

# OMI SOLUTIONS (PTY) LTD: THE PROPOSED TGME MINING PROJECT, EHLANZENI DISTRICT MUNICIPALITY, MPUMALANGA PROVINCE

## INTEGRATED HERITAGE IMPACT ASSESSMENT

Submitted subject to Section 38(3) and Section 38(8) of the NHRA

**Prepared For:**

Renee Kruger

Director Environmental Licensing: OMI Solutions (Pty) Ltd

Project Code	Date	Version	Status
NH-R-20-040	10 October 2021	1.0	Draft
NH-R-20-040	10 November 2021	2.0	Final Draft
NH-R-20-040	1 February 2022	3.0	Final Draft
NH-R-20-040	27 March 2022	4.0	Final

**HERITAGE IMPACT ASSESSMENT (HIA) ON PORTIONS 1, 2, 3, 4, 5 AND THE REMAINING EXTENT OF THE FARM FRANKFORT 509KT, THE FARM KRUGERS HOOP 527KT, PORTION 1 AND THE REMAINING EXTENT OF THE FARM VAN DER MERWES REEF 526KT, PORTIONS 1, 2 AND THE REMAINING EXTENT OF PORTIONS OF THE FARM MORGENZON 525KT, THE FARM PEACH TREE 544KT, AND PORTIONS 18, 42, 43, 44 AND THE REMAINING EXTENT OF THE FARM PONIESKRANS 543KT FOR THE PROPOSED TGME MINING PROJECT IN THE EHLANZENI DISTRICT MUNICIPALITY, MPUMALANGA PROVINCE**

**SPECIALIST DECLARATION OF INDEPENDENCE**

I, Nelius Kruger, declare that –

- I act as the independent specialist;
- I am conducting any work and activity relating to the proposed TGME Mining Project in an objective manner, even if this results in views and findings that are not favorable to the client;
- I declare that there are no circumstances that may compromise my objectivity in performing such work;
- I have the required expertise in conducting the specialist report and I will comply with legislation, including the relevant Heritage Legislation (National Heritage Resources Act no. 25 of 1999, Human Tissue Act 65 of 1983 as amended, Removal of Graves and Dead Bodies Ordinance no. 7 of 1925, Excavations Ordinance no. 12 of 1980), the Minimum Standards: Archaeological and Palaeontological Components of Impact Assessment (SAHRA, EC-PHRA and the CRM section of ASAPA), regulations and any guidelines that have relevance to the proposed activity;
- I have not, and will not engage in, conflicting interests in the undertaking of the activity;
- I undertake to disclose to the applicant and the competent authority all material information in my possession that reasonably has or may have the potential of influencing - any decision to be taken with respect to the application by the competent authority; and - the objectivity of any report, plan or document to be prepared by myself for submission to the competent authority;
- All the particulars furnished by me in this declaration are true and correct.

**Disclosure of Vested Interest**

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



Signature of specialist

**Name:** Nelius Kruger

**Date:** 27 March 2022

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The Heritage Consultant promotes the conservation of sensitive archaeological and heritage resources and uncompromisingly adheres to relevant Heritage Legislation (National Heritage Resources Act no. 25 of 1999, Human Tissue Act 65 of 1983 as amended, Removal of Graves and Dead Bodies Ordinance no. 7 of 1925, Excavations Ordinance no. 12 of 1980). In order to ensure best practices and ethics in the examination, conservation and mitigation of archaeological and heritage resources, the Heritage Consultant follows the Minimum Standards: Archaeological and Palaeontological Components of Impact Assessment as set out by the South African Heritage Resources Agency (SAHRA) and the CRM section of the Association for South African Professional Archaeologists (ASAPA).

This Heritage Impact Assessment has been compiled considering the National Environmental Management Act 1998 (NEMA) and Environmental Impact Regulations 2014 as amended, requirements for specialist reports, Appendix 6, as indicated in the NEMA Table below.

Requirements of Appendix 6 – GN R326 EIA Regulations of 7 April 2017	Relevant section in report	Comment where not applicable.
1.(1) (a) (i) Details of the specialist who prepared the report	Page 4, Section 1.2 and Addendum 1 of Report.	-
(ii) The expertise of that person to compile a specialist report including a curriculum vita	Section 1.2 and Addendum 1 of Report.	-
(b) A declaration that the person is independent in a form as may be specified by the competent authority	Page 4 of the report	-
(c) An indication of the scope of, and the purpose for which, the report was prepared	Section 1.3 and Section 1.4: Project Brief and Terms of Reference	-
(cA) An indication of the quality and age of base data used for the specialist report	Section 4: Archaeo-Historical Context	-
(cB) a description of existing impacts on the site, cumulative impacts of the proposed development and levels of acceptable change;	Section 7: Statement of Significance and Impact Rating	-
(d) The duration, date and season of the site investigation and the relevance of the season to the outcome of the assessment	Section 3: Method of Enquiry	-
(e) a description of the methodology adopted in preparing the report or carrying out the specialised process inclusive of equipment and modelling used	Section 3: Method of Enquiry	-
(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;	Section 7: Statement of Significance and Impact Rating	-
(g) An identification of any areas to be avoided, including buffers	Section 6: Results Archaeological Survey	-
(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;	Section 7: Statement of Significance and Impact Rating	-
(i) A description of any assumptions made and any uncertainties or gaps in knowledge;	Section 4.2: Limitations and Constraints	-
(j) A description of the findings and potential implications of such findings on the impact of the proposed activity, including identified alternatives, on the environment	Section 7: Statement of Significance and Impact Rating	-
(k) Any mitigation measures for inclusion in the EMPr	Section 7.3: Management Actions Section 8: Recommendations	-
(l) Any conditions for inclusion in the environmental authorisation	N/A	None required
(m) Any monitoring requirements for inclusion in the EMPr or environmental authorisation	Section 7.3: Management Actions Section 8: Recommendations	-
(n)(i) A reasoned opinion as to whether the proposed activity, activities or portions thereof should be authorised and	Section 1 & Section 8	-
(n)(iA) A reasoned opinion regarding the acceptability of the proposed activity or activities; and		-
(n)(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 7.3: Management Actions Section 8: Recommendations	-
(o) A description of any consultation process that was undertaken during the course of carrying out the study	N/A	Not applicable. A public consultation process will be conducted as part of the EIA and EMPr process.
(p) A summary and copies if any comments that were received during any consultation process	N/A	Not applicable.
(q) Any other information requested by the competent authority.	N/A	Not applicable.
(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.	Section 1.5: CRM: Legislation, Conservation and Heritage Management	-

## EXECUTIVE SUMMARY

This report details the results of a Heritage Impact Assessment (HIA) study subject to an Environmental Impact Assessment (EIA) process for the proposed TGME Mining Project in the Ehlanzeni District Municipality of the Mpumalanga Province. The project entails the recommissioning of mining on portions of the Farms Frankfort 509KT, Krugers Hoop 527KT, Van Der Merwes Reef 526KT, Morgenzon 525KT, Peach Tree 544KT and Ponieskrans 543KT where existing and new mining infrastructure will be reestablished. The report includes background information on the area's archaeology, its representation in Southern Africa, and the history of the larger area under investigation, survey methodology and results as well as heritage legislation and conservation policies. A copy of the report will be supplied to the South African Heritage Resources Agency (SAHRA) and recommendations contained in this document will be reviewed.

<b>Project Title</b>	TGME Mining Project
<b>Project Type / Scope</b>	Mining Development
<b>Project Location</b>	Beta North Mining Area: S24.91307° E30.73806° Frankfort Mining Area: S24.88747° E30.73072° CDM Mining Area: S24.87516° E30.72600°
<b>1:50 000 Map Sheet</b>	2430DC
	Portions 1, 2, 3, 4, 5 and the Remaining Extent of the farm Frankfort 509KT, the farm Krugers Hoop 527KT, Portion 1 and the Remaining Extent of the farm Van Der Merwes Reef 526KT, Portions 1, 2 and the Remaining Extent of Portions of the farm Morgenzon 525KT, the farm Peach Tree 544KT, and Portions 18, 42, 43, 44 and the Remaining Extent of the farm Ponieskrans 543KT
<b>Magisterial District / Municipal Area</b>	Ehlanzeni District Municipality
<b>Province</b>	Mpumalanga Province

The study area has evidence for occupation over an extensive period of time, spanning from the Stone Age through to the historical period. Briefly, the Stone Age is associated with the manipulation of lithics to create tools. These date from as early as 2.5 million years ago through to less than 150 years. This period overlaps with the migration of Bantu speakers into southern Africa bringing with them agricultural technologies, herding and a settled way of life manifested through stone walling. For the purposes of this study, the literature review was primarily focused on the historical period as activities associated with the project is planned within a predominantly Historical Period landscape.

The farm Ponieskrans, which would later become Pilgrim's Rest, was officially declared a gold field in September 1873 heralding the dawn of one of South Africa's largest and most significant gold rushes. Initially, alluvial gold was prospected where diggers were panning in the streams around Pilgrims Rest - some from as far away as California and Australia. Pilgrims Rest was declared a public digging in 1875 but gold panning declined in 1876 and heavy equipment was employed to locate and mine subsurface reefs. Several smaller companies were formed who mined smaller claims where larger conglomerates commenced with mining in deeper gold-bearing ore. By 1895 several small mining companies amalgamated to form the Transvaal Gold Mining Estates (TGME). This company was listed on the London Stock Exchange and became the first listed gold mining company in South Africa. As the volumes of gold ore increased, the engineers constructed small, local hydro-electric plants to generate electricity for the electric tramway and the ore crushers at the reduction works, constructed in 1897. Pilgrim's Rest was southern Africa's second town with street electricity, the first being Kimberley. Mining in Pilgrim's Rest ceased in 1971 and the village was acquired by the authorities for the formation of a National Museum and tourism destination.



The TGME Mine Project on the Farms Frankfort 509KT, Krugers Hoop 527KT, Van Der Merwes Reef 526KT, Morgenzon 525KT, Peach Tree 544KT and Ponieskrans 543KT is situated within the larger Pilgrim's Rest heritage landscape which is regarded as highly significant and of national significance. Pilgrim's Rest and the farm Ponieskrans were declared a Provincial Heritage Site in 1986 and an application for World Heritage Site status for the Reduction works was lodged in November 2006 but the declaration was never formalized. Ponieskrans and the Pilgrim's Rest region encompass a rich and significant historic landscape with regards to Section 3(3) of the National Heritage Resources Act in particular, as a result of (a) its importance in the community, or pattern of South Africa's history; (b) its possession of uncommon, rare or endangered aspects of South Africa's natural or cultural heritage; (c) its potential to yield information that will contribute to an understanding of South Africa's natural or cultural heritage; (d) its importance in demonstrating the principal characteristics of a particular class of South Africa's natural or cultural places or objects; and (f) its importance in demonstrating a high degree of creative or technical achievement at a particular period. It is therefore abundantly clear that the Pilgrim's Rest landscape represents a striking visual representation of mining, evoking images of time, place, and historical patterns associated with past mining epochs. The historical mining horizon provide clues to past activity and many historical layers form part of this significant landscape. However, the historical landscape is unfortunately highly compromised with vast site transformation in past decades - and in recent years in particular – evident as a result of the following:

- In this landscape, it is a common occurrence that newer mining infrastructure replace older heritage sites where mining continues, for example it has been noted that some of TGME's current portals may have been superimposed on old mining adits. An obvious consequence is that historical layering of mine features become intertwined and indistinct which also makes the accurate dating and sequencing of mining remains in the project areas challenging.
- Natural processes such as surface wash, erosion and changes in vegetation have inevitably impacted on heritage features and the heritage landscape.
- Large-scale illegal informal mining activities by so-called "Zamas" in the landscape and areas subject to this assessment have resulted in an almost complete destruction of infrastructure associated with historical and recent mining. This includes heritage resources and features which, until relatively recently, remained in a well-preserved state of preservation. In addition, natural resources such as vegetation, geomorphological stability and water courses are also affected by illegal mining which has sterilized large portions of the landscape from heritage remnants.

