

Phase 1 Cultural Heritage Assessment:

**AMENDMENT TO AN ENVIRONMENTAL AUTHORISATION FOR THE PROPOSED THETA PROJECT,
NEAR PILGRIM'S REST, MPUMALANGA**

Prepared for:

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Report No: 2019/JvS/042

- Date: September 2019
- Revision No: 3
- Status: Final
- Date: June 2020



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Specialist competency:

Johan A van Schalkwyk, D Litt et Phil, heritage consultant, has been working in the field of heritage management for more than 40 years. Originally based at the National Museum of Cultural History, Pretoria, he has actively done research in the fields of anthropology, archaeology, museology, tourism and impact assessment. This work was done in Limpopo Province, Gauteng, Mpumalanga, North West Province, Eastern Cape Province, Northern Cape Province, Botswana, Zimbabwe, Malawi, Lesotho and Swaziland. Based on this work, he has curated various exhibitions at different museums and has published more than 70 papers, most in scientifically accredited journals. During this period, he has done more than 2000 impact assessments (archaeological, anthropological, historical and social) for various government departments and developers. Projects include environmental management frameworks, roads, pipeline-, and power line developments, dams, mining, water purification works, historical landscapes, refuse dumps and urban developments.



J A van Schalkwyk
Heritage Consultant
June 2020

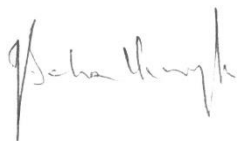


SPECIALIST DECLARATION

I, J A van Schalkwyk, as the appointed independent specialist, in terms of the 2014 EIA Regulations (as amended), hereby declare that I:

- I act as the independent specialist in this application;
- I 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;
- regard the information contained in this report as it relates to my specialist input/study to be true and correct, and do not have and will not have any financial interest in the undertaking of the activity, other than remuneration for work performed in terms of the NEMA, the Environmental Impact Assessment Regulations, 2014 (as amended) and any specific environmental management Act;
- I declare that there are no circumstances that may compromise my objectivity in performing such work;
- I have expertise in conducting the specialist report relevant to this application, including knowledge of the Act, Regulations and any guidelines that have relevance to the proposed activity;
- I will comply with the Act, Regulations and all other applicable legislation;
- I have no, and will not engage in, conflicting interests in the undertaking of the activity;
- I have no vested interest in the proposed activity proceeding;
- 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 have ensured that information containing all relevant facts in respect of the specialist input/study was distributed or made available to interested and affected parties and the public and that participation by interested and affected parties was facilitated in such a manner that all interested and affected parties were provided with a reasonable opportunity to participate and to provide comments on the specialist input/study;
- I have ensured that the comments of all interested and affected parties on the specialist input/study were considered, recorded and submitted to the competent authority in respect of the application;
- all the particulars furnished by me in this specialist input/study are true and correct; and
- I realise that a false declaration is an offence in terms of regulation 48 and is punishable in terms of section 24F of the Act.

Signature of the specialist



J A van Schalkwyk
June 2020

EXECUTIVE SUMMARY

**Phase 1 Cultural Heritage Assessment:
AMENDMENT TO AN ENVIRONMENTAL AUTHORISATION FOR THE PROPOSED THETA PROJECT,
NEAR PILGRIM'S REST, MPUMALANGA**

Transvaal Gold Mining Estates Limited (TGME) is situated in the Sabie / Pilgrim's Rest goldfields area of Mpumalanga. The proposed mining operation is located adjacent to the existing TGME metallurgical plant, which is situated 2.5km southwest of the town of Pilgrim's Rest, Mpumalanga Province. TGME, through an engineering scoping study and an engineering feasibility study, has identified the opportunity to mine gold bearing reefs via modified terrace mining and this has triggered the need to amend its current MP 30/5/1/2/2/83MR right to include the new mining sections.

In accordance with Section 38 of the NHRA, an independent heritage consultant was appointed by *Batho Earth Environmental Consultants* to conduct a cultural heritage assessment to determine the cultural heritage significance of the areas where the new mining sections is located. A number of previous studies, Fourie (2008); Henning (1981); Pistorius (2005); Reinders, Mason & Van Wyk (2007), have been done regarding the heritage features on the farm Ponieskrans. The main aim of the current study was therefore to determine what impact the proposed development would have on these sites and features.

This report describes the methodology used, the limitations encountered, the heritage features that were identified and the recommendations and mitigation measures proposed relevant to this. The investigation consisted of a desktop study (archival sources, database survey, maps and aerial imagery) and a physical survey that also included the interviewing of relevant people. It should be noted that the implementation of the mitigation measures is subject to SAHRA/PHRA's approval.

The cultural landscape qualities of the region essentially consist of two components. The first is made up of a limited pre-colonial (Stone Age and Iron Age) occupation. The second component is a rural area in which the human occupation consists of two elements. The discovery of gold during the late 19th century resulted in a flood of people entering the area, establishing gold mining activities all over the landscape. The second element is a rural farming community, which, since the early 20th century revolved around forestry, which altered the landscape beyond recognition. These two elements led to the establishment of a number of smaller towns in the region, all which are now part of an ongoing tourism industry.

Identified sites

During the survey, the following sites, features or objects of cultural significance were identified, only some of which are deemed to be conservation/documentation worthy:

Name	Latitude	Longitude	Impact	Management
001 Fort	-24,91824	30,75706	Inside Theta Hill Pit	Avoid/Retain
002 Cemetery	-24,91814	30,74484	Outside development	Avoid/Retain
003 Burial site	-24,91806	30,74478	Outside development	Avoid/Retain
004 Burial site	-24,91792	30,74353	Outside development	Avoid/Retain
005 Graves	-24,91748	30,74682	Outside development	Avoid/Retain
019 Pump house	-24,90674	30,74701	Close to access road	Avoid/Retain
024 Cocopan bridge	-24,90787	30,74648	Integral part of remaining track	Avoid/Retain
025 Cocopan track (east)	-24,91013	30,74188	In proposed haul road	Document

026 Cocopan track (west)	-24,91006	30,73983	In proposed haul road	Document
032 Concrete structure	-24,91243	30,74408	Inside waste rock dump area	No further action
033 Foundations	-24,91222	30,74263	Inside waste rock dump area	No further action
034 Farmer's race	-24,91245	30,74267	Inside waste rock dump area	No further action
038 Foundations	-24,91383	30,73645	In proposed haul road	No further action
046 Informal settlement	-24,91581	30,74291	People to be relocated	Document
047 Compound	-24,91712	30,74277	Abandoned 1972	No further action

Impact assessment and proposed mitigation measures

Impact analysis of cultural heritage resources under threat of the proposed development, is based on the present understanding of the development:

IDENTIFIED HERITAGE RESOURCES					
Site No.	Site type	NHRA category	Field rating	Impact rating: Before/After mitigation	Proposed mitigation (Refer to definitions in Section 12.3)
Old fort					
001	Historic structure	Section 34	High significance Grade 4-A	60	(1) Avoidance/Preserve; (2) Archaeological investigation
				27	
Mitigation					
(1) Avoidance/Preserve					
<ul style="list-style-type: none"> Currently, the Theta Pit boundary approaches the fort to within about 22m. It is recommended that a buffer zone of at least 15m is created around the outer edges of the fort and that this is formalised with a suitable, permanent fence (with an access gate). 					

IDENTIFIED HERITAGE RESOURCES					
Site No.	Site type	NHRA category	Field rating	Impact rating: Before/After mitigation	Proposed mitigation (Refer to definitions in Section 12.3)
Cocopan bridge and track					
024 - 026	Historic structure	Section 34	High significance Grade 4-A	60	(1) Avoidance/Preserve; (2) Archaeological investigation
				27	
Mitigation					
(2) Archaeological investigation: If this feature, i.e. the section to be covered by the proposed PCD and haul road, cannot be avoided it should be documented in full before destruction. It is also proposed that:					
<ul style="list-style-type: none"> The section of the track extending from the road towards TGME (in the vicinity of the old pump station) westwards up until and including the metal bridge crossing the Blyde River be declared a no-go area and that it is protected and retained as a sample of this type of technology. <ul style="list-style-type: none"> It is also sufficiently close to the reduction works to be used part of a possible future tourism attraction. Material salvaged from the section the be impacted on by the proposed mining activities should be used to rehabilitate the section that is to be retained, and the rest should be placed in a secure place for safekeeping. 					

IDENTIFIED HERITAGE RESOURCES					
Site No.	Site type	NHRA category	Field rating	Impact rating: Before/After mitigation	Proposed mitigation (Refer to definitions in Section 12.3)
"Built" adits					
008 - 013	Historic structures	Section 34	High significance Grade 4-A	27	(1) Avoidance/Preserve; (2) Archaeological investigation
				27	
Mitigation					
(1) Avoidance/Preserve					

- No further action required

IDENTIFIED HERITAGE RESOURCES					
Site No.	Site type	NHRA category	Field rating	Impact rating: Before/After mitigation	Proposed mitigation (Refer to definitions in Section 12.3)
Burial sites					
002 - 005	Graves, Cemeteries and Burial Grounds	Section 36	High significance Grade 4-A	27 27	(1) Avoidance/Preserve; (2) Archaeological investigation
Mitigation					
(1) Avoidance/Preserve					
<ul style="list-style-type: none"> • No further action required 					

Legal requirements

The legal requirements related to heritage specifically are specified in Section 3 of this report. For this proposed project, the assessment has determined that no sites, features or objects of heritage significance occur in the study area. If heritage features are identified during construction, as stated in the management recommendation, these finds would have to be assessed by a specialist, after which a decision will be made regarding the application for relevant permits.

- In the event that any of the identified structures is to be impacted on, a valid permit would be required from SAHRA/PHRA prior to its destruction. Such a permit will only be issued after the site has been fully documented – mapped, photographed and described.

Reasoned opinion as to whether the proposed activity should be authorised:

- From a heritage point of view, it is recommended that the proposed development be allowed to continue on acceptance of the conditions proposed below.

Conditions for inclusion in the environmental authorisation:

- The Palaeontological Sensitivity Map (SAHRIS) indicate that most of the study area has a very high sensitivity of fossil remains to be found and therefore a field assessment and protocol for finds is required. A smaller section on the western side of the development has a high sensitivity and therefore a desktop assessment is required. Based on the outcome of that, a field assessment might be required.
- In the unlikely event that any of the identified structures is to be impacted on, it must be fully documented – mapped, photographed and described – beforehand.
- Should archaeological sites or graves be exposed in other areas during construction work, it must immediately be reported to a heritage practitioner so that an investigation and evaluation of the finds can be made.



J A van Schalkwyk
Heritage Consultant
June 2020

TECHNICAL SUMMARY

Project description	
Description	Development of new mining areas
Project name	Theta Mining Project

Applicant
Transvaal Gold Mining Estates Limited (TGME)

Environmental assessors
Batho Earth Environmental Consulting
Ms D Verster

Property details						
Province	Mpumalanga					
Magisterial district	Pilgrim's Rest					
District municipality	Thaba Cweu					
Topo-cadastral map	2430DC & 2430DD					
Farm name	Ponieskrans 543KT					
Closest town	Pilgrim's Rest					
Coordinates	Centre point (approximate)					
	No	Latitude	Longitude	No	Latitude	Longitude
	1	S 24,91132	E 30,74776			

Development criteria in terms of Section 38(1) of the NHR Act	Yes/No
Construction of road, wall, power line, pipeline, canal or other linear form of development or barrier exceeding 300m in length	No
Construction of bridge or similar structure exceeding 50m in length	No
Development exceeding 5000 sq m	Yes
Development involving three or more existing erven or subdivisions	No
Development involving three or more erven or divisions that have been consolidated within past five years	No
Rezoning of site exceeding 10 000 sq m	No
Any other development category, public open space, squares, parks, recreation grounds	No

Land use	
Previous land use	Mining
Current land use	Mining

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GLOSSARY OF TERMS AND ABBREVIATIONS

TERMS

Bioturbation: The burrowing by small mammals, insects and termites that disturb archaeological deposits.

Cumulative impacts: “Cumulative Impact”, in relation to an activity, means the past, current and reasonably foreseeable future impact of an activity, considered together with the impact of activities associated with that activity, that in itself may not be significant, but may become significant when added to existing and reasonably foreseeable impacts eventuating from similar or diverse activities.

Debitage: Stone chips discarded during the manufacture of stone tools.

Factory site: A specialised archaeological site where a specific set of technological activities has taken place – usually used to describe a place where stone tools were made.

Historic Period: Since the arrival of the white settlers - c. AD 1830 - in this part of the country.

Holocene: The most recent time period, which commenced c. 10 000 years ago.

Iron Age (also referred to as **Early Farming Communities**): Period covering the last 1800 years, when new people brought a new way of life to southern Africa. They established settled villages, cultivated domestic crops such as sorghum, millet and beans, and they herded cattle as well as sheep and goats. As they produced their own iron tools, archaeologists call this the Iron Age.

Early Iron Age	AD 200 - AD 900
Middle Iron Age	AD 900 - AD 1300
Later Iron Age	AD 1300 - AD 1830

Midden: The accumulated debris resulting from human occupation of a site.

Mitigation, means to anticipate and prevent negative impacts and risks, then to minimise them, rehabilitate or repair impacts to the extent feasible.

National Estate: The collective heritage assets of the Nation.

Pleistocene: Geological time period of 3 000 000 to 20 000 years ago.

Stone Age: The first and longest part of human history is the Stone Age, which began with the appearance of early humans between 3-2 million years ago. Stone Age people were hunters, gatherers and scavengers who did not live in permanently settled communities. Their stone tools preserve well and are found in most places in South Africa and elsewhere.

Early Stone Age	2 500 000 - 150 000 Before Present
Middle Stone Age	150 000 - 30 000 BP
Later Stone Age	30 000 - until c. AD 200

Tradition: As used in archaeology, it is a seriated sequence of artefact assemblages, particularly ceramics.

ACRONYMS and ABBREVIATIONS

ASAPA	Association of Southern African Professional Archaeologists
BCE	Before the Common Era (the year 0)

BP	Before Present (calculated from 1950 when radio-carbon dating was established)
CE	Common Era (the year 0)
DMR & E	Department of Mineral Resources and Energy
ESA	Early Stone Age
EIA	Early Iron Age
HIA	Heritage Impact Assessment
I & AP's	Interested and Affected Parties
LIA	Late Iron Age
LSA	Later Stone Age
MIA	Middle Iron Age
MSA	Middle Stone Age
NASA	National Archives of South Africa
NHRA	National Heritage Resources Act
PHRA	Provincial Heritage Resources Agency
SAHRA	South African Heritage Resources Agency
SAHRIS	South African Heritage Resources Information System
TPA	Transvaal Provincial Administration
TGME	Transvaal Gold Mining Estates Limited

COMPLIANCE WITH APPENDIX 6 OF THE 2014 EIA REGULATIONS (AS AMENDED)

Requirements of Appendix 6 – GN R982	Addressed in the Specialist Report
1. (1) A specialist report prepared in terms of these Regulations must contain-	
a) details of-	
i. the specialist who prepared the report; and	Front page
ii. the expertise of that specialist to compile a specialist report including a curriculum vitae;	Page i Addendum Section 6
b) a declaration that the specialist is independent in a form as may be specified by the competent authority;	Page ii
c) an indication of the scope of, and the purpose for which, the report was prepared;	Section 1
(cA) an indication of the quality and age of base data used for the specialist report;	Section 4
(cB) a description of existing impacts on the site, cumulative impacts of the proposed development and levels of acceptable change;	Section 7.3
d) the duration, date and season of the site investigation and the relevance of the season to the outcome of the assessment;	Section 4.2.2
e) a description of the methodology adopted in preparing the report or carrying out the specialised process inclusive of equipment and modelling used;	Section 4
f) details of an assessment of the specific identified sensitivity of the site related to the proposed activity or activities and its associated structures and infrastructure, inclusive of a site plan identifying site alternatives;	Addendum Section 5; Figure 9 & 10
g) an identification of any areas to be avoided, including buffers;	Section 8
h) 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 9 & 10 Addendum Section 5
i) a description of any assumptions made and any uncertainties or gaps in knowledge;	Section 2
j) a description of the findings and potential implications of such findings on the impact of the proposed activity or activities;	Section 7
k) any mitigation measures for inclusion in the EMPr;	Section 9 & 10
l) any conditions for inclusion in the environmental authorisation;	Section 10
m) any monitoring requirements for inclusion in the EMPr or environmental authorisation;	Section 9
n) a reasoned opinion-	
i. whether the proposed activity, activities or portions thereof should be authorised;	Section 10
(iiA) regarding the acceptability of the proposed activity or activities; and	
ii. if the opinion is that the proposed activity, activities or portions thereof should be authorised, any avoidance, management and mitigation measures that should be included in the EMPr, and where applicable, the closure plan;	Section 8, 9, 10
o) a description of any consultation process that was undertaken during the course of preparing the specialist report;	-
p) a summary and copies of any comments received during any consultation process and where applicable all responses thereto; and	-
q) any other information requested by the competent authority.	-
(2) Where a government notice by the Minister provides for any protocol or minimum information requirement to be applied to a specialist report, the requirements as indicated in such notice will apply.	-

**Phase 1 Cultural Heritage Assessment:
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1. INTRODUCTION

1.1 Background

In 1974 the historic village of Pilgrim's Rest, situated on Portion 42 of the farm Ponieskrans 543KT (originally spelt as Ponieskrantz) was bought by the Transvaal Provincial Administration (TPA) and developed as a National Monument under the National Monuments Act, No. 28 of 1969 (as amended). This was later extended to include the rest of the farm and in 1975 the part on which Alanglade (the house of the general manager) and the golf course are situated, were also bought by TPA. However, with the promulgation of the National Heritage Resources Act, No. 25 of 1999, the Pilgrim's Rest site lost its national status and reverted to be a site of provincial heritage status.

