach and Methodology
The specific identified sensitivity of the site related to the activity and its associated structures and infrastructure	Part 7. Contextualising the project area Part 7.8 The heritage character of the Booysendal South Expansion Project Area
An identification of any areas to be avoided, including buffers	Part 9.4. Managing heritage resources that remain unaffected
A map superimposing the activity including the associated structures and infrastructure on the environmental sensitivities of the site including areas to be avoided, including buffers;	Figure 12, 14
A description of any assumptions made and any uncertainties or gaps in knowledge;	Part 1.3. Assumptions and limitations

A description of the findings and potential implications of such findings on the impact of the proposed activity, including identified alternatives, on the environment	Part 8. Types and ranges of heritage resources Part 9.1. Possible impact on the heritage resources
Any mitigation measures for inclusion in the EMPr	Part 9.1. Possible impact on the heritage resources Part 9.3 Mitigating and Managing heritage resources Part 9.4 Managing heritage resources that remain unaffected
Any conditions for inclusion in the environmental authorisation	Part 9.3 Mitigating and Managing heritage resources Part 9.4 Managing heritage resources that remain unaffected Part 9.5 Summary
Any monitoring requirements for inclusion in the EMPr or environmental authorisation	Part 9.5. Summary
A reasoned opinion as to whether the proposed activity or portions thereof should be authorised and	Part 9.5.Summary
If the opinion is that the proposed activity or portions thereof should be authorised, any avoidance, management and mitigation measures that should be included in the EMPr, and where applicable, the closure plan	Part 9.3. Mitigating and managing heritage resources Part 9.4. Managing heritage resources that remain unaffected
A description of any consultation process that was undertaken during the course of carrying out the study	Part 6.4 Consultation process undertaken and comments received from stakeholders
A summary and copies if any comments that were received during any consultation process	Part 6.4 Consultation process undertaken and comments received from stakeholders

Any other information requested by the competent authority.	None

5 THE BOOYSENDAL SOUTH EXPANSION PROJECT

5.1 Location

The Northam Platinum Booysendal Pty Limited Project is situated on the eastern limb of the Bushveld Igneous Complex which straddles the Limpopo and Mpumalanga Provinces of South Africa. Booysendal North (BN) is currently Northam Platinum's operational mine in the Groot Dwars River Valley in the Steenkampsberge and the intention is to further develop the project by means of the Booysendal South Expansion Project. The towns closest to the project are Mashishing (Lydenburg) approximately 35 km to the east of Booysendal and Roossenekal which is located 21 km to the west of the Groot Dwars River Valley. Steelpoort is situated approximately 40 km to the north-east. Mines adjacent to Booysendal include the African Rainbow Minerals' Two Rivers mine (west), Anglo Platinum's Mototolo mine (north) and Assmangs' Dwarsriver Chrome Mine (northwest) (2530AA Draaikraal [1: 50 000 topographical map]) (Figure 1).

5.2 The nature of the Booysendal South Expansion Project

For operational purposes, the Booysendal Operations can be divided into two main areas (Figure 2):

- The existing 2011 UG_2 and Merensky operation known as Booysendal North (BN); and
- The Booysendal South (BS1/BS2; BS3, BS4 (the former Everest mine operations) and the Merensky Portal expansion and linear infrastructure corridors.

The current BN operation consists of a reverse decline portal, a processes plant, workshops, offices change rooms, training centre, a tailings storage facility, a run of mine stockpile, waste rock dump, various linear infrastructure including access road, powerline and water pipeline, Merensky Portals and various storm water management infrastructure.

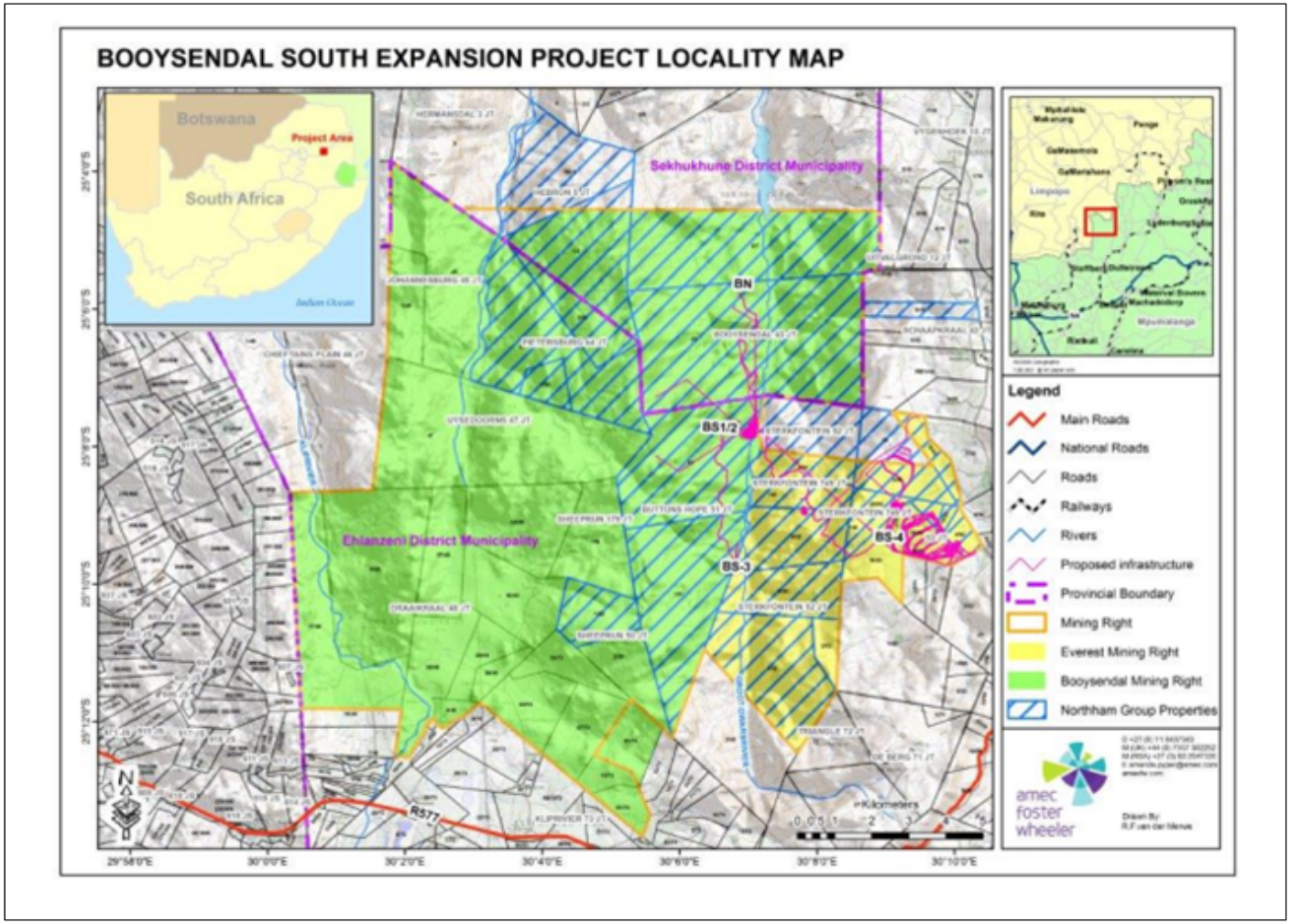


Figure 1- Regional location of the Booysendal South Expansion Project in the Mpumalanga and Limpopo Provinces (above).

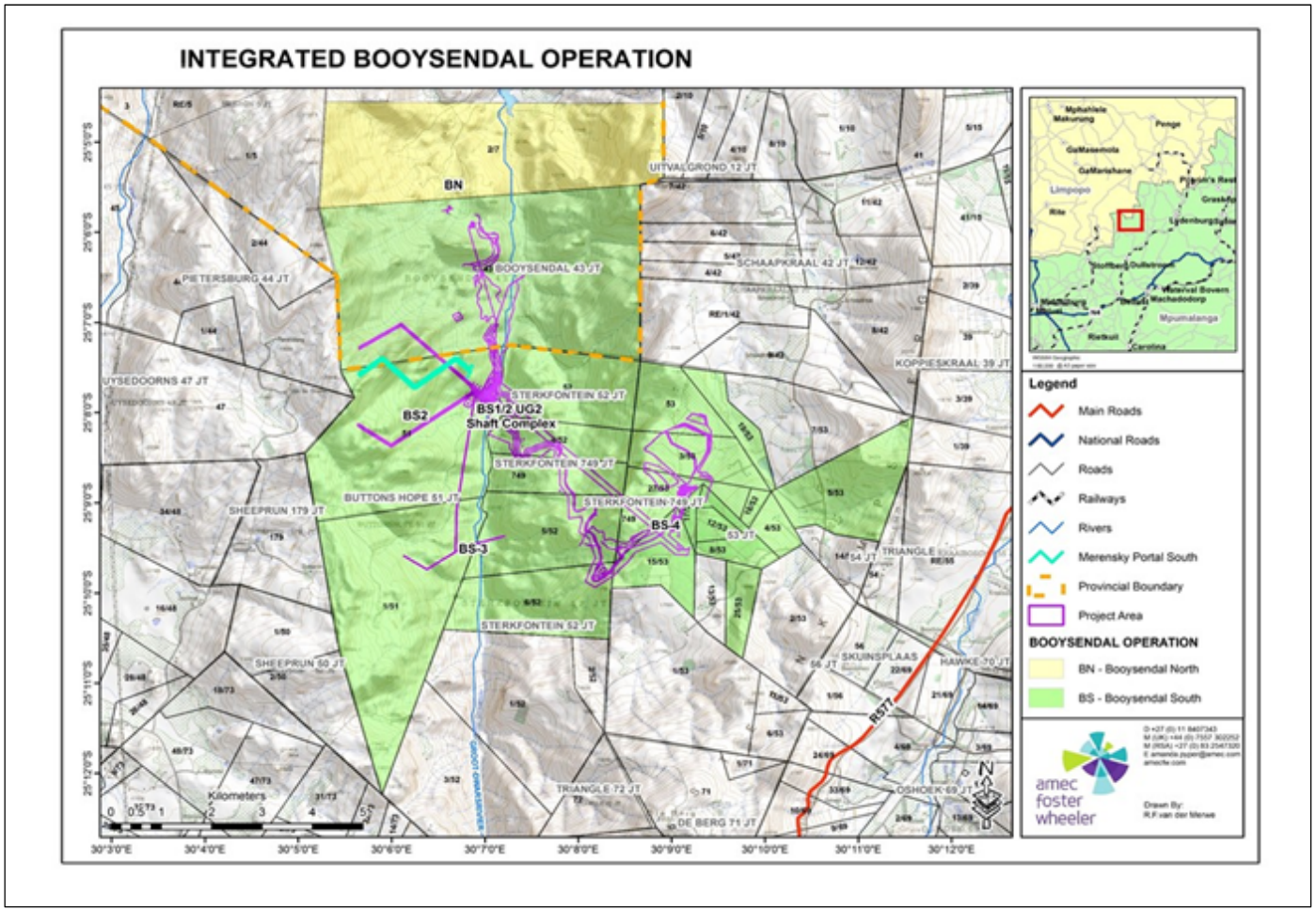


Figure 2- The integrated Booysendal Operation involving Booysendal North (BN) and Booysendal South (BS) in the Groot Dwars River Valley in the Mpumalanga and Limpopo Provinces (above).

The Booysendal South Expansion Project will involve infrastructure and mining development that will lead to a doubling of the current BN production of 220,000ktpm to 450,000ktpm. The Booysendal South Expansion Project focuses on 4 development areas with linear infrastructure situated between the various areas:

Area 1 - BS1/2 Complex (Figure 3): The bulk of the Booysendal South Expansion Project is associated with BS1/2 and will consist of a new portal, emergency escape portal and associated surface infrastructure from where the UG2 reef will be mined. The BS1/2 complex is located on a central section of the farm Buttonshope 51JT.

Activities which already have commenced (S24G activities) include the following:

- Infilling of more than 5 cubic meters within the 100-year flood line of the Groot Dwars River for the establishment of the portal terrace and the main river crossing over the Groot Dwars River;
- Diversion of two tributaries of the Groot Dwars River upstream from BS1/2;
- Clearance of more than 300 m² of CBA and of approximately 6 ha in extent of vegetation for the construction of the portal and the infrastructure described herein
- Stockpiling and terracing for the BS1/2 portal within the 100 m flood line of an unnamed tributary of the Groot Dwars River;
- Construction of a pollution control dam, a sewage treatment plant and a drinking water treatment plant, mine dewatering, process water tanks and water storage tanks which requires authorization in terms of the National Water Act, 36 of 1998 for Section 21 (b), (f), (j) and (g) water uses;
- Construction of a crusher plant and an associated conveyor system which will transport the ore to a new silo and from there to an Aerial Rope conveyor system at the edge of the BS1/2 terrace;
- Construction of Aerial Rope conveyor system from BS1/2 to BS4 which constitutes clearance of vegetation more than the NEMA listed activity threshold and infilling of more than 5 cubic meters in a drainage line for one of the towers;
- Construction of a bridge across the Groot Dwars River;

- Storage facilities for diesel, dangerous and hazardous chemicals in excess of the NEMA listed activity thresholds; and