This archaeological assessment attempted to capture as much of the remaining mining heritage in the baseline environment and the project development areas within notable project constraints, including site safety, restricted site movement during surveys, visibility constraints and a rapidly disintegrating heritage horizon. The assessment relied heavily on previously work conducted on the Pilgrim's Rest heritage landscape in order to compliment potential limitations in the assessment. Cognizant of the above, the following observations and recommendations are made based on heritage sites within the TGME Mining Project areas that risk direct impact from the project activities:

- In the proposed *Beta North Mining Area*, a number of features of significance were noted. These include Historical / extant adits and a Historical / extant drainage shaft (**NH-TGME-2430DC-01** , **NH-TGME-2430DC-02**), the remains of the Historical tram line / cocopan line (**NH-TGME-2430DC-03**), the remains of a Historical concrete water furrow (**NH-TGME-2430DC-04**), Historical suspension bridge remains (**NH-TGME-2430DC-06**), the Historical Farmer's Race remains (**NH-TGME-2430DC-08**), Historical concrete structures (**NH-TGME-2430DC-05**, **NH-TGME-2430DC-07**) and a Historical concrete low-level bridge (**NH-TGME-2430DC-09**). In the proposed *Frankfort Mining Area*, the remains of the Historical MET plant building (**NH-TGME-2430DC-10**) and the remains of a Historical suspension bridge or pulley system (**NH-TGME-2430DC-11**) were noted. In the *CDM Mining Area*, Historical / extant adits (**NH-TGME-2430DC-**

**14, NH-TGME-2430DC-15, NH-TGME-2430DC-16, NH-TGME-2430DC-17, NH-TGME-2430DC-18**), the remains of the Historical tram line / cocopan line (**NH-TGME-2430DC-12**) a Historical / contemporary water furrow (**NH-TGME-2430DC-13**) and a burial site (**NH-TGME-2430DC-19**) were noted. In many instances, these features are poorly preserved or destroyed but the sites are nonetheless intrinsically linked to the highly significant Pilgrim's Rest Mining legacy thus bearing high heritage value. In addition, the sites and features are older than 60 years and protected under the National Heritage Resource Act (NHRA 1999). The sites will be directly impacted on by the proposed project where the significance of the impact is essentially high. As the farm Ponieskrans is a declared Provincial Heritage site, retaining and conserving the sites would essentially be required but there remains little to conserve at most of the sites and uncontrolled destruction of the landscape by illegal miners is ongoing. For this reason, it is recommended that a comprehensive research-driven Phase 2 heritage mitigation plan is implemented to include all these sites, informed a robust research framework. The framework should (1) determine the extent of the heritage horizons within the project areas and immediate surroundings, (2) investigate the nature, extent and historical context of mining at each of the project sites, (3) provide a description and interpretation of these mining sites within the context of the Pilgrim's Rest heritage landscape and the Ponieskrans Provincial Heritage Site values, and (4) aim to preserve the historical fabric of the mining legacy at the project areas and in particular, development areas for the purposes of future research in the Pilgrim's Rest landscape. This process should include a detailed desktop assessment, reappraisal of previous publications and a literature study of sources on the Pilgrim's Rest area whereby robust research driven mitigation methodology based on current research themes is formulated. All features should be documented by means of systematic surveys, site mapping and the complete recording of all heritage resources in the project areas. This heritage mitigation plan should culminate in the publication of research findings. The mitigation plan should be undertaken subject to close liaison with the relevant heritage authorities and the process should include a comprehensive Public Participation and Social Engagement process whereby all relevant stakeholders (SAHRA, MP-PHRA, the SAHRA Built Environment Unit, TGME, Pilgrim's Rest Museum, the Thaba Chweu Municipality and others) are adequately consulted. Finally, destruction permits should be obtained from SAHRA after completion of the Phase 2 Mitigation Plan and prior to the alteration or destruction of heritage remains at the sites.

- For the burial site in the CDM Mining Area (**NH-TGME-2430DC-19**) it is primarily recommended that the burial site be conserved *in situ* and that a conservation buffer of at least 50m be implemented around the heritage receptor. The site should be fenced and an access gate should provide controlled access to the sites. A distance of at least 2m should be maintained between the grave and fence which should be at least 1,5m high. A clear signboard should be erected indicating the heritage sensitivity of the site and contact details for visitation of the graves should be provided. The sites should be monitored on a weekly basis during initial site clearing and earth moving activities by an ECO familiar with the sensitivity of receptors, or the Heritage Consultant in order to detect any impact at the earliest opportunity. Should this measure prove unachievable, the graves should be relocated by a qualified archaeologist, and in accordance with relevant legislation, permitting, statutory permissions and subject to any local and regional provisions and laws and by-laws pertaining to human remains. A full social consultation process should occur in conjunction with the mitigation of cemeteries and burials (see Addendum 1). Generally, it is recommended that the EIA public participation and social consultative process address the possibility of further graves occurring in the project area.
- It is further recommended that TGME engage the relevant heritage authority (SAHRA, SAHRA Built Environment Unit, MP-PHRA) with regards to the impact of the project on the Ponieskrans Provincial Heritage Site and proposed mitigation measures.
- A careful watching brief monitoring process is recommended whereby an informed ECO inspect the construction site on regular basis in order to monitor possible impact on heritage resources. Should any

previously undetected paleontological, archaeological or historical material, heritage resources, graves or human remains be exposed during construction activities, the operations in the affected area must be suspended and a qualified archaeologist be contacted for an assessment of the find.

The mining landscape around the project areas holds countless traces of historical mining, settlement and industrial expansion. These include mining heritage remains associated with gold mining, many cemeteries and burial sites, mining settlement remains and the remains of individual historical period pioneer houses. In addition, the hills surrounding Pilgrim's Rest are littered with mine adits, ventilation shafts and underground drainage channels. The following recommendations are made based on the baseline environment around the TGME Mining Project area that risk indirect impact from the project activities:

- As noted above, the mining landscape of Pilgrim's Rest is unique and the proposed project should be planned and executed in such a way as to shield historic landscapes as much as possible from uncontrolled destruction. Here, it is recommended that a **Site Conservation Management Plan** for heritage resources in the baseline be implemented. The plan should be developed in order to manage and conserve heritage resources in the landscape surrounding the project areas during construction and operation of the mines. The plan should include basic training for construction staff on possible heritage finds, chance find procedures and action steps for mitigation measures as well as communication routes to follow in the case of a discovery. It is recommended that key stakeholders such as the Pilgrim's Rest Museum be closely involved in the compilation and implementation of the management plan.
- It would be advisable to conduct regular blast vibration monitoring during the initial stages of mining at the Beta North site to assess potential effects of blasting on the nearby rock art. This measure should include frequent site monitoring by a suitably qualified Rock Art Specialist. Should it be established that the site is deteriorating or the adjacent geological feature is destabilizing due to mining activities the possibility of relocation of the rock art site must be considered and investigated.
- Human burial sites are highly significant and sensitive heritage resources and every measure should be taken to avoid impact on these receptors. It is generally recommended that burial sites be conserved *in situ* and that conservation buffers of at least 50m be implemented around the heritage receptors. Where possible, sites should be fenced and access gates should provide controlled access to the sites. Clear signboards should be erected indicating the heritage sensitivity of the sites and contact details for visitation of the graves should be provided. Cemeteries and graves situated in close proximity of proposed mining developments should be monitored on a frequent basis during initial site clearing and earth moving activities by an ECO familiar with the sensitivity of receptors, or the Heritage Consultant in order to detect any impact at the earliest opportunity. Monthly monitoring of burial sites is recommended during operational stages of the development, the details of which should be stipulated in the Site Conservation Management Plan. The developer should carefully liaise with the heritage specialist and the SAHRA Burial Ground and Graves (BGG) Unit with regards to these recommended management measures.
- It should be stated that it is likely that further undetected archaeological remains might occur elsewhere in the project landscape at archeological sites, along water sources and drainage lines, fountains and pans would often have attracted human activity in the past. Also, since Stone Age material seems to originate from below present soil surfaces in eroded areas, the larger landscape should be regarded as potentially sensitive in terms of possible subsurface deposits. Burials and historically significant structures dating to the Colonial Period occur on farms in the area and these resources should be avoided during all phases of construction and development, including the operational phases of the development.

In terms of the Palaeontological Landscape (Butler, 2022), it was noted that the proposed mining site is underlain by Quaternary alluvium and scree, diabase, and the Timeball Hill Formation (Pretoria Group, Transvaal Supergroup) as well as the Malmani Subgroup (Chuniespoort Group, Transvaal Supergroup). According to the PalaeoMap of South African Heritage Resources Information System the Palaeontological Sensitivity of the Quaternary superficial sediments is low but locally High, the diabase is igneous in origin and has an insignificant Palaeontological Sensitivity while that of the Timeball Hill Formation is High and the Palaeontological Sensitivity of the Malmani Subgroup (Transvaal Supergroup) is Very High (Almond and Pether 2008, SAHRIS website). No visible evidence of fossiliferous outcrops was found in the development footprint and thus an overall medium palaeontological significance is allocated to the proposed development footprint. It was concluded that the proposed development will not lead to detrimental impacts on the palaeontological reserves of the area and construction of the development may be authorised in its whole extent. The following recommendations were made for the Palaeontological Landscape:

- The ECO for this project must be informed that the Palaeontological Sensitivity of the Timeball Hill Formation is High while that of the Malmani Subgroup (Transvaal Supergroup) is Very High.
- If Palaeontological Heritage is uncovered during surface clearing and excavations the **Chance find Protocol** attached should be implemented immediately. Fossil discoveries ought to be protected and the ECO/site manager must report to South African Heritage Resources Agency (SAHRA) (Contact details: SAHRA, 111 Harrington Street, Cape Town. PO Box 4637, Cape Town 8000, South Africa. Tel: 021 462 4502. Fax: +27 (0)21 462 4509. Web: [www.sahra.org.za](http://www.sahra.org.za)) so that mitigation (recording and collection) can be carried out.
- Before any fossil material can be collected from the development site the specialist involved would need to apply for a collection permit from SAHRA. Fossil material must be housed in an official collection (museum or university), while all reports and fieldwork should meet the minimum standards for palaeontological impact studies proposed by SAHRA (2012).
- These recommendations should be incorporated into the Environmental Management Plan for the proposed mining Development