Transvaal Gold Mining Estates Limited (TGME) is situated in the Sabie / Pilgrim's Rest goldfields area of Mpumalanga. The proposed mining operation is located adjacent to the existing TGME metallurgical plant, which is situated 2,5km southwest of the town of Pilgrim's Rest, Mpumalanga Province. TGME, through an engineering scoping study and an engineering feasibility study, has identified the opportunity to mine gold bearing reefs via modified terrace mining and this has triggered the need to amend its current MP 30/5/1/2/2/83MR right to include the new mining sections.¹

The Transvaal Gold Exploration Company was first formed in 1883, but following a name change and merger the company was reconstituted as Transvaal Gold Mining Estates Limited (TGME) on 16 May 1895, making it the oldest gold mining company in South Africa. Gold was mined continuously by TGME until 1971 and again from 1986 until 2015. The metallurgical plant is currently on care and maintenance pending the next project development phase. The metallurgical plant, which has not produced commercial quantities of gold since 2015, remains connected to the national electricity grid, with all other existing infrastructure in place including tailings storage facility, water resource access and an accessible road network.

Batho Earth Environmental Consultants was appointed to undertake the EIA for the amend of the current MP 30/5/1/2/2/83MR right to include the new mining sections.

South Africa's heritage resources, also described as the 'national estate', comprise a wide range of sites, features, objects and beliefs. However, according to Section 27(18) of the National Heritage Resources Act (NHRA), No. 25 of 1999, no person may destroy, damage, deface, excavate, alter, remove from its original position, subdivide or change the planning status of any heritage site without a permit issued by the heritage resources authority responsible for the protection of such site.

In accordance with Section 38 of the NHRA, an independent heritage consultant was appointed by *Batho Earth Environmental Consultants* to conduct a cultural heritage assessment to determine the cultural heritage significance of the areas where the new mining sections is located. A number of previous studies, Fourie (2008); Henning (1981); Pistorius (2005); Reinders, Mason & Van Wyk (2007), have been done regarding the heritage features on the farm Ponieskrans. The main aim of the current study was therefore to determine what impact the proposed development would have on these sites and features.

¹ All information regarding the mining site and project development was taken *ad verbum* from the *Draft Scoping Report* (Verster 2019a).

This report forms part of the Environmental Impact Assessment (EIA) as required by the EIA Regulations in terms of the National Environmental Management Act, 1998 (Act No. 107 of 1998) as amended and is intended for submission to the South African Heritage Resources Agency (SAHRA).

1.2 Terms and references

1.2.1 Scope of work

The aim of this study is to determine the cultural heritage significance of the sites, features and objects a where the new mining sections is to take place. This included:

- Conducting a desk-top investigation of the area;
- A visit to the proposed development site.

The objectives were to:

- Evaluate the potential impacts of construction, operation and maintenance of the proposed development on archaeological, cultural and historical resources;
- Recommend mitigation measures to ameliorate any negative impacts on areas of archaeological, cultural or historical importance.

1.2.2 Assumptions and Limitations

The investigation has been influenced by the following factors:

- It is assumed that the description of the proposed project, provided by the client, is accurate.
- The unpredictability of buried archaeological remains.
- No subsurface investigation (i.e. excavations or sampling) were undertaken, since a permit from SAHRA is required for such activities.
- It is assumed that the public consultation process undertaken as part of the Environmental Impact Assessment (EIA) is sufficient and that it does not have to be repeated as part of the heritage impact assessment.
- Old maps relating to the previous mining operations were not available, contribution to a lack of causal understanding.
- Access to some areas could not be achieved due to the presence of very aggressive illegal miners, colloquially referred to as “zama-zama’s.” Although this was not the case in the study areas specifically, it did served to limit the possibility of obtaining a causal overview of smaller elements located in the larger landscape.

2. LEGISLATIVE FRAMEWORK

2.1 Background

Heritage Impact Assessments are governed by national legislation and standards and International Best Practise. These include:

- South African Legislation
 - National Heritage Resources Act, 1999 (Act No. 25 of 1999) (NHRA);
 - Mineral and Petroleum Resources Development Act, 2002 (Act No. 22 of 2002) (MPRDA);
 - National Environmental Management Act 1998 (Act No. 107 of 1998) (NEMA); and
 - National Water Act, 1998 (Act No. 36 of 1998) (NWA).
- Standards and Regulations

- South African Heritage Resources Agency (SAHRA) Minimum Standards;
- Association of Southern African Professional Archaeologists (ASAPA) Constitution and Code of Ethics;
- Anthropological Association of Southern Africa Constitution and Code of Ethics.
- International Best Practise and Guidelines
 - ICOMOS Standards (Guidance on Heritage Impact Assessments for Cultural World Heritage Properties); and
 - The UNESCO Convention concerning the Protection of the World Cultural and Natural Heritage (1972).

2.2 Heritage Impact Assessment Studies

South Africa's unique and non-renewable archaeological and palaeontological heritage sites are 'generally' protected in terms of the National Heritage Resources Act (Act No 25 of 1999, Section 35) and may not be disturbed at all without a permit from the relevant heritage resources authority.

The National Heritage Resources Act (Act No. 25 of 1999, Section 38) provides guidelines for Cultural Resources Management and prospective developments:

"38 (1) Subject to the provisions of subsections (7), (8) and (9), any person who intends to undertake a development categorised as:

- (a) the construction of a road, wall, powerline, pipeline, canal or other similar form of linear development or barrier exceeding 300m in length;*
- (b) the construction of a bridge or similar structure exceeding 50m in length;*
- (c) any development or other activity which will change the character of a site:*
 - (i) exceeding 5 000 m² in extent; or*
 - (ii) involving three or more existing erven or subdivisions thereof; or*
 - (iii) involving three or more erven or divisions thereof which have been consolidated within the past five years; or*
 - (iv) the costs of which will exceed a sum set in terms of regulations by SAHRA or a provincial heritage resources authority;*
- (d) the re-zoning of a site exceeding 10 000 m² in extent; or*
- (e) any other category of development provided for in regulations by SAHRA or a provincial heritage resources authority, must at the very earliest stages of initiating such a development, notify the responsible heritage resources authority and furnish it with details regarding the location, nature and extent of the proposed development."*

And:

"38 (3) The responsible heritage resources authority must specify the information to be provided in a report required in terms of subsection (2)(a): Provided that the following must be included:

- (a) The identification and mapping of all heritage resources in the area affected;*
- (b) an assessment of the significance of such resources in terms of the heritage assessment criteria set out in section 6(2) or prescribed under section 7;*
- (c) an assessment of the impact of the development on such heritage resources;*
- (d) an evaluation of the impact of the development on heritage resources relative to the sustainable social and economic benefits to be derived from the development;*
- (e) the results of consultation with communities affected by the proposed development and other interested parties regarding the impact of the development on heritage resources;*
- (f) if heritage resources will be adversely affected by the proposed development, the consideration of alternatives; and*
- (g) plans for mitigation of any adverse effects during and after the completion of the proposed development."*

3. HERITAGE RESOURCES

3.1 The National Estate

The National Heritage Resources Act (No. 25 of 1999) defines the heritage resources of South Africa which are of cultural significance or other special value for the present community and for future generations that must be considered part of the national estate to include:

- places, buildings, structures and equipment of cultural significance;
- places to which oral traditions are attached or which are associated with living heritage;
- historical settlements and townscapes;
- landscapes and natural features of cultural significance;
- geological sites of scientific or cultural importance;
- archaeological and palaeontological sites;
- graves and burial grounds, including-
 - ancestral graves;
 - royal graves and graves of traditional leaders;
 - graves of victims of conflict;
 - graves of individuals designated by the Minister by notice in the Gazette;
 - historical graves and cemeteries; and
 - other human remains which are not covered in terms of the Human Tissue Act, 1983 (Act No. 65 of 1983);
- sites of significance relating to the history of slavery in South Africa;
- movable objects, including-
 - objects recovered from the soil or waters of South Africa, including archaeological and palaeontological objects and material, meteorites and rare geological specimens;
 - objects to which oral traditions are attached or which are associated with living heritage;
 - ethnographic art and objects;
 - military objects;
 - objects of decorative or fine art;
 - objects of scientific or technological interest; and
 - books, records, documents, photographic 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).

3.2 Cultural significance

In the NHRA, Section 2 (vi), it is stated that “cultural significance” means aesthetic, architectural, historical, scientific, social, spiritual, linguistic or technological value or significance. This is determined in relation to a site or feature’s uniqueness, condition of preservation and research potential.

According to Section 3(3) of the NHRA, a place or object is to be considered part of the national estate if it has cultural significance or other special value because of

- its importance in 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.

A matrix (see **Section 2 of Addendum**) was developed whereby the above criteria were applied for the determination of the significance of each identified site. This allowed some form of control over the application of similar values for similar identified sites.

4. STUDY APPROACH AND METHODOLOGY

4.1 Extent of the Study

This survey and impact assessment cover the identified property, referred to as the Theta Mining Project, as is presented in Section 5 below and illustrated in Figures 3 & 4.

4.2 Methodology

4.2.1.1 Survey of the literature

A survey of the relevant literature was conducted with the aim of reviewing the previous research done and determining the potential of the area. In this regard, various anthropological, archaeological and historical sources were consulted – see list of references in Section 10.

- Information on events, sites and features in the larger region were obtained from these sources.

4.2.1.2 Survey of heritage impact assessments (HIAs)

A survey of HIAs done for projects in the region by various heritage consultants was conducted with the aim of determining the heritage potential of the area – see list of references in Section 10.

- Information on sites and features in the larger region were obtained from these sources.

4.2.1.3 Data bases

The *Heritage Atlas Database*, various SAHRA databases, the *Environmental Potential Atlas*, the *Chief Surveyor General* and the *National Archives of South Africa* were consulted.

- Database surveys produced a number of sites located in the larger region of the proposed development.

4.2.1.4 Other sources

Aerial photographs and topographic and other maps were also studied - see the list of references below.

- Information of a very general nature were obtained from these sources

4.2.1.5 Public participation

The EIA public participation process has been conducted by an independent specialist in collaboration with the EAP and other specialists in the various fields of expertise. Interested and affected parties were invited to raise their concerns regarding the proposed development.

- Comments received during this process (Verster 2019b), on any matter related to the proposed project, including heritage concerns that may arise as a result of the project, have been included in this HIA report.

4.2.1.6 Interviews

During the field surveys interviews were also conducted with the following people:

- Ms R Reinders of the Pilgrim's Rest Museum;
- Ms J Mason of the Pilgrim's Rest Museum;
- Ms C van Wyk, former director of the Pilgrim's Rest Museum;
- Ms S Mthuke, long-time local resident.

4.2.2 Field survey

The site was visited on 26 and 27 March 2019 and again on 30 July 2019. The field survey was done according to generally accepted archaeological practices, and was aimed at locating all possible sites, objects and structures. The area that had to be investigated was identified by the *Batho Earth* by means of maps and .kml files indicating the development area. This was loaded onto an ASUS digital device and used in Google Earth during the field survey to access the areas.

During the first field survey, the vegetation cover was high and thick, obscuring ground visibility, making the location and evaluation of the various identified features very difficult. Therefore, a second visit was undertaken during the winter when the vegetation cover was down, and all identified features were revisited. Unfortunately, some areas could not be accessed due to the presence of very aggressive illegal miners, colloquially referred to as "zama-zama's."



Figure 1. Seasonal variations in ground visibility



Figure 2. Variations in ground visibility over time

5. PROJECT DESCRIPTION

5.1 Site location

Transvaal Gold Mining Estates Limited (TGME) is situated in the Sabie / Pilgrim's Rest goldfields area of Mpumalanga. The proposed mining operation is located adjacent to the existing TGME metallurgical plant, which is situated 2.5km southwest of the town of Pilgrim's Rest, Mpumalanga Province (Fig. 3). For more information, see the Technical Summary on p. V above.

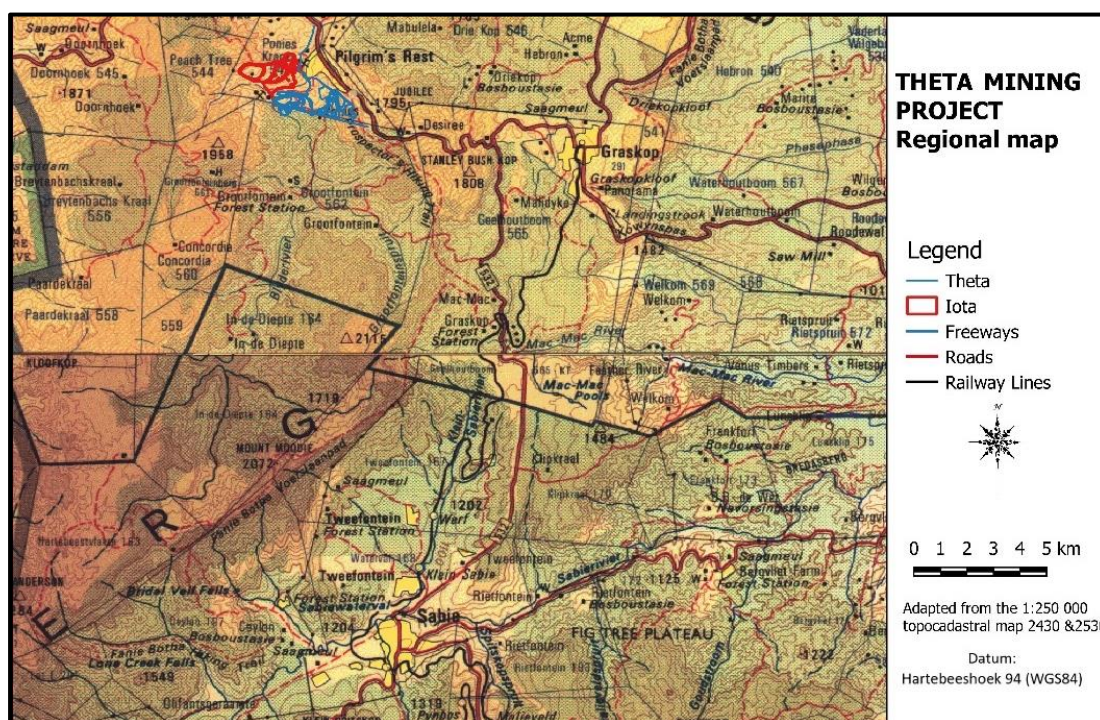


Figure 3. Location of the study area in regional context.

5.2 Project description

The activity relates to an existing mining right for which an amendment to the approved Environmental Impact Assessment & Environmental Management Plan is being applied for.

Three mining areas were identified based on exploration and evaluation work done within the study area. The three areas are referred to as:

- Theta Pit;
- Browns Pit; and
- Iota Pit.

The proposed area of influence will be situated on Portion 42 of the farm Ponieskrans 543KT. The area of influence referred to as part of this application is the area where the proposed infrastructure will be located and where the actual mining operations will take place.

The mining method selected for this project is referred to as modified terrace mining. This mining method is suited to the mountainous profile of the current topography. The ore deposit is considered stratified and inclined. The elevation and nature of the deposit eliminated the use of draglines and conventional strip mining. To overcome the steeply dipping orientation the ore will be extracted on a flat surface whereby all the reefs are extracted on the horizontal plane via a surface miner.

The modified terrace mining method allows for potential backfilling (where applicable) and landscaping of the waste material. The overburden or waste material will be removed with a combination of excavators and trucks with the assistance of Xcentric rippers via a dozer. Selective rock breaking via blasting could also be required. The ore will then be mined utilising a combination of surface miner or conventional loading and haul techniques.

The mine scheduling strategy is to target sufficient ore is produced to maintain a live ore stockpile (<2 months) which could feed the processing plant at 500 ktpa.