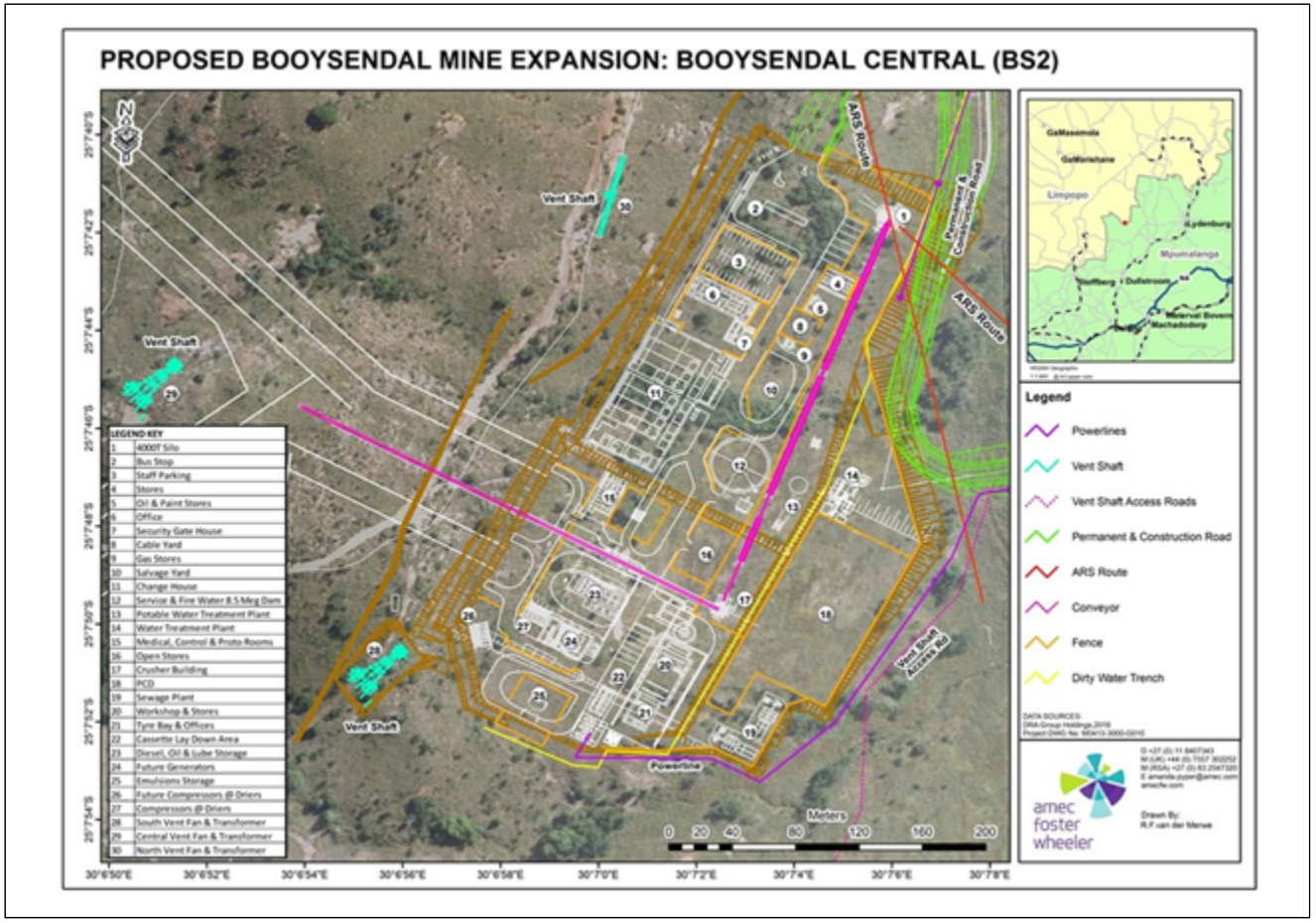


Figure 3- The proposed Booysendal South Expansion Project involving the BS1/BS2 Shaft Complex and S24G activities in the central part of the project area (above).

- Construction of a 132kVA powerline from BN to BS1/2 (to commence shortly). The electricity supply is required for operation of the mining activities and the conveyor system;
- Oil separators and settlers for storm water;
- Various water infrastructure at BS1/2 including a raw water tank of 8,500m³; process water storage tank of 812m³; potable water storage tank of 10m³; potable water treatment plant with a throughput capacity of 15m³/h; sewage treatment plant with a capacity of 30m³/h; pollution control dam with a capacity of 14,000m³;
- Pipeline from BS4 to BS1/2 – 80m³/h less than 120cm in diameter.
- Vent fans at BS1/2 (to commence). The vent fans are an integral part of the BS1/2 operations;
- Construction of a 13,2 meter wide road with a servitude of 30 meters from BN to BS1/2. Construction of this road has commenced. The western section of the road follows the alignment of an existing exploration track of 4m. Vegetation clearance of the servitude and construction of 14 culverts commenced. Although sections along this road have also historically been disturbed due to agricultural practices, there are sections that fall within the CBA; and
- Potable water will be provided from the TKO dam, while process and make-up water will be from the fissure water and Valley Boxcut PCD.

Activities associated with BS1/2 which will commence at a later stage as part of the EIA/EMP application process and includes the construction and development of an:

- Aerial Rope conveyor system between BS1/2 and BN; and
- Emergency escape portal north of the main BS1/2 portal.

Area BS3 (Figure 4): Underground mining on the southern section of the farm Buttonshope 51JT. The mine will be accessed through an existing underground tunnel which runs from BS1/2. This will also include all infrastructure included and depicted in Figure 4. All infrastructure and activities associated with BS3 are future activities and will therefore be included as part of an additional EIA/EMP process.

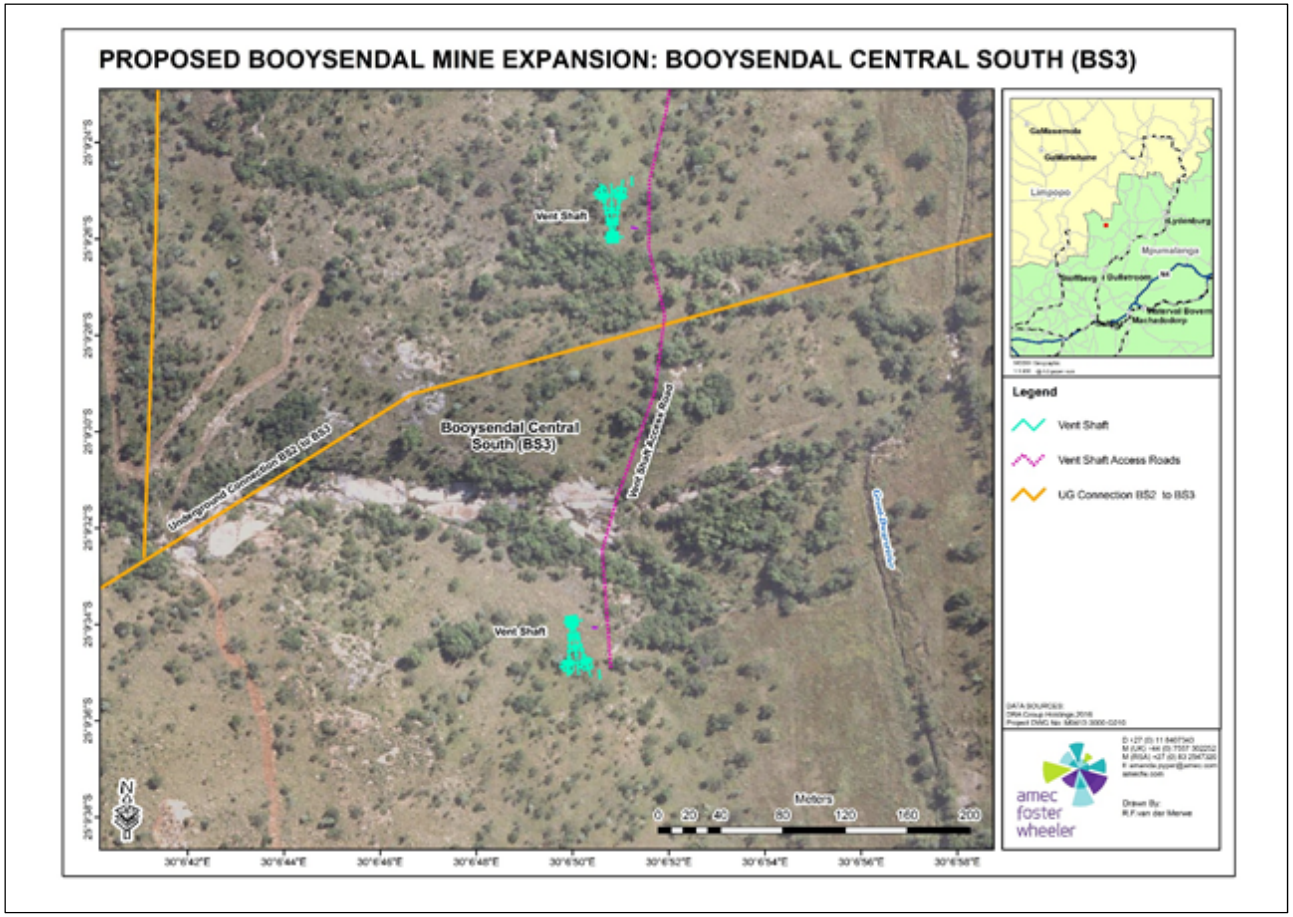


Figure 4- The Booysendal South Expansion Project involving the BS3 or underground mining operations (above).

Area BS4 (Figure 5): Construction of the following activities have commenced at BS4 (Everest) and are included in the Section 24G application, namely:

- Reworking and replacing of tailings on the existing TSF1 at BS4;
- Backfilling of the underground workings with tailings;
- Upgrade of the storm water management system at BS4 using the Storm Water Management Plan developed by SLR in 2011, as the basis for the upgrades. The following upgrades were or will be made:
    - Upgrade of the storm water drainage at and downstream of the portal;
    - Upgrade of the clean and dirty water separation system upstream of the existing TSF and to the east of the existing portal and workshop complex;
    - Upgrade and lining of the plant pollution control dam (PCD); Decommissioning and rehabilitation of the workshop PCD;
    - Upgrade of the northern portal PCD;
    - Upgrade of the sewage treatment plant at the workshop; and
    - Construction of a PCD at the valley boxcut.
- Water supply pipeline from the TKO dam to BS1/2;
- Increase in the size of the ore stockpile (ROM);
- Silt trap at the upstream point of the conveyor system;

Future activities which will be included in an additional EIA/EMP process for BS4 include:

- The future TSF 2 and RWD to the north on the kiwi farm footprint; and
- Return water pipeline from the RWD to the plant

Emergency Escape Portals

The Emergency Escape Portals and associated infrastructure will form part of the EIA/EMP process.

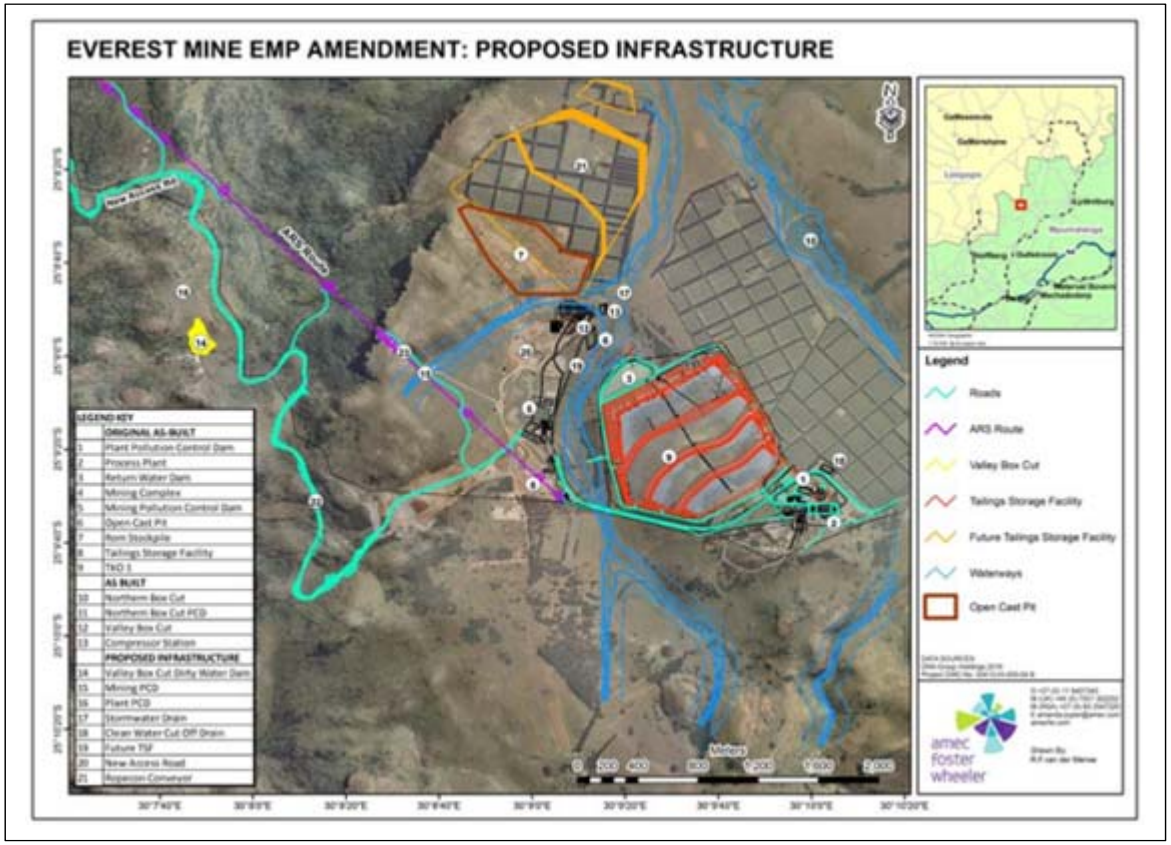


Figure 5- The Booysendal South Expansion Project involving the BS4 (Everest) operations (above).

Merensky Portals:

2 Merensky portals are associated with the central part of the Booysendal South Expansion Project, namely:

- Merensky portal (central, north).
- Merensky portal (central, south).

Alternatives

Alternatives that may have a bearing on heritage resources include the following, namely:

Access road from BS2 to BS3

Two alternatives are proposed, namely:

- A preferred alternative (orange) which is an existing exploration road.
- Alternative 01 which represents a new road (pink dotted line) along the valley floor which will require several crossings over the Groot Dwars River.

Ore Transport (Section 24G and EMP Amendment)

The following four alternatives were considered for the transportation of ore:

Trucking – Alternative 1	***Overland Conveying – Alternative 2***	***Aerial Ropecon – Preferred Alternative***
Haul ore from the portal and transport to Everest (using the road alignment indicted on the plan	*Convey ore from portals to B4 by means of conventional conveyor (using the conveyor / ropecon alignment indicated on the plan)*	*Convey ore from portals to silo using ARC to transport ore to B4 and BN (using conveyor / ARC alignment indicated on the plan*

Transmission Lines (Section 24G)

Alternative 1: 33kV from BS4 to BS1/2 within the main access road reserve

Alternative 2: 132 kV from BS4 to BS1/2 within the main access road reserve

Alternative 3: 33kV from BN following existing exploration road.

Preferred Alternative: 132 kV from BN within main access road reserve.