In terms of the Visual Landscape (Erwee, 2022), it was noted that the project areas are located within a semi-rural and rural (Frankfort Area) mountainous area, with gentle to steep undulating terrain, which form distinguishing topographical features in the form of prominent hills, outcrops and steep cliffs that are interspersed with thicketed valleys where the Blyde River, streams (Peach Tree Stream) and ephemeral drainage lines are situated. The topography of the area is considered an important ecotourism attraction as tourists traveling on the scenic routes and passes within the area have a pleasant viewing experience. The visual receptors present within a 5 km radius comprise the town of Pilgrim's Rest, farmers, and several nature reserves of which the Mount Sheba Private Nature Reserve (NR) and its hiking trails are of importance due to the Lost City Hiking Trail having a clear line of sight towards the Beta North and Dukes Areas. Furthermore, the R533, Vaalhoek Road and several gravel roads are present within the vicinity of the PROJECT Areas. Permanent residents of the town of Pilgrim's Rest, hikers and people camping in the Mount Sheba Private NR are considered high sensitive receptors. People at their place of work are considered low sensitive receptors, as they are likely to focus on the activities at hand and not the surrounding environment. Motorists and tourists traveling on the scenic roads are considered moderate to highly sensitive receptors, since tourists' attention are focused towards the panoramic scenic landscape. Visual observations of the Project Areas along the R533 however requires knowledge of the exact locations thereof, as such motorists will not directly observe the proposed mining activities in the landscape. Since the town of Pilgrim's Rest is a popular tourist destination for both local and international tourists, these tourist attractions (Pilgrim's Rest, God's Window etc.) are considered exceptionally high sensitive receptor areas. Historic mining infrastructure such as old mine shafts, waste rock dumps and TSFs are present in the area, forming part of the heritage and tourism attraction of the area. No active mining is taking place within the Project Areas, and the existing TGME metallurgical plant, offices and TSF at the Beta Area are

still in use and will form part of the operational activities of the proposed project. However historic mining activities have taken place in the Project Areas, which resulted in visual scarring of the terrain. The Visual Absorption Capacity (VAC) of the area is considered high, indicating that the proposed project will be absorbed in the area, resulting in a moderate to low visual intrusion on the surrounding area. The vast mountainous terrain is the main contributing factor of the VAC, since the hills and mountains are blending, making it difficult to observe distinguishing features within the landscape, from significant distances. Additionally, the indigenous forests, commercial plantations and woodlands in the surrounding areas as well as tree lines along the roads, further assist in screening the proposed mining activities from sensitive receptors. The landscape quality of the Project is considered high. The entire town of Pilgrim's Rest was declared a National Monument in 1986 as a living memory of the early gold rush days in South Africa during the late 1800s / early 1900s. The uniqueness of this historic village is evident in its museums and historic sites, offering the visitor a view into the past, and capturing the spirit of a bygone era of artisanal mining. Additionally, the mountainous terrain forms part of the natural beauty and panoramic scenery of the greater region. The Municipality Spatial Development Framework identifies Pilgrim's Rest and the surrounding area as a protected provincial heritage site and an important tourism node within its area of jurisdiction (SDP, 2007), which is richly imbued with a diversity of natural, cultural and historic gems. Thaba Chweu Local Municipality further hosts numerous events throughout the year that attracts both local residents and visitors to the area including the Long Tom Marathon, Subaru/Ashburton Sabie Classic Mountain Bike race and Sabie Forest Fair (Thaba Chweu, 2016). Given the mountainous terrain, the vast landscape is appealing to one's visual senses, which may fill the observer with a sense of calmness, tranquillity and wellbeing. As such this landscape offers a sense of place which can be described as calm, tranquil and peaceful and being one with nature. The lighting environment associated with the Project Areas is considered intrinsically dark, while taking the larger region into consideration, the area is considered rural with low district brightness, due to the TGME offices and town of Pilgrim's Rest being sources of night time lighting and contributing to sky glow. The proposed project is expected to contribute to the effects of sky glow and artificial lighting in the region, particularly as a result of stationary lighting sources

Based on the impact assessment, it was determined that the Project will have a moderate visual impact on the receiving environment, even though it is situated within close proximity to the town of Pilgrim's Rest. With the proposed Project Areas located at the foothills and in disturbed areas, and the mountainous backdrop, the sensitive receptors present is not likely to experience significant visual intrusion. As evident from the viewshed analysis and confirmed during the field assessment, only small portions within the town of Pilgrim's Rest and small stretches along the R533 will observe portions of the proposed mining activities. Night-time lighting as a result of potential 24-hour mining operations will reduce the visibility of starry skies within the intrinsically dark to rural landscape. Should 24-hour mining activities take place, the night-time lighting associated with the Project Areas will have a moderately high impact. With mitigation and management measures implemented, with particular reference to lighting design and placement, and mining activities taking place during the day 06:00 to 18:00 the impact of night-time lighting may result in the impact being reduced to moderately low levels. Should the project be authorised to proceed, it is imperative that all mitigation measures as stipulated in this report be strictly adhered to. Said mitigation measures would need to comprise concurrent rehabilitation throughout the construction and operational phases and effective management of dust generation.

**This HIA includes a detailed synthesis of baseline and heritage site data as well as an analysis of direct and indirect impact scenarios over the short-and long-term, on heritage, paleontological and visual receptors in the project area. The Pilgrims Rest Museum were involved on EIA level in order to provide input in final impact assessments and the final HIA Report.**

TGME Mining Project Areas: Heritage Occurrences

Site Code	Short Description	Coordinate S	Coordinate E	NHRA Category	Preservation	Mitigation Action
<b>Beta North Mining Area</b>						
NH-TGME-2430DC-01	Historical / Extant Adit	-24.9095	30.73056	Generally Protected A	Good	<p><b>Site Management Plan:</b> Compile a heritage Site Management Plan (SMP) detailing a plan of action and measures for the long-term conservation and management of the heritage resource and its historical fabric.</p> <p><b>Phase 2 Mitigation:</b> Integrated and Legally compliant Phase 2 Study and assessment.</p> <p><b>Site Monitoring:</b> Strict monitoring (construction and commissioning) by the heritage consultant or an ECO familiar with the heritage occurrences of the sites.</p> <p><b>Site Declaration Status:</b> Engage the relevant heritage authority (SAHRA, SAHRA Built Environment) in terms of site declaration status as Grade II Provincial Heritage Resources subject to the NHRA 1999 (Section 7).</p> <p><b>Further Research:</b> Engage with tertiary institutions, academics and relevant specialists to document and further research the Pilgrim's Rest and Ponieskrants historical horizon.</p> <p><b>Permitting:</b> Destruction permits should be obtained from SAHRA after completion of the Phase 2 Mitigation Plan and prior to the alteration or destruction of heritage remains at the sites</p>
NH-TGME-2430DC-02	Historical / Extant drainage shaft	-24.9122	30.73162	Generally Protected A	Good	
NH-TGME-2430DC-03	Historical tram line / cocopan line	-24.9114	30.73158	Provincial Significance Grade 2	Poor	
NH-TGME-2430DC-04	Historical concrete water furrow	-24.9123	30.73193	Provincial Significance Grade 2	Poor	
NH-TGME-2430DC-05	Historical concrete structure	-24.9133	30.73328	Generally Protected A	Poor	
NH-TGME-2430DC-06	Historical suspension bridge remains	-24.9142	30.7342	Generally Protected A	Poor	
NH-TGME-2430DC-07	Historical concrete structure	-24.9138	30.73648	Generally Protected A	Poor	
NH-TGME-2430DC-08	Historical Farmer's Race remains	-24.9124	30.74267	Provincial Significance Grade 2	Poor	
NH-TGME-2430DC-09	Historical concrete low-level bridge	-24.9119	30.73513	Generally Protected A	Good	
<b>Frankfort Mining Area</b>						
NH-TGME-2430DC-10	Historical met plant building	-24.808	30.73723	Provincial Significance Grade 2	Poor	
NH-TGME-2430DC-11	Historical suspension bridge or pulley system	-24.8016	30.73392	Generally Protected A	Poor	
<b>CDM Mining Area</b>						
NH-TGME-2430DC-12	Historical tram line / cocopan line	-24.8874	30.72903	Provincial Significance Grade 2	Poor	
NH-TGME-2430DC-13	Historical / contemporary water furrow	-24.8878	30.72661	Generally Protected A	Good	
NH-TGME-2430DC-14	Historical Adit	-24.8883	30.7264	Generally Protected A	Poor	
NH-TGME-2430DC-15	Historical / Extant Adit	-24.8883	30.72609	Generally Protected A	Good	
NH-TGME-2430DC-16	Historical Adit	-24.885	30.7254	Provincial Significance Grade 2	Poor	
NH-TGME-2430DC-17	Historical / Extant Adit	-24.8758	30.72431	Provincial Significance Grade 2	Good	
NH-TGME-2430DC-18	Historical Adit	-24.8755	30.72402	Provincial Significance Grade 2	Poor	
NH-TGME-2430DC-19	Burial Site	-24.8737	30.72677	Generally Protected A (High Significance)	Poor	<p><b>Site Monitoring:</b> General site monitoring by informed ECO on a bi-weekly basis during construction.</p> <p><b>Avoidance:</b> Implement a heritage conservation buffer of at least 100m around the graves / cemetery, redesign the project layouts to avoid the heritage resource and the proposed conservation buffer. Fence all burial places and apply access control. Implement a site management plan detailing strict site management conservation measures.</p> <p><b>Site Management Plan:</b> Compile a heritage Site Management Plan (SMP) detailing a plan of action and measures for the long-term conservation and management of the heritage resource and its historical fabric.</p> <p><b>Grave Relocation:</b> Relocation of burials and documentation of site, full social consultation with affected parties, possible conservation management and protection measures. Subject to authorizations and relevant permitting from heritage authorities and affected parties.</p>

## NOTATIONS AND TERMS/TERMINOLOGY

**Absolute dating:** Absolute dating provides specific dates or range of dates expressed in years.

**Archaeological record:** The archaeological record minimally includes all the material remains documented by archaeologists. More comprehensive definitions also include the record of culture history and everything written about the past by archaeologists.

**Artefact:** Entities whose characteristics result or partially result from human activity. The shape and other characteristics of the artefact are not altered by removal of the surroundings in which they are discovered. In the Southern African context examples of artefacts include potsherds, iron objects, stone tools, beads and hut remains.

**Assemblage:** A group of artefacts recurring together at a particular time and place, and representing the sum of human activities.

**Context:** An artefact's context usually consists of its immediate *matrix*, its *provenience* and its *association* with other artefacts. When found in *primary context*, the original artefact or structure was undisturbed by natural or human factors until excavation and if in *secondary context*, disturbance or displacement by later ecological action or human activities occurred.

**Cultural Heritage Resource:** The broad generic term *Cultural Heritage Resources* refers to any physical and spiritual property associated with past and present human use or occupation of the environment, cultural activities and history. The term includes sites, structures, places, natural features and material of palaeontological, archaeological, historical, aesthetic, scientific, architectural, religious, symbolic or traditional importance to specific individuals or groups, traditional systems of cultural practice, belief or social interaction.

**Cultural landscape:** A cultural landscape refers to a distinctive geographic area with cultural significance.

**Cultural Resource Management (CRM):** A system of measures for safeguarding the archaeological heritage of a given area, generally applied within the framework of legislation designed to safeguard the past.

**Feature:** Non-portable artefacts, in other words artefacts that cannot be removed from their surroundings without destroying or altering their original form. Hearths, roads, and storage pits are examples of archaeological features

**Impact:** A description of the effect of an aspect of the development on a specified component of the biophysical, social or economic environment within a defined time and space.

**Lithic:** Stone tools or waste from stone tool manufacturing found on archaeological sites.

**Matrix:** The material in which an artefact is situated (sediments such as sand, ashy soil, mud, water, etcetera). The matrix may be of natural origin or human-made.

**Midden:** Refuse that accumulates in a concentrated heap.

**Microlith:** A small stone tool, typically knapped of flint or chert, usually about three centimetres long or less.

**Monolith:** A geological feature such as a large rock, consisting of a single massive stone or rock, or a single piece of rock placed as, or within, a monument or site.

**Phase 1 CRM Assessment:** An Impact Assessment which identifies archaeological and heritage sites, assesses their significance and comments on the impact of a given development on the sites. Recommendations for site mitigation or conservation are also made during this phase.

**Phase 2 CRM Study:** In-depth studies which could include major archaeological excavations, detailed site surveys and mapping / plans of sites, including historical / architectural structures and features. Alternatively, the sampling of sites by collecting material, small test pit excavations or auger sampling is required. Mitigation / Rescue involves planning the protection of significant sites or sampling through excavation or collection (in terms of a permit) at sites that may be lost as a result of a given development.

**Phase 3 CRM Measure:** A Heritage Site Management Plan (for heritage conservation), is required in rare cases where the site is so important that development will not be allowed and sometimes developers are encouraged to enhance the value of the sites retained on their properties with appropriate interpretive material or displays.