Infrastructure associated with the terrace mining operations include:

- Iota Pit;
- Theta Pit;
- Browns Pit;
- Haul Roads and river crossing;
- Topsoil stockpiles,
- Run-of mine stockpiles,
- Strategic Ore stockpile;
- Waste rock dumps;
- Pollution Control Dams and
- Settling Dam

5.3 Progression of site layouts

The following was taken *ad verbum* from Pieterse (2019) and is included in this document is a portrayal of the progression from an initial to the most feasible site layout related to the Theta Project. The progression has been significantly influenced by engineering, economical, environmental and social considerations and is described in detail in the subsequent sections.

Engineering Feasibility Study

The applicant Transvaal Gold Mining Estates (TGME), through an engineering feasibility study, has identified the opportunity to mine gold bearing reefs via modified terrace mining and therefore the need to amend its current environmental authorisation linked to their existing mining right (83MR) to include the new mining sections to mine the near surface material.

Three mining areas were identified based on exploration and evaluation work done within the study area. The three areas are referred to as:

- Theta Pit;
- Browns Pit; and
- Iota Pit.

The engineering feasibility study formed the basis for the permitting phase, and informed the initial site layout (Figure 1) which was incorporated into the Environmental Authorisation application which comprises a Scoping Phase and an Environmental Impact Assessment Phase, which results in the development of an Environmental Management Plan for consideration by the competent authority (The Department of Minerals Resources and Energy).

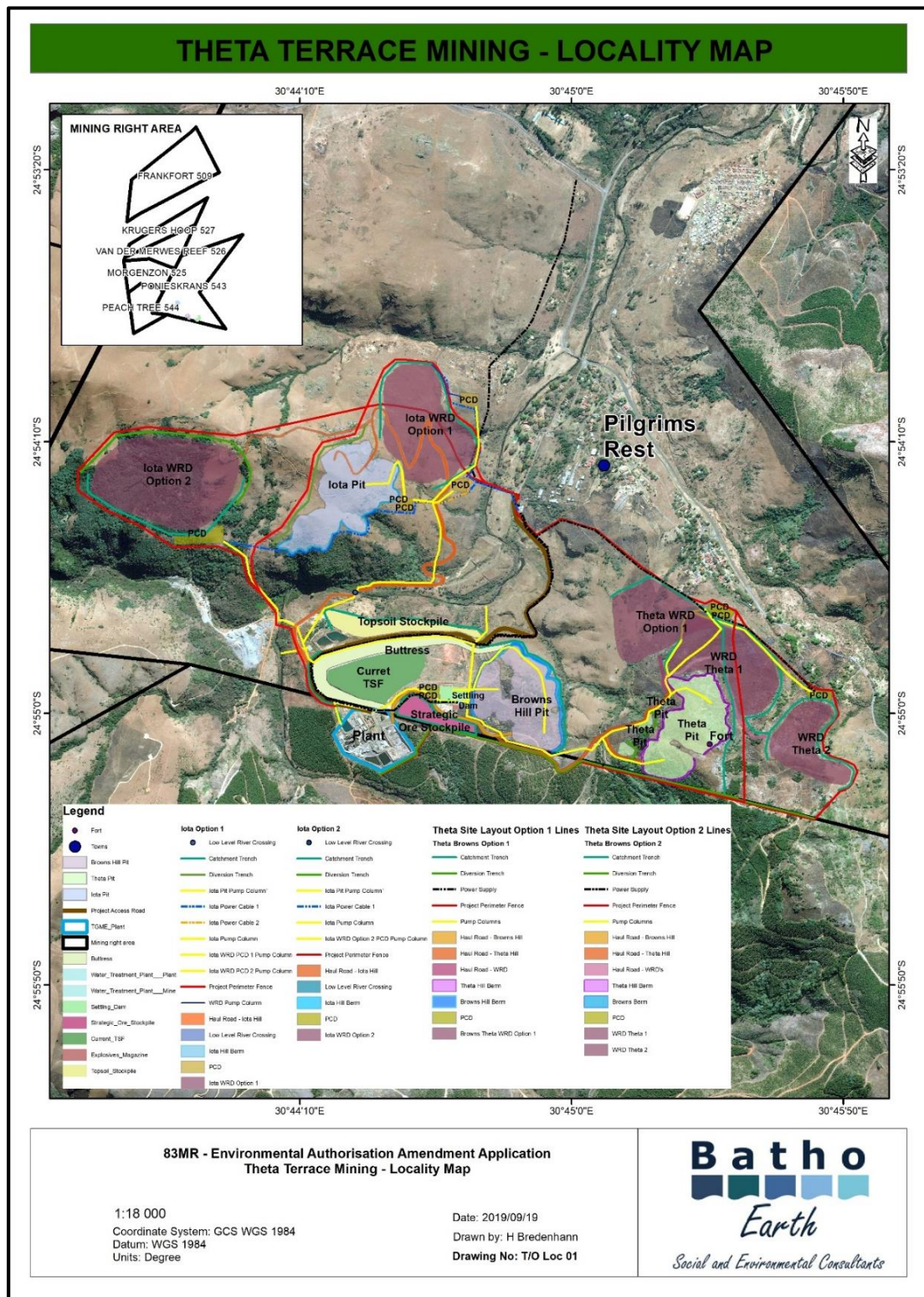


Figure 1: General Site Layout – Scoping Phase

Environmental Scoping Phase

Infrastructure associated with the terrace mining operations include topsoil stockpiles, run-of mine ore stockpiles, waste rock dumps and haul roads.

The general mining site infrastructure will include offices, change houses and laundry facilities, control room, first aid station, stores and laydown yard, salvage yard and waste sorting area, transformer substation, fuel storage facility, refuelling bay, wash bay, workshops, brake test ramp and parking areas. In terms of the placement of the related infrastructure, a few design or layout alternatives were considered initially for the various Waste Rock Dumps (WRD).

As part of the operational activities two potential options were proposed for the locations of the associated Waste Rock Dumps (WRD) at both Theta and Iota Hills. These are detailed as follows:

- Theta/Browns Waste Rock Dump Option 1: This option is situated between both Browns and Theta Pit (Figure 2);
- Theta/Browns Waste Rock Dump Option 2: Located to the north eastern side of Theta Pit, incorporates two smaller pockets separated by a tributary (Figure 3);
- Iota Waste Rock Dump Option 1: Located to the north western corner of the Iota Pit (Figure 4); and
- Iota Waste Rock Dump Option 2: Is located to the north eastern boundary of the Iota Pit (Figure 5).

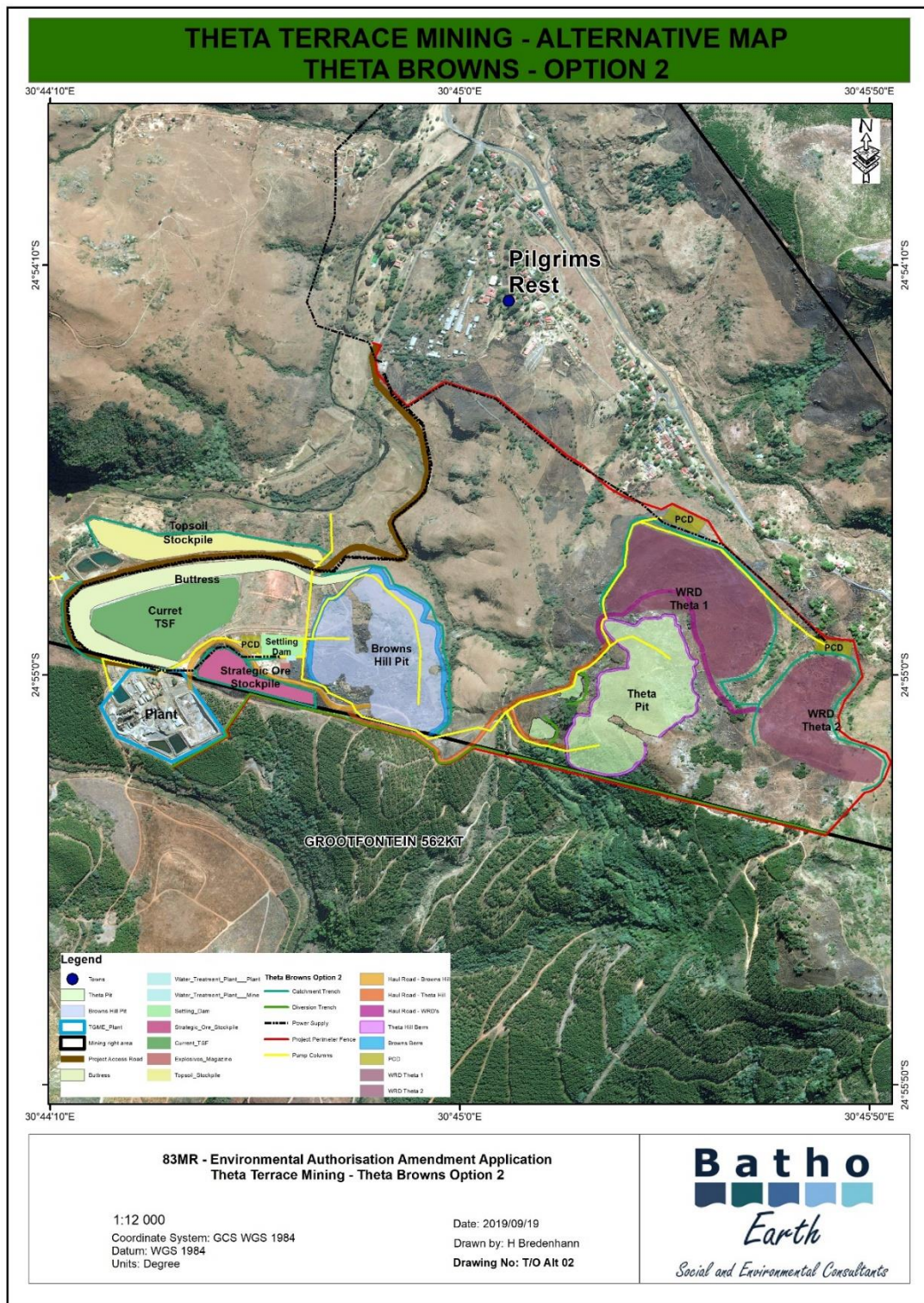


Figure 3: Theta & Browns – Option 2

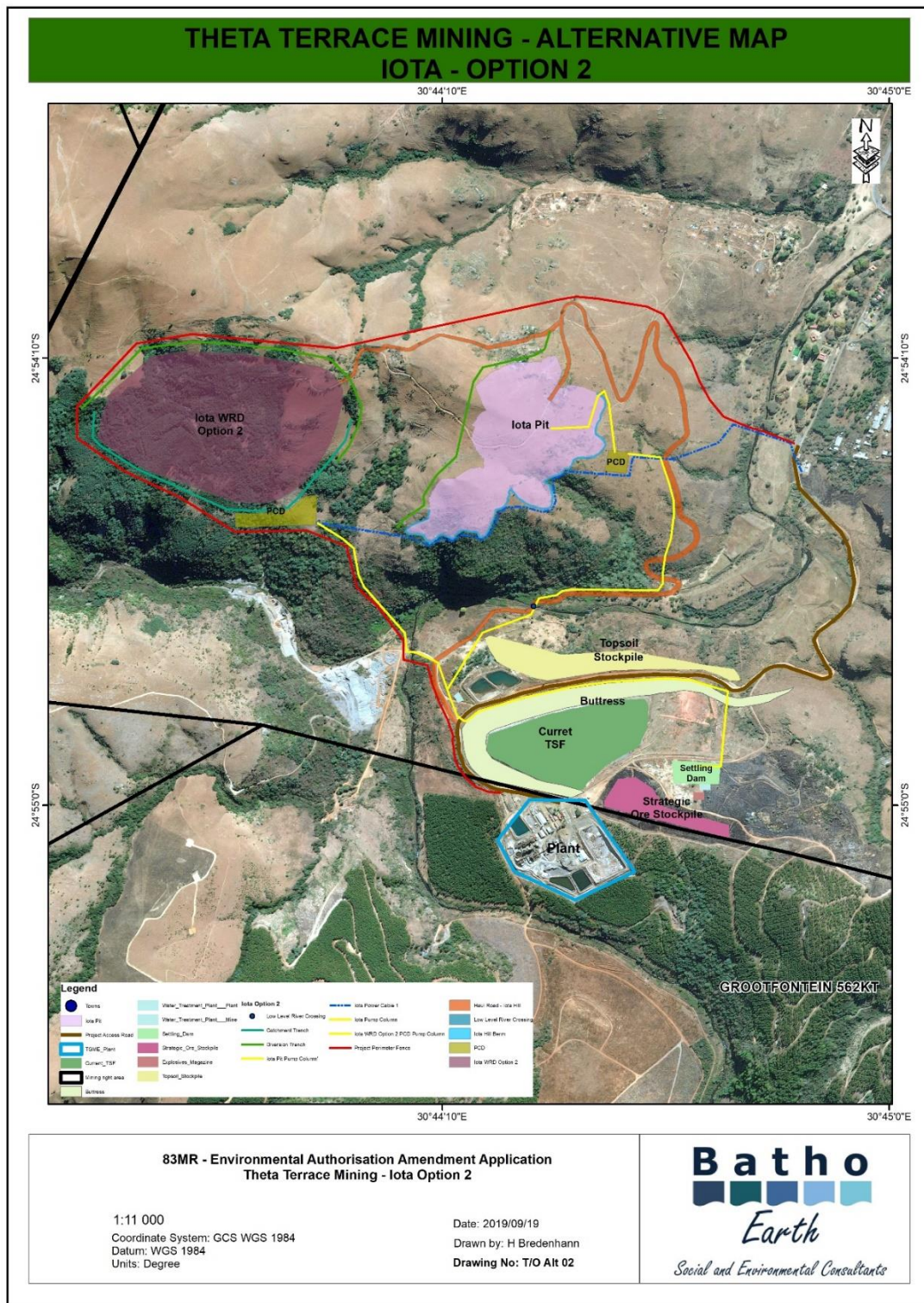


Figure 5: Iota – Option 2

Environmental Impact Assessment Phase

The plan of study proposed in the Scoping Report made provision for various biophysical and social studies which would determine the baseline conditions at the project site as well as make

recommendations related to the feasibility of the proposed localities and alternatives as per the initial site layout plan (Figure 1).

The outcome of these biophysical and social studies was used to inform the final site layout plan, as is common practice in Integrated Environmental Management. Integrated environmental management (IEM) is a philosophy that is concerned with finding the right balance between development and the environment. The difference between IEM and an Environmental Impact Assessment (EIA) is that IEM is a whole philosophy whereas EIA is just one tool or technique used to gather and analyse environmental information that is a part of the IEM process (Source: *Enviropaedia*).

Environmental and social management practices are based on following the precautionary principle, which, simply defined, means developing actions on issues considered to be uncertain, for instance applied in assessing risk management.

Development of a Feasible Site Layout

Certain biophysical and social baseline studies, namely terrestrial ecology (fauna and flora), soils and land capability, air quality, noise and vibration, visual impact, socio-economic and health impact, water quality, heritage and the rehabilitation objectives, returned substantial environmental and social sensitivities and nuances.

However, the process of EIA, within which the above-mentioned studies were undertaken, is inhibited in its ability to assess year-round baseline conditions due to the legislated timeframes imposed by South African law and regulation. In these instances, which is typical of EIA processes, the Environmental Assessment Practitioner (EAP) imposes the precautionary approach by informing the site layout plan from an environmental and social perspective to assist the applicant to achieve the most feasible site layout plan.

In the case of the Theta Project, the application of the precautionary approach resulted in an alteration of the site layout plan as initially presented in the Scoping Report. The alteration reflects revised pit layouts (with the Theta Pit being largely affected), new waste rock dump (WRD) locations as well as optimisation of the overall project footprint to achieve the best IEM scenario considering the extent of baseline information available at the time.

The altered site layout plan was achieved through the implementation of the following mitigation hierarchy:

1. Avoid the potential impact altogether;
2. Minimise the area of the potential impact as far as possible;
3. Rehabilitate and restore the affected area; and
4. Secure a biodiversity offset area as compensation for the affected area.

In this instance, the pit shells were reduced in size and waste rock dump sites were relocated to avoid/minimise the impacts on the ground-truthed portions of highest biodiversity significance to minimize the extent of areas requiring detailed rehabilitation and to limit the requirements for offsets of residual impacts.

Refer to Figure 6 for the revised site layout plan which will be incorporated into the Environmental Impact Assessment Report and Environmental Management Plan. Additional seasonal studies are planned as part of the ongoing environmental, social and rehabilitation programmes. The results of these planned studies might decrease current uncertainties to which the precautionary principle was applied which could lead to future layout developments.