Mining BS3 (EMP Amendment)

Alternative 1: Mining via a portal system

Preferred Alternative: Mining through an underground tunnel from BS2.

Mining at BS1/2 (Section 24G):

Alternative 1: Mining from 2 portals at BS1 and a separate BS2

Preferred Alternative: 1 portal system which is split into two separate underground adits.

Main Access Road (Section 24G)

2 alternatives are considered: the old and new alignment.

5.3 The nature of the Booysendal South Expansion Project area

The Booysendal South Expansion Project area comprises 2 main ecological niches, namely the rugged Groot Dwars River Valley where the bulk of the mine infrastructure (BS1/BS2 and BS3) will be established which includes a flat plain on the eastern edge of the valley where the BS4 (Everest) development will be situated. The following descriptions with photographs illuminate the nature and characteristics of these ecological niches which are both associated with heritage resources.

Figure 6- The bottom of the Groot Dwars River Valley where the bulk of BS1/2's infrastructure will be established more than one hundred meters below the escarpment where the BS4 infrastructure has been established (above).

Figure 7- The central northern Merensky Portal will be developed along the slope of a mountain in the Groot Dwars River Valley. The terrain where the BS1/BS2 infrastructure will be established is rugged and not suitable for occupation by large numbers of people in the past (above).

Figure 8- Undisturbed grass plains on the edge of the Dwars River Valley where the BS4 (Everest) infrastructure has been established (above).

Figure 9- Large tracks of land were utilised for the soft fruit industry such as Kiwi farming adjacent to the former BS4 (Everest) operations (above).

Figure 10- The bulk of the BS4 infrastructure has already been established along the edge of the Groot Dwars River Valley (above).

5.4 The heritage character of the Booysendal South Expansion Project area

The heritage character of the Booysendal South Expansion Project is outlined in Part 7 ‘Contextualising the Booysendal South Expansion Project Area’ of the report.

The most common types and ranges of heritage resources in the larger area uncovered during heritage surveys include the following:

- MSA artefacts which occur as isolated finds over the landscape. These artefacts are sparse and too widely scattered to be of any significance.

- Decorated pottery belonging to Eiland stylistic facies (AD1550 to AD1750) have been recorded in the larger area. These sites are not marked by any stone walls and therefore are difficult to detect as they are also marked with little archaeological remains. The number of sites uncovered to date is low.

- Pottery attributed to the Marateng phase (AD1650 to AD1840) is associated with stone walls which are common in the larger area. Whilst many of these sites can be associated with the Ndzundza-Ndebele others may hold affinities with Bokoni and Swazi derived communities.

- Inconspicuous, ephemeral stone walls or pieces of stone walls occur at random across the area and cannot also be associated with any particular period other than the Historical period or the Iron Age. Many of these sites and features may straddle both these periods. They were mostly built on or near rocky outcrops and in summer are barely visible when they are covered with tall grass and vegetation.

- The remains of ruins representing structures which were constructed with stones and bricks, or a mixture of these materials. They are mostly marked by rectangular and linear walls. These sites date from either the Historical period or from the recent past. When these remains date from the Historical period and were reoccupied in the more recent past they may have been altered to such an extent that they have little heritage significance.

6 APPROACH AND METHODOLOGY

This Phase I HIA study was conducted using the following methods:

6.1 Field survey

Field surveys were conducted during 1 to 2 November 2016 and on 17 November 2016. Archaeological visibility was good as the summer rain season had not commenced in this part of Mpumalanga and Limpopo.

Earlier surveys of the Booysendal project area were conducted by fieldworkers from as early as 2007 (Pistorius); Huffman and Schoeman [2001, 2002(a), 2002(b), 2002 (c)] and Van Der Walt and Celliers (2009, 2016). Track logs are not available for the early surveys as it was not required at the time that the surveys were conducted. Van der Walt & Cilliers tracks log is reflected in their report.

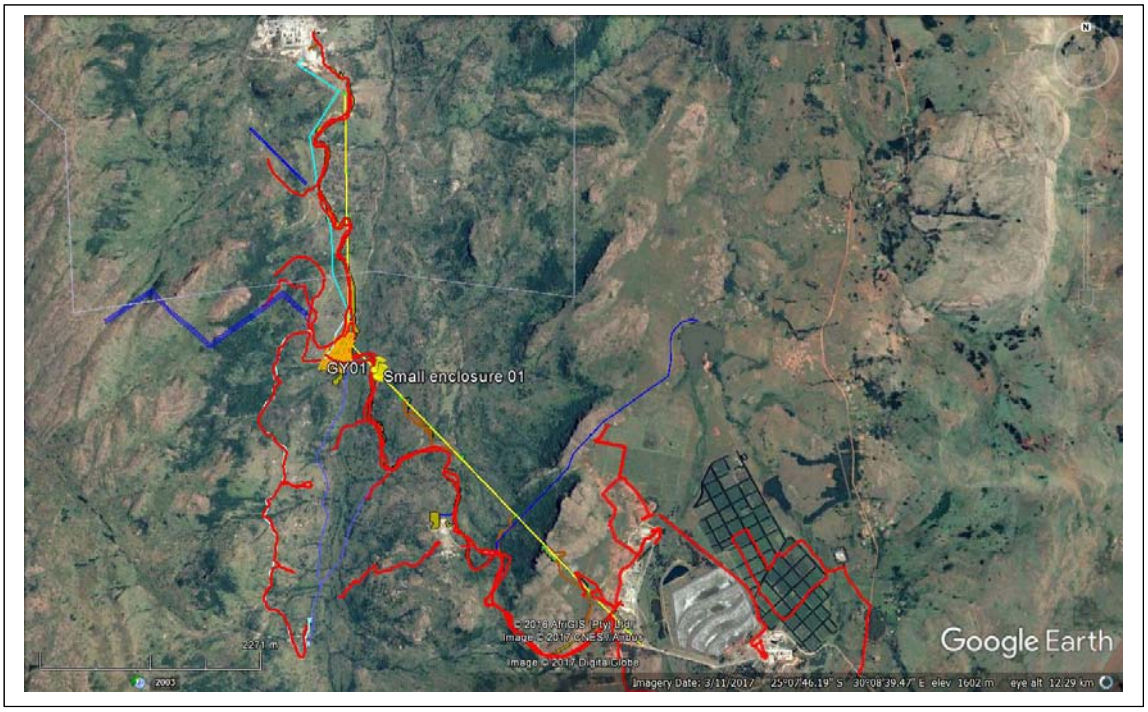


Figure 11- GPS track log which was registered with a mounted GPS instrument. Pedestrian surveys were conducted from the main pathway. Not all tracks were recorded as a result of signal loss (above).

The field survey for Everest and for the Meresnky Portals as well as the survey for the S24G activities was conducted by means of following prospector and mine roads in the Groot Dwars River Valley. Other accessible pathways such as 'two spoor' field tracks situated in the extremely rugged area were also utilized to enter the higher slopes of the valley in order to gain access to portions of the development's footprint such as the Merensky Portals. Only main routes were recorded with a mounted GPS instrument. Pedestrian surveys were undertaken from these primary access routes. Some of the tracks were unable to be recorded on GPS due to signal loss.

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

The north-eastern part of the project area is covered with Kiwi plantations. These plantations were not fully surveyed however, several tracks were travelled and recorded in this intensely disturbed part of the project area.

The central and southern part of Everest is disturbed by previous open cast mining activities and patches of rehabilitated land. Mine infrastructure is also concentrated in this part of the project area.

Ecological indicators such as alternations in vegetation patterns; open or bald spots in the veld; protrusions of boulders, low hills or patches with grass or extreme dense vegetation were searched as these could harbour stone walls or dwellings of farm workers who may have lived here in the past.

Google imagery served as a supplementary source (*prior* and after fieldwork) to establish the possible presence of heritage resources such as farm homesteads or extended stone walled villages.

The nature and character of the project area is further illuminated with descriptions and photographs in Part 5.3 'The nature of the Booysendal South Expansion Project Area' in the report.

6.2 Databases, literature survey and maps

Databases retained and maintained at institutions such as the PHRA, the Archaeological Data Recording Centre at the National Flagship Institute (Museum Africa) in Pretoria and SAHRA's national archive (SAHRIS) were consulted to determine whether any heritage resources of significance had been identified during earlier heritage surveys in or near the project area.

The author is acquainted with the project area at large as he has done several heritage impact assessment studies near the proposed project area. Several earlier heritage impact assessment studies have also been conducted by other fieldworkers in and within close proximity of the project area. These studies provided information regarding the nature and heritage characteristics of the area, namely (see Part 12 'Bibliography relating to earlier heritage studies').

The literature relating to the pre-historical and the historical unfolding of the larger Project Area was reviewed. This review focused on local historical groups such as the Petlas and Chomas who lived in the area, the Ndzundza-Ndebele who lived closer to Roossenekal and the Bakoni and Bapedi who lived in the larger region. The historical or colonial period is briefly referred to as the towns of Roossenekal and Lydenburg represent two of the oldest towns that were established by colonists (Voortrekkers) north of the Vaal River.

It is important to contextualise the pre-historical and historical background of the region in order to comprehend the identity and meaning of heritage sites in the project area and subsequently to determine the significance of any remains which may be affected by the Everest Project (see Part 7, 'Contextualising the Project Area' and Part 11, 'Select Bibliography').

In addition, the project area was also studied by means of maps on which it appears (2530AA Draaikraal, 1:50 000 topographical map).

6.3 Spokespersons consulted

No community or community members occupy the project area. Consequently, no one was consulted regarding the meaning and significance of some of the stone ruins present in the project area or any the possible intangible heritage matters (see below).

The larger part of the field survey was done in conjunction with Mr Dirk Hatting, Environmental Officer with Booysendal who is very well familiar with the Booysendal mining area at large (See Part 14, 'Spokespersons consulted').

6.4 Consultation process undertaken and comments received from stakeholders

No specific consultation process was undertaken for purposes of the heritage study as the stakeholder consultation process for the project is being conducted by Amec, Foster and Wheeler as part of the EMP Amendment process.

6.5 Significance rating

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

Likelihood:

1 = Unlikely	**2 = Possible**	**3 = Likely**	**4 = Definite Likelihood**
Low to no probability of occurrence with the implementation of management measures	Possible that impact may occur from time to time	Distinct / realistic possibility that impacts will occur if not managed and monitored	Impacts will occur even with the implementation of management measures

Duration:

1 = Temporary	2 = Short Term	3 = Long Term	4 = Permanent
Possible to within a short period of time mitigate / immediate or fairly quick progress with management implementation <3 years	Impacts reversible within a short period of time +3 to 5 yrs	Impacts will only cease after the operational life +/- 50 yrs	Long term, beyond mine closure or irreplaceable

Extent:

1 = Localised	2 = Site	3 = Area of Influence	4 = Regional/ Provincial/ National
Localised to specific area of activities	Confined to the site	The extent of the impacts will affect the wider area of Influence	Importance of the impact is of regional provincial or national importance

Magnitude (negative):

-1 = Low	-2 = Minor	-3 = Moderate	-4 = High
Deterioration of baseline conditions or functions are negligible Nuisance Will not cause any material change to the value or function of the receptor/s of Emissions will comply with legal limits Emissions contained within footprint within limits	Moderate deterioration, partial loss of habitat / biodiversity/ social functions or resources, Emissions at times exceed legal limits Emissions reach outside project footprint	Reversible although substantial illness, injury, loss of habitat, loss of resources Notable deterioration of functions Impact on biodiversity Causes a change in the value or function of receptor but does not fundamentally affect its overall viability Emissions regularly exceed legal limits	Mainly irreversible Causes a significant change in the environment affecting the viability, value and function of the receptors Substantial impact and loss of biodiversity Death/ loss of receptors Loss of livelihood Emissions do not comply with regulations Impact on listed species

		Emissions will affect the wider region Livelihood of sensitive receptors are impacted	

Magnitude (positive):

+1 = Low	+2 = Minor	+3 = Moderate	+4 = High
Slight enhancement of baseline conditions or functions Potential pollution sources are removed Slight positive change to the value or function of the receptor/s Project controls assists in Emissions will comply with legal limits Emissions contained within footprint within limits	Minor enhancement, of habitat / biodiversity/ social functions or resources, Better control of emissions Project assist in management and control of emissions	Substantial improvement in human health habitat, and ecosystem services Notable improvement of functions Moderate improvement of biodiversity Causes a change in the value or function of receptor and improves overall viability Emissions regularly improves Livelihood of sensitive receptors are improved	Significant positive change in the environment viability, value and function Substantial impact and improvement of biodiversity Better protection of receptors Development of livelihood Emissions improve to comply with regulations Protection of listed species

Sensitivity:

1 = Low	2 = Moderate Low	3 = Moderate	4 = High
Areas already subjected to significant degradation Non-designated or locally designated sites/habitats Non-sensitive receptor with regards to the impact type (e.g. noise receptors) No vulnerable	Partially degraded area Sensitive receptors present Small number of vulnerable communities present	Regionally designated sites / habitats Regionally rare or endangered species Moderately sensitive receptor with regard to the impact type Some vulnerable communities present	Nationally or internationally designated sites/habitats Species protected under national or international laws / conventions High sensitivity with regard to the impact type High number of vulnerable communities

communities			present High dependency

Significance

The significance of the impact is calculated as follow:

Significance = (Likelihood + duration + extent + sensitivity) x magnitude

		Likelihood + duration + extent + sensitivity			
		Low (+ / -) ≤4	Minor (+/ -) 5 – 8	Moderate (+ / -) 9 – 12	High (+ / -) 13 – 16
Magnitude	Low (1)	Not significant	Not significant	Minor	Moderate
	Minor (2)	Not significant	Minor	Minor	Moderate
	Moderate (3)	Minor	Moderate	Moderate	High
	High (4)	Moderate	High	High	High

7 CONTEXTUALISING THE PROJECT AREA

The larger study area falls within a geographical area which includes parts of southern Sekhukhuneland, the Steelpoort Valley as well as the Lydenburg and Roossenekal (KoNomtjarhelo) areas which are important historical beacons close to the Project Area. The following overview of pre-historical, historical and cultural evidence indicates the wide range of heritage resources which do occur across the larger study area (see Part 11 'Select Bibliography' and Part 12 'Bibliography of earlier heritage studies').