**Provenience:** Provenience is the three-dimensional (horizontal and vertical) position in which artefacts are found. Fundamental to ascertaining the provenience of an artefact is *association*, the co-occurrence of an artefact with other archaeological remains; and *superposition*, the principle whereby artefacts in lower levels of a matrix were deposited before the artefacts found in the layers above them, and are therefore older.

**Random Sampling:** A probabilistic sampling strategy whereby randomly selected sample blocks in an area are surveyed. These are fixed by drawing coordinates of the sample blocks from a table of random numbers.

**Scoping Assessment:** The process of determining the spatial and temporal boundaries (i.e. extent) and key issues to be addressed in an impact assessment. The main purpose is to focus the impact assessment on a manageable number of important questions on which decision making is expected to focus and to ensure that only key issues and reasonable alternatives are examined. The outcome of the scoping process is a Scoping Report that includes issues raised during the scoping process, appropriate responses and, where required, terms of reference for specialist involvement.

**Site (Archaeological):** A distinct spatial clustering of artefacts, features, structures, and organic and environmental remains, as the residue of human activity. These include surface sites, caves and rock shelters, larger open-air sites, sealed sites (deposits) and river deposits. Common functions of archaeological sites include living or habitation sites, kill sites, ceremonial sites, burial sites, trading, quarry, and art sites,

**Stratigraphy:** This principle examines and describes the observable layers of sediments and the arrangement of strata in deposits

**Systematic Sampling:** A probabilistic sampling strategy whereby a grid of sample blocks is set up over the survey area and each of these blocks is equally spaced and searched.

**Trigger:** A particular characteristic of either the receiving environment or the proposed project which indicates that there is likely to be an *issue* and/or potentially significant *impact* associated with that proposed development that may require specialist input. Legal requirements of existing and future legislation may also trigger the need for specialist involvement.

## LIST OF ABBREVIATIONS

<b>Abbreviation</b>	<b>Description</b>
ASAPA	Association for South African Professional Archaeologists
AIA	Archaeological Impact Assessment
BP	Before Present
BCE	Before Common Era
BGG	Burial Grounds and Graves
CRM	Culture Resources Management
EIA	Early Iron Age (also Early Farmer Period)
EIA	Environmental Impact Assessment
EFP	Early Farmer Period (also Early Iron Age)
ESA	Earlier Stone Age
GIS	Geographic Information Systems
HIA	Heritage Impact Assessment
ICOMOS	International Council on Monuments and Sites
K2/Map	K2/Mapungubwe Period
LFP	Later Farmer Period (also Later Iron Age)
LIA	Later Iron Age (also Later Farmer Period)
LSA	Later Stone Age
MIA	Middle Iron Age (also Early later Farmer Period)
MRA	Mining Right Area
MSA	Middle Stone Age
NHRA	National Heritage Resources Act No.25 of 1999, Section 35
PFS	Pre-Feasibility Study
PHRA	Provincial Heritage Resources Authorities
SAFA	Society for Africanist Archaeologists
SAHRA	South African Heritage Resources Association
TGME	Transvaal Gold Mining Estates
YCE	Years before Common Era (Present)



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## 1 BACKGROUND

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### 1.1 Scope and Project Brief

OMI Solutions (Pty) Ltd has commissioned a Heritage Impact Assessment (HIA) as part of an Environmental Impact Assessment process for the proposed mining in the Pilgrims 'Rest area of the Mpumalanga Province (hereafter referred to as the "TGME Mining Project" or "the Project"). The rationale of the HIA is to determine the presence of heritage resources such as archaeological and historical sites and features, graves and places of religious and cultural significance in previously unstudied areas; to consider the impact of the proposed project on such heritage resources; and to submit appropriate recommendations with regard to the cultural resources management measures that may be required at affected sites / features.

Transvaal Gold Mining Estates Limited ("TGME"), a subsidiary of Theta Gold Mines Limited, is the holder of an existing mining right with Department of Mineral Resources and Energy ("DMRE") Reference Number: MP 30/5/1/2/2/83 MR ("83MR") with effective date 16 October 2013. The 83MR mining area comprises Portions 1, 2, 3, 4, 5 and the Remaining Extent of the farm Frankfort 509KT, the farm Krugers Hoop 527KT, Portion 1 and the Remaining Extent of the farm Van Der Merwes Reef 526KT, Portions 1, 2 and the Remaining Extent of Portions of the farm Morgenzon 525KT, the farm Peach Tree 544KT, and Portions 18, 42, 43, 44 and the Remaining Extent of the farm Ponieskrans 543KT ("Mining Area"). TGME propose to re-operationalise its historical underground mines within the 83MR Mining Area which includes (refer to Figure 1-1 to Figure 1-4):

- **The Frankfort underground mines.**
- **Beta North underground mines.**
- **Clewer Dukes and Morgenzon ("CDM") underground mines.**

The proposed project will require additional surface infrastructure to support the underground working, the expansion of the current Tailings Disposal Facility ("TSF") and an upgrade of the old TGME process and beneficiation plant. TGME is confident that the project will have a dramatic impact on the lives of our host communities by creating much needed jobs and downstream economic development; thereby assisting in accelerating the South African government's post-COVID economic recovery plan. Further, TGME's corporate presence in the region will result in a net positive benefit to the Blyde River catchment, safety and security of the host community and local tourism revenues; which would otherwise continue to deteriorate at the mercy of alien invasive vegetation and illegal miners.

### 1.2 Project Specialist Management

Mr. Neels Kruger acts as field director for the project; responsible for the assimilation of all information, the compilation of the final consolidated AIA report and recommendations in terms of heritage resources on the demarcated project areas. Mr. Kruger is an accredited archaeologist and Culture Resources Management (CRM) practitioner with the Association of South African Professional Archaeologists (ASAPA), a member of the Society for Africanist Archaeologists (SAFA) and the Pan African Archaeological Association (PAA).

### 1.3 Project Terms of Reference

Heritage specialist input into the Environmental Impact Assessment (EIA) process is essential to ensure that, through the management of change, developments still conserve our heritage resources. It is also a legal requirement for certain development categories which may have an impact on heritage resources. Thus, EIAs should always include an assessment of heritage resources. The heritage component of the EIA is provided for in the **National Environmental Management Act, (Act 107 of 1998)** and endorsed by section 38 of the **National**

**Heritage Resources Act (NHRA - Act 25 of 1999).** In addition, the NHRA protects all structures and features older than 60 years, archaeological sites and material and graves as well as burial sites. The objective of this legislation is to ensure that developers implement measures to limit the potentially negative effects that the development could have on heritage resources.

This Phase I HIA study is therefore designed to obtain knowledge of the presence, relevance and significance of any heritage resources that may occur in the TGME mining area and that may be affected by the proposed new mining activities. The aims of this HIA study were to establish whether any of the types and ranges of heritage resources as outlined in the National Heritage Resources Act (Act 25 of 1999) (Box 1) do occur in the TGME mining area and, if so, to determine the nature, the extent and the significance of these remains; to determine whether such remains will be affected by the proposed extensions to current mining activities; and to evaluate what appropriate actions could be taken to reduce the impact of the development activities on such remains.

Based hereon, this project **terms of reference for** heritage specialist input are:

- *Provide a detailed description of all archaeological artefacts, structures (including graves) and settlements which may be affected, if any.*
- *Assess the nature and degree of significance of such resources within the area.*
- *Establish heritage informants/constraints to guide the development process through establishing thresholds of impact significance;*
- *Assess and rate any possible impact on the archaeological and historical remains within the area emanating from the proposed development activities.*
- *Propose possible heritage management measures provided that such action is necessitated by the development.*
- *Liaise and consult with the South African Heritage Resources Agency (SAHRA). A Notification of Intent to Develop (NID) will be submitted to SAHRA at the soonest opportunity.*

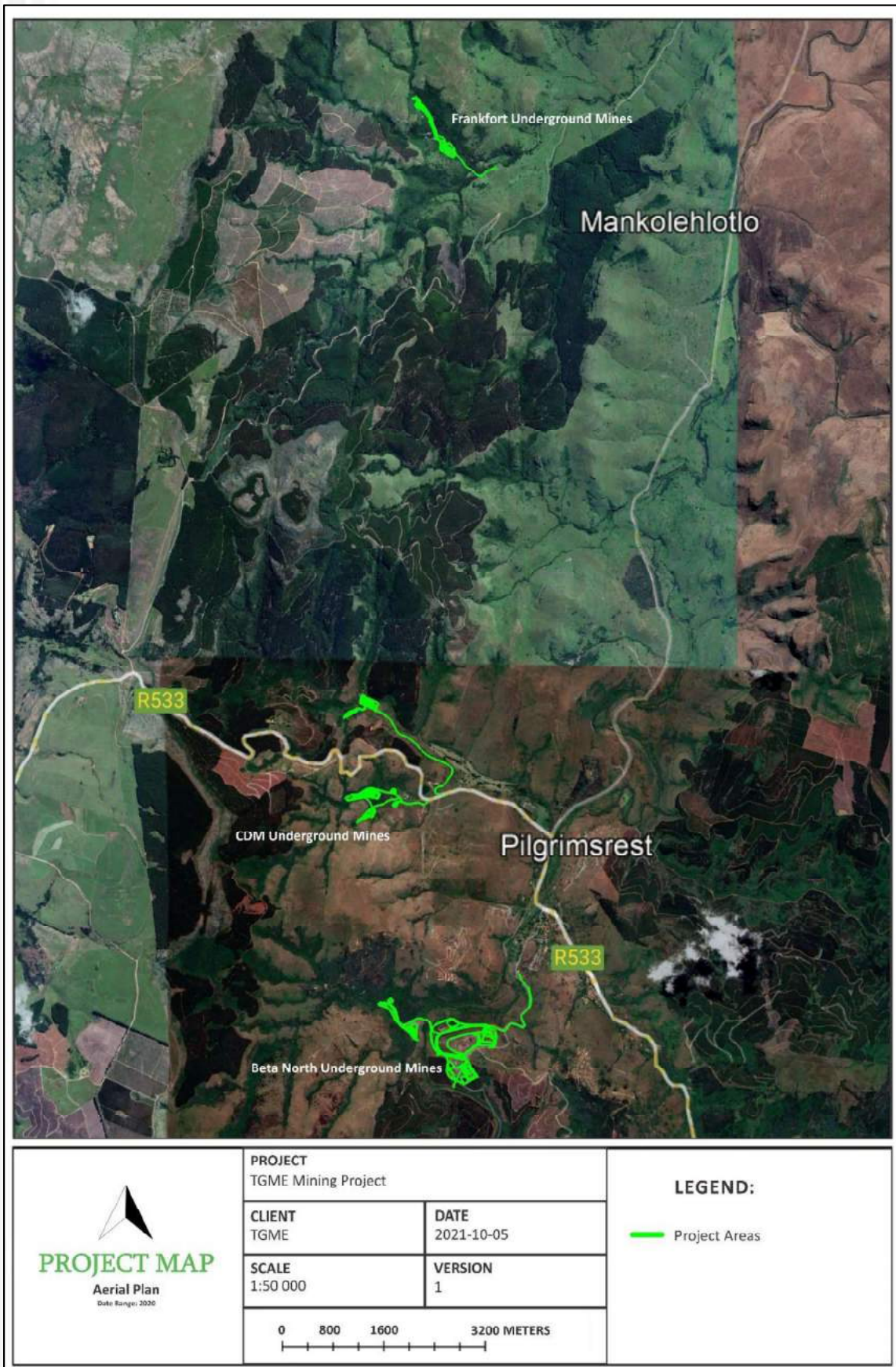


Figure 1-1: Aerial map indicating the project components subject to the TGME Mining Project.