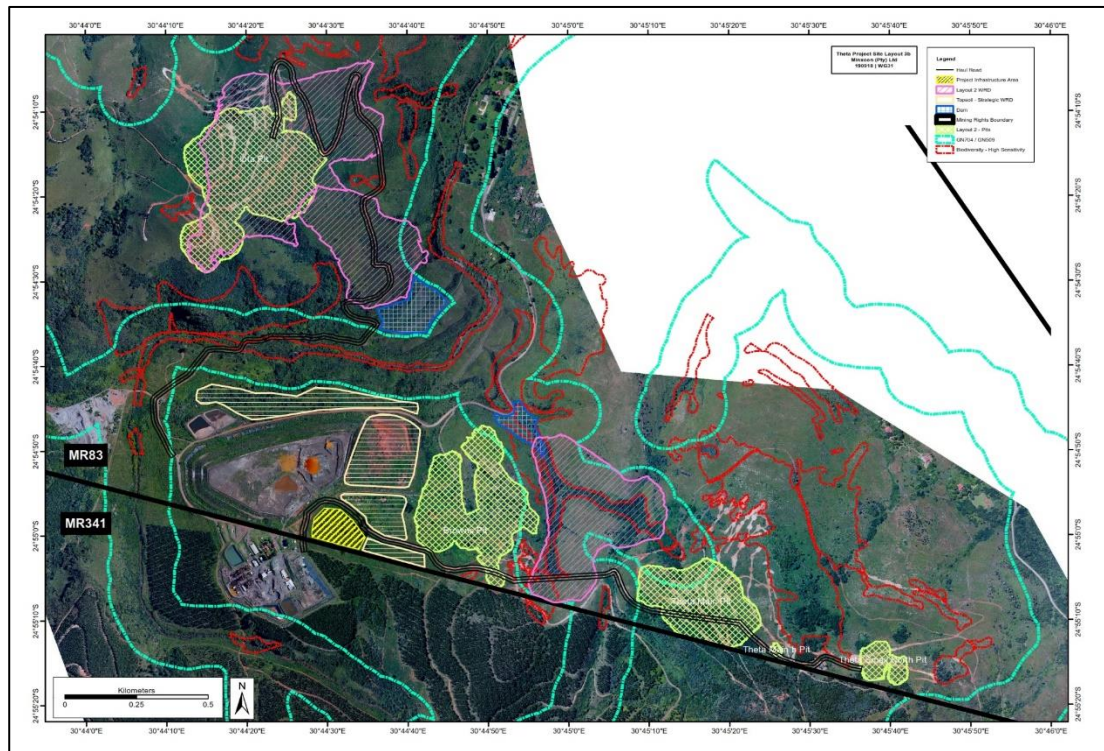


Figure 6: Revised layout (EIA/EMP Phase)

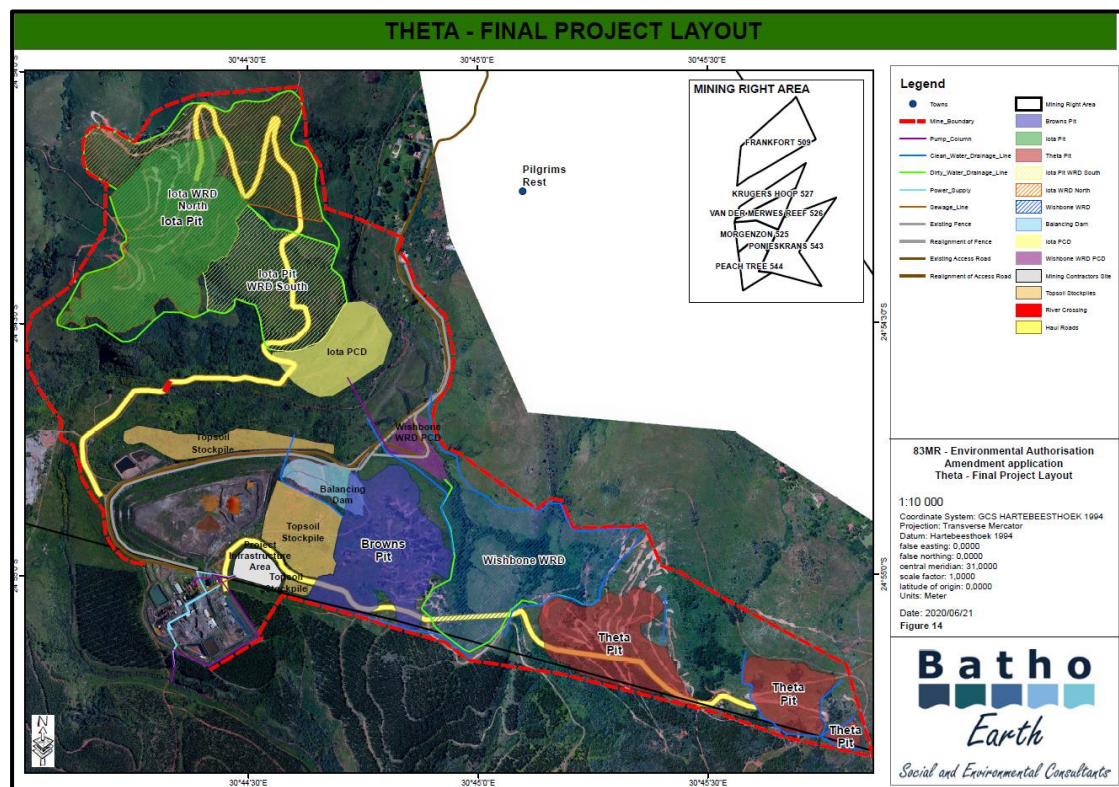


Figure 7: Final layout (June 2020)

6. DESCRIPTION OF THE AFFECTED ENVIRONMENT

6.1 Cultural landscape

The cultural landscape qualities of the region essentially consist of two components. The first is made up of a limited pre-colonial (Stone Age and Iron Age) occupation. The second component is a rural area in which the human occupation consists of two elements. The discovery of gold during the late 19th century resulted in a flood of people entering the area, establishing gold mining activities all over the landscape. The second element is a rural farming community, which, since the early 20th century revolved around forestry, which altered the landscape beyond recognition. These two elements led to the establishment of a number of smaller towns in the region, all which are now part of an ongoing tourism industry.

6.1.1 Early history

Very little habitation of the eastern highveld and escarpment area took place during Early Stone Age times. One exception is at Bushman Rock Shelter, which has deposits covering the complete span of human occupation, since Early Stone Age to early historic times.

It was only during the Middle Stone Age (MSA) that people, by applying a range of strategies for survival and using more complex tool kits, manage to occupy areas that were earlier avoided. During Middle Stone Age times (c. 150 000 – 30 000 BP), people became more mobile, occupying areas formerly avoided. In many cases, tools dating to this period are found on the banks of the many pans that occur all over. The MSA is a technological stage characterized by flakes and flake-blades with faceted platforms, produced from prepared cores, as distinct from the core tool-based ESA technology.

Late Stone Age (LSA) people had even more advanced technology than the MSA people and therefore succeeded in occupying even more diverse habitats. Some sites are known to occur in the region. These are mostly open sites located near river and pans. For the first time we also get evidence of people's activities derived from material other than stone tools. Ostrich eggshell beads, ground bone arrowheads, small bored stones and wood fragments with incised markings are traditionally linked with the LSA.

The LSA people have also left us with a rich legacy of rock art, which is an expression of their complex social and spiritual believes. Such sites are located on a number of farms such as London, Ledophine, Berlyn, Ponieskrantz, Dientjie, Bourke's Luck and Clear Stream (Van Wyk-Rowe 1997).

Iron Age people started to settle in southern Africa c. AD 200 at Silver Leaves and AD 280 at Eiland. Having only had cereals (sorghum, millet) that need summer rainfall, Early Iron Age (EIA) people did not move outside this rainfall zone, and neither did they occupy the central interior highveld area. Because of their specific technology and economy, Iron Age people preferred to settle on the alluvial soils near rivers for agricultural purposes, but also for firewood and water. Sites dating to the Early Iron Age are found, for example near Lydenburg, as well as Ohrigstad (Van Wyke-Rowe 1997).

The occupation of the larger geographical area (including the study area) did not start much before the 1500s. By the 16th century things changed, with the climate becoming warmer and wetter, creating condition that allowed Late Iron Age (LIA) farmers to occupy areas previously unsuitable, for example the highveld regions of Mpumalanga, where they established hundreds of stone walled settlements.

6.1.2 Historic period

History of Gold Mining in Pilgrim's Rest Area

The first gold in the Pilgrim's Rest valley was discovered in 1873 by a lone traveller and prospector, Alec "Wheelbarrow" Patterson - nicknamed as such due to his years of using a wheelbarrow to transport all his possessions across the Eastern Transvaal on his quest to find gold. He kept his rich findings of alluvial gold a secret, fearing the multitude of prospectors that would descend on the area. However, news of gold in the Pilgrim's Rest area made international headlines when, shortly after Patterson, William Trafford also discovered gold in the area. Legend has it that the area acquired its name when Trafford, in pure delight, yelled loudly: "The Pilgrim is at Rest" and the mountains echoed back "Pilgrim's rest...rest".

Officially declared as a goldfield on 14 May 1873, the large amount of alluvial gold in the area led to a stampede of prospectors and their families vying for claims. The mines commissioner had to relocate from Mac-Mac in order to deal with the situation as, within a year after the gold discovery, 1 500 settlers were already working their own claims. Numerous hills around the area were also found to be rich with ore, the highest yielding ones being Jubilee, Ponieskrantz, Desiree, Brown's Hill, Bourke's Luck, Poverty Creek and Starvation Gulch. During the first few years of mining the retrieval of alluvial gold remained the most popular and profitable, with an estimated yield worth two million Rand being retrieved (TPA B&M 1981:1).

The town of Pilgrim's Rest grew from a camp of temporary tents and "*sinkwonings*" into what is roughly still visible today. Efforts to declare Pilgrim's Rest as a town started in 1894, but even by the outbreak of the Anglo-Boer war in 1899 this decision had still not been finalised by talks between the state and mining industry. By that time the town consisted of some 200 white settlers, with several thousand black inhabitants living in surrounding areas. By 1899 the business sector in the town consisted of two hotels, the Royal and the Pilgrim's, two banks and ten shops that included a butchery, pharmacy and general merchants. The school was housed in an old wooden building up until 1896, when it was moved to an old town hall. The education law instating English to be taught as a second language in 1896 led to the priest, Hon. Colin Rae opening the St. Mary's School at the Wesleyan church. It was only in 1899 that the state agreed to take over and subsidise the school, leading to the foundation of the new school building to be laid on the 1st of February 1899 (TPA B&M 1981:5, 6)

The period of plenty was not to last however, as the annexation of the Transvaal by the British in 1877 and the First Independence War (1880 – 1881) caused the mining sector to come to grinding halt. Despite securing their independence again in 1881, large scale depression was evident among the population, forcing the newly reinstated Republican Government to make exclusive concessions to certain individuals and companies in order to reignite all manner of industries (TPA B&M 1981:2).

David Benjamin, a financier from London, brokered an arrangement with the Government for mining rights in the areas of Ponieskrantz, Ledovine, Waterhoutboom, Driekop, Grootfontein and Belvedere. The details of this contract were as follows: Benjamin would pay an annual sum of £ 1 000 to the Government, guaranteed to have full mining industry works back to full earning within two years and to employ a minimum of 25 white personnel at the same time. The Government agreed to this contract, but included that Benjamin had to reimburse(?) the current occupants and owners in the area. With the aid of the State attorney, Jorrisen, the contract was finalised and led to the creation of the Transvaal Gold Exploration Company in 1882. Garner Williams, a well-known mining engineer from Kimberley, was given the post of local manager. The company was initially unable to declare any dividends, but after gold was discovered at Jubilee and Columbia Hill by Charlie Robinson, production started increasing rapidly. Soon numerous other mining companies formed, the most important of which were to be Pilgrim's Mining and Estate Company, Jubilee Mines Ltd. and New Clewer Estates (TPA B&M 1981:2).

In 1885 H. Eckstein & Co., a mining company from the Witwatersrand, acquired a majority stake in the Transvaal Gold Exploration Company and, amalgamated with several other mining groups, was renamed the Lydenburg Gold Mining Estates (TPA B&M 1981:2). During a special meeting on 29 July 1896 the company was once again renamed, this time becoming The Transvaal Gold Mining Estates Ltd (TGME) (Fowler 1986:292). TGME's mining industries were prolific for some time in the Pilgrim's Rest

valley, with more than a dozen mines operating at the same time, while TGME's mines in Ponieskrantz - oddly named as letters of the Greek alphabet – Beta (that produced gold for 85 years until 1971), Eta, Theta, Iota and Chi, were also showing dividends. Till today no one knows why, or who, decided to name these mines in a foreign alphabet (TPA B&M 1981:3).

The first consultant engineer for TGME, Mr Wertheman, decided to create a central processing plant where the ore from Jubilee, Clewer, Beta and Theta could be processed at the same time and he thus also insisted on having a train line laid down from the mines to the central processing plant. This endeavour proved difficult as there were no natural deposits of coal to power steam engines, but TGME decided to lay down an electric railroad which ran on hydroelectricity generated at the Brown's Hill plant. The original railway was insufficient for the needs of the mines, so in 1897 a tramline, running for 12km and built at the cost of £17 000, was laid down. Only ore from the Clewer and Beta mines were transported via this railway, while for 60 years the other mines made successful use of mules to transport ore (TPA B&M 1981:3).

TGME mines had a good understanding with their employees for many years, reporting no strikes or unrest. It was only during the unrest in the Rand mines that TGME had to deal with renegotiating salaries, but it was achieved peacefully with no strikes or violence (TPA B&M 1981:6; Fowler 1986:296).

In 1899 another war broke out between the Transvaal Republic and the British, which would once again bring all mining in the area to a full halt. As the British never cared much for the land east of Lydenburg, the *Boerekommandoes* used it as a place of rest between their attacks. Despite efforts to maintain gold production for the Boere the majority of TGME miners were banished to Delagoabaai, with only two men left behind to look after the mines. The war brought a shortage of money, and it was decided to use the gold and tools left behind in the TGME workshops to start the small production of coins, called "*veldsponde*". Barberton's school principal, Mr P.J. Kloppers, was put in charge of the "*Staatsmunt te Velde*" where a 986 "*veldsponde*", branded with "*Z.A.R. 1902*" on one side, and "*Een Pond*" on the other, were produced. Partially made from gold mined at Pilgrim's Rest and partially by that supplied from the Pretoria Munt, these coins still hold great value as collector's items today (TPA B&M 1981:4; Fowler 1986:293).

Despite the complete cessation of all production during the war, the mine equipment has sustained no damage, and thus production was restored almost immediately. However, this was not to be without its own challenges. New manager, Hugh Hughes, due to severe lack of able-bodied workers, was forced to bring in a work force of Asian immigrants to try reach previous production values. Furthermore, the devastation left after the war meant that the cost of shipping had increased exponentially, leaving hundreds of tons worth of gold piling up at Machadodorp. The closets railways were at Nelspruit and Machadodorp, leaving the inhabitants of Pilgrim's Rest with no other choice but to return to the use of oxen and "*ossewaens*" (ox drawn wagons) to collect and replenish their necessary foodstuff and goods, although the services of mule drawn carriages – the "*Zeerderberg-poskoets*" were available for passengers, this type of transport was ineffective and completely useless to the mines. Despite talks of building a railway between Pilgrim's Rest and Graskop, this would only be realised in 1914. Mining profits were only achieved again in 1904, with the Theta mine producing more than 40 000 ton of ore in 1907. This was followed by another gold rush in 1908, where 500 miners came to stake claims, mostly in the Jubilee mine surroundings (TPA B&M 1981:4).

The next two years would show some horrific disasters: firstly, the old mill in Camel's Creek burnt to the ground on the 9th of July 1908, and second, even more grievously, the devastating flood on 2 January 1909, where a seven-hour long storm wreaked havoc on the town and mines. The Blyderiver rose approximately 30 feet, with rain fall exceeding 212.5mm. It swept away all bridges, the Jubilee station, the central cyanide compound and the electric tramline, killing 6 people in Clewer as well as causing the deaths of three boys and injuring another four people in a landslide that overwhelmed a village of huts. The damage to the mines was also devastating, with the main drives at various mines collapsing at the mouths (TPA B&M 1981:5).