7.1 Early Stone Age

Stone Age sites are marked by stone artefacts that are found scattered on the surface of the earth or as parts of deposits in caves and rock shelters. The Stone Age is divided into the Early Stone Age (ESA) (covers the period from 2.5 million years ago to 250 000 years ago), the Middle Stone Age (MSA) (refers to the period from 250 000 years ago to 22 000 years ago) and the Late Stone Age (LSA) (the period from 22 000 years ago to 200 years ago). The earliest ancestors of modern humans emerged some two to three million years ago (Deacon & Deacon 1999; Keykendall & Strkalj 2007)

The project area which partly extends over the Groot Dwars River Valley and adjacent escarp may have been occupied from the earliest times although remains dating from the ESA have not yet been discovered. The earliest occupation of the area may have been by Homo Erectus who lived 500 000 years ago. Acheulian hand axes and cleavers may occur on the forested valley floors along the Groot Dwars River. Homo Erectus successful adaptation contributed to the Acheulian having a wide distribution over the world with a preference for wooded areas. Towards the end of the Acheulian phase (Sango industry) Home Erectus manufactured picks, plains and other tools that were successfully utilized in forested areas (Deacon and Deacon 1999).

7.2 Middle Stone Age

Middle Stone Age (MSA) sites dating from as early as two hundred thousand years ago have been found all over South Africa. Therefore, MSA hunter-gatherer bands once lived and hunted across the larger part of the country. MSA people, who probably looked like modern humans, occupied camp sites near water but also occupied caves. They manufactured a wide range of stone tools, including blades and points that have been hafted in long wooden sticks which were used as spears. They also used bow and arrows making them skilled hunters (Deacon & Deacon 1999).

Middle Stone Age (MSA) sites are numerous and date from 250 000 years ago and are associated, initially, with an archaic form of *Homo sapiens* and later with modern humans (*Homo sapiens sapiens*). MSA people must have roamed the study area as a limited number of artefacts from this time period were discovered in the Groot Dwars River Valley (Huffman & Schoeman 2002[a]). MSA people manufactured stone tools with prepared surface platforms, points (for arrows) and stone tools that were hafted in wooden handles such as spears and knives. They also occupied caves and rock shelters (Deacon and Deacon 1999).

7.3 Later Stone Age

Later Stone Age San (LSA) hunter-gathers established base camps in caves and on level plains. Some of these sites may be as old as 20 000 years. LSA occupation of the Mpumalanga Province also has been researched at Bushman Rock Shelter near Lydenburg where it dates back 12 000BP (Before Present) to 9 000BP and at Höningnestkrans near Badfontein where a LSA site dates back to 4 870BP to 200BP (Esterhuysen & Smith 2007).

The LSA period is also associated with rock engravings and rock paintings. Approximately 400 rock art sites are distributed throughout Mpumalanga and can be divided into San rock art which is the most wide spread, herder or Khoe Khoe (Khoi Khoi) paintings (thin scattering from the Limpopo Valley) through the Lydenburg district into the Nelspruit area) and localised late white farmer paintings. Farmer paintings can

be divided into Sotho-Tswana finger paintings and Nguni engravings (Only 20 engravings occur at Boomplaats, north-west of Lydenburg). Farmer paintings are more localised than San or herder paintings and were mainly used by the painters for instructional purposes (Smith & Zubieta 2007).

A rock engraving which date from the more recent past were recorded against the eastern slope of the Groot Dwars River Valley (Huffman & Schoeman 2001, 2002[a], 2002[b] & 2002[c]**)** and it is possible that more engravings may exist in this valley.

7.4 Early Iron Age

The Iron Age is associated with the first agro-pastoralists or farming communities who lived in semi-permanent villages and who practised metal working during the last two millennia. The Iron Age is usually divided into the Early Iron Age (EIA) (covers the 1st millennium AD) and the Later Iron Age (LIA) (covers the first 880 years of the 2nd millennium AD) (Mason, 1986; Huffman 2007)

Bantu-Negroid farmers and metalworkers, the first Early Iron Age (EIA) people established large settlements in the Steelpoort Valley and near Lydenburg 1 500 years ago. EIA sites were investigated at Sterkspruit (near Lydenburg, AD720) and in Nelspruit where the provincial governmental offices were constructed. The most infamous EIA site in South Africa is the Lydenburg head site which provided two occupation dates, namely AD600 and from AD900 to AD1100. At this site the Lydenburg terracotta heads were discovered. Doornkop, located south of Lydenburg, dates from AD740 and AD810 (Evers 1981; Whitelaw 1996).

Although no EIA sites have been uncovered in the study area an Eiland type site (AD1000 to AD1300) was recorded in the Groot Dwars River Valley (Huffman & Schoeman 2001, 2002[a], 2002[b] & 2002[c]). Little is known about the Eiland people except that they manufactured a characteristic style of pottery, practised metal working, herded with cattle and probably kept small stock as well. They built dwellings with clay and grass roofs. Grinding stones indicate that they either planted crops or traded metal for crops.

7.5 The Late Iron Age

The LIA is well represented in Mpumalanga and stretches from AD1600 into the nineteenth century and the Historical Period. Several spheres of influence, mostly associated with stone walled sites, can be distinguished in the region. Historically spheres of influence close to the study area include the following:

- Early arrivals in the Mpumalanga Province such as Bakone clans who lived between Lydenburg, Badfontein and Machadodorp and Eastern Sotho clans such as the Pai, Pulana and Kutswe who established themselves in the eastern parts of the province (Collett 1979, 1983; Delius 2007; Makhura 2007; Delius & Schoeman 2008).
- Swazi expansion into the Highveld and Lowveld of the Mpumalanga Province occurred during the reign of Sobhuza (AD1815 to 1836/39) and Mswati (AD1845 to 1868) while Shangaan clans entered the province across the Lembombo Mountains in the east during the second half of the nineteenth century (Delius 2007; Makhura 2007.).
- The Bakgatla (Pedi) chiefdom in the Steelpoort Valley rose to prominence under Thulare during the early 1800's and was later ruled by Sekwati and Sekhukune from the village of Tsjate in the Leolo Mountains. The Pedi maintained an extended sphere of influence across the Limpopo and Mpumalanga Provinces during the nineteenth century (Mönnig 1978; Delius 1984).
- The Ndzundza-Ndebele established settlements at the foot of the Bothasberge (Kwa Maza and Esikhunjini) in the 1700's and lived at Erholweni from AD1839 to AD1883 where the Ndzundza-Ndebele's sphere of influence known as KoNomtjarhelo stretched across the Steenkampsberge (Van Vuuren 1983).
- Stone walled settlements spread out along the eastern edge of the Groot Dwars River Valley served as the early abode for smaller clans such as the Choma and Phetla which date from the nineteenth century.

The majestic Leolo Mountain range to the north-west of the Steenkampsberge is an important beacon in the origin history of many indigenous Sotho speaking groups which now are scattered across the Limpopo Province.

7.6 Historical Period

During the early Historical Period the Ndzundza-Ndebele occupied the Mapochsgronden and established their capitol Erholweni (Mapochs Caves) near Roossenekal. Numerous sites that are associated with the Ndzundza-Ndebele and possibly with Swazi (Mokwana) clans are scattered around Erholweni in a sphere of influence that is known as KoNomtjarhelo. The Ndzundza-Ndebele ruled this domain for approximately forty-four years (1839 to 1883) under the consecutive reigns of four chiefs. Voortrekker colonist also occupied the Mapochsgronden from the early nineteenth century onwards. Erholweni was declared a national monument in 1968 (Grove 1999, Van Vuuren 1983, Van Jaarsveld 1985).

During the 18th and the 19th centuries lesser well known clans such as the Phetlas and Chomas settled in an area to the east of Roossenekal. Here they build an extensive and diversified range of stone walled sites many with graveyards located in cattle enclosures.

Colonists who left the Cape Colony in the early 19th century established themselves to the north of the Vaal River in three of the oldest towns in the former Eastern Transvaal Province, namely Ohrigstad, Lydenburg and Roossenekal during the late 1830's. Conflict between the Colonists and the Ndzundza-Ndebele on Mapochsgronden eventually lead to at least two wars. During the Mapochs Wars as many as thirty to forty blockhouses were built around Erholweni in order to serve as bulwarks for ZAR forces fighting the Ndundza-Ndebele. These forts eventually contributed to the siege of the Mapochs Caves and the final subjugation of the Ndzundza-Ndebele in 1867. The colonists established farm homesteads with outbuildings, agricultural fields, cattle kraals and cemeteries. Some of these heritage resources still exist in the larger project area.

Together with the colonists a unique stone architectural heritage was established on eastern Highveld which stretched from the second half of the 19th century well into the early 20th century. Stone was used to build farmsteads and dwellings, both in urban and in rural areas. The variety of stone types that were used included sandstone, ferricrete ('ouklip'), dolerite ('blouklip'), granite, shale and slate (Naude 1993, 2000).

Villages and homesteads occupied by labourers in the service of farmers, in conjunction with graveyards, after the Pedi and Ndzundza-Ndebele were disbanded, are common throughout the larger study area.

7.7 The early mining period

The project area is located on the eastern limb of the Merensky Reef in the southern part of the Steelpoort Valley. The Merensky Reef is composed of the crescent-shaped Bushveld Complex that stretches across the central part of South Africa. This Reef is known for its wealth of mineral resources, generally referred to as the platinum-group metals (PGM's) (Wilson & Anhauser 1998). The first discovery of the eastern limb of the Merensky Reef can be traced back to the early decades of the 20th century when the reef was exposed from the Leolo Mountain range in the north to where the Steenkampsberg, west of the Dwars River (Dwars River range), commences as a continuation of the Leolo Mountain range in the south (Wagner 1973).

The Merensky Reef occurs, geographically, in the westerly and the easterly parts of the Bushveld Complex. These two limbs of the Complex are confined to the North-West, Mpumalanga and northern Limpopo Provinces. The norite zone in which the Merensky Reef outcrops is a rugged mountainous terrain, except in the extreme north-western sector. The area is dominated by, high, rough-looking scrub-covered hills and ridges that alternate with flat-bottomed valleys. The 4 perennial streams being, the Olifants, Tubatse, Dwars and Moopetsi Rivers traverse the platinum fields and contain a number of powerful springs . The Merensky Reef has been traced and estimated to have a total distance strike extent of 283 km of which 138 km is part of the eastern limb and 145 km in the western limb of the Bushveld Complex. Vertical depths of 1 900 m have been registered along the Reef, which also indicates its continuity. The eastern limb of the Reef is geologically less well known than the western limb,

because mining activities in this part of the Reef have been limited (Wagner 1973, Viljoen and Reimold 1999).

Andries Lombaard's discovery of platinum nuggets in the Moopetsi River on the farm Maandagshoek in the Steelpoort area in 1924 can be considered the initial discovery of the Merenky Reef (Lombaard 1945).

7.8 Earlier archaeological and heritage studies

Two provincial heritage sites occur in the region, namely the Mapochs Caves (Erholweni) and the Groot Dwars River geological occurrence. The geological site is situated 28km to the north of the Booysendal South Expansion Project whilst the Mapochs Caves is located 20km to the west of the Booysendal South Expansion Project. These sites will in no way be directly influenced by this project.

A number of heritage impact assessment studies for various Environmental Impact Assessment Reports (EIAs) and for Environmental Management Programmes (EMPs) mostly for platinum, chrome, vanadium and granite mines have been completed by archaeologists and heritage specialists (Huffman & Schoeman 2001, 2002[a], 2002[b] & 2002[c]; van Schalkwyk 2005; Roodt 2003[a], 2003[b], 2003[c], 2005, 2008[a], 2008[b]; Van der Walt & Fourie 2006; Van der Walt & Celliers 2009, 2016 and Pistorius 2007, 2010 and 2011). These studies outline the general heritage character of the region and the most common types and ranges of heritage resources to be expected across the wider landscape. According to Van Der Walt & Cilliers (2016) more than 240 heritage sites ranging from the MSA to the recent past have been recorded in the wider area since 2002.

These studies as well as earlier post graduate studies and a number of scientific articles on the settlement history and conflict between the Ndzundza Ndebele and the colonists on Mapochsgronden illuminate the general heritage character of the larger study area (Van Vuuren 1983, Van Jaarsveld 1985). This information provides a general baseline for the heritage character of the Booysendal South Expansion Project area.

The spatial distribution of these settlements reflects different uses of the landscape. Whilst many agriculturally-orientated societies (Eiland, Leolo and Marateng pottery styles) built their villages in valleys near cultivatable alluvium others (probably Ndebele) built settlements with terraces along the lower slopes of hills and low mountains. From AD 1838 onwards, colonial framers constructed farmsteads and other structures such as cattle enclosures near dolerite dykes on high vantage points on meadows utilizing grazing veld as pastures for cattle, dolerite as building material and the high viewpoints for protection purposes. The latter was necessitated as a result of increasing conflict with the Ndzundza- Ndebele in the area.

According to the SAHRIS Paleo Sensitivity map most of the study area is classified as being of zero and low palaeontological sensitivity. According to SAHRIS no palaeontological studies are required although a protocol for finds is required which is included in the paleontological report (Rubidge 2011).

The most common types and ranges of heritage resources in the larger area so far uncovered during heritage surveys include the following:

- MSA artefacts which occur as isolated finds over the landscape (Huffman 2007, Van Der Walt & Celliers 2016). These artefacts are sparse and too widely scattered to be of any significance. Their presence, however, has been noted in earlier reports.

- Decorated pottery belonging to Eiland stylistic facies (AD1550 to AD1750) have been recorded in the larger area (Huffman 2007: 186-189). These sites are not marked by any stone walls and therefore are difficult to detect as they are also marked with little archaeological remains. The number of sites uncovered to date is low.

- Pottery attributed to the Marateng phase (AD1650 to AD1840) is associated with stone walls which are common in the larger area (Huffman 2007: 207). Whilst many of these sites can be associated with the Ndzundza-Ndebele others may hold affinities with Bokoni and Swazi derived communities.

- Inconspicuous, ephemeral stone walls or pieces of stone walls occur at random across the area and cannot also be associated with any particular period other than the Historical period or the Iron Age. Many of these sites and features may straddle both these periods. They were mostly built on or near rocky outcrops and in summer are barely visible when they are covered with tall grass and vegetation.