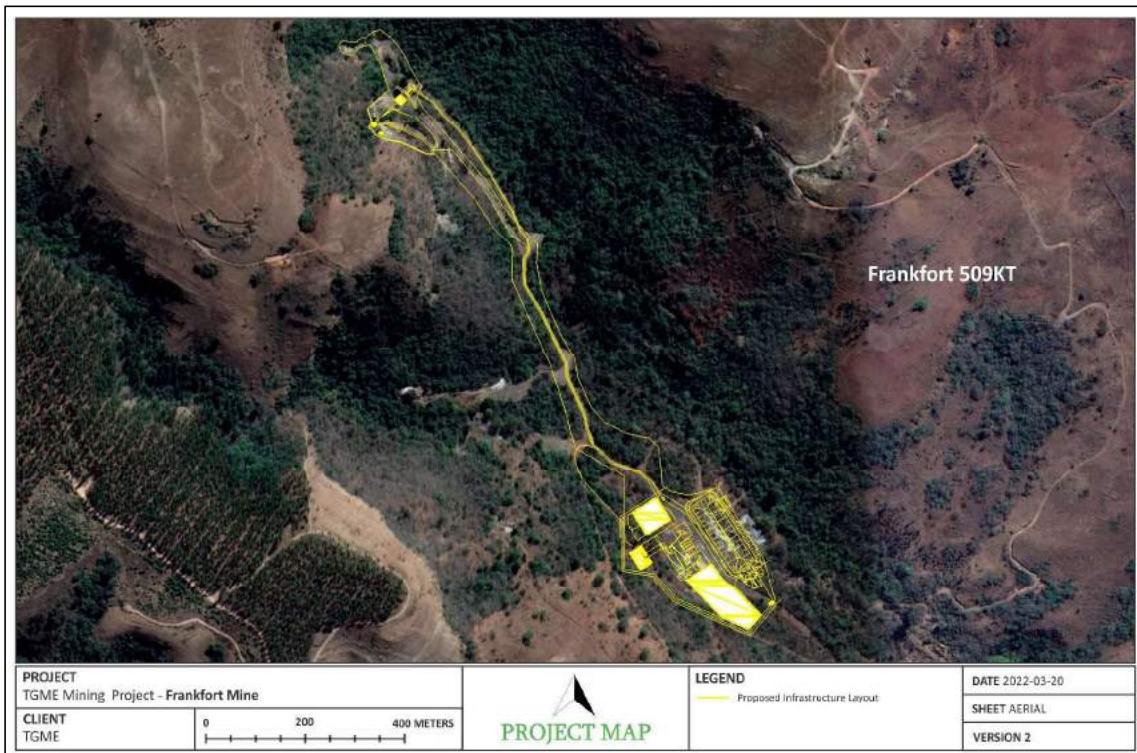


Figure 1-2: Aerial map indicating the proposed project footprint area for the Frankfort Mining Area.



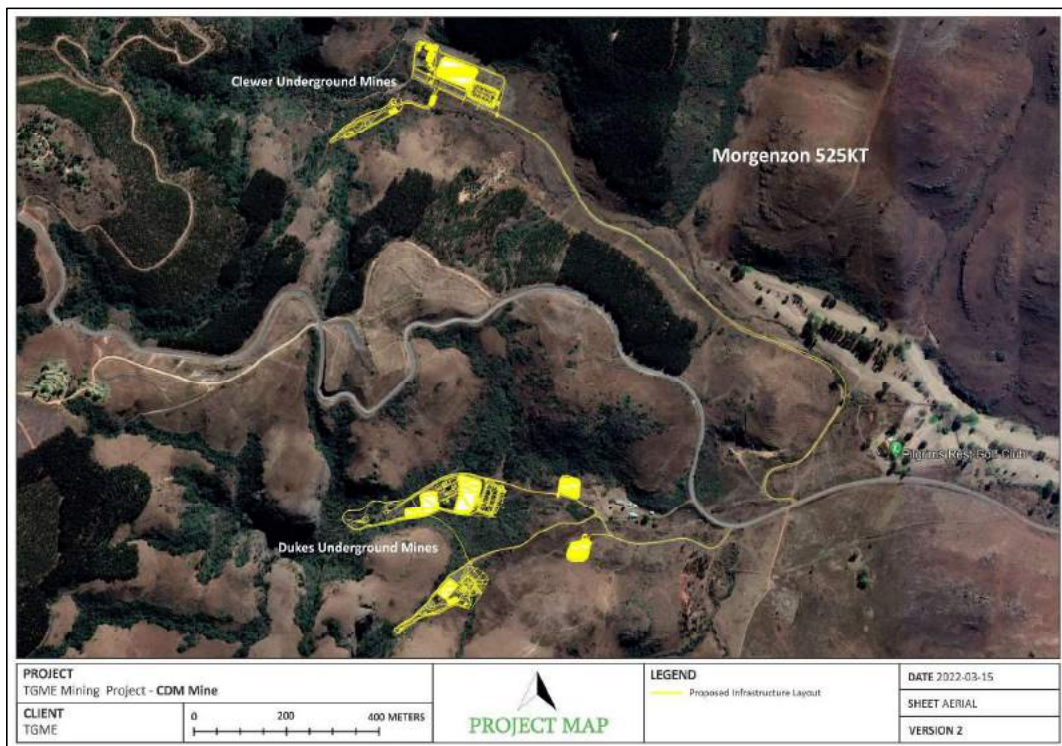


Figure 1-3: Aerial map indicating the proposed project footprint area for the CDM Mining Area.



Figure 1-44: Aerial map indicating the proposed project footprint area for the Beta North Mining Area.

## 2 LEGISLATIVE FRAMEWORK

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### 2.1 CRM: Legislation, Conservation and Heritage Management

The broad generic term *Cultural Heritage Resources* refers to any physical and spiritual property associated with past and present human use or occupation of the environment, cultural activities and history. The term includes sites, structures, places, natural features and material of palaeontological, archaeological, historical, aesthetic, scientific, architectural, religious, symbolic or traditional importance to specific individuals or groups, traditional systems of cultural practice, belief or social interaction.

#### 2.1.1 Legislation regarding archaeology and heritage sites

The South African Heritage Resources Agency (SAHRA) and its provincial offices aim to conserve and control the management, research, alteration and destruction of cultural resources of South Africa. It is therefore vitally important to adhere to heritage resource legislation at all times.

##### a. National Heritage Resources Act No 25 of 1999, section 35

According to the National Heritage Resources Act No 25 of 1999 (section 35) the following features are protected as cultural heritage resources:

- a. Archaeological artefacts, structures and sites older than 100 years
- b. Ethnographic art objects (e.g., prehistoric rock art) and ethnography
- c. Objects of decorative and visual arts
- d. Military objects, structures and sites older than 75 years
- e. Historical objects, structures and sites older than 60 years
- f. Proclaimed heritage sites
- g. Grave yards and graves older than 60 years
- h. Meteorites and fossils
- i. Objects, structures and sites of scientific or technological value.

In addition, the national estate includes the following:

- a. Places, buildings, structures and equipment of cultural significance
- b. Places to which oral traditions are attached or which are associated with living heritage
- c. Historical settlements and townscapes
- d. Landscapes and features of cultural significance
- e. Geological sites of scientific or cultural importance
- f. Archaeological and paleontological sites
- g. Graves and burial grounds
- h. Sites of significance relating to the history of slavery
- i. Movable objects (e.g., archaeological, paleontological, meteorites, geological specimens, military, ethnographic, books etc.)

With regards to activities and work on archaeological and heritage sites this Act states that:

*“No person may alter or demolish any structure or part of a structure which is older than 60 years without a permit by the relevant provincial heritage resources authority.” (34. [1] 1999:58)*

and

*“No person may, without a permit issued by the responsible heritage resources authority-*

- (a) *destroy, damage, excavate, alter, deface or otherwise disturb any archaeological or palaeontological site or any meteorite;*
- (b) *destroy, damage, excavate, remove from its original position, collect or own any archaeological or palaeontological material or object or any meteorite;*
- (c) *trade in, sell for private gain, export or attempt to export from the Republic any category of archaeological or palaeontological material or object, or any meteorite; or*
- (d) *bring onto or use at an archaeological or palaeontological site any excavation equipment or any equipment which assist in the detection or recovery of metals or archaeological and palaeontological material or objects, or use such equipment for the recovery of meteorites. (35. [4] 1999:58)."*

and

*"No person may, without a permit issued by SAHRA or a provincial heritage resources agency-*

- (a) *destroy, damage, alter, exhume or remove from its original position or otherwise disturb the grave of a victim of conflict, or any burial ground or part thereof which contains such graves;*
- (b) *destroy, damage, alter, exhume, remove from its original position or otherwise disturb any grave or burial ground older than 60 years which is situated outside a formal cemetery administered by a local authority;*
- (c) *bring onto or use at a burial ground or grave referred to in paragraph (a) or (b) and excavation equipment, or any equipment which assists in the detection or recovery of metals (36. [3] 1999:60)."*

#### **b. Human Tissue Act of 1983 and Ordinance on the Removal of Graves and Dead Bodies of 1925**

Graves and burial grounds are commonly divided into the following subsets:

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

Graves 60 years or older are heritage resources and fall under the jurisdiction of both the National Heritage Resources Act and the Human Tissues Act of 1983. However, graves younger than 60 years are specifically protected by the Human Tissues Act (Act 65 of 1983) and Ordinance on Excavations (Ordinance no. 12 of 1980) as well as any local and regional provisions, laws and by-laws. Such burial places also fall under the jurisdiction of the National Department of Health and the Provincial Health Departments.

#### **c. National Heritage Resources Act No 25 of 1999, Section 35**

This act (Act No 25 of 1999) states that a survey and evaluation of cultural resources must be done in areas where development projects, that will change the face of the environment, will be undertaken. The impact of the development on these resources should be determined and proposals for the mitigation thereof are made. Environmental management should also take the cultural and social needs of people into account. Any disturbance of landscapes and sites that constitute the nation's cultural heritage should be avoided as far as possible and where this is not possible the disturbance should be minimized and remedied.

#### **2.1.2 Background to HIA and AIA 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. Heritage sites are frequently threatened by development projects and both the environmental and heritage legislation require impact

assessments (HIAs & AIAs) that identify all heritage resources in areas to be developed. Particularly, these assessments are required to make recommendations for protection or mitigation of the impact of the sites. HIAs and AIAs should be done by qualified professionals with adequate knowledge to (a) identify all heritage resources including archaeological and palaeontological sites that might occur in areas of development and (b) make recommendations for protection or mitigation of the impact on the sites.

**A detailed guideline of statutory terms and requirements is supplied in Addendum 1.**

## 2.2 Rating of significance

The National Heritage Resources Act (Act no 25 of 1999) also stipulates the assessment criteria and grading of archaeological sites. The following categories are distinguished in Section 7 of the Act:

- *Grade I:* Heritage resources with qualities so exceptional that they are of special national significance;
- *Grade II:* Heritage resources which, although forming part of the national estate, can be considered to have special qualities which make them significant within the context of a province or a region;
- *Grade III:* Other heritage resources worthy of conservation, and which prescribes heritage resources assessment criteria, as set out in section 3(3) of the act.

Significance is influenced by the context and state of the archaeological site. Six criteria were considered following Kruger (2019):

- Site integrity (i.e., primary vs. secondary context),
- Amount of deposit, range of features (e.g., stonewalling, stone tools and enclosures),
- Density of scatter (dispersed scatter),
- Social value,
- Uniqueness, and
- Potential to answer current and future research questions.