TGME would only start to see true difficulties in the Pilgrim's Rest area after 1914, with production in the mines falling sharply from a record amount of R570 936 in 1914, steadily declining until only showing profits of R31 102 in 1919. The years after the First World War proved even more difficult for TGME, and in an effort to stem loss of profit it was decided to develop an experimental plantation to enter the profitable lumber industry. Led by project manager Mr. Robert Gardner, the planting of wattle trees and "*bloekombome*" had reached 3 664 acres by 1927. This would become a national operation, which still flourishes today (TPA B&M 1981:6). The announcement of the devaluation of the pound, announced by Mr Havenga in 1932, brought temporary relief to the mines, as the price of gold now rose from 4s 10d to 124s per ounce. However, the 1940's led to yet another decline in mine production in the area, despite another devaluation of the pound in 1941 (Fowler 1986:293). TGME had been through tumultuous times in its history in the Pilgrim's Rest area, having delivered some 300 000 tons of ore per year between 1935 and 1955, with a record yield of 403 000 ton during the 1941 – 1942 financial year, but production had dwindled to an average of roughly 50 000 ton per year during the 1950's. Despite having had to face natural disasters, pestilence (eg. "*runderpest*" in 1896), low grade ore, three wars, unstable ground, veld fires, horse-sickness and mudslides (Fowler 1986:296) the sheer amount of ore generated in the area is actually astounding, with the area having delivered R16 350 000 000 (of which the first R2 000 000 was from alluvial gold). Sadly, the decline in production meant that mines started closing and in 1968 TGME was forced to sell some of their rights to Rand Mines Properties (RMP). After the closing of its last mine, Beta, TGME sold the last of their assets to RMP in 1971 (TPA B&M 1981:7).

Bourke's Luck Gold Mine, underlying sections of the farms Dientjie 453KT, Bourke's Luck 454 KT and Willemsoord 475KT, was closed in 1955 but yielded approximately 4,5 t of gold over a span of 7,5 km and also yielded sellable copper and iron pyrite by-products (Ward & Wilson 1998:362).

Pilgrim's Rest Central Mines were formed by approximately a dozen or so mines in the area, with the highest yielding being Desire, Theta, Beta, Columbia Hill, Duke's Hill-Clewere, Jubilee and Ponieskrans Mines. The approximate gold ore yield of about 106,8 t was transported from the mines to a centralised, common beneficiation and roasting plant, which aided in prolonging the profitability of Transvaal Gold Mining Estate's interests in the Vaalhoek and Pilgrim's Rest area. As with most mines in the area there were widespread complications with broken ground, underground water and refractory ore (Fowler 1986).

Other mines in the area, namely Vaalhoek Gold Mine, closed in 1956, Elandsdrift mine, underlying the farm Elandsdrift 220JT which was an opencast mine closed in 1944 and the Mamre-Slaaihoek Mines, all closed due to the same problems as the bigger mines as well as due to the poor quality and erratic distribution of gold ore (Ward & Wilson 1998:363).

6.2 Site specific review

6.2.1 Heritage status

In 1974 the historic village of Pilgrim's Rest, situated on Portion 42 of the farm Ponieskrans 543KT (originally spelt as Ponieskrantz) was bought by the Transvaal Provincial Administration and developed as a National Monument under the National Monuments Act, No. 28 of 1969 (as amended). This was later extended to include the rest of the farm and in 1975 the part on which Alanglade (the house of the general manager) and the golf course are situated, were also bought by TPA. However, with the promulgation of the National Heritage Resources Act, No. 25 of 1999, the Pilgrim's Rest site lost its national status and reverted to be a site of provincial heritage status.

6.2.2 World heritage listing

In 2007 efforts were made to have the Central Reduction Works declared as World Heritage site by having it added to UNESCO's Tentative List for World Heritage Status (Rowe & Venter 2007). However, at the last available revision of the Tentative Lists, dated 15/04/2015 (<http://whc.unesco.org/en/tentativelists/>), it seems as if this listing was terminated as the Pilgrim's Rest Central Reduction Works is not included on the list.

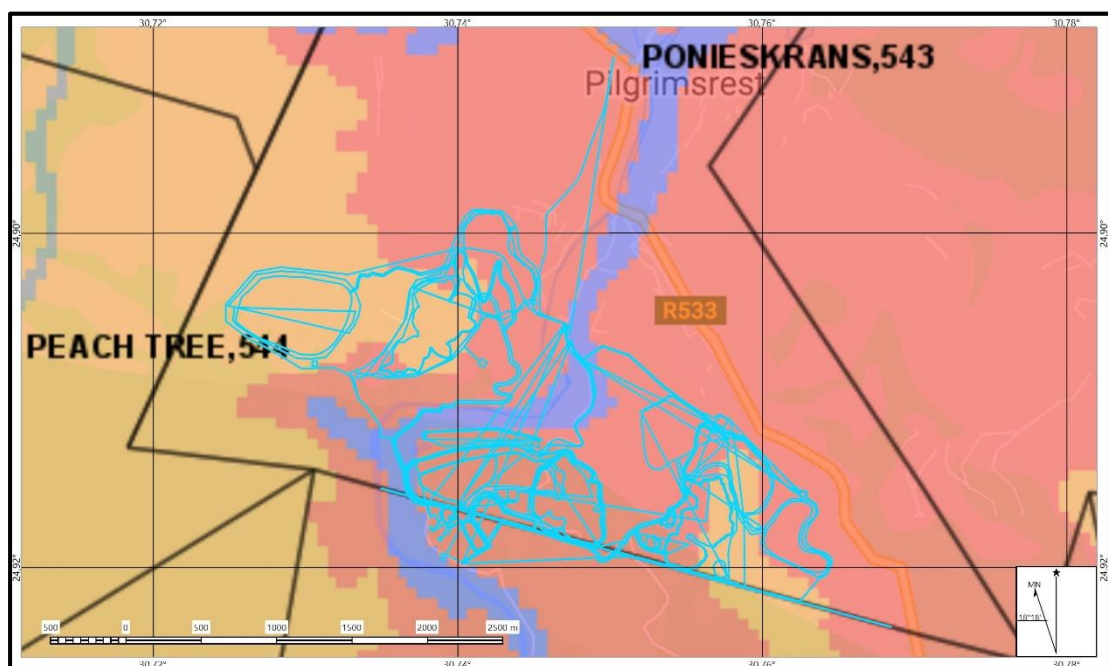
6.2.3 Fragmented heritage

As can be expected, over time, with new developments and expansion taking place, subsequent closing down of the operations, opening up the mining activities again, and final closure, many of the structures and features that operated in causal manner to successfully extract the gold over a large geographic region, were adapted, modified, forgotten, cannibalized and vandalised. Especially linear developments such as pipelines, cocopan tracks, electricity power lines and even roads suffered the most. In most cases only isolated elements or even parts of elements remain in the landscape. But people and communities also had to be relocated to different areas.

Fortunately, much of this causal context have been documented by the mine itself, e.g. in reports and maps, but also by the activities of the Pilgrim's Rest Museum, the latter which also included oral history documentation. The heritage context of surviving, fragmentary elements in the landscape are therefore not dependant on being protected *in situ* but are actually already protected in a virtual context.

6.2.4 Palaeontological sensitivity

The Palaeontological Sensitivity Map (SAHRIS) indicate that most of the study area (Fig. 4) has a very high sensitivity of fossil remains to be found and therefore a field assessment and protocol for finds is required. A smaller section on the western side of the development has a high sensitivity and therefore a desktop assessment is required. Based on the outcome of that, a field assessment might be required.



Colour	Sensitivity	Required Action
RED	VERY HIGH	field assessment and protocol for finds is required
ORANGE/YELLOW	HIGH	desktop study is required and based on the outcome of the desktop study, a field assessment is likely
GREEN	MODERATE	desktop study is required
BLUE	LOW	no palaeontological studies are required however a protocol for finds is required
GREY	INSIGNIFICANT/ZERO	no palaeontological studies are required
WHITE/CLEAR	UNKNOWN	these areas will require a minimum of a desktop study. As more information comes to light, SAHRA will continue to populate the map.

Figure 4. The Palaeontological sensitivity of the study area

7. SURVEY RESULTS

7.1 Known heritage sites and features

The list presented in Table 1 below is based on own observations, supported by previous work done in the region: Fourie (2008); Henning (1981); Pistorius (2005); Reinders, Mason & Van Wyk (2007); Van Wyk-Rowe (2003).

Table 1. Known heritage sites and features in the larger region as well as the study area

Label	Comment	Latitude	Longitude
001 Fort	Extant	-24,91825	30.75707
002 Cemetery	Extant	-24,91814	30.7448400
003 Graves	Extant	-24,91793	30.7435350
004 Graves	Unknown	-24,91765	30.7429167
005 Graves	Unable to verify	-24,91748	30.7468167
006 Wesleyan mission	Defunct	-24,91202	30.7467000
007 Mission Suisse Romande	Defunct	-24,91309	30.7497100
008 Adit	Extant	-24,91748	30.7588650
009 Adit	Extant	-24,90683	30.7258440
010 Adit	Extant	-24,90774	30.7220730
011 Adit	Extant	-24,90740	30.7217730
012 Adit	Extant	-24,91478	30.7340667
013 Adit	Extant	-24,90950	30.7305970
014 Mine dump	Extant	-24,91072	30.7470833
015 Mine dump	Extant	-24,91038	30.7435333
016 Ore bin	Defunct	-24,91285	30.7345333
017 Ore floor	Defunct	-24,91152	30.7449000
018 Browns Hill Mill	Defunct	-24,91138	30.7452833
019 Pump house	Extant	-24,90674	30.74701
020 Roy's Race	Extant (partial)	-24,90837	30.7477333
021 Water regulator	Extant (partial)	-24,91128	30.7452500
022 Point of race	Extant (partial)	-24,91127	30.7448333
023 Weir	Extant (partial)	-24,91075	30.7401944
024 Coco pan bridge	Extant	-24,90793	30.74649
025 Coco pan track	Extant	-24,91013	30.7418833

026 Coco pan track	Extant	-24,91007	30.7398333
027 Concrete structure	Extant (partial)	-24,90892	30.7475167
028 Concrete structure	Extant	-24,90972	30.7472500
029 Concrete structure	Extant	-24,91038	30.7467333
030 Concrete structure	Extant	-24,91132	30.7459167
031 Culvert	Extant (partial)	-24,91125	30.7445333
032 Concrete structure	Extant (partial)	-24,91243	30.7440833
033 Foundations	Extant (partial)	-24,91222	30.7426333
034 Farmer's race	Extant (partial)	-24,91245	30.7426667
035 Suspension bridge achor	Extant (partial)	-24,91053	30.7394333
036 Suspension bridge	Extant (partial)	-24,91087	30.7391667
037 Low Level Bridge	Extant	-24,91194	30.73516
038 Foundations	Extant (partial)	-24,91383	30.7364500
039 Suspension bridge remains	Extant (partial)	-24,91420	30.7342000
040 Beta Structure	Defunct	-24,91335	30.7332667
041 Beta Structure	Extant	-24,91405	30.7349500
042 Beta West Water	Extant	-24,91223	30.7315833
043 Historic structure	Defunct	-24,91331	30.7305556
044 Historic settlement	Defunct	-24,91450	30.7316944
045 Previous settlement	Defunct	-24,91820	30.7356167
046 Informal settlement	Extant	-24,91580	30.7429000
047 Compound	Defunct	-24,91712	30.7427667
048 Blacklow's Cutting	Extant (partial)	-24,91710	30.7420700
049 Concrete structure	Extant (partial)	-24,90547	30.7293840
050 Rock art site	Extant	-24,91413	30.7306500
051 Browns Hill Pit	Extant (partial)	-24,91642	30.7470725
052 Theta Hill Pit	Extant (partial)	-24,91776	30.7558404

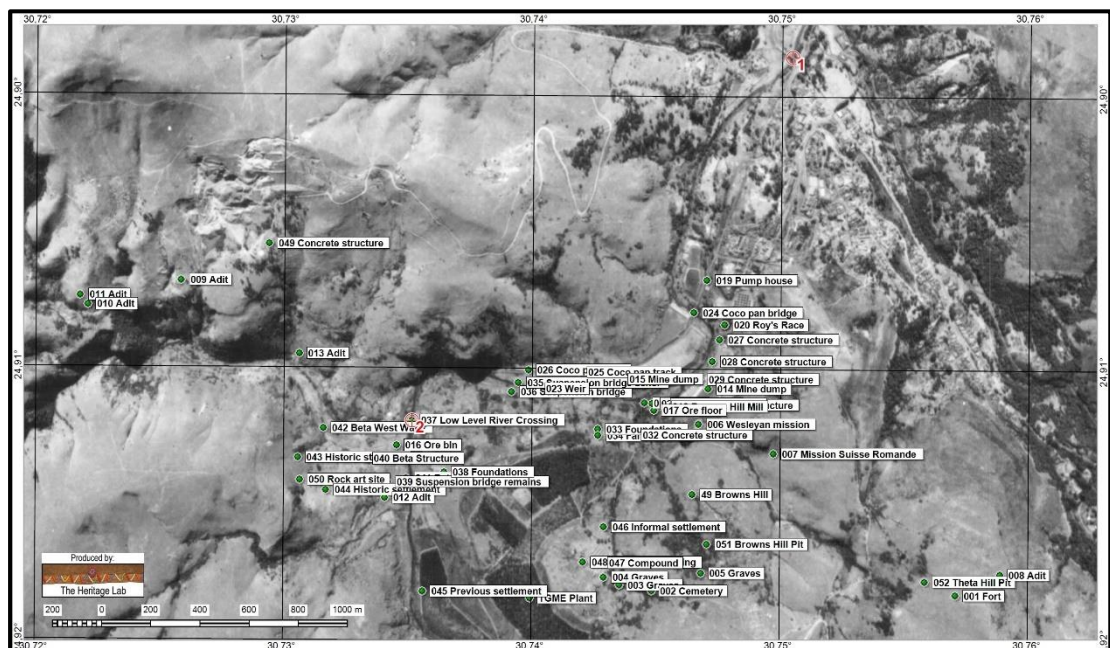


Figure 5. Know heritage sites indicated on the aerial photograph dating to 1953 (Photo: 325_036_05740) (Red wheel-crosses = calibration points)



Figure 6. Know heritage sites indicated on the aerial photograph dating to 2018 (Photo: Google Earth)

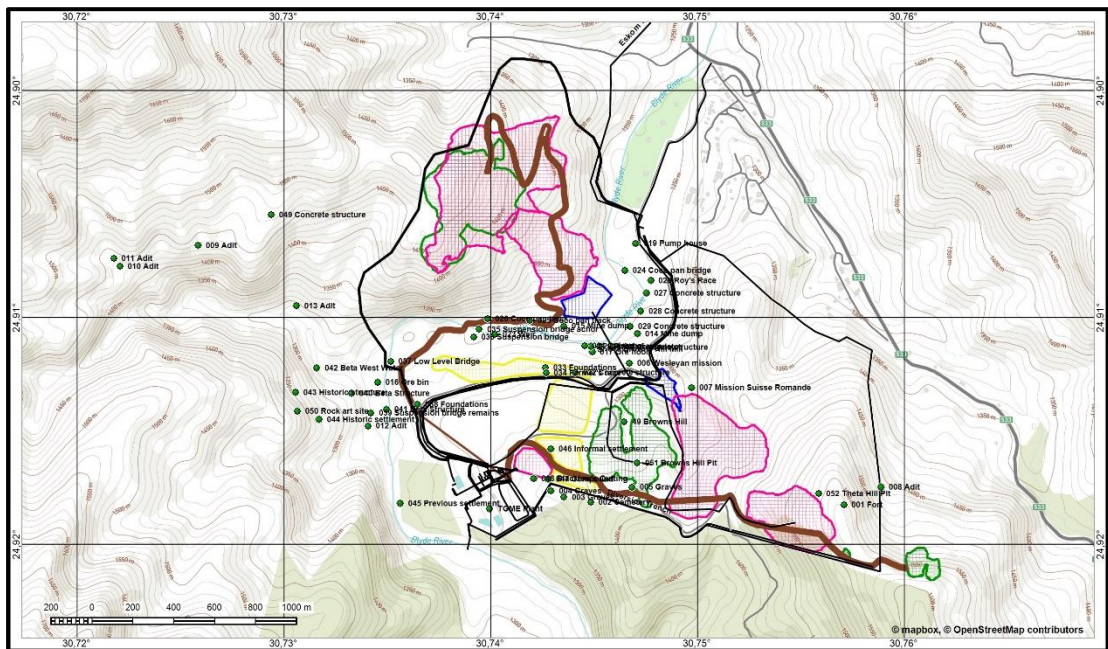


Figure 7. Known heritage sites in relation to the development

After evaluating the identified sites with reference to them being impacted on by the proposed development, we are left with only a few (Table 2 below). However, there are a number which will not be directly impacted on but are viewed to be of high enough significance to be listed as sites to be avoided and are consequently also included in Table 2.