- The remains of ruins representing structures which were constructed with stones and bricks, or a mixture of these materials. They are mostly marked by rectangular and linear walls. These sites date from either the Historical period or from the recent past. When these remains date from the Historical period and were reoccupied in the more recent past they may have been altered to such an extent that they have little significance any longer.

8 HERITAGE SURVEY FOR THE BOOYSENDAL SOUTH EXPANSION PROJECT

2 heritage surveys and assessments were conducted for the Booysendal South Expansion Project. The first study for the BS1/BS2 and BS3 areas was done by HCAC in 2016 whilst the author conducted a survey for the BS4 (Everest) development in November 2016. A second survey by the author in November 2016 was aimed at establishing whether any heritage resources may have been negatively influenced as a result of the early commencement of development activities (S24G activities) *prior* to environmental authorisation for the Booysendal South Expansion Project. This survey also focussed on the Merensky Portal areas. The results of these three surveys are discussed.

8.1 Paleontology

According to the SAHRIS Paleo sensitivity map most of the study area is classified as being of zero palaeontological sensitivity although the developments on the farm De Kafferskraal are in an area marked as of low palaeontological sensitivity. According to SAHRIS no palaeontological studies are required. A previous Paleontological study on the farms Hoogland 38-JT, Sterkfontein 52-JT and Sterkfontein 74-JT which was done by Rubidge (2011) concurs with the SAHRIS recommendations (Van der Walt and Celliers 2016).

8.2 Heritage resources in the BS1/BS2 and BS3 areas

Booysendal South (BS1/BS2 and BS3) was subjected to a heritage survey by Van Der Walt & Celliers in 2016. According to the authors '[a] total of 49 sites are on record for the study area. The current assessment identified 32 sites within the study area. In addition to the newly recorded sites a further 17 sites are on record from previous surveys that covered sections of the study area' (Figure 12, Table -1).

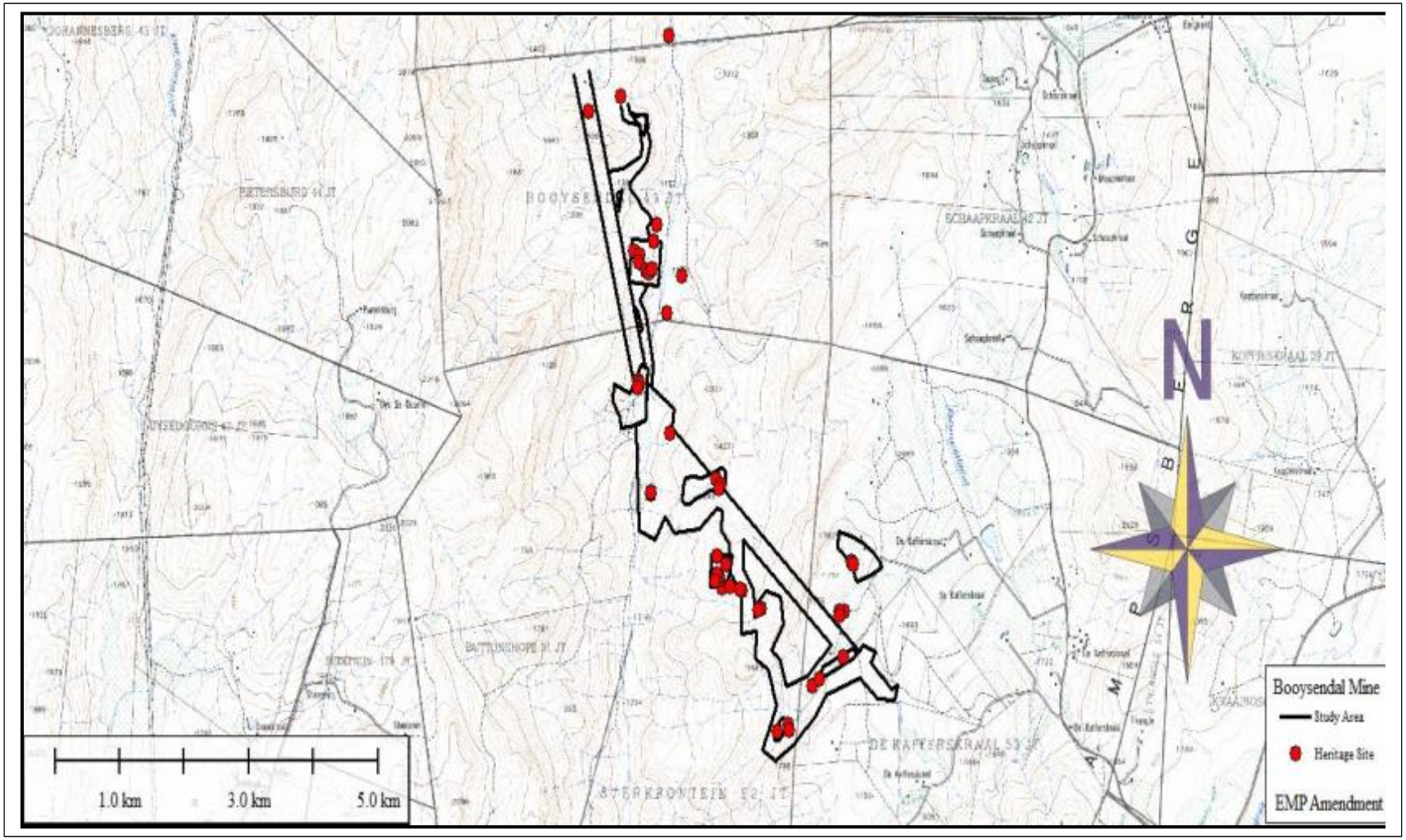


Figure 12- Heritage resources as identified and mapped by van der Walt & Celliers in the BS1/BS2 and BS3 areas during a survey in 2016 (above).

Table 1-Heritage resources documented by van der Walt & Cilliers in 2016 in the BS1/BS2 and BS3 Booysendal south area (below).

FIELD NUMBER	TYPE SITE	LONGITUDE	LATITUDE
344	Historical Ruin	30° 06' 55.5553" E	25° 05' 53.9016" S
345	Historical Ruin	30° 07' 01.9849" E	25° 06' 50.1949" S
346	Historical Ruin	30° 07' 05.0483" E	25° 06' 51.8832" S
347	Cemetery	30° 07' 04.3609" E	25° 06' 54.3563" S
350	Iron Age	30° 07' 07.7520" E	25° 06' 57.3659" S
351	Stone Cairn	30° 07' 09.8977" E	25° 06' 57.6288" S
352	Communal Grinding Area	30° 07' 09.7031" E	25° 06' 58.3201" S
353	Historical Ruin	30° 07' 13.6201" E	25° 06' 40.8419" S
354	Historical Ruin	30° 07' 03.7236" E	25° 07' 37.1279" S
355	Historical Ruin	30° 07' 04.7927" E	25° 07' 38.4493" S
356	Historical Ruin	30° 07' 04.1771" E	25° 07' 40.1231" S
357	Historical Ruin	30° 07' 20.0280" E	25° 07' 56.5068" S
358	Terracing	30° 07' 43.1401" E	25° 08' 13.0885" S
359	Stone Cairn	30° 07' 45.6851" E	25° 08' 14.9603" S
360	Terracing	30° 07' 44.4757" E	25° 08' 16.7065" S
362	Historical Ruin	30° 07' 10.3331" E	25° 08' 18.5640" S
363	Possible Graves	30° 07' 10.3835" E	25° 08' 18.1609" S
365	Stone Cairn	30° 07' 43.4497" E	25° 08' 41.3449" S
366	Terracing	30° 07' 48.1513" E	25° 08' 44.3364" S
367	Terracing	30° 08' 05.8560" E	25° 09' 00.1260" S
368	Terracing	30° 08' 04.3404" E	25° 09' 00.7093" S
369	Rock Engraving	30° 07' 19.4088" E	25° 05' 31.7004" S
370	Iron Age	30° 08' 46.8169" E	25° 09' 17.9029" S
372	Linear Stone Wall	30° 08' 50.9171" E	25° 08' 43.1629" S
373	Historical Ruin	30° 08' 51.9901" E	25° 08' 44.2607" S
374	Cemetery	30° 08' 19.0859" E	25° 09' 42.5808" S
375	Stone Cairn	30° 08' 13.5241" E	25° 09' 44.8777" S
376	Linear Stone Wall	30° 08' 19.9969" E	25° 09' 44.1683" S
378	Terracing	30° 06' 39.4199" E	25° 05' 59.6185" S
379	Iron Age	30° 6'39.87"E	25° 6'8.13"S
600	Terracing	30° 07' 10.7868" E	25° 06' 56.5956" S
601	Terracing	30° 07' 11.9820" E	25° 06' 46.8144" S
602	Grave	30° 08' 47.2000" E	25° 09' 01.0000" S
603	Historic Pedi Complex	30° 08' 45.0000" E	25° 09' 01.0000" S
604	MSA	30° 08' 45.0000" E	25° 09' 02.8000" S
605	Stone Kraal 2	30° 08' 31.4000" E	25° 09' 28.2000" S
606	Stone Kraal	30° 08' 34.8000" E	25° 09' 26.0000" S
607	Grave	30° 08' 41" E	25° 09' 30" S
608	Iron Age	30° 07' 26.2000" E	25° 06' 59.3001" S
609	Iron Age	30° 07' 18.6001" E	25° 07' 12.9000" S
610	Iron Age	30° 07' 56.3401" E	25° 08' 53.6399" S
611	Iron Age	30° 07' 45.9600" E	25° 08' 52.6800" S
612	Iron Age	30° 07' 55.2601" E	25° 08' 53.2799" S
612	Iron Age	30° 07' 54.9599" E	25° 08' 52.9199" S
613	Iron Age	30° 07' 50.3401" E	25° 08' 52.1399" S
614	Iron Age	30° 07' 45.3601" E	25° 08' 49.4999" S
615	Iron Age	30° 07' 44.7599" E	25° 08' 48.4200" S
616	Iron Age	30° 07' 43.4401" E	25° 08' 47.8801" S
617	Iron Age	30° 07' 42.4799" E	25° 08' 50.3400" S

8.3 Heritage resources in the BS4 (Everest) and portal areas

The author conducted a heritage survey for the BS4 (former Everest operation) and for the Merensky Portals. The remains that were encountered were mainly confined to historical remains and graveyards.

8.3.1 Historical remains

Historical remains refer to finds which can be associated with the historical era which commenced when the first colonists (Voortrekkers) settled in Roossenekal in AD1838. These remains include material and non-material evidence which were the result of colonial activities as well as remains which are associated with indigenous people who, in some instances, adapted their material culture in such a way that contact and exchange with colonial material culture is reflected in new settlement styles or other cultural elements. This contact is also visible in newly acquired items and artefacts such as tin ware, porcelain, glass, etc. Historical remains in the BS4 area therefore are discussed in two categories, namely remains associated with colonists and remains that were produced by indigenous people.

Stone walls, some short and others longer, as well as single enclosures occur across the project area in low numbers. These walls are inconspicuous and are not associated with any extended settlements or even with small homesteads. They were mostly built on or near rocky outcrops and are in some instances barely visible as they are covered with grass and vegetation. Due to the fact that they do not have any context little can be said of these remains except that they are part of the larger cultural landscape.

8.3.1.1 Colonial historical remains

A colonial dwelling (H01) with an elongated ground plan and constructed with dolerite stone occur on the highlands far to the south of BS4 (Figure 13). This dwelling was probably fitted with a pitched corrugated iron or a thatched grass roof. Only part of one walls of the house is still intact.

This dwelling was occupied by a bachelor with the name of Ben Willemse during the 1940's. It is highly likely that the dwelling served as the original residence of the two Coetzee people who were buried in GY01 close to the dwelling. H01 probably dates from the late 19th century or the early twentieth century and will not be affected by the BS4 activities.

Figure 13- The remains of H01 which probably was occupied by some of the first colonial farmers who settled in the Steenkampsberge during the nineteenth century (above).

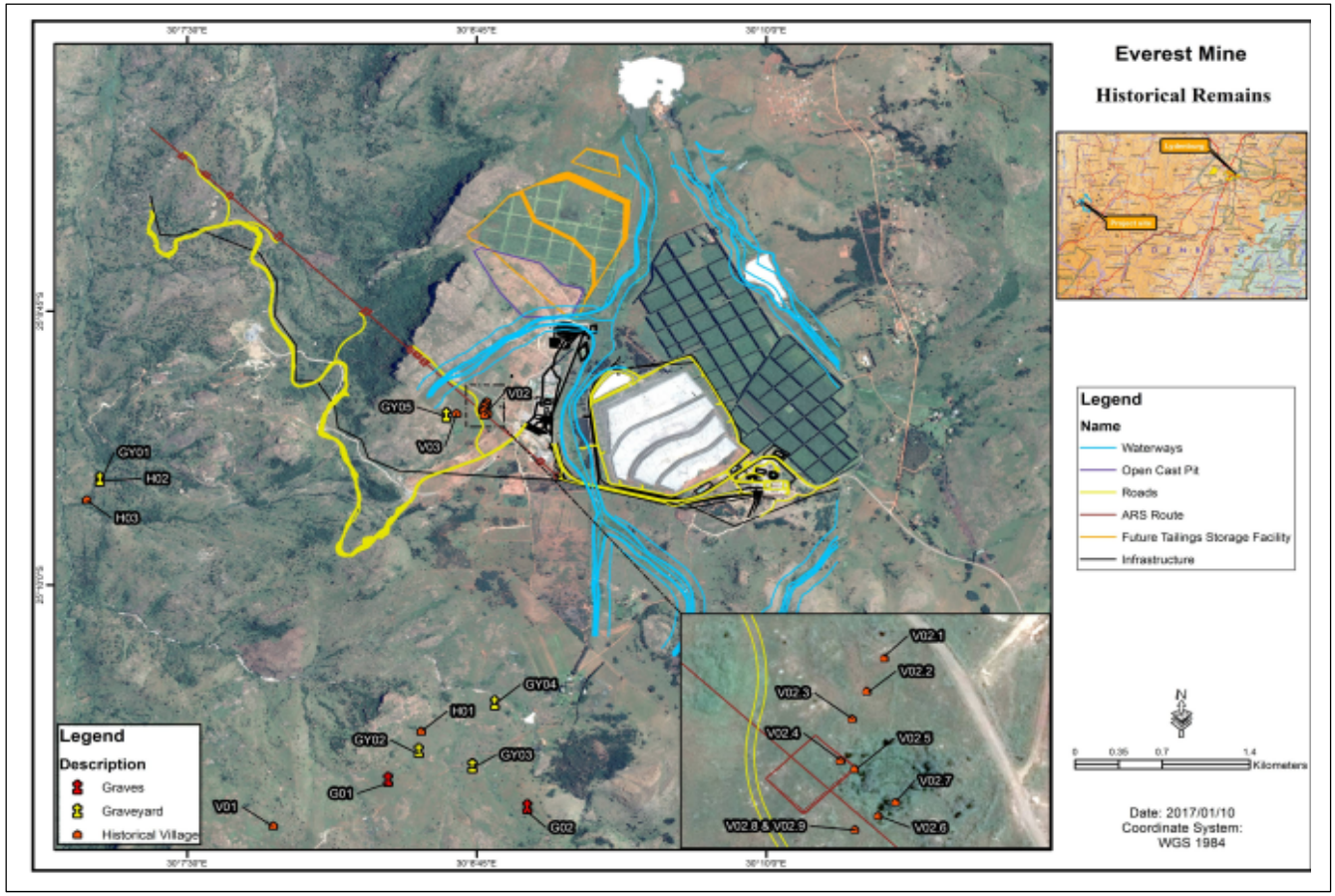


Figure 14- Heritage survey for the BS4 area (and Merensky Portals not visible) revealed the presence of historical remains and graveyards in the BS4 area (above).