The categories of significance were based on the above criteria the above and the grading system outlined in the NHRA and summarized below:

Significance Field Rating	Rating Action
National Grade I significance	Should be managed as part of the national estate.
Provincial Grade II significance	Should be managed as part of the provincial estate
Local Grade IIIA	Should be included in the heritage register and not be mitigated (high significance).
Local Grade IIIB	Should be included in the heritage register and may be mitigated (high/ medium significance). Permitting required.
General protection A (IV A)	Site should be mitigated before destruction (high/medium significance). Permitting required.
General protection B (IV B)	Site should be recorded before destruction (medium significance). Permitting required.
General protection C (IV C).	Phase 1 is seen as a sufficient recording of the existing structure and it may therefore be demolished (low significance).
No significance: sites that do not require mitigation.	None

### 3 REGIONAL CONTEXT

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#### 3.1 Area Location

The proposed TGME Mining Project occurs Portions 1, 2, 3, 4, 5 and the Remaining Extent of the farm Frankfort 509KT, the farm Krugers Hoop 527KT, Portion 1 and the Remaining Extent of the farm Van Der Merwes Reef 526KT, Portions 1, 2 and the Remaining Extent of Portions of the farm Morgenzon 525KT, the farm Peach Tree 544KT, and Portions 18, 42, 43, 44 and the Remaining Extent of the farm Ponieskrans 543KT in the larger Pilgrim's Rest area in the Ehlanzeni District Municipality, Mpumalanga Province. The TGME's mining areas are confined to small pieces of land on these farms where these areas will be affected by mining activities such as the recommissioning of shafts, the establishment of surface infrastructure and the upgrading of roads. The study area appears on 1:50000 map sheet 2430DC (see Figure 2-1) and a key location point for the project is:

- **Frankfort Mining Area: S24.91307° E30.73806°**
- **Open Pit Area: S24.88747° E30.73072°**
- **CRG Area: S24.87516° E30.72600°**

#### 3.2 Area Description: Receiving Environment

The study area falls within the Savanna Biome, which is the largest Biome in southern Africa, occupying over one-third of the surface area of South Africa (Accocs 1988). It is characterized by a grassy ground layer and a distinct upper layer of woody plants. The geological formation of the larger landscape consists of a composite of rocks which have a very weak structure, known as the terra rossa. The project area is dominated by rolling plains with interspersed hills, with a dominant hill crest in the north where previous mining activities have impacted on the outcrop. The general elevation across the project area varies from 1 600 to 1 780 m above mean sea level (mamsl), which generally slopes to the south-west. Historical mining activities have altered the natural topography with the presence of various mine dumps scattered throughout the project area.

#### 3.3 Current Site Status Quo

The larger Pilgrim's Rest area remains relatively pristine considering the fact that the landscape was mined for much of the past centuries resulting in large-scale human settlement. In addition, portions of the landscape and valley floors and the lower slopes of mountains in particular, have been utilized for agriculture in past decades but large pristine tracks of land remain higher up against the mountains. The discovery of gold in the Transvaal Republic in the 1880's created a demand for timber, which was used in mines, as sleepers, as building material for houses, as firewood and as wagon-building material and afforestation is prevalent throughout the region. TGME established their own short temporary Blue Gum plantations and processing industries resulting in the successful afforestation around Ponieskrans. Existing land uses associated with the project area at large include a combination of farmlands, informal settlements, forests, agricultural areas, historical mine housing and historical mining infrastructure.

**Locally, the project areas have been vastly affected by historical, recent and contemporary mining activities. Large-scale illegal informal mining activities by so-called "Zamas" at the sites subject to this assessment have resulted in an almost complete destruction of infrastructure associated with historical and recent mining. This includes heritage resources and features which, until relatively recently, remained in a well-preserved state. Natural resources such as vegetation, geomorphological stability and water courses are also affected by illegal mining.**



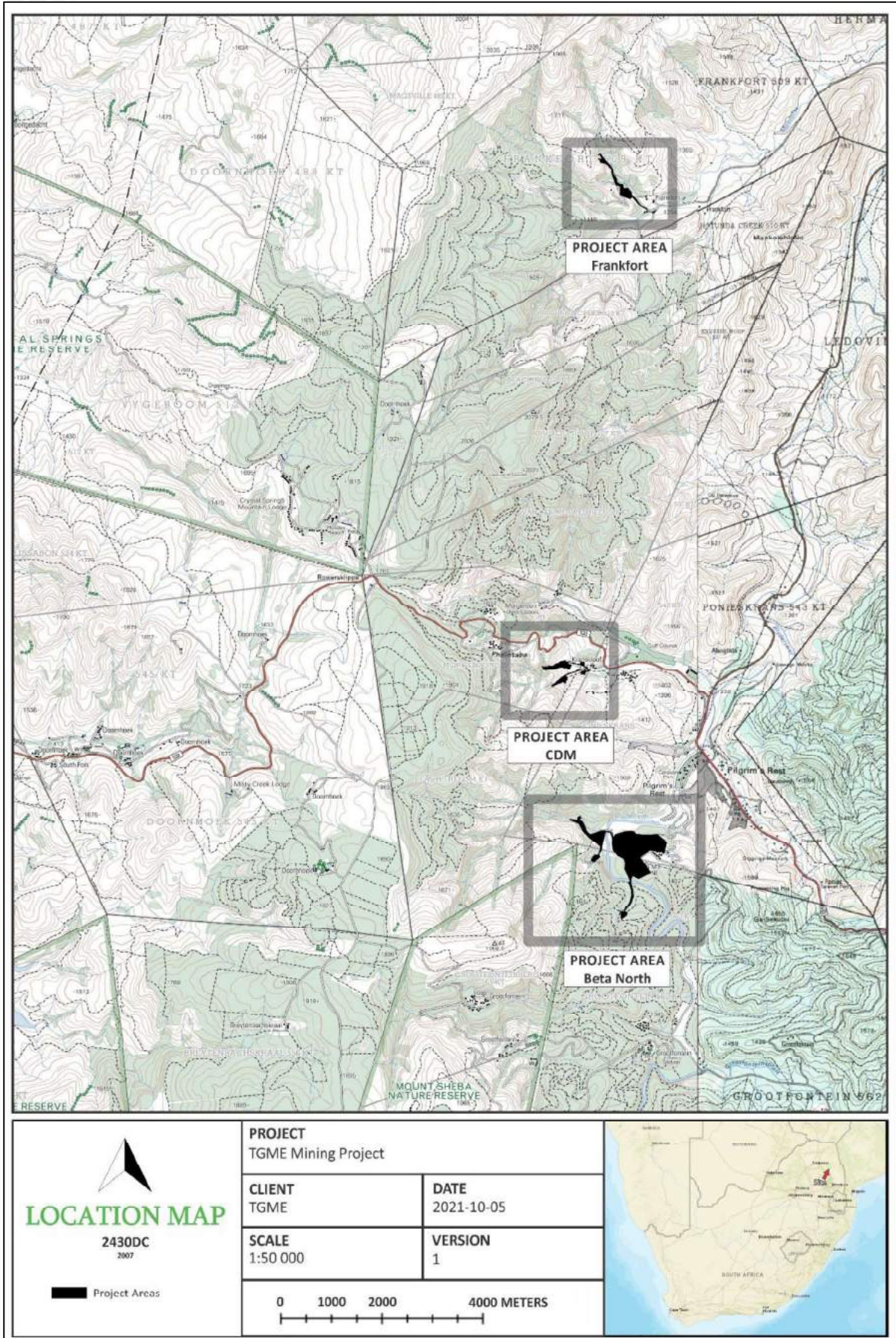


Figure 3-1: 1:50 00 Map representation of the location of the proposed TGME Mining Project (sheet 2430DC).

## 4 METHOD OF ENQUIRY

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### 4.1 Sources of Information

Data from detailed desktop, aerial and field studies were employed in order to sample surface areas systematically and to ensure a high probability of heritage site recording.

#### 4.1.1 Desktop Study

Pilgrim's Rest and its surrounds have been well documented in terms of its archaeology and history. Databases kept and maintained at institutions such as the South African Heritage Resources Agency (SAHRA), the Pilgrims Rest Museum and the TGME Historical Document repository were consulted to contextualize the proposed project within a larger historical milieu. A number of Cultural Resources Management (CRM) projects and research projects have been conducted for TGME which proved invaluable in capturing the heritage landscape of the project. These were:

- Fourie (2008);
- Henning (1981);
- Pistorius (2005);
- Reinders, Mason & Van Wyk (2007);
- Van Wyk-Rowe (2003);
- Fourie (2008);
- Van Schalkwyk (2019).

#### 4.1.2 Remote Sensing

Aerial photography is often employed to locate and study archaeological sites, particularly where larger scale area surveys are performed. The site assessment of the project area relied heavily on this method to assist the challenging foot site survey. Here, depressions, variation in vegetation, soil marks and landmarks were examined and specific attention was given to shadow sites (shadows of walls or earthworks which are visible early or late in the day), crop mark sites (crop mark sites are visible because disturbances beneath crops cause variations in their height, vigor and type) and soil marks (e.g., differently coloured or textured soil (soil marks) might indicate ploughed-out burial mounds). Attention was also given to moisture differences, as prolonged dampening of soil as a result of precipitation frequently occurs over walls or embankments. In addition, historical aerial photos obtained during the archival search were scrutinized and features that were regarded as important in terms of heritage value were identified and if they were located within the boundaries of the project area, they were physically visited in an effort to determine whether they still exist and in order to assess their current condition and significance. By superimposing high frequency aerial photographs with images generated with Google Earth as well as historical aerial imagery, potential sensitive areas were subsequently identified, geo-referenced and transferred to a handheld GPS device. These areas served as reference points from where further vehicular and pedestrian surveys were carried out.

#### 4.1.3 Map Data

Similar to the aerial survey, the site assessment of the project area relied heavily on archive and more recent map renderings of project area to assist the challenging foot site survey where historical and current maps of the project area were examined. By merging data obtained from the desktop study and the aerial survey, sites and areas of possible heritage potential were plotted on these maps of Ponieskrans and Pilgrim's Rest area using GIS software. These maps were then superimposed on high-definition aerial representations in order to graphically demonstrate the geographical locations and distribution of potentially sensitive landscapes. It should be noted that not all the heritage remains in the project area were documented and mapped, due to the fact that extensive and detailed inventories of heritage sites exist and large-scale heritage survey of the general landscape outside of the project areas is required for the purposes.



#### **4.1.4 Stakeholder Engagement**

For this assessment, Me Christine Rowe (TGME) was consulted with regard to the types and ranges of heritage resources which occur in the project area, the location of some of these remains and the identity of some of the mining heritage sites. Her acute knowledge of the local and regional history proved invaluable to this assessment. A stakeholder meeting was held with Me René Reinders, Me Judith Mason and Me Nondumiso Simelane of the Pilgrims Rest Museum who were involved in the EIA level review of the final Heritage Impact Assessment Report (see Addendum 3, Attendance Register).

#### **4.1.5 Field Survey**

Archaeological survey implies the systematic procedure of the identification of archaeological sites. An archaeological survey of the project areas was conducted in October 2021. The process encompassed a random field survey in accordance with standard archaeological practice by which heritage resources are observed and documented. Cognizant of constraints for the site assessment (see Section 4.2 below) particular focus was placed on sites noted in the desktop study as well as GPS reference points identified during the aerial and mapping survey. Where possible, random spot checks were made and potentially sensitive heritage areas were investigated. Using a Garmin GPS, the survey was tracked and general surroundings were photographed with a Samsung Digital camera. Real time aerial orientation, by means of a mobile Google Earth application was also employed to investigate possible disturbed areas during the survey.

### **4.2 Limitations**

#### **4.2.1 Access and Movement**

The study areas are accessed via a number of regional roads connecting to the R533 Road to Pilgrim's Rest. Access control is applied to some of the project areas but the consultant moved around in a group accompanied by TGME personnel and no access restrictions onto the sites were encountered during the site visit. Portions of the project areas are densely vegetated which constrained movement on some of the sites.