Table 2. Known heritage sites and features in close proximity of the development area

Name	Latitude	Longitude	Impact	Management
001 Fort	-24,91824	30,75706	Inside Theta Hill Pit	Avoid/Retain
002 Cemetery	-24,91814	30,74484	Outside development	Avoid/Retain
003 Burial site	-24,91806	30,74478	Outside development	Avoid/Retain
004 Burial site	-24,91792	30,74353	Outside development	Avoid/Retain
005 Graves	-24,91748	30,74682	Outside development	Avoid/Retain
019 Pump house	-24,90674	30,74701	Close to access road	Avoid/Retain
024 Cocopan bridge	-24,90787	30,74648	Integral part of remaining track	Avoid/Retain
025 Cocopan track (east)	-24,91013	30,74188	In proposed haul road	Document
026 Cocopan track (west)	-24,91006	30,73983	In proposed haul road	Document
032 Concrete structure	-24,91243	30,74408	Inside waste rock dump area	No further action
033 Foundations	-24,91222	30,74263	Inside waste rock dump area	No further action
034 Farmer's race	-24,91245	30,74267	Inside waste rock dump area	No further action
038 Foundations	-24,91383	30,73645	In proposed haul road	No further action
046 Informal settlement – dating to the late 1980s	-24,91581	30,74291	People to be relocated	No further action
047 Compound	-24,91712	30,74277	Abandoned 1972	No further action

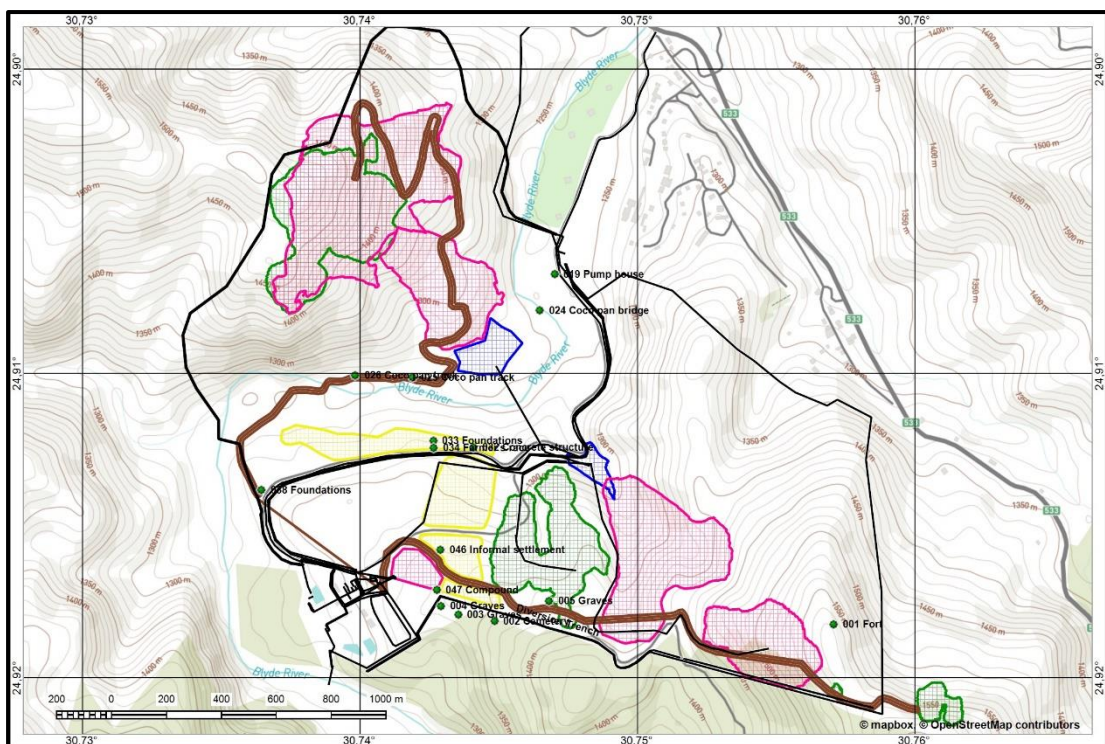


Figure 8. Heritage sites in close proximity of the development area

7.2 Inventory of identified cultural heritage sites and features to be protected

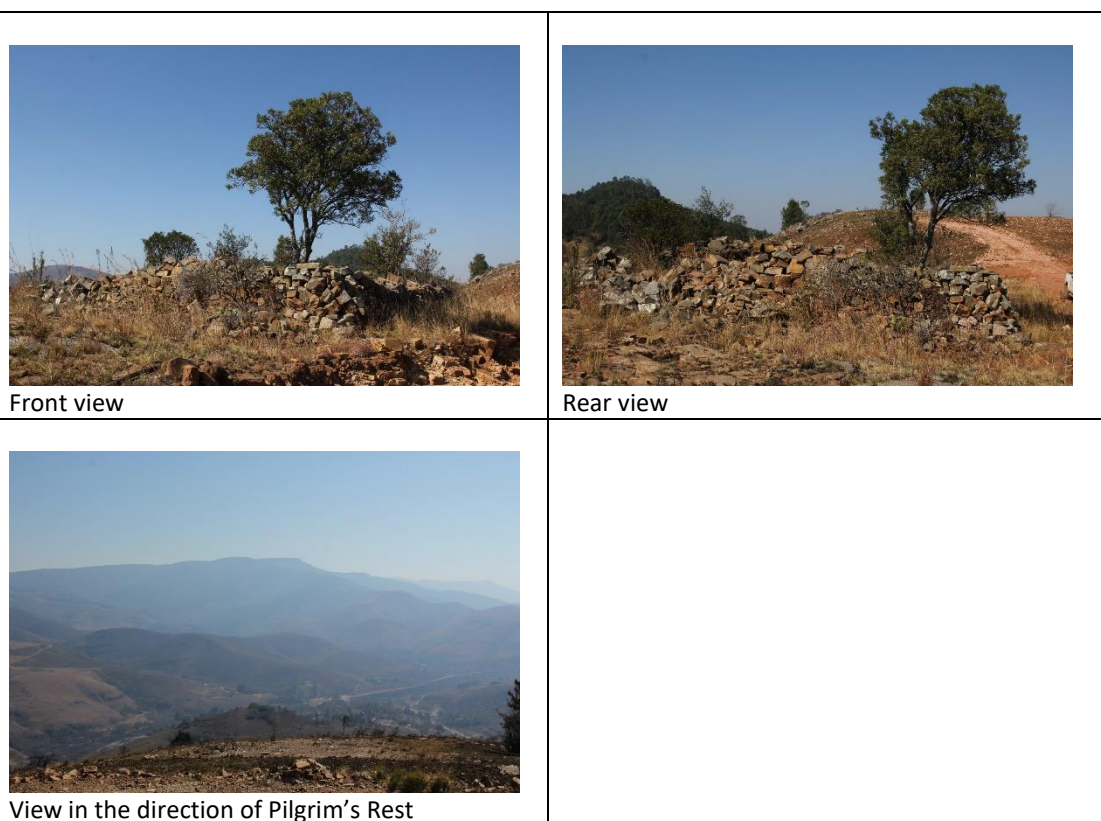
NHRA Category	Structures older than 60 years - Section 34
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001. Type: Fort. **Farm:** Ponieskrantz 543KT. **Coordinates:** S 24,91825; E 30,75707

Description

A rectangular structure of packed stone. It occupies a commanding position on a hill overlooking not only Pilgrim’s Rest town, but the larger region as well.

Research has shown that the intended function of this feature might be a fortification that was built in preparation for expected hostilities that might arise during the so-called Sekhukhune War’s (1876-1879). As far as is known, it fortunately was never used for its intended purpose.



Significance of site/feature	Generally protected: High significance - Grade 4-A
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Reasoned opinion: This site represents the remains of a period in South African history where the groundwork for the future development of the country was laid. Sites representing struggle for the possession of the land and its resources are usually few and far between and therefore the destruction of a single such site would have a proportionate high impact on the occurrences of similar features in the larger landscape.

References

Mason, J. 2011. *Historical archaeological investigation of a stone structure at Pilgrim’s Rest that probably served as a fortification during the First (1876) and Second (1878/79) Sekhukhune Wars.* Unpublished report: Pilgrim’s Rest.

Smith, K.W. 1967. The Campaigns against the Bapedi of Sekhukhune, 1877-1879. *Argiefjaarboek vir Suid-Afrikaanse Geskiedenis* 30(2):1-69.

<p>024-026. Type: Cocopan bridge. Farm: Ponieskrantz 543KT. Coordinates: S 24,90793; E 30,74649 S 24,90674; E 30,74701 East S 24,91013; E 30,74188 West S 24,91007; E 30,73983</p>
<p>Description</p> <p>A section of the old electrified cocopan track extending from the road towards TGME (at the old pump station) westwards to the metal bridge across the Blyde River. This track operated between Beta Mine and the Central Reduction Works but represents only a small section of what was in use over the larger region. Unfortunately, most of this feature that was used in the larger region have been vandalised.</p>

 <p>Side view</p>	 <p>Top view</p>
 <p>Track and electricity pylons</p>	

Significance of site/feature	Generally protected: High significance - Grade 4-A
<p>Reasoned opinion: This site represents the remains of a technology that became redundant due to the cessation in demand of its original purpose. For its time it represented a remarkable progressive and modern technology. Sites representing industrial heritage are usually few and far between and therefore the destruction of a single such site, or even a segment of it, would have a proportionate high impact on the occurrences of similar features in the larger landscape.</p> <ul style="list-style-type: none"> This feature is older than 60 years and therefore enjoy general protection under the Heritage Act. As this is a linear development, an impact on even a section of it would have a proportionate high impact on the occurrences of similar features in the larger landscape. Large sections this feature has already been destroyed, with this the only section that is still reasonably intact. 	

References
-

008-013. Type: Adits. **Farm:** Ponieskrantz 543KT.

Description

A number of old adits are scattered around the larger region. Most are simple holes dug into the side of the hill, whereas others are shored up with stone walls, concrete casings and pillars.
 None of the built ones are known to be located in the development area, but they are mentioned here in case some unknown ones are located during future mining operations.



Significance of site/feature	Generally protected: High significance - Grade 4-A
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Reasoned opinion: These sites represents the remains of a technology that became redundant due to the cessation in demand of its original purpose. However, they are older than 60 years and therefore enjoy general protection under the Heritage Act. Such sites representing mining heritage are usually well represented in the larger landscape and some have been declared formal heritage site, e.g. in the Steelpoort River valley.

References

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NHRA Category	Graves, Cemeteries and Burial Grounds - Section 36
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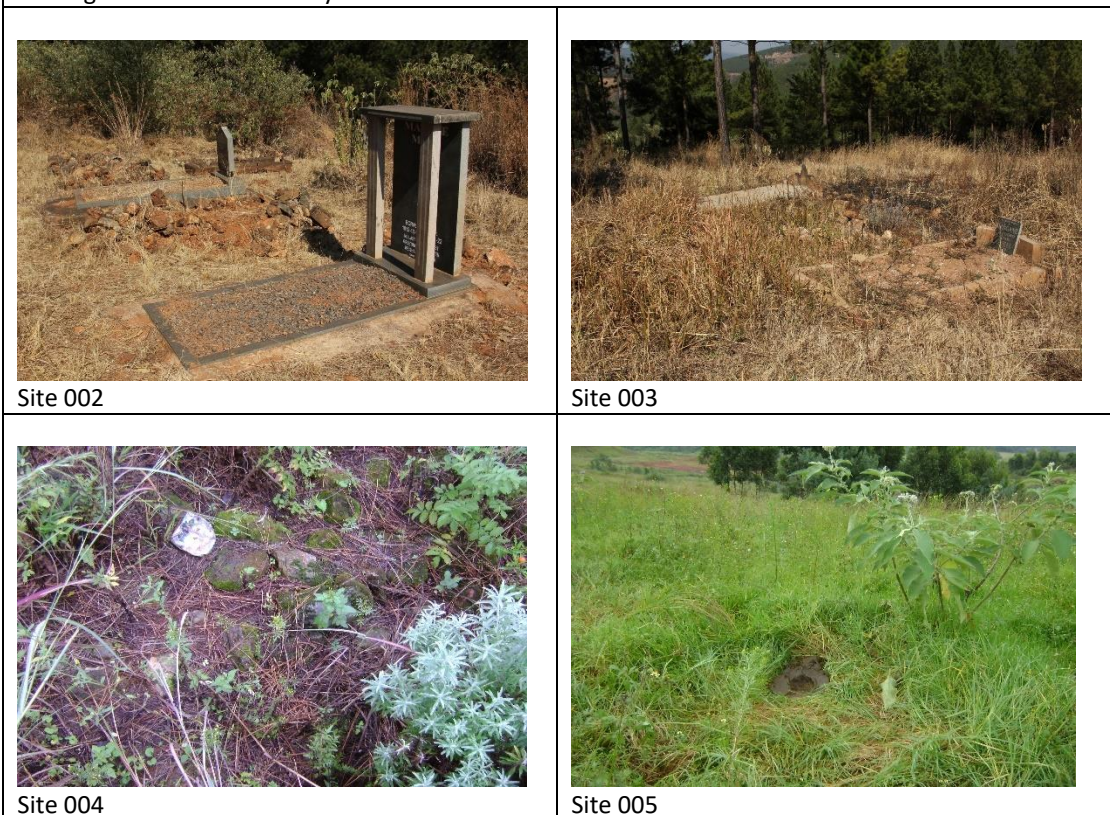
002-005. Type: Burial sites. **Farm:** Ponieskrantz 543KT **Coordinates:** 002: S 29,91814; E 30,74484
 003: S 24,91793; E 30,74353
 004: S 24,91765; E 30,74291
 005: S 24,91748; E 30,74681

Description

Four informal burial sites have been identified that still exist in the region of the proposed development. Originally there were a larger number, but some of these have been relocated as far back as 2007-2008 (see Fourie 2008).

The graves all belong to former labourers at the mine or their family members. The burial sites range in size from nearly 60 individuals to as few as two or three persons.

Some of the sites were much overgrown with vegetation and have little evidence of grave markers, making their verification very difficult.



Significance of site/feature	Generally protected: High significance – Grade IV-A
Reasoned opinion: Burial sites are viewed as having high emotional and sentimental value. However, mitigation is possible if proper procedures have been followed.	

References
Fourie (2008)

8. RESULTS: IMPACT ASSESSMENTS AND MITIGATION MEASURES

8.1 Impact assessment

Heritage impacts are categorised as:

- Direct or physical impacts, implying alteration or destruction of heritage features within the project boundaries;
- Indirect impacts, e.g. restriction of access or visual intrusion concerning the broader environment;
- Cumulative impacts that are combinations of the above.

The significance of the anticipated impact on heritage resources is determined through a synthesis of various characteristics in a formula presented below, and can be assessed as low, medium or high (for a detailed version, see Section 2 of the Addendum at the end of this document):

$S = (E+D+M) \times P$; where

S = Significance weighting

E = Extent

D = Duration

M = Magnitude

P = Probability

Significance of impact		
Points	Significant Weighting	Discussion
< 30 points	Low	Where this impact would not have a direct influence on the decision to develop in the area.
31-60 points	Medium	Where the impact could influence the decision to develop in the area unless it is effectively mitigated.
> 60 points	High	Where the impact must have an influence on the decision process to develop in the area.

8.2 Mitigation measures

Mitigation: means to anticipate and prevent negative impacts and risks, then to minimise them, rehabilitate or repair impacts to the extent feasible.

For the current study, the following mitigation measures are proposed (see Section 3 of the Addendum for a discussion of all mitigation measures) and are summarised in Table 3 below.