8.3.1.2 Indigenous historical remains

Historical remains which are associated with indigenous people such as the Nzundza-Ndebele, Chomas or Petla's comprise the following:

8.3.1.2.1 Two hamlets

2 hamlets or homesteads (H02 and H03) which were probably occupied by 2 family groups occur on the eastern bank of the Groot Dwars River Valley, approximately 120m below the escarp (Figures 15 -17).

Both hamlets were constructed with stone walls which probably served as enclosures for small stock or as protective walls in which dwellings were constructed. Hamlet H03 holds the remains of a large dwelling which was constructed with a mixture of clay and rubble.

Both hamlets are associated with a number of lower and upper grinding stones. Hamlet (H02) is also associated with a graveyard with 3 graves (GY01). These remains will not be affected by the project.

Figure 15- Stone walls and upright stones in a hamlet (H02) on the eastern bank of the Groot Dwars River Valley (above).

Figure 16- An enclosure built with stone in the second hamlet (H03) on the eastern bank of the Groot Dwars River Valley (above).

Figure 17- Lower grinding stones occur in both hamlets in the historical village on the bottom of the Groot Dwars River Valley (below).

Figure 18- The remains of a small stone walled village against the slope of a low hill to the south of the mining area (above).

8.3.1.2.2 A small village

These remains (HV01) consist of a number of dwellings which were located along the lower southern slope of a kopje on the highlands far to the south of BS4 (Figures 18, 19). The village may have contained as many as 10 dwellings which were constructed with mud and which were either attached to stone walls or which were located within the perimeters of stone walls. Only the stone walls of the village have survived. These remains will however not be affected by the project.

Figure 19- A prominent structure constructed with stone may have served as the gathering place for men (*kgotla*) in a small village located against the slope of a low hill (above).

8.3.1.2.3 A second small village

The remains of a second small village (HV02) occur in the midst of the BS4 Project (Figures 20-21). These remains comprise of several structures which were constructed with stone. These included heavy solid stone walls, short stretches of walls, a half-circle and at least two piles of stone.

A lower grinding stone on the surface of a rock is situated next to the largest enclosure in the complex. The village was constructed in and around several large boulders and is currently overgrown with vegetation. This village will be affeceted by the proposed Aerial Ropecon System.

Figure 20- The entrance to one of the enclosures in village HV02 is constructed with a heavy solid stone wall (above).

Figure 21- A lower grinding stone on the surface of a natural rock near the largest enclosure in the village (above).

8.3.1.2.4 A third small village

This village (HV03) comprises of 3 to 4 structures which represent residential remains or dwellings and a small enclosure (Figures 22-23). The residential remains include dwellings constructed with clay bricks and which were plastered. These dwellings which are severely dilapidated date from the recent past. A possible older residence was constructed with stone and is composed of several rooms. A small enclosure close to GY05 but some distance from the residences may be part of V03.
This village will not be affected by the project.

Figure 22- An elongated structure such as a possible residence which was constructed with stone in HV03 (above).

Figure 23- A small enclosure in close proximity of GY05 may be part of HV03 (above).

8.3.2 Graveyards and graves

The following graveyards and a possible grave were observed in and near the project area, namely:

8.3.2.1 Graveyard 01

This graveyard (GY01) holds 3 graves one of which is fitted with a cement slab and headstone but with no inscriptions (Figure 24). The other 2 graves are demarcated with stones. These graves are probably older than 60 years and will not be affected by the project.

Figure 24 - Three graves near hamlet H01 on the bottom of the Groot Dwars River Valley (above).

8.3.2.2 Graveyard 02

This graveyard (GY02) holds 2 graves which are both fitted with dolerite headstones and with cement slabs (Figure 25). However, the inscriptions on the headstones cannot be deciphered - except for the name 'Anna Coetzee (1882 or 1892)' on one of the headstones. These graves are probably older than 60 years. GY02 will not be affected by the BS4 activities.

Figure 25 - The two graves of the Coetzee family (GY02) are located near the remains of a colonial dwelling. Both are older than sixty years (above).

8.3.2.3 Graveyard 03

This graveyard (GY03) is located within an elongated enclosure which was constructed with stone (Figure 26). It holds the remains of at least thirteen members of the Phetla community. Most of the graves are demarcated with stones whilst at least 5 are fitted with cement headstones.

Most of these graves are probably older than 60 years but will not be affected by the BS4 activities.

Inscriptions on some of these headstones read as follow:

- 'Lazarus Phetla Lehu 11/11/1954'
- Jacobus Phetla Lehu 1954'
- Phetla Phoku'

Figure 26 - The graveyard (GY03) of members of the Phetla clan is located within the confines of a stone walled enclosure (above).

8.3.2.4 Graveyard 04

This is a relatively large graveyard (GY04) with at least 15 graves of which many are fitted with granite headstones (Figure 27). It is located on flat grassland some distance to the south of the BS4 activities and will not be affected by the development .

These graves are all probably older than 60 years.

Inscriptions on some of the headstones read as follow:

- 'Mathlako Magosabo Sabhina *07-02-1914 †15-12-1951
- 'Makhalema Maria Phetla *1933-01-12 †2000-04-02'
- 'Moses Mogalakane *1946-11-09 †1984-06-20'

Figure 27 - Graveyard 04 holds as many as fifteen graves most of which are decorated (above).

8.3.2.5 Graveyard 05

This graveyard (GY05) holds at least 9 graves (Figure 28). Three of the graves are decorated whilst the remainder are covered with heaps of stone.

Inscriptions on 2 of the headstones read as follow:

- 'Makolo Mamashego Ennicah *04-12-1920 †21-12-2002'
- 'Phetla Mantsukuyane Marriam *11-03-1956 †31-07-2004'

These graves are all probably older than 60 years.

GY05 is fenced with a dilapidated and partly collapsed fence which is fitted with an entrance gate. GY05 will not be affected by the BS4 activities.

Figure 28 - Graveyard 05 holds nine graves of which six are decorated (above).

8.3.2.6 Grave 01

This single grave (G01) is covered with a cement slab and fitted with a cement headstone (FIGURE X). The inscription on the headstone is undecipherable. G01 will not be affected by the BS4 activities.

Figure 29 - G01 is a single grave in an iron framework (above).

8.3.2.7 Grave 02

This single grave is located some distance from the mine's infrastructure. It is fitted with a dolerite headstone with no inscription. It will not be affected by the BS4 activities.

Table 2 - Coordinates and significance rating for historical remains (below).

LEGEND ON MAP	HISTORICAL VILLAGE	COORDINATES	SIGNIFICANCE RATING
H01	Historical House Coetzee family	25º 10.667'S; 30º 08.511'E	**Medium to high**
H02	1st Hamlet in Groot Dwars River Valley	25º 09.517'S; 30º 07.124'E	**Medium to high**
H03	2nd Hamlet in Groot Dwars River Valley	25º 09.610'S; 30º 07.067'E	**Medium to high**
V01	Village against the slope of a hill	25º 11.099'S; 30º 07.871'E	**Medium to high**
V02	Village situated between and next to boulders	25º 09.224'S; 30º 08.782'E	**Medium to high**
V03	Close to GY05 dates from more recent past	25º 09.216'S; 30º 08.662'E	**Medium to high**

Table 3- Coordinates for graveyards and graves (above).

LEGEND ON MAP	GRAVEYARDS AND GRAVES	COORDINATES	SIGNIFICANCE RATING
GY01	Three graves on bottom of Groot Dwars River Valley	25º 09.517'S; 30º 07.124'E	**HIGH**
GY02	Graves of Coetzee family associated with HH01	25º 10.755'S; 30º 08.500'E	**HIGH**
GY03	Graveyard of the Phetla community with 13 graves	25º 10.826'S; 30º 08.732'E	**HIGH**
GY04	Holds approximately 15 graves	25º 10. 538'S; 30º 08.828'E	**HIGH**
GY05	Holds nine graves	25º 09.244'S; 30º 08.619'E	**HIGH**
G01	Single grave in iron frame	25º 10. 877'S; 30º 08.367'E	**HIGH**

G02	Single grave with upright stone acting as headstone	25º 11. 012'S; 30º 08.968'E	**HIGH**

8.4 Heritage survey for S24G activities

A follow-up heritage survey was conducted by the author in conjunction with Mr. Dirk Hatting, Environmental Officer at Booysendal on 1 and 2 November 2016 to investigate whether the premature implementation of development activities may have impacted on some of the heritage resources that were identified and recorded by Van der Walt & Celliers during 2016. The survey also focused on the Merensky Portals.

Heritage resources that were impacted as a result of the premature implementation of the Booysendal South Expansion Project's developmental activities are the following, namely (Tables 4 & 7):

- Historical ruins (355 and 356) were destroyed.
- Iron Age features 610, 612[a], 612[b], 611,614, 615, 616, 617 have been destroyed.

Table 4- Heritage resources impacted as a result of S24G activities.

HERITAGE RESOURCES IMPACTED BYS24G ACTIVITIES				
Legend on Map Figure 12	**Heritage resource**	**Significance**	**Motivation**	**Cause of impact**
355 356	Historical ruins Historical ruins	Low-medium	See rating below	BS1/2 Infrastructure
610 612(a) 612(b)	Iron Age feature Iron Age feature	Low-medium	See rating below	BS1/2 Infrastructure
611 614	Iron Age feature Iron Age feature	Low-medium Low-medium	See rating below See rating below	Cleared area Cleared area
615 616 617	Iron Age feature Iron Age feature Iron Age feature	Low-medium Low-medium Low-medium	See rating below See rating below See rating below	Cleared area Cleared area Cleared area

Figure 30- Impact of S24G activities on Iron Age remains 355 and 356 in the BS1/2 complex (above).

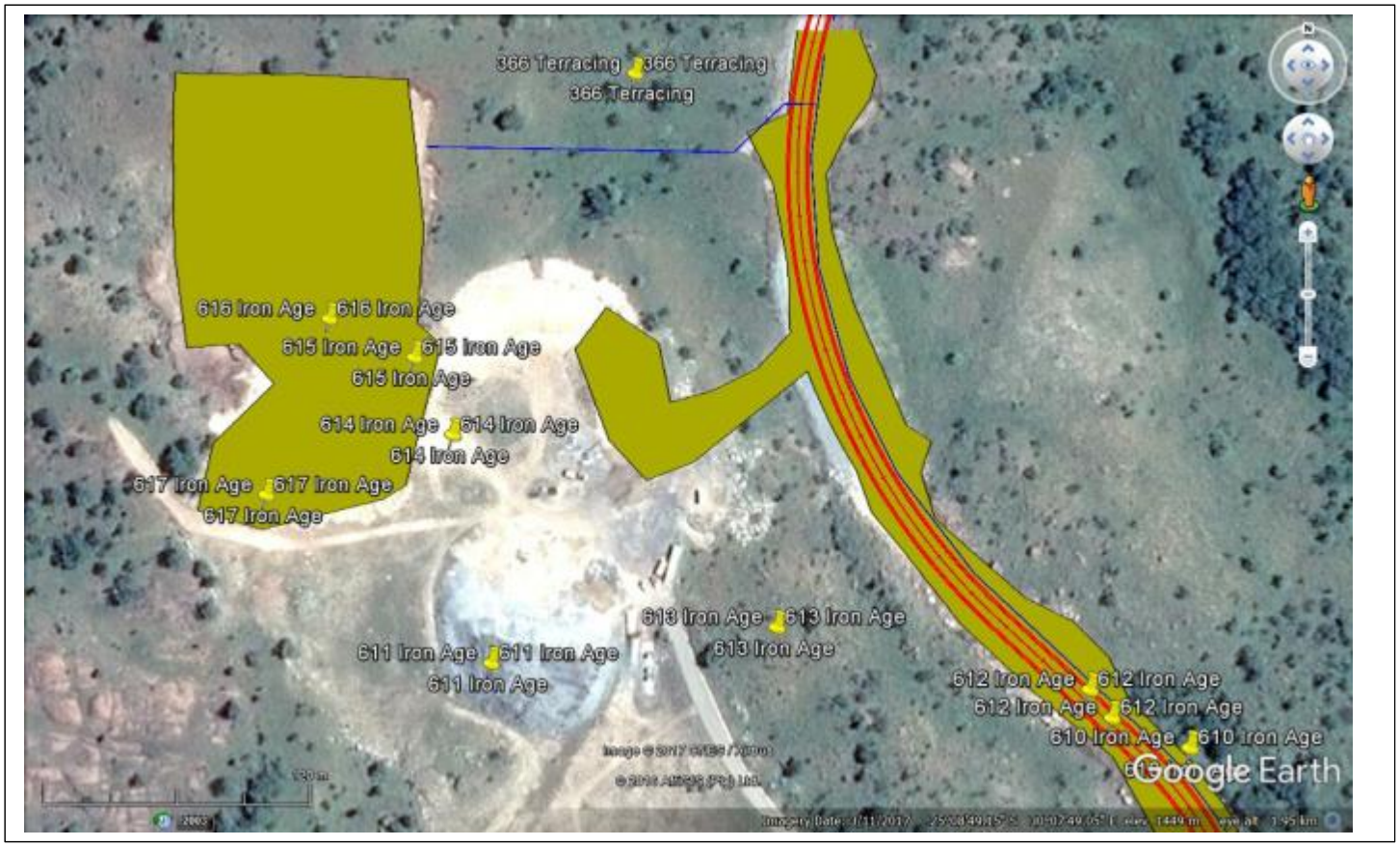


Figure 31- Impact of S24G activities on Iron Age remains 610, 612(a), 612(b), 614, 615, 616 and 617 in the BS1/2 complex (above).