#### **4.2.2 Safety**

As noted previously, the project areas are current mined by large numbers of illegal miners, some of whom are armed and aggressive. Safety proved to be a major concern and the consultant moved around in a group accompanied by TGME personnel and private security companies. This proved to be a constraint in terms of free-movement on the sites.

#### **4.2.3 Visibility**

The surrounding vegetation in the project area mostly comprised out of forests, pockets of pioneering species and mixed grasslands. The general visibility at the time of the HIA survey (October 2021) ranged from moderate along the exiting footpaths and agricultural fields, to low in densely overgrown areas. In single cases during the survey sub-surface inspection was possible.



Figure 4-1: View of an old mining compound area near the Beta Mine.



Figure 4-2: View of illegal mining activity in the Beta North project area.



Figure 4-3: View of general surroundings in the Beta North project area.



Figure 4-4: View of general surroundings in the landscape of the Frankfort project area.



Figure 4-5: An old processing yard in the Frankfort project area.



Figure 4-6: View of the contemporary Frankfort mine adit area.





Figure 4-7: View of old mine dumps CRG project area at the Lower Dukes mine.



Figure 4-8: View of illegal mining activities at the Lower Dukes mine.



Figure 4-9: View of general surroundings in the CDM project area at the Upper Dukes mine.



Figure 4-10: View of an old mining settlement near the Morgenzon Mine in the CDM Mining area.



Figure 4-11: View of the former TGME offices in the CDM Mine area.

## 5 THE BASELINE ENVIRONMENT

### 5.1 The Baseline Heritage Landscape<sup>1</sup>

Archaeology in Southern Africa is typically divided into two main fields of study, the **Stone Age** and the **Iron Age** or **Farmer Period**. The following table provides a concise outline of the chronological sequence of periods, events, cultural groups and material expressions in Southern African pre-history and history.

Table 1 Chronological Periods across Southern Africa

Period	Epoch	Associated cultural groups	Typical Material Expressions
Early Stone Age 2.5m – 250 000 YCE	Pleistocene	Early Hominins: <i>Australopithecines</i> <i>Homo habilis</i> <i>Homo erectus</i>	Typically, large stone tools such as hand axes, choppers and cleavers.

<sup>1</sup>The history of Pilgrim’s Rest has been well documented and this section was, in part extracted from “Pilgrim’s Rest: From mining village to world heritage site” compiled by the Human Science Research Department, Pilgrim’s Rest Museum (Christine Rowe, Judith Mason, Cheryl van Dyk, René Reinders)

Middle Stone Age 250 000 – 25 000 YCE	Pleistocene	First <i>Homo sapiens</i> species	Typically, smaller stone tools such as scrapers, blades and points.
Late Stone Age 20 000 BC – present	Pleistocene / Holocene	<i>Homo sapiens sapiens</i> including San people	Typically, small to minute stone tools such as arrow heads, points and bladelets.
Early Iron Age / Early Farmer Period 300 – 900 AD <b>(commonly restricted to the interior and north-east coastal areas of Southern Africa)</b>	Holocene	First Bantu-speaking groups	Typically, distinct ceramics, bead ware, iron objects, grinding stones.
Middle Iron Age (Mapungubwe / K2) / early Later Farmer Period 900 – 1350 AD <b>(commonly restricted to the interior and north-east coastal areas of Southern Africa)</b>	Holocene	Bantu-speaking groups, ancestors of present-day groups	Typically, distinct ceramics, bead ware and iron / gold / copper objects, trade goods and grinding stones.
Late Iron Age / Later Farmer Period 1400 AD -1850 AD <b>(commonly restricted to the interior and north-east coastal areas of Southern Africa)</b>	Holocene	Various Bantu-speaking groups including Venda, Thonga, Sotho-Tswana and Zulu	Distinct ceramics, grinding stones, iron objects, trade objects, remains of iron smelting activities including iron smelting furnace, iron slag and residue as well as iron ore.
Historical / Colonial Period ±1850 AD – present	Holocene	Various Bantu-speaking groups as well as European farmers, settlers and explorers	Remains of historical structures e.g., homesteads, missionary schools etc. as well as, glass, porcelain, metal and ceramics.

The study area has evidence for occupation over an extensive period of time, spanning from the Stone Age through to the historical period. Briefly, the Stone Age is associated with the manipulation of lithics to create tools. These date from as early as 2.5 million years ago through to less than 150 years ago (Lombard, et al., 2012). This period overlaps with the migration of Bantu speakers into southern Africa bringing with them agricultural technologies, herding and a settled way of life manifested through stone walling (Huffman, 2007). For the purposes of this study, the literature review was primarily focused on the historical period as activities associated with the project is situated in a predominantly Historical Period landscape. European settlers first arrived on the Escarpment as Voortrekkers associated with the Great Trek of 1838, seeking land outside of British rule. During the early 1870's the first payable gold on the farm Geelhoutboom near Sabie on the Mpumalanga escarpment was discovered. This initiated the first major gold rush in South Africa which moved to Barberton in 1884, and ended at the gold fields of the Witwatersrand in 1886. Pilgrim's Rest was declared a gold field on 22 September 1873.

### 5.1.1 Early History and the Stone Ages

According to archaeological research, the earliest ancestors of modern humans emerged some two to three million years ago. The remains of Australopithecine and *Homo habilis* have been found in dolomite caves and underground dwellings in the Riverton Area at places such as Sterkfontein and Swartkrans near Krugersdorp. *Homo habilis*, one of the Early Stone Age hominids, is associated with Oldowan artefacts, which include crude implements manufactured from large pebbles. The Acheulian industrial complex replaced the Oldowan industrial complex during the Early Stone Age. This phase of human existence was widely distributed across South Africa and is associated with *Homo erectus*, who manufactured hand axes and

cleavers from as early as one and a half million years ago. Middle Stone Age sites dating from as early as two hundred thousand years ago have been found all over South Africa. Middle Stone Age hunter-gatherer bands also lived and hunted in the Orange and Vaal River valleys. These people, who probably looked like modern humans, occupied campsites near water but also used caves as dwellings. They manufactured a wide range of stone tools, including blades and points that may have had long wooden sticks as hafts and were used as spears.

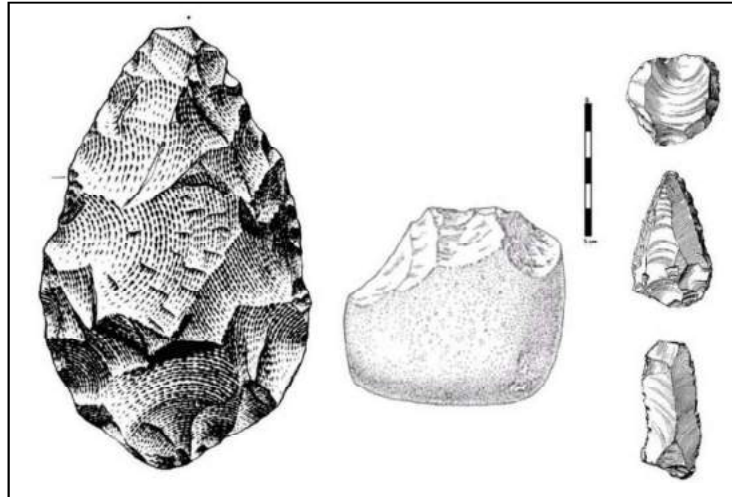


Figure 5-1: Typical ESA handaxe (left) and cleaver (center). To the right is a MSA scraper (right, top), point (right, middle) and blade (right, bottom).

A large number of rock paintings and an abundance of stone artefacts found in Mpumalanga indicate that the original inhabitants of this province were the San (Bushmen). There is also evidence that the San people mined red ochre at Dumaneni near Malelane for centuries before the migration of black people to this part of Africa. The final disappearance of the San people in Mpumalanga may be attributed to the greatly increasing and rapidly expanding population of the African settlers that immigrated to this area approximately two thousand years ago. Approximately 24 rock painting sites have been identified in the escarpment region from Sabie to the Strydom Tunnel. It is said that Earlier Stone Age (ESA) and Later Stone Age (LSA) artefacts have been observed in the Pilgrim's Rest area. LSA microlithic stone tools are sometimes associated with rock shelters and caves, of which there are several in the mountainous Pilgrim's Rest area. Several rock painting sites have been documented in the Pilgrim's Rest area.

### 5.1.2 Iron Age / Farmer Period

The beginnings of the Iron Age (Farmer Period) in southern Africa are associated with the arrival of a new Bantu speaking population group at around the third century AD. These newcomers introduced a new way of life into areas that were occupied by Later Stone Age hunter-gatherers and Khoekhoe herders. Distinctive features of the Iron Age are a settled village life, food production (agriculture and animal husbandry), metallurgy (the mining, smelting and working of iron, copper and gold) and the manufacture of pottery. Iron Age farming communities generally preferred to occupy river valleys within the eastern half of southern Africa owing to the summer-rainfall climate that was conducive for growing millet and sorghum. The Later Iron Age (LIA) is not only distinguished from the EIA by greater regional diversity of pottery styles but is also marked by extensive stone wall settlements. In many instances, LIA farmer communities moved from river valleys to the hilltops.

Over the greater part of Mpumalanga, Gauteng and the Limpopo Province a relatively dense population of black people lived for many centuries prior to the Difaqane and predating the northward migration of white people from the south. These people brought the Iron Age technology with them from the northern and central parts of Africa. The first black immigrants to the eastern part of the escarpment and the lowland



areas of Mpumalanga bordering on Mozambique belonged to the Basuto-Bafadi group. These Sesotho speaking people moved southwards along the interior plateau, while the Nguni speaking group moved down east of the Lebombo Mountains. While the Zulu and Xhosa moved towards Natal, the Nguni speaking Swazi settled in the Swaziland area. Here the Swazi encountered people - from the Basuto-Bafadi group, which they almost eliminated in their disputes over land. The remainder of these Sesotho speaking people moved to the north of Swaziland and at the end of the 18<sup>th</sup> century united under chief Simkulu to form the Ba-ka-Ngomane. The Ba-ka-Ngomane lived in the area between the Lomati River (south), the Rooi Lebombo (east), the Sabie River (north) and Pretoriuskop to the west. In 1819 the Zulu king, Chaka, fought and won a battle against the Ndwandwe. The surviving Ndwandwe, under the leadership of Shoshangane fled northwards through Swaziland. The Swazi chief allowed Shoshangane free passage through Swaziland, but Kongwane of the Ba-ka-Ngomane opposed the migrant army at Sikwameni on the Komati River. Shoshangane's army defeated the Ba-ka-Ngomane who was afterwards unable to recover their strength and with continuous raids by Zulu parties between 1819 and 1828 the Ba-ka-Ngomane were weakened further. Today the remainder of the Ba-ka-Ngomane people are living to the west and south of Komatipoort. They have lost their original Sesutho language and speak either Seswati or Shangaan.