Table 3: Impact assessment

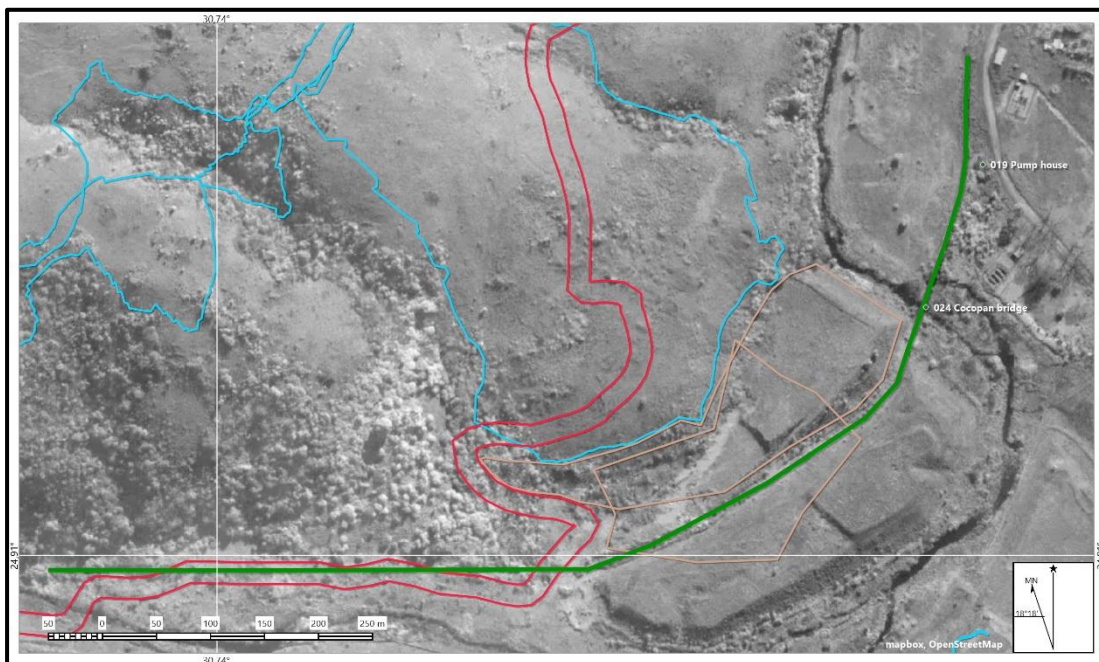
NHRA Category		Structures older than 60 years - Section 34			
001. Type: Fort. Farm: Ponieskrantz 543KT. Coordinates: S 24,91825; E 30,75707					
Impact assessment					
Currently, the Theta Pit boundary approaches the fort to within about 22m – see image below.					
Mitigation					
(1) Avoidance/Preserve: Because of its location within the larger project development area, it would be possible to avoid this site as it actually occupies a small footprint;					
<ul style="list-style-type: none"> • It is recommended that a buffer zone of at least 15m is created around the outer edges of the fort and that this is formalised with a suitable, permanent fence (with an access gate). 					
Significance of impact: before/after mitigation					
Extent	Duration	Intensity	Probability	Significance	Weight
3	5	4	5	60	Medium
1	5	3	3	27	Low
Requirements					

Should there be an impact on the site, a permit would be required from the provincial heritage authority.



024-026. Type: Cocopan track and bridge. **Farm:** Ponieskrantz 543KT. **Coordinates:** S 24,90674; E 30,74701; S 24,90793; E 30,74649

Impact assessment
 A section of the cocopan track (green polyline below) will be impacted on due to the proposed construction of a new pollution control dam (PCD) (brown polygons below), as well as a new haul road (red polygon below). (Blue polygons = waste rock dump)



Mitigation
 (2) Archaeological investigation: If this feature, i.e. the section to be covered by the PCD and the haul road, cannot be avoided it should be documented in full before destruction. It is also proposed that:

- The section of the track extending from the road towards TGME (in the vicinity of the old pump station) westwards up until and including the metal bridge crossing the Blyde River be declared a no-go area and that it is protected and retained as a sample of this type of technology.
 - It is also sufficiently close to the reduction works to be used part of a possible future tourism attraction.
 - Material salvaged from the section the be impacted on by the proposed mining activities should be used to rehabilitate the section that is to be retained, and the rest should be placed in a secure place for safekeeping.

Significance of impact: before/after mitigation					
Extent	Duration	Intensity	Probability	Significance	Weight
3	5	4	5	60	Medium
1	5	3	3	27	Low

Requirements
 The site should be mitigated before impacting on it. A permit for its destruction would be required from the provincial heritage resources authority.

008-013. Type: Built adits. **Farm:** Ponieskrantz 543KT.

Impact assessment

These sites are not located inside the development area and therefore the possibility that it might be impacted on is minimal. However, they are included in this list as areas that has to be avoided.

Mitigation

(1) Avoidance/Preserve: Because of its location within the larger project development area, it would be possible to avoid these sites.

Significance of impact: before/after mitigation

Extent	Duration	Intensity	Probability	Significance	Weight
1	5	3	3	27	Low
1	5	3	3	27	Low

Requirements

No further action required

NHRA Category	Graves, Cemeteries and Burial Grounds - Section 36				
002-005. Type: Burial sites. Farm: Ponieskrantz 543KT Coordinates: 002: S 29,91814; E 30,74484 003: S 24,91793; E 30,74353 004: S 24,91765; E 30,74291 005: S 24,91748; E 30,74681					
Impact assessment					
All four sites are located outside the proposed development area and therefore there would be no direct impact on them. However, they are included in this list as areas that has to be avoided.					
Mitigation					
(1) Avoidance/Preserve: Because of their location outside the larger project development area, it would be possible to avoid these sites. In addition, they occupy a small footprint, which can be easily fenced off and protected.					
Significance of impact: before/after mitigation					
Extent	Duration	Intensity	Probability	Significance	Weight
1	5	3	3	27	Low
1	5	3	3	27	Low
Requirements					
No further action required					

9. MANAGEMENT MEASURES

Heritage sites are fixed features in the environment, occurring within specific spatial confines. Any impact upon them is permanent and non-reversible. Those resources that cannot be avoided and that are directly impacted by the proposed development can be excavated/recorded and a management plan can be developed for future action. Those sites that are not impacted on can be written into the management plan, whence they can be avoided or cared for in the future.

Sources of risk were considered with regards to development activities defined in Section 2(viii) of the NHRA that may be triggered and are summarised in Table 4A and 4B below. These issues formed the basis of the impact assessment described. The potential risks are discussed according to the various phases of the project below.

9.1 Objectives

- Protection of archaeological, historical and any other site or land considered being of cultural value within the project boundary against vandalism, destruction and theft.
- The preservation and appropriate management of new discoveries in accordance with the NHRA, should these be discovered during construction activities.

The following shall apply:

- Known sites should be clearly marked in order that they can be avoided during construction activities.
- The contractors and workers should be notified that archaeological sites might be exposed during the construction activities.

- Should any heritage artefacts be exposed during excavation, work on the area where the artefacts were discovered, shall cease immediately and the Environmental Control Officer shall be notified as soon as possible;
- All discoveries shall be reported immediately to a heritage practitioner so that an investigation and evaluation of the finds can be made. Acting upon advice from these specialists, the Environmental Control Officer will advise the necessary actions to be taken;
- Under no circumstances shall any artefacts be removed, destroyed or interfered with by anyone on the site; and
- Contractors and workers shall be advised of the penalties associated with the unlawful removal of cultural, historical, archaeological or palaeontological artefacts, as set out in the National Heritage Resources Act (Act No. 25 of 1999), Section 51. (1).

9.2 Control

In order to achieve this, the following should be in place:

- A person or entity, e.g. the Environmental Control Officer, should be tasked to take responsibility for the heritage sites and should be held accountable for any damage.
- Known sites should be located and isolated, e.g. by fencing them off. All construction workers should be informed that these are no-go areas, unless accompanied by the individual or persons representing the Environmental Control Officer as identified above.
- In areas where the vegetation is threatening the heritage sites, e.g. growing trees pushing walls over, it should be removed, but only after permission for the methods proposed has been granted by SAHRA. A heritage official should be part of the team executing these measures.

Table 4A: Construction Phase: Environmental Management Programme for the project

Action required	Protection of heritage sites, features and objects		
Potential Impact	The identified risk is damage or changes to resources that are generally protected in terms of Sections 27, 28, 31, 32, 34, 35, 36 and 37 of the NHRA that may occur in the proposed project area.		
Risk if impact is not mitigated	Loss or damage to sites, features or objects of cultural heritage significance		
Activity / issue	Mitigation: Action/control	Responsibility	Timeframe
1. Removal of Vegetation 2. Construction of required infrastructure, e.g. access roads, water pipelines	See discussion in Section 9.1 above	Environmental Control Officer	During construction only
Monitoring	See discussion in Section 9.2 above		

Table 4B: Operation Phase: Environmental Management Programme for the project

Action required	Protection of heritage sites, features and objects		
Potential Impact	It is unlikely that the negative impacts identified for pre-mitigation will occur if the recommendations are followed.		
Risk if impact is not mitigated	Loss or damage to sites, features or objects of cultural heritage significance		
Activity / issue	Mitigation: Action/control	Responsibility	Timeframe
1. Removal of Vegetation 2. Construction of required infrastructure,	See discussion in Section 9.1 above	Environmental Control Officer	During construction only

e.g. access roads, water pipelines			
Monitoring	See discussion in Section 9.2 above		

10. CONCLUSIONS AND RECOMMENDATIONS

This report describes the methodology used, the limitations encountered, the heritage features that were identified and the recommendations and mitigation measures proposed relevant to this. The investigation consisted of a desktop study (archival sources, database survey, maps and aerial imagery) and a physical survey that also included the interviewing of relevant people. It should be noted that the implementation of the mitigation measures is subject to SAHRA/PHRA's approval.

The cultural landscape qualities of the region essentially consist of two components. The first is made up of a limited pre-colonial (Stone Age and Iron Age) occupation. The second component is a rural area in which the human occupation consists of two elements. The discovery of gold during the late 19th century resulted in a flood of people entering the area, establishing gold mining activities all over the landscape. The second element is a rural farming community, which, since the early 20th century revolved around forestry, which altered the landscape beyond recognition. These two elements led to the establishment of a number of smaller towns in the region, all which are now part of an ongoing tourism industry.

Identified sites

During the survey, the following sites, features or objects of cultural significance were identified, only some of which are deemed to be conservation/documentation worthy:

Name	Latitude	Longitude	Impact	Management
001 Fort	-24,91824	30,75706	Inside Theta Hill Pit	Avoid/Retain
002 Cemetery	-24,91814	30,74484	Outside development	Avoid/Retain
003 Burial site	-24,91806	30,74478	Outside development	Avoid/Retain
004 Burial site	-24,91792	30,74353	Outside development	Avoid/Retain
005 Graves	-24,91748	30,74682	Outside development	Avoid/Retain
019 Pump house	-24,90674	30,74701	Close to access road	Avoid/Retain
024 Cocopan bridge	-24,90787	30,74648	Integral part of remaining track	Avoid/Retain
025 Cocopan track (east)	-24,91013	30,74188	In proposed haul road	Document
026 Cocopan track (west)	-24,91006	30,73983	In proposed haul road	Document
032 Concrete structure	-24,91243	30,74408	Inside waste rock dump area	No further action
033 Foundations	-24,91222	30,74263	Inside waste rock dump area	No further action
034 Farmer's race	-24,91245	30,74267	Inside waste rock dump area	No further action
038 Foundations	-24,91383	30,73645	In proposed haul road	No further action
046 Informal settlement	-24,91581	30,74291	People to be relocated	Document
047 Compound	-24,91712	30,74277	Abandoned 1972	No further action

Impact assessment and proposed mitigation measures

Impact analysis of cultural heritage resources under threat of the proposed development, is based on the present understanding of the development:

IDENTIFIED HERITAGE RESOURCES					
Site No.	Site type	NHRA category	Field rating	Impact rating: Before/After mitigation	Proposed mitigation (Refer to definitions in Section 12.3)
Old fort					
001	Historic structure	Section 34	High significance Grade 4-A	60 27	(1) Avoidance/Preserve; (2) Archaeological investigation
Mitigation					
(1) Avoidance/Preserve					
<ul style="list-style-type: none"> Currently, the Theta Pit boundary approaches the fort to within about 22m. It is recommended that a buffer zone of at least 15m is created around the outer edges of the fort and that this is formalised with a suitable, permanent fence (with an access gate). 					

IDENTIFIED HERITAGE RESOURCES					
Site No.	Site type	NHRA category	Field rating	Impact rating: Before/After mitigation	Proposed mitigation (Refer to definitions in Section 12.3)
Cocopan bridge and track					
024 - 026	Historic structure	Section 34	High significance Grade 4-A	60 27	(1) Avoidance/Preserve; (2) Archaeological investigation
Mitigation					
(2) Archaeological investigation: If this feature, i.e. the section to be covered by the proposed PCD and haul road, cannot be avoided it should be documented in full before destruction. It is also proposed that:					
<ul style="list-style-type: none"> The section of the track extending from the road towards TGME (in the vicinity of the old pump station) westwards up until and including the metal bridge crossing the Blyde River be declared a no-go area and that it is protected and retained as a sample of this type of technology. <ul style="list-style-type: none"> It is also sufficiently close to the reduction works to be used part of a possible future tourism attraction. Material salvaged from the section the be impacted on by the proposed mining activities should be used to rehabilitate the section that is to be retained, and the rest should be placed in a secure place for safekeeping. 					

IDENTIFIED HERITAGE RESOURCES					
Site No.	Site type	NHRA category	Field rating	Impact rating: Before/After mitigation	Proposed mitigation (Refer to definitions in Section 12.3)
"Built" adits					
008 - 013	Historic structures	Section 34	High significance Grade 4-A	27 27	(1) Avoidance/Preserve; (2) Archaeological investigation
Mitigation					
(1) Avoidance/Preserve					
<ul style="list-style-type: none"> No further action required 					

IDENTIFIED HERITAGE RESOURCES					
Site No.	Site type	NHRA category	Field rating	Impact rating: Before/After mitigation	Proposed mitigation (Refer to definitions in Section 12.3)
Burial sites					
002 - 005	Graves, Cemeteries and Burial Grounds	Section 36	High significance Grade 4-A	27 27	(1) Avoidance/Preserve; (2) Archaeological investigation
Mitigation					
(1) Avoidance/Preserve					
<ul style="list-style-type: none"> No further action required 					

Legal requirements

The legal requirements related to heritage specifically are specified in Section 3 of this report. For this proposed project, the assessment has determined that no sites, features or objects of heritage significance occur in the study area. If heritage features are identified during construction, as stated in the management recommendation, these finds would have to be assessed by a specialist, after which a decision will be made regarding the application for relevant permits.

- In the event that any of the identified structures is to be impacted on, a valid permit would be required from SAHRA/PHRA prior to its destruction. Such a permit will only be issued after the site has been fully documented – mapped, photographed and described.

Reasoned opinion as to whether the proposed activity should be authorised:

- From a heritage point of view, it is recommended that the proposed development be allowed to continue on acceptance of the conditions proposed below.

Conditions for inclusion in the environmental authorisation:

- The Palaeontological Sensitivity Map (SAHRIS) indicate that most of the study area has a very high sensitivity of fossil remains to be found and therefore a field assessment and protocol for finds is required. A smaller section on the western side of the development has a high sensitivity and therefore a desktop assessment is required. Based on the outcome of that, a field assessment might be required.
- In the unlikely event that any of the identified structures is to be impacted on, it must be fully documented – mapped, photographed and described – beforehand.
- Should archaeological sites or graves be exposed in other areas during construction work, it must immediately be reported to a heritage practitioner so that an investigation and evaluation of the finds can be made.

11. REFERENCES

11.1 Data bases

Chief Surveyor General
Environmental Potential Atlas, Department of Environmental Affairs and Tourism.
Heritage Atlas Database, Pretoria
National Archives of South Africa
SAHRA Archaeology and Palaeontology Report Mapping Project (2009)
SAHRIS Database

11.2 Literature

Bergh, J.S. (red.). 1998. *Geskiedenisatlas van Suid-Afrika: die vier noordelike provinsies*. Pretoria: J.L. Schaik.

Bonner, P. & Shapiro, K.A. 1993. Company Town, Company Estate: Pilgrim's Rest, 1910-1932. *Journal of Southern African Studies* 19(2):171-200.

Fourie, W. 2008. *Heritage Assessment: Transvaal Gold Mining Company (Browns Hill) Ponieskrantz 543KT, Pilgrim's Rest, Mpumalanga*. Pretoria: Unpublished report.

Fourie, W. 2009a. *Heritage Assessment: Pilgrim's Rest Trend Deposit Project for Transvaal Gold Mining Estate on the Farm Grootfontein 562KJ, Pilgrim's Rest, Mpumalanga*. Pretoria: Unpublished report.

Fourie, W. 2009b. *Heritage Assessment: Rietfontein Underground Mine Project for Transvaal Gold Mining Estate on the farm Spitskop 195JT, Sabie, Mpumalanga*. Pretoria: Unpublished report.

Fourie, W. 2009c. *Heritage Assessment: Hermansburg Project for Transvaal Gold Mining Estate on the farm Hermansburg 495KT, Pilgrim's Rest, Mpumalanga*. Pretoria: Unpublished report.

Fowler, A.R.C. 1986. Mining at the Transvaal Gold Mining Estates, Limited 1872 – 1967. *Journal of the South African Institute of Mining and Metallurgy*, 68 (7): 291–335.

Henning, T. 1981. *PRMA: Pilgrim's Rest report*. Unpublished report.

Mason, J., Reinders, R., Rowe, C. & van Dyk, C. 2007. *Preliminary report: Heritage resources and remains on the farm Ponieskrantz 543KT*. Unpublished report.