The survey, however, also uncovered a graveyard and a historical village which were not identified during the earlier survey. Two of the features of this historical village (3 glower grinding stones and a graveyard) occur on opposite shoulders of a road deviation but was not affected when the survey for the S24G activities was conducted (Table 5).

Table 5 - Historical remains and graveyard uncovered during the survey for S24G activities (below).

LEGEND ON MAP	HERITAGE RESOURCE	COORDINATES	SIGNIFICANCE RATING
1	Small enclosure 01	25º 07.930's; 30º 07.276'e	**Low to Medium**
2	Small enclosure 02	25º 07.835's; 30º 07.255'e	**Low to Medium**
3	**3 lower grinding stones**	**25º 07.968's; 30º 07.284'e**	**Low to Medium**
4	**GY01**	**25º 07.968's; 30º 07.293'e**	**HIGH**
5	HH01	25º 07.979's; 30º 07.304'e	**Low to Medium**
6	HH02	25º 07.969's; 30º 07.313'e	**Low to Medium**
7	Large enclosure	25º 07.964's; 30º 07.317'e	**Low to Medium**
8	Square enclosure	25º 07.945's; 30º 07.333'e	**Low to Medium**

8.5 Summary: types and ranges of heritage resources

The heritage resources which were uncovered by Van Der Walt & Celliers and the author are similar in types and ranges than those which have been identified during earlier heritage surveys in the Steenkampsberge where the proposed Booysendal South Expansion Project is being established. These heritage resources comprise the following types and ranges, namely:

- Stone wallled sites which date from the Late Iron Age and/or the Historical Period. These settlements are mostly characterised by stone walls; the presence of a limited numbers of potsherds and low numbers of lower grinding stones. In some instances stone walls are only a few layers high or are limited to lines of stones which demarcate terraces.
- Stone ruins which date from the Historical Period into the recent past. These building structures usually have elongated or square groundplans.
- Graveyards.

- Stone cairns dating from an unknown period.
- A single engraving on a dolerite boulder consisting of a circular motif which may represent the layout (ground plan) of a stone wallled settlement.

All the heritage resources (including graveyards) that were documented during these surveys are illustrated in Figure 32.

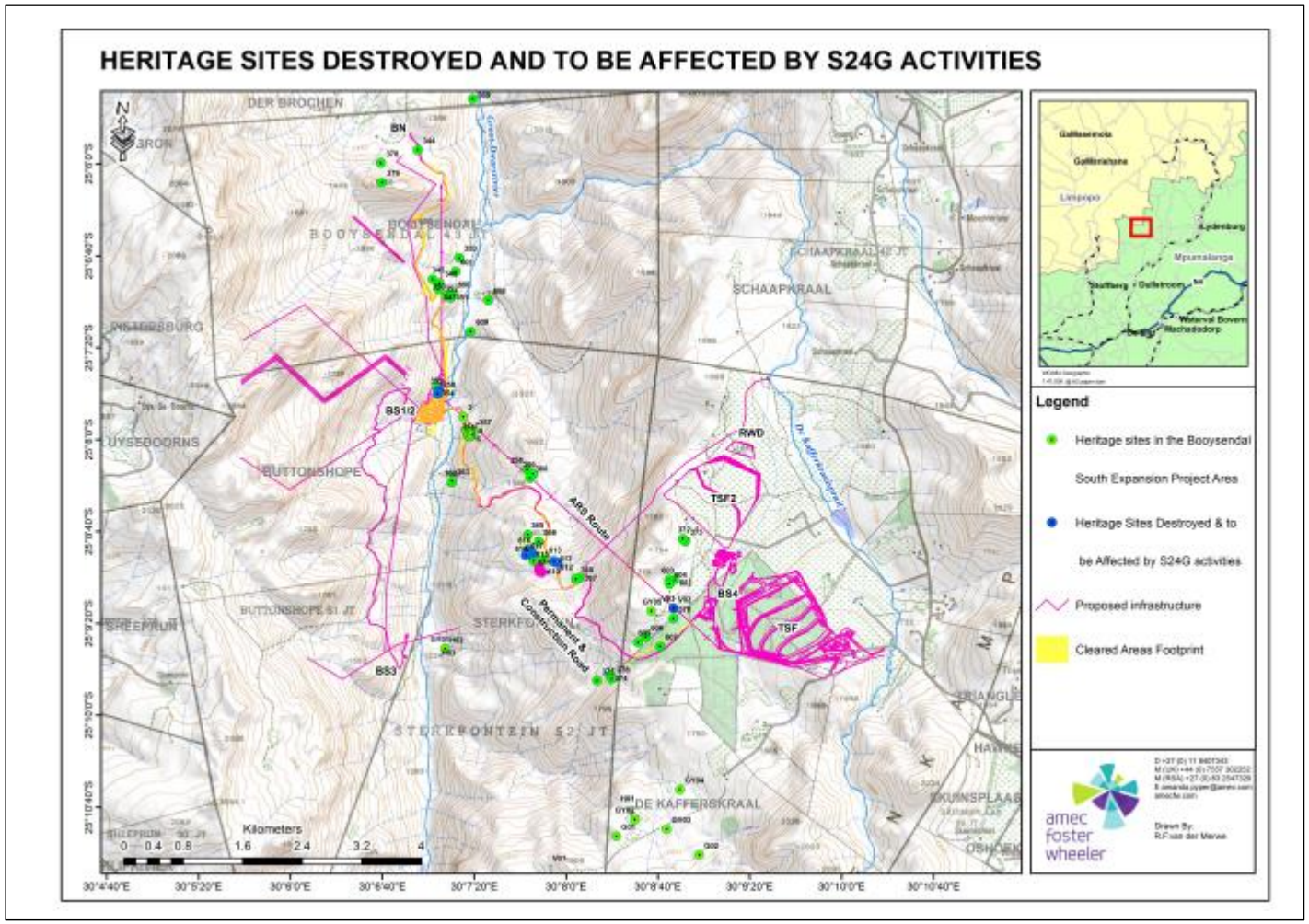


Figure 32- Heritage resources (including graveyards) which were documented in the Booysendal South Expansion Project. Note the heritage resources which have been destroyed as a result of S24G activities and the heritage resources which will be affected by future S24G activities (above).

9 HERITAGE IMPACT ASSESSMENT FOR THE BOOYSENDAL SOUTH EXPANSION PROJECT

The Booysendal South Expansion Project comprising developmental areas with linear infrastructure between BS1/2, the Merensky Portals, BS3, BS4 and the Emergency Escape Portals may impact some of the existing heritage resources which have been identified in the project area. The significance of these heritage resources therefore must be determined as well as the extent and severity of the impact on these remains in order to propose and implement mitigation measures for those heritage resources that may be affected by these project activities and to recommend management measures for those heritage resources which remain unaffected in the project area.

The various developmental activities for the Booysendal South Expansion Project (outlined in Part 5.2, 'The nature of the Booysendal South Expansion Project') which are associated with these developmental areas comprise the following broad categories for the purposes of this report, namely:

- Activities which are associated with the nornmal EIA/EMP process to be followed for the Booysendal South Expansion Project.
- S24G activities which have commenced *prior* to environmental authorisation for the Booysendal South Expansion Project and those which still must be completed for the project.

9.1 Possible impact on heritage resources

Impacts on heritage resources can be direct, indirect or cumulative. Impacts need to be related to all activities including direct third party activities, namely:

- Direct impacts are caused by particular actions at the same time and place.
- Indirect impacts are caused by the actions later in time or further removed in distance from heritage resources but are still reasonably foreseeable;

- Cumulative impacts on heritage resources occur as the results of an incremental increase in actions when added to other past, present, and reasonably foreseeable future actions regardless of who or what undertakes such actions.

According to the current lay out plan for the Booysendal South Expansion Project considering all alternatives the following heritage resources may be impacted as a result of the following activities to be conducted during the normal EIA/EMP process and those which have occurred as a result of S24G activities which have been implemented or which will occur when the latter remaining activities will be implemented, namely:

9.1.1 Impacts as a result of the normal EIA/EMP process

It appears that none of the heritage resources of significance will be impacted by the EIA/EMP process.

9.1.2 Impacts as a result of implemented S24G activities

Heritage resources which have been destroyed as a result of S24G activities implemented include the following (Tables 4 & 7):

- Historical ruins (355 & 356) have been destroyed.
- Iron Age features 610, 612, 611,614, 615, 616, 617 have been destroyed

The historical ruin and Iron Age features are assessed as a single type (range) of heritage resource as these types of remains often lie between the Iron Age and the Historical Period. These remains therefore cannot always with be classified into one of these categories with great certainty.

9.1.2 Impacts as a result of future S24G activities

The following heritage resources will be indirectly impacted once the remaining S24G activities have commenced and been implemented (Table 7).

- Historical village 02 (HV02) will be impacted when the ARS is constructed. The impact may be indirect as the ARS crosses above the site. A pylon may be constructed in the site and may affect archaeological remains on surface or remains which occur subsurface.

Access road BS2 to BS3. Alt 01 Preferred		*No Impact*
Access road BS2 to BS3. Alt 01 Along valley floor crossing Dwars River several times		*No impact*
Ore Transport (Section 24G and EMP Amendmend) Four alternatives		
Alt 01 Trucking *Haul ore from the portal and transport to Everest (using the road alignment indicted on the plan)*		*Impact on Heritage resources 610, 612a, 612b*
Alt 02 Overland convey *Convey ore from portals to BS4 by means of conventional conveyor (using the conveyor / ropecon alignment indicated on the plan)*		*Impact on Historical Village 02*
Alt 03 ARS Preferred *Convey ore from portals to silo using ARC to transport ore to BS4 and BN (using conveyor / ARC alignment indicated on the plan*		*Impact on Historical Village 02*
Transmission Lines (Section 24G)		
Alt 01 33kV from BS4 to BS1/2		*Within the main access road reserve. No impact*
Alt 02 132kV from BS4 to BS1/2		*Within the main access road reserve. No impact*
Alt 03 33kV from BN to BS1/2		*Following existing exploration road. No impact*
Preferred Alt 132kV from BN to BS1/2		*Within main access road reserve. No impact*
Mining BS3 (EMP Amendment)		
Alt 01 Mining via portal		*No impact*
Alt 02 Mining through underground tunnel from BS2		*No impact*
Mining at BS1/2 (Section 24G)		
Alternative 1: Mining from two portals at BS1 and a separate BS2		*Impact on Heritage resources 355, 365*
Preferred Alternative: One portal system split into two separate underground adits		*No impact*
Main access road		
Old alignment		*No impact*
New alignment		*S24G activities implemented impacted on remains*

Table 6 – Alternatives for the Booysendal South Expansion Project and their impact on heritage resources (above).

Figure 33- Impact of future S24G activities which involves the construction of the ARS on Historical Village 02 (above).

Table 7- Heritage resources impacted as a result of implemented and future S24G activities.

HERITAGE RESOURCES IMPACTED BYS24G ACTIVITIES				
Legend on Map	**Heritage resource**	**Significance**	**Motivation**	**Cause of impact**
355 356	Historical ruins Historical ruins	Low-medium Low-medium	See rating below See rating below	BS1/2 Infrastructure
610 612	Iron Age feature Iron Age feature	Low-medium Low-medium	See rating below See rating below	BS1/2 Infrastructure
611 614	Iron Age feature Iron Age feature	Low-medium Low-medium	See rating below See rating below	Cleared area Cleared area
615 616 617	Iron Age feature Iron Age feature Iron Age feature	Low-medium Low-medium Low-medium	See rating below See rating below See rating below	Cleared area Cleared area Cleared area
HERITAGE RESOURCES TO BE IMPACTED BY FUTURE S24G ACTIVITIES				
Legend on map		**Significance**	**Motivation**	**Cause of impact**
HV02	Iron Age and or historical ruins	Low-medium	See rating below	ARS

9.2 The significance of the heritage resources

The heritage resources which have been impacted by the Booysendal South Expansion Project and those that will be impacted by future S24G activities comprise the following category, namely (Table 7):

- Remains which date from the Iron Age and/or the Historical Period.

The significance of these remains is established in order to determine the severity of the impact on these remains.

9.2.1 The significance of the Iron Age and/or Historical remains

These remains are older than 60 years and therefore are protected by the National Heritage Resources Act (No 25 of 1999).

The historical remains are rated as low-medium significance. This rating is based on the use of 2 rating (grading) schemes, namely:

- A scheme of criteria which outline places and objects as part of the national estate as they have cultural-historical significance or other special value (outlined in Section 3 of the NHRA [Act No 25 of 1999] (see Box 1) (Table 8).
- A field rating scheme according to which heritage resources are graded in 3 tiers (levels) of significance based on the regional occurrence of heritage resources (Table 9) (Section 7 of the NHRA [Act No 25 of 1999).

9.2.1.1 Criteria to be part of the national estate

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

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

Significance rating for historical remains which are part of the National Estate		
Low	**Low - Medium**	**High**
Historical significance	X	
Social significance	X	
Spiritual significance	X	
Scientific significance (research, use, application, e.g. in tourism industry)		
Integrity of sites		
Low	**Low-Medium**	**High**
Preservation	X	
Extensiveness	X	
Representative	X	

Table 9- Rating the Iron Age/historical remains' significance according to criteria outlined in the NHRA (25 of 1990) (above).

The highlighted criteria reflect aspects of the social, historical, spiritual and scientific significance (research, use and application, e.g. in tourism industry) of the Historical and or Iron Age remains. According to these criteria, the cultural historical significance of the Historical/Iron Age remains is graded as low to medium significance. When considering the integrity of the heritage sites in conjunction with its cultural-historical significance judging factors such as the preservation (condition); extensiveness (archaeological deposits present/absent) and representative (unique/repetitive) nature of the sites; these factors can also be rated as low to medium significance (Table 7).