Mason, J. 2011. *Historical archaeological investigation of a stone structure at Pilgrim's Rest that probably served as a fortification during the First (1876) and Second (1878/79) Sekhukhune Wars*. Unpublished report: Pilgrim's Rest.

Pieterse, F. 2017. *Final scoping report for proposed "TGME Mine Development Project (10167)": gold mining project in terms of pre-mined residue and hard rock mining near Pilgrim's Rest, Mpumalanga Province*. Unpublished report: Globesight Consultants.

Pieterse, F. 2019. *Theta Project – Progression of site layouts from Environmental Scoping Phase to Environmental Impact Assessment Phase*. Unpublished report: Globesight Consultants.

Pistorius, J.C.C. 2005. *A Phase 1 Heritage Impact Assessment (HIA) study for an EMP for Transvaal Gold Mine Estates (TGME) in Pilgrims Rest in Mpumalanga Province South Africa*. Pretoria: Unpublished report.

- Praagh, L.V. (ed.) 1906. *The Transvaal and its mines*. London: Praagh & Lloyd.
- Reinders, R., Mason, J. & Van Wyk, C. 2007. *Preliminary documentation report: historical remains: Brown's Hill, Pilgrim's Rest*. Pilgrim's Rest Museum: Unpublished report.
- Rowe, C. & Venter, L. 2007. *Tentative World Heritage List Submission report*. Unpublished report dated 26 January 2007.
- Transvaalse Provinsiale Biblioteek-en Museumdiens (TPA B&M) 1981. *Pilgrim's Rest Geskiedenis in Beeld*. TPA-Museumdiens.
- Van der Walt, J. 2007. *Transvaal Gold Mining Estates Limited. Elandsdrift 220JT Archaeological Impact Assessment. Proposed mining on the farm Elandsdrift 220JT, Sabie, Mpumalanga*. Johannesburg: Unpublished report.
- Van Schalkwyk, J.A. 2004. *Heritage impact assessment for the proposed Leroro township extension, Bourke's Luck area, Mpumalanga*. Unpublished report 2004KH012.
- Van Schalkwyk, J.A. 2015. *Desktop review of the cultural heritage potential in the region of the proposed Bourkes Luck hotel development, Mpumalanga Province*. Unpublished report 2015JvS001.
- Van Wyk-Rowe, C. 1997. The prehistorical and early historical inheritance of the Mpumalanga Escarpment. In Van Schalkwyk, J.A. (ed.) *Studies in Honour of Professor J.F. Eloff. Research by the National Cultural History Museum* 6:59-77.
- Van Wyk-Rowe, 2003. *Pilgrim's Rest Museum – "Late White" paintings*. Unpublished report: Pilgrim's Rest.
- Verster, D. 2017. *Proposed "TGME mine development project (10167)": Gold Mining Projects in terms of pre-mined residue and hard rock mining, near Pilgrim's Rest, Mpumalanga Province: Comments and Response report as part of the final scoping report*. Unpublished report: Batho Earth Social and Environmental Consultants.
- Verster, D. 2019a. *Amendment to an environmental authorisation for the proposed Theta Project, near Pilgrim's Rest, Mpumalanga*. Unpublished report: Batho Earth Social and Environmental Consultants.
- Verster, D. 2019b. *Public Participation Process and Comments and Response Report*. Unpublished report: Batho Earth Social and Environmental Consultants.
- Ward, J.H.W and Wilson, M.G.C 1998. Gold outside the Witwatersrand Basin. Wilson, M.G.C. & Anhaeusser, C.R. (eds) *The Mineral Resources of South Africa*. Handbook 16. Pretoria: Council for Geoscience. Pp. 350 – 387.

11.3 Maps, aerial photographs and websites

1: 50 000 Topocadastral maps

Aerial photographs: Chief Surveyor-General

Google Earth

US Department of the Interior: Office of Surface Mining Reclamation and Enforcement.

<https://osmre.gov>

12. ADDENDUM

1. Indemnity and terms of use of this report

The findings, results, conclusions and recommendations given in this report are based on the author's best scientific and professional knowledge as well as available information. The report is based on survey and assessment techniques which are limited by time and budgetary constraints relevant to the type and level of investigation undertaken and the author reserve the right to modify aspects of the report including the recommendations if and when new information may become available from ongoing research or further work in this field or pertaining to this investigation.

Although all possible care is taken to identify all sites of cultural importance during the investigation of study areas, it is always possible that hidden or sub-surface sites could be overlooked during the study. The author of this report will not be held liable for such oversights or for costs incurred as a result of such oversights.

Although the author exercises due care and diligence in rendering services and preparing documents, he accepts no liability and the client, by receiving this document, indemnifies the author against all actions, claims, demands, losses, liabilities, costs, damages and expenses arising from or in connection with services rendered, directly or indirectly by the author and by the use of the information contained in this document.

This report must not be altered or added to without the prior written consent of the author. This also refers to electronic copies of this report which are supplied for the purposes of inclusion as part of other reports, including main reports. Similarly, any recommendations, statements or conclusions drawn from or based on this report must make reference to this report. If these form part of a main report relating to this investigation or report, this report must be included in its entirety as an appendix or separate section to the main report.

2. Assessing the significance of heritage resources and potential impacts

A system for site grading was established by the NHRA and further developed by the South African Heritage Resources Agency (SAHRA 2007) and has been approved by ASAPA for use in southern Africa and was utilised during this assessment.

2.1 Significance of the identified heritage resources

According to the NHRA, Section 2(vi) the **significance** of a heritage sites and artefacts is determined by it aesthetic, architectural, historical, scientific, social, spiritual, linguistic or technical value in relation to the uniqueness, condition of preservation and research potential. It must be kept in mind that the various aspects are not mutually exclusive, and that the evaluation of any site is done with reference to any number of these.

Matrix used for assessing the significance of each identified site/feature

1. SITE EVALUATION				
1.1 Historic value				
Is it important in the community, or pattern of history				
Does it have strong or special association with the life or work of a person, group or organisation of importance in history				
Does it have significance relating to the history of slavery				
1.2 Aesthetic value				
It is important in exhibiting particular aesthetic characteristics valued by a community or cultural group				
1.3 Scientific value				
Does it have potential to yield information that will contribute to an understanding of natural or cultural heritage				
Is it important in demonstrating a high degree of creative or technical achievement at a particular period				
1.4 Social value				
Does it have strong or special association with a particular community or cultural group for social, cultural or spiritual reasons				
1.5 Rarity				
Does it possess uncommon, rare or endangered aspects of natural or cultural heritage				
1.6 Representivity				
Is it important in demonstrating the principal characteristics of a particular class of natural or cultural places or objects				
Importance in demonstrating the principal characteristics of a range of landscapes or environments, the attributes of which identify it as being characteristic of its class				
Importance in demonstrating the principal characteristics of human activities (including way of life, philosophy, custom, process, land-use, function, design or technique) in the environment of the nation, province, region or locality.				
2. Sphere of Significance		High	Medium	Low
International				
National				
Provincial				
Regional				
Local				
Specific community				
3. Field Register Rating				
1.	National/Grade 1: High significance - No alteration whatsoever without permit from SAHRA			
2.	Provincial/Grade 2: High significance - No alteration whatsoever without permit from provincial heritage authority.			
3.	Local/Grade 3A: High significance - Mitigation as part of development process not advised.			

4.	Local/Grade 3B: High significance - Could be mitigated and (part) retained as heritage register site	
5.	Generally protected A: High/medium significance - Should be mitigated before destruction	
6.	Generally protected B: Medium significance - Should be recorded before destruction	
7.	Generally protected C: Low significance - Requires no further recording before destruction	

2.2 Significance of the anticipated impact on heritage resources

All impacts identified during the HIA stage of the study will be classified in terms of their significance. Issues would be assessed in terms of the following criteria:

Nature of the impact

A description of what causes the effect, what will be affected and how it will be affected.

Extent

The physical **extent**, wherein it is indicated whether:

- 1 - The impact will be limited to the site;
- 2 - The impact will be limited to the local area;
- 3 - The impact will be limited to the region;
- 4 - The impact will be national; or
- 5 - The impact will be international.

Duration

Here it should be indicated whether the lifespan of the impact will be:

- 1 - Of a very short duration (0–1 years);
- 2 - Of a short duration (2-5 years);
- 3 - Medium-term (5–15 years);
- 4 - Long term (where the impact will persist possibly beyond the operational life of the activity); or
- 5 - Permanent (where the impact will persist indefinitely).

Magnitude (Intensity)

The magnitude of impact, quantified on a scale from 0-10, where a score is assigned:

- 0 - Small and will have no effect;
- 2 - Minor and will not result in an impact;
- 4 - Low and will cause a slight impact;
- 6 - Moderate and will result in processes continuing but in a modified way;
- 8 - High, (processes are altered to the extent that they temporarily cease); or
- 10 - Very high and results in complete destruction of patterns and permanent cessation of processes.

Probability

This describes the likelihood of the impact actually occurring and is estimated on a scale where:

- 1 - Very improbable (probably will not happen);
- 2 - Improbable (some possibility, but low likelihood);
- 3 - Probable (distinct possibility);
- 4 - Highly probable (most likely); or
- 5 - Definite (impact will occur regardless of any prevention measures).

Significance

The significance is determined through a synthesis of the characteristics described above (refer to the formula below) and can be assessed as low, medium or high:

$S = (E+D+M) \times P$; where

S = Significance weighting

E = Extent
 D = Duration
 M = Magnitude
 P = Probability

Significance of impact		
Points	Significant Weighting	Discussion
< 30 points	Low	Where this impact would not have a direct influence on the decision to develop in the area.
31-60 points	Medium	Where the impact could influence the decision to develop in the area unless it is effectively mitigated.
> 60 points	High	Where the impact must have an influence on the decision process to develop in the area.

Confidence

This should relate to the level of confidence that the specialist has in establishing the nature and degree of impacts. It relates to the level and reliability of information, the nature and degree of consultation with I&AP's and the dynamic of the broader socio-political context.

- High, where the information is comprehensive and accurate, where there has been a high degree of consultation and the socio-political context is relatively stable.
- Medium, where the information is sufficient but is based mainly on secondary sources, where there has been a limited targeted consultation and socio-political context is fluid.
- Low, where the information is poor, a high degree of contestation is evident and there is a state of socio-political flux.

Status

- The status, which is described as either positive, negative or neutral.

Reversibility

- The degree to which the impact can be reversed.

Mitigation

- The degree to which the impact can be mitigated.

Nature:		
	Without mitigation	With mitigation
Construction Phase		
Probability		
Duration		
Extent		
Magnitude		
Significance		
Status (positive or negative)		
Operation Phase		
Probability		
Duration		
Extent		
Magnitude		
Significance		
Status (positive or negative)		
Reversibility		
Irreplaceable loss of resources?		
Can impacts be mitigated		

3. Mitigation measures

- *Mitigation: means to anticipate and prevent negative impacts and risks, then to minimise them, rehabilitate or repair impacts to the extent feasible.*

Impacts can be managed through one or a combination of the following mitigation measures:

- Avoidance
- Investigation (archaeological)
- Rehabilitation
- Interpretation
- Memorialisation
- Enhancement (positive impacts)

For the current study, the following mitigation measures are proposed, to be implemented only if any of the identified sites or features are to be impacted on by the proposed development activities:

- (1) Avoidance/Preserve: This is viewed to be the primary form of mitigation and applies where any type of development occurs within a formally protected or significant or sensitive heritage context and is likely to have a high negative impact. This measure often includes the change / alteration of development planning and therefore impact zones in order not to impact on resources. The site should be retained *in situ* and a buffer zone should be created around it, either temporary (by means of danger tape) or permanently (wire fence or built wall). Depending on the type of site, the buffer zone can vary from
 - 10 metres for a single grave, or a built structure, to
 - 50 metres where the boundaries are less obvious, e.g. a Late Iron Age site.
- (2) Archaeological investigation/Relocation of graves: This option can be implemented with additional design and construction inputs. This is appropriate where development occurs in a context of heritage significance and where the impact is such that it can be mitigated. Mitigation is to excavate the site by archaeological techniques, document the site (map and photograph) and analyse the recovered material to acceptable standards. This can only be done by a suitably qualified archaeologist.
 - This option should be implemented when it is impossible to avoid impacting on an identified site or feature.
 - This also applies for graves older than 60 years that are to be relocated. For graves younger than 60 years a permit from SAHRA is not required. However, all other legal requirements must be adhered to.
 - Impacts can be beneficial – e.g. mitigation contribute to knowledge
- (3) Rehabilitation: When features, e.g. buildings or other structures are to be re-used. Rehabilitation is considered in heritage management terms as an intervention typically involving the adding of a new heritage layer to enable a new sustainable use.
 - The heritage resource is degraded or in the process of degradation and would benefit from rehabilitation.
 - Where rehabilitation implies appropriate conservation interventions, i.e. adaptive reuse, repair and maintenance, consolidation and minimal loss of historical fabric.
 - Conservation measures would be to record the buildings/structures as they are (at a particular point in time). The records and recordings would then become the ‘artefacts’ to be preserved and managed as heritage features or (movable) objects.
 - This approach automatically also leads to the enhancement of the sites or features that are re-used.

-
- (4) Mitigation is also possible with additional design and construction inputs. Although linked to the previous measure (rehabilitation) a secondary though 'indirect' conservation measure would be to use the existing architectural 'vocabulary' of the structure as guideline for any new designs.
 - The following principle should be considered: **heritage informs design**.
 - This approach automatically also leads to the enhancement of the sites or features that are re-used.

 - (5) No further action required: This is applicable only where sites or features have been rated to be of such low significance that it does not warrant further documentation, as it is viewed to be fully documented after inclusion in this report.
 - Site monitoring during development, by an ECO or the heritage specialist are often added to this recommendation in order to ensure that no undetected heritage/remains are destroyed.

4. Curriculum vitae

Johan Abraham van Schalkwyk

Personal particulars

Date of birth: 14 April 1952
Identity number: 520414 5099 08 4
Marital status: Married; one daughter
Nationality: South African

Current address: home

62 Coetzer Ave, Monument Park, Pretoria, 0181
Mobile: 076 790 6777; E-mail: jvschalkwyk@mweb.co.za

Qualifications

1995 DLitt et Phil (Anthropology), University of South Africa
1985 MA (Anthropology), University of Pretoria
1981 BA (Hons), Anthropology, University of Pretoria
1979 Post Graduate Diploma in Museology, University of Pretoria
1978 BA (Hons), Archaeology, University of Pretoria
1976 BA, University of Pretoria

Non-academic qualifications

12th HSRC-School in Research Methodology - July 1990
Dept. of Education and Training Management Course - June 1992
Social Assessment Professional Development Course - 1994
Integrated Environmental Management Course, UCT - 1994

Professional experience

Private Practice
2017 - current: Professional Heritage Consultant

National Museum of Cultural History

1992 - 2017: Senior researcher: Head of Department of Research. Manage an average of seven researchers in this department and supervise them in their research projects. Did various projects relating to Anthropology and Archaeology in Limpopo Province, Mpumalanga, North West Province and Gauteng. Headed the Museum's Section for Heritage Impact Assessments.
1978 - 1991: Curator of the Anthropological Department of the Museum. Carried out extensive fieldwork in both anthropology and archaeology

Department of Archaeology, University of Pretoria

1976 - 1977: Assistant researcher responsible for excavations at various sites in Limpopo Province and Mpumalanga.

Awards and grants

1. Hanisch Book Prize for the best final year Archaeology student, University of Pretoria - 1976.
2. Special merit award, National Cultural History Museum - 1986.
3. Special merit award, National Cultural History Museum - 1991.
4. Grant by the Department of Arts, Culture, Science and Technology, to visit the various African countries to study museums, sites and cultural programmes - 1993.
5. Grant by the USA National Parks Service, to visit the United States of America to study museums, sites, tourism development, cultural programmes and impact assessment programmes - 1998.
6. Grant by the USA embassy, Pretoria, under the Bi-national Commission Exchange Support Fund, to visit cultural institutions in the USA and to attend a conference in Charleston - 2000.
7. Grant by the National Research Foundation to develop a model for community-based tourism - 2001.

8. Grant by the National Research Foundation to develop a model for community-based tourism - 2013. In association with RARI, Wits University.

Publications

Published more than 70 papers, mostly in scientifically accredited journals, but also as chapters in books.

Conference Contributions

Regularly presented papers at conferences, locally as well as internationally, on various research topics, ranging in scope from archaeology, anthropological, historical, cultural historical and tourism development.

Heritage Impact Assessments

Since 1992, I have done more than 2000 Phase 1 and Phase 2 impact assessments (archaeological, anthropological, historical and social) for various government departments and developers. Projects include environmental management frameworks, roads, pipeline-, and power line developments, dams, mining, water purification works, historical landscapes, refuse dumps and urban developments.