9.2.1.2 Field rating scheme for heritage resources

Grading of heritage resources remains the responsibility of heritage resources authorities. However, in terms of minimum standards SAHRA requires that heritage reports include field ratings in order to comply with Section 38 of the NHRA (No 25 of 1999). The NHRA (No 25 of 1999, Section 7) provides for a 3-tier grading system for heritage resources. The field rating process is designed to provide a qualitative and

quantitative rating of heritage resources. The rating system distinguishes 3 categories of heritage resources:

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

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

Table 10- Field rating (grading) for historical remains in the project area

According to the highlighted field rating scheme the Historical/ Iron Age remains can be rated as of low to medium significance (Table 8).

9.2.3 Significance of the impact on the heritage resources

The significance of the impact on the Historical/Iron Age remains is the following:

9.2.3.1 Significance of impacts of implemented S24G activities

The significance of impacts on the Historical /Iron Age remains which have been destroyed as a result of the implementation of S24G activities is high (Table 9).

Table 10- Significance of the impact on Historical/Iron Age remains as a result of implemented S24G activities (above).

Impact Component	**Impact 1**	**Significance prior to Mitigation**	**Significance with Mitigation**
Activity	Implemented S24 G activities Construction activities		
Risk/ Impact			
Project Phase (during which impact will be applicable) CO = construction, OP = operational, CL = Closure and post-closure Nature of Impact	CO Negative		
Type of Impact	Heritage resources destroyed		
	Define Significance Categories	Significance Prior to Mitigation	Significance With Mitigation
Likelihood/ probability		4	
Duration	Long-term	4	
Extent	Localised	1	
Receptor Sensitivity	Moderate low	2	
Magnitude	Minor The magnitude will depend on the location of infrastructure such as the pylon on which the aerial ropeway will be constructed.	-4	
Impact Significance	High impact significance as heritage sites was destroyed. No mitigation measures possible		
Mitigating and Monitoring Requirements			

Required Management Measures	
Required Monitoring (if any)	
Responsibility for implementation	
Impact Finding	
Impact Finding	Heritage resources destroyed

9.2.3.1 Significance of impacts of future S24G activities

The significance of the impact of S24G activities to be implemented on Historical/Iron Age remains will be moderate. However, in the event that mitigation measures are implemented it will become low.

Table 11- The significance of the impact of S24G activities to be implemented on Historical/Iron Age remains will be low if mitigation measures are implemented.

Impact Component	**Impact 1**	**Significance prior to Mitigation**	**Significance with Mitigation**
Activity	Preconstruction activities such as site preparation and clearance Construction activities		
Risk/ Impact	Vegetation clearance for pylons for aerial ropeway can directly impact on V02 and destroy stone walls and/or archaeological deposits.		
Project Phase (during which impact will be applicable) CO = construction, OP = operational, CL = Closure and post-closure Nature of Impact	CO Negative		
Type of Impact	Direct if pylon is erected in V02: Clearance of vegetation and excavating hole for pylon will directly lead to impact		
	Define Significance Categories	Significance Prior to Mitigation	Significance With Mitigation
Likelihood/ probability	Likely	2	2
Duration	Long-term	4	3

Extent	Localised Only V02 will be influenced.	1	1
Receptor Sensitivity	Moderate low	2	1
Magnitude	Minor The magnitude will depend on the location of infrastructure such as the pylon on which the aerial ropeway will be constructed.	-2	2
Impact Significance	High significance as heritage sites is not renewable and losses are permanent and irreversible. With the correct mitigation and monitoring the rating can be decreased to Moderate	Moderate	Minor
Mitigating and Monitoring Requirements			
Required Management Measures	Phase 2 investigation of HV02. Documentation (mapping and photographing) of HV02 as well as text excavations of the site.		
Required Monitoring (if any)	Long-term monitoring with all heritage resources and graveyards.		
Responsibility for implementation	Environmental Officer and Mine Manager		
Impact Finding			
Impact Finding	Impact can be mitigated by means of further investigation.		

9.3 Mitigating and managing the heritage resources

The following mitigation and management measures are outlined for the Historical/Iron Age remains which have been impacted by S24G activities and those that will be affected once the remaining S24G activities have commenced namely:

9.3.1 Mitigating implemented S24G activities

No mitigation measures can be implemented as the Historical/Iron Age remains have been destroyed.

9.3.2 Mitigating future S24G activities

Although V02 has been slightly altered as a result of developmental activities during the more recent past the core of the complex is still intact and may inform about the historical significance and meaning of these structures before they are affected when the Ropecon is constructed.

V02 has to be documented by means of compiling a ground plan, taking photographs and describing the spatial composition and features of the village before any of the remains of the village may be affected in any way. This task must be undertaken by an archaeologist that is accredited with the ASAPA. SAHRA will require that V02 be studied and documented before SAHRA will make any recommendations regarding the future existence of the village.

The significance of any impact on VC02 will be low after the mitigation measures have been implemented (Table 9).

9.4 Managing heritage resources that remain unaffected

9.4.1 The historical remains

Historical remains must at all costs be avoided in order to ensure that these remains are not deliberately or coincidentally damage or destroyed by mine personnel and vehicles. This can be achieved by means of erecting signposts at the historical remains with notices such as the following: 'Please avoid historical remains. Protected by the National Heritage Resources Act (No 25 of 1999). Damage caused may lead to prosecution'.

Heritage resources should be managed in the following way:

- All heritage resources must be registered in a heritage register. A uniform standard must be used to register (number) all the types and ranges of heritage resources.
- Heritage resources must be inspected on a regular basis not exceeding a six month period.
- Inspections should be noted in an inspection register. The register should outline the state of the heritage resources during each inspection. Reports on damages to any of the heritage resources should be followed with the necessary mitigation measures.
- Permits must be obtained from SAHRA to conduct mitigation work. The nature of the mitigation work should be recorded in the inspection register.

- Corridors of at least 30 m should be maintained between the outer edges or perimeters of heritage resources and any developmental components such as roads or other infrastructure that may be developed in the future.

9.4.2 Graveyards and graves

Graveyards and graves that remain unaffected should be managed according to a management plan to ensure their future unaffected existence. The following management measures are recommended:

- Graveyards and graves must be demarcated with fences or with walls and should be fitted with access gates.
- Regulated visitor hours should be implemented that is compatible with mine safety rules. This will not be necessary when graveyards and graves are located next to national roads.
- Corridors of at least 30 m should be maintained between graveyard and grave's fences and any developmental components such as roads or other infrastructure that may be developed in the future.
- Graveyards and graves should be inspected on a regular basis not exceeding every 3 months. Inspections should be noted in an inspection register. The register should outline the state of the graveyards/graves during each inspection.
- Reports on damages to any of the graves or to the graveyards (fences, walls, gates) should be followed with the necessary mitigation work which must be registered in the inspection register.
- Mitigation done to graves older than sixty years can only be done after SAHRA has issued the necessary permit
- Graveyards/graves should be kept tidy from invader weeds and any refuse.

9.5 Cumulative impacts

The Booysendal South Expansion Project potentially contributes to cumulative impacts in the larger area as a result of the following:

- An increase in population numbers as a result of job creation whether in formal or informal settlements as these settlements may expand and further expose or damage heritage resources. This also includes the possible looting of archaeological sites whether to be utilized for building material or for the illegal collecting of artefacts.
- The Booysendal South Expansion Project is but one of a number of developmental projects in the Groot Dwars River Valley which all have a detrimental influence on the archaeological record and cultural landscape of this ecozone.
- Due to the magnitude, size and surface area to be covered by the project and probably to be increased in the future the archaeological record of the mining area can be obliterated. This increasing the importance of managing the recorded heritage resources in a responsible manner.
- Heritage resources deliberately destroyed by the project as well as those of low significance which are studied before they are destroyed all contribute to the context and significance of the larger cultural landscape.
- Cultural historical landscapes and heritage resources are non- renewable and cannot be replaced once they have been altered or destroyed.

9.6 Summary

The cultural-historical remains in the Booysendal South Expansion Project Area do not have outstanding heritage significance. Most of the remains have been recorded and have been briefly described. It seems as if no graves or graveyards will be impacted by the development. These remains have high significance and may not be affected by the project *prior* to alternative legal arrangements and approval.

A limited number of historical remains have been destroyed as a result of S24G activities whilst a historical village may be affected when the ARC system is constructed. Mitigation measures have been proposed and management measures have been outlined in the Environmental Management Program report (EMPr) for the remaining heritage resources in the Booysendal South Expansion Project Area.

There is no reason from a heritage point of view, why the proposed Booysendal South Expansion Project having considered all alternatives, cannot proceed if the mitigation and management measures recommended in this report and in the EMPr have been implemented.

10 CONCLUSION AND RECOMMENDATIONS

2 heritage surveys and assessments were conducted for the Booysendal South Expansion Project. The first study for the BS1/BS2 and BS3 areas was done by HCAC in 2016 whilst the author conducted a survey for the BS4 (Everest) development in November 2016. A second survey by the author in November 2016 was aimed at establishing whether any heritage resources may have been negatively influenced as a result of the early commencement of development activities (S24G activities) *prior* to environmental authorisation for the Booysendal South Expansion Project. This survey also focussed on the Merensky Portal areas. The results of these three surveys are discussed.

Heritage resources that were impacted as a result of the premature implementation of developmental activities are the following, namely (Tables 4 & 7):

- Historical ruins (355 and 356) were destroyed.
- Iron Age features 610, 612[a], 612[b], 611,614, 615, 616, 617 have been destroyed

Heritage survey

The heritage resources which were uncovered by Van Der Walt & Celliers and the author are similar in types and ranges than those which have been identified during earlier heritage surveys in the Steenkampsberge where the proposed Booysendal South Expansion Project is being established.

All the heritage resources (including graveyards) that were documented during these surveys are illustrated in Figure 32.

Heritage impact assessment

The various developmental activities for the Booysendal South Expansion Project (outlined in Part 5.2, 'The nature of the Booysendal South Expansion Project') which are associated with these developmental areas comprise the following broad categories for the purposes of this report, namely:

- Activities which are associated with the nornmal EIA/EMP process to be followed for the Booysendal South Expansion Project.
- S24G activities which have commenced *prior* to environmental authorisation for the Booysendal South Expansion Project and those which still must be completed for the project.

Impacts as a result of the normal EIA/EMP process

It seems as if no heritage resources of significance will be impacted by the EIA/EMP process.

Impacts as a result of implemented S24G activities

Heritage resources which have been destroyed as a result of S24G activities which have been implemented include the following (Tables 4 & 7):

- Historical ruin (356) has been destroyed.
- Iron Age features 610, 612, 611,614, 615, 616, 617 have been destroyed

The historical ruin and Iron Age features are assessed as a single type (range) of heritage resource as these remains in many instances straddle the Iron Age and the Historical Period and therefore cannot always with great certainty be classified into one of these categories.

Impacts as a result of future S24G activities

The following heritage resources will be indirectly impacted when the remaining S24G activities have been implemented (Table 7).

- Historical village 02 (HV02) will be impacted when the ARS is constructed. The impact may be indirect as the ARS crosses above the site. A pylon may be constructed in the site and may affect archaeological remains on surface or remains which occur subsurface.

The significance of the Iron Age and/or Historical remains

The heritage resources which have been impacted by the Booysendal South Expansion Project and those that will be impacted by future S24G activities comprise the following category, namely (Table 7):

- Remains which date from the Iron Age and/or the Historical Period.

The significance of these remains is established in order to determine the severity of the impact on these remains.

These remains are older than sixty years and therefore are protected by the National Heritage Resources Act (No 25 of 1999).

The historical remains are rated as of low-medium significance. This rating is based on the use of two rating (grading) schemes, namely:

- A scheme of criteria which outline places and objects as part of the national estate as they have cultural-historical significance or other special value (outlined in Section 3 of the NHRA [Act No 25 of 1999] (see Box 1) (Table 8).
- A field rating scheme according to which heritage resources are graded in three tiers (levels) of significance based on the regional occurrence of heritage resources (Table 9) (Section 7 of the NHRA [Act No 25 of 1999).

According to these criteria the cultural historical significance of the Historical/Iron Age remains is graded as low to medium significance. When considering the integrity of the heritage sites in conjunction with its cultural-historical significance judging factors such as the preservation (condition); extensiveness (archaeological deposits present/absent) and representative (unique/repetitive) nature of the sites these factors can also be rated as of low to medium significance (Table 7).

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

According to the highlighted field rating scheme the Historical/ Iron Age remains can be rated as of low to medium significance (Table 8).

Significance of the impact on the heritage resources

The significance of the impact on the Historical/Iron Age remains is the following:

The significance of impacts on the Historical /Iron Age remains which have been destroyed as a result of the implementation of S24G activities is high (Table 9).

The significance of the impact of S24G activities to be implemented on Historical/Iron Age remains will be medium. If mitigation measures are implemented it will become low.

Mitigating and managing the heritage resources

The following mitigation and management measures are outlined for the Historical/Iron Age remains which have been destroyed by S24G activities and those that will be affected when the remaining S24G activities are implemented., namely:

Mitigating implemented S24G activities

No mitigation measures can be implemented as the Historical/Iron Age remains have been destroyed.

Mitigating future S24G activities

Although V02 has been slightly altered as a result of developmental activities during the more recent past the core of the complex is still intact and may inform about the historical significance and meaning of these structures before they are affected when the Ropecon is constructed.

V02 has to be documented by means of compiling a ground plan, taking photographs and describing the spatial composition and features of the village before any of the remains of the village may be affected in any way. This task must be undertaken by an archaeologist that is accredited with the ASAPA. SAHRA will require that V02 be studied and documented before SAHRA will make any recommendations regarding the future existence of the village.

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Managing heritage resources that remain unaffected

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Cumulative impacts

The Booysendal South Expansion Project potentially contributes to cumulative impacts in the larger area as a result of the following:

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Summary

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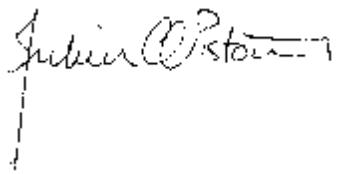
There is no reason from a heritage point of view why the proposed Booysendal South Expansion Project considering all alternatives cannot proceed if the mitigation and management measures recommended in this report and in the EMPr have been implemented.



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