The Sesutho speaking people in the north eastern parts of Mpumalanga, who managed to maintain their cultural identity, despite the Difaqane and whose descendants are still to be found in these parts, are the maPai, maPulana and the baKutswe. In the Pilgrim's Rest area, the maPulana was the main group until the Swazi in the nineteenth century caused them to flee and scatter. These people had all fled north from their original territories, after attacks by, first Zwibe and later, the incoming Swazi in the 1820s and their numerical strength was therefore in direct ratio to their distance from the old Swazi power. The history of the maPulana dates back to Motshiteng in the Barberton area. From there they trekked through Krokodilpoort and settled at Sakwaneng north east of Pretoriuskop. From Sakwaneng they were driven away by the Swazi and fled northwards. They split up in several sections and settled in the area north of the Crocodile River, west of the Kruger National Park, south of the Sabie River and to the east of the Blyde River, Mount Anderson, Makobolane Mountain and Houtbosloop. The tribal region of the Pulana is a large area divided in two by the road leading from Pilgrim's Rest to Bushbuckridge. During the first part of the nineteenth century the maPai were living to the north of Swaziland. In the early 1850's the Swazi attacked the maPai and they fled northwards. The maPai under Vutsimi settled at xaNyatza and those under Lesisi fled to caves in the mountains near Mac. A number of the maPai and some Swazi people moved to Sekukuniland where Sekwati allowed them a piece of land west of the Steelpoort River. After the murder of Sekukuni in 1882 the Swazi decided to remain in Sekukuniland, but the maPai decided to return to the land along the Sabie River. On their return they found that white people already established themselves at Mac and Pilgrim's Rest where gold was discovered in 1873. By this time the leadership of the maPai had passed from the hands of the descendants of Lesisi, and the vaK wena (Makoena) and the vaxaMasixu (Mashego) were now the leading clans. In 1953 Simon Mashego was the unofficial chief of the Pai. In the 1950's the багаMogane regarded themselves as the royal clan of the maPulana. At this stage the багаMogane lived on the western banks of the Blyde River, mainly on the farm Clondyke 201 and some of the adjacent farms. It appears that the nucleus of the maPulana were the Mashego, from which the Mogane took over the leadership. It is however evident that both the Mogane and the Mashego were the leading clans of the maPulana. The Mashego clan are divided in the багаMasego a Malalé and the багаMasego a Makéré. Other important family clans of the maPulana are the багаTshilwane (Chiloane) and the багаMashile (Mashile), who lived in the most northern parts of the Pulana area. They are renowned for having defeated, under their chief Maripe Mashile, the Swazi at Mariepskop (thaba ya gaMogologolo) in 1864.

It is doubtful whether the Pilgrims Rest area was occupied by the Early Iron Age Bantu-Negroid people who lived in the Limpopo, Mpumalanga, KwaZulu-Natal and North-West Provinces of South Africa during the 3<sup>rd</sup> to 9<sup>th</sup> centuries AD. The earliest Iron Age settlers who may have moved into the Pilgrims Rest region were Sotho-speaking groups, such as the Pai, the Pulana and the Kutswe. Some of these Eastern-Sotho clans



originated from the North-West Province and moved to Mpumalanga, probably in the 17<sup>th</sup> century. These Eastern Sotho clans were uprooted during the difaqane when Mzilikazi's Matabele (Ndebele) entered the Mpumalanga area during the third decade of the 19<sup>th</sup> century. Soon hereafter, pressure on the Swazi chiefdom exerted by the expanding Ndwandwe chiefdom further to the south led to the dispersal of a large number of Swazi clans across Mpumalanga, some of whom may have ended up in the Pilgrims Rest area. It is said that Late Iron Age sites (with associated stone walled sites) do occur on Grootfontein 562KT, which is now used for forestry. Some of the caves in the Pilgrims Rest area also contain evidence of brief Iron Age occupation, as potsherds occur in some of these shelters. Caves were used by refugees in times of upheaval, such as the difaqane during the Late Iron Age.

### 5.1.3 Pilgrim's Rest

Most tales of the origins of the Transvaal Republic's first genuine and lasting gold mining town give credit to a loner known as Alec Wheelbarrow Patterson, who left the diggings at Mac Mac because they had become too crowded for him. Arriving in the area from Mac Mac, Patterson stumbled upon the valley and panned for gold even before he pitched his tent. He was later joined by William Trafford. Within two years, more than 1 500 diggers were panning in the streams around Pilgrims Rest - some from as far away as California and Australia. The 'tentedorp' (town consisting of tents) gradually made way for houses built with wooden frames and covered with corrugated iron. A few of the first houses were also built using stone. Pilgrims Rest was declared a public digging in 1875. By the end of that year there were 21 stores, 18 canteens and three bakeries. Individual claims were approximately 50 meters square. Most of the gold used to occur in the middle section of the stream. Those diggers who worked claims downstream often ran out of water for panning, as the water was used up by the diggers panning upstream. Diggers without claims dug 'races' (water furrows) that directed water from other streams to claims without water. Gold panning began to decline in 1876, because the surface pickings of gold were exhausted. Heavy equipment was now required to get into the earth in order to find reefs. Several smaller companies were formed to raise the capital. Most diggers preferred not to work for companies and many drifted away to new gold fields elsewhere in South Africa.

### 5.1.4 The Pilgrim's Rest Goldfields

#### - *Alluvial Era*

Miners that arrived on the Goldfields in the 1870's came from all over the world. The first arrivals were mostly men from South Africa, drawn from Natal and the Cape Colony. They walked, came on horseback or ox wagon. Ships delivered hundreds of men from the Australian and Californian goldfields, hurrying to catch the next coach to the Transvaal. At the peak of the gold diggings there were approximately 1500 white diggers, working 4000 claims. At the time of the diggers' arrival at Pilgrim's Rest there was only one black family staying on the goldfields. Kameel and his family stayed, at what is today still known as Kameel's Creek, to the south of the present reduction works site. At the time the Goldfields were officially declared, on 1 September 1873, there were approximately 250 white people engaged in various occupations on the Fields and 103 black people. On 31 December 1873 the white population had increased to 300 and the black population to 203, making a total number of 503, which is an increase of 50 whites and 100 blacks in a period of four months. However, soon after the discovery of gold a growing number of black diggers moved to the goldfields. Many of them were black farmers who needed money to pay their taxes, or buy guns or tools like hoes and ploughs for their land. Black, coloured and Indian diggers were not permitted to own any claims on the goldfields and they worked mainly as laborers. Although these black diggers came from several different areas, most of them were from Mozambique, Swaziland and Sekukuniland.

#### - *The Companies Era 1882 to 1895:*

Between 1881 and 1895, the various small companies, which were to amalgamate as the TGME, all operated separately. In the report of the Transvaal Gold Exploration and Land Co. (1884), O'Donoghue mentions that

white labor was very expensive (£12-£20/ week) and not reliable. Local black laborers from the different kraals in the area were considered a better option, as they were more reliable and wages (with rations) would be cheaper for the company (15s — 30s/ month). Another small company operating at the time was the Central Lydenburg Gold Fields Ltd., which owned the Blackhills Mine, some 10km north of Pilgrim's Rest. For an operation of this size, a manager, a prospector and a force of 30-40 local black laborers were employed. Men, as well as women, were employed as laborers by such companies, at approximately 35s to £2/ month (excluding rations).

- ***The TGME Era 1896 to 1972:***

After the establishment of the TGME in 1896 mining activities in the area expanded and the Central Reduction Works was built to process ore from the outlying mines. Subsequently the production of gold by the TGME was dramatically increased, which also demanded an expanding labor force, both black and white. In the TGME's golden years (1910 to 1915) the Company employed 250 white men and nearly 3000 black men. The TGME recruited a large number of Welsh and Cornish miners, as the conditions at the Pilgrim's Rest mines were basically the same as those in the coal and tin mines of Wales and Cornwall. From these early days the TGME experienced great difficulty in obtaining the labor required for the mines and reduction works. Many of the local black inhabitants of Pilgrim's Rest and the Lowveld district had been recruited to work on the Witwatersrand mines. Most of the black communities in the area led traditional lives and would in good rain years resort to their own agricultural endeavors. With the closing of the mines and the reduction works during the Anglo Boer War (1899 -1902) the TGME lost its entire labor force. The English-speaking miners had been deported to Mozambique (although some chose to join the British forces, to fight). The Afrikaans employees had been called up to join their commandos. The black employees of TGME had returned to their villages in the surrounding area, as they saw no reason to become involved in a war, which had nothing to do with them. At the commencement of mining activities in September 1902, three hundred and thirty-six laborers were recruited and employed. They were mostly laborer's that were previously employed by the TGME and who returned to the company on their own accord. By 1904 the TGME made arrangements with various recruiting agents to supply labor and from November of that year onwards the supply steadily increased. It was reported that in 1906 the average number of laborer's employed by the company was 1855. From 1914 the labor supply once again dwindled due to a good harvest and to some extent the labor unrest on the Rand. In 1918, at the outbreak of the influenza epidemic, the entire labor force fled to their kraals, thus adding greatly to the mortality in their ranks and spreading the disease amongst their women and children. Subsequently a large number of the laborers at Pilgrim's Rest were recruited from Mozambique and to a lesser extent Malawi. This practice continued until 1972 when the last mines at Pilgrim's Rest closed. A large number of these recruits did not return to their countries of origin but continued to reside in South Africa. By 1950 there were approximately 24 000 black laborers employed on farms in the Mpumalanga Lowveld region. The mines employed 14 000 laborers and 5 000 were employed by secondary industries. This proves that the growing farming and forestry industries of Mpumalanga seriously affected the supply of labor to the mines. In order to accommodate the TGME labor force the mine was compelled to provide housing. This took the form of compounds, which were erected on various sites around Pilgrim's Rest in close proximity to the Reduction Works and larger outlying mines. When the mines finally closed down in 1972 the TGME offered employment for the laborers at several of Rand Mines' other mines, as well as on the TGME farms in the area. Many of the laborers however preferred to stay in the village and seek employment locally.

The TGME has remained the biggest role player in the mining history of the area. The economy of South Africa was, for many years, closely linked with that of the biggest gold producers on the Escarpment. The gold mining industry on the Escarpment led to the establishment of an independent forestry industry, a rail network to the area and the establishment of Graskop. The TGME mined Ponieskrans until September 1971. After nearly a century of gold production, TGME sold its assets to Rand Mines Properties Ltd in 1968 and

ceased all its mining operations in 1972. In 1974 an agreement was reached between the then Transvaal Provincial Administration (TPA) and Rand Mine Properties, whereby the TPA obtained ownership of the historical village of Pilgrims Rest, with the aim of developing it into a holiday resort. The TPA also bought additional land bordering on the town so that it owned some 1 800 hectares of Poneskrans.

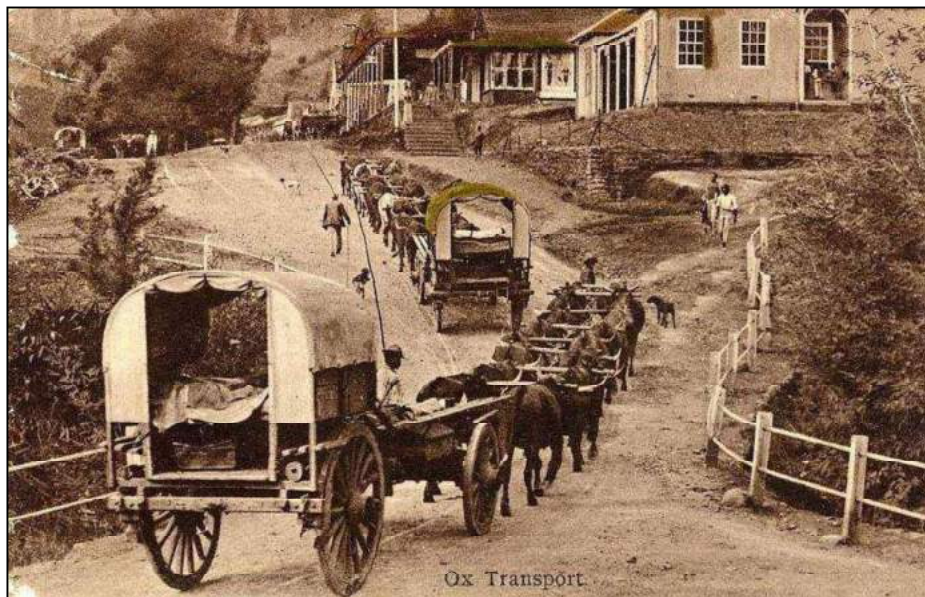


Figure 5-2: An archive photo of Pilgrim's Rest at the turn of the 19<sup>th</sup> century.



Figure 5-3: An early photo of Pilgrim's Rest during its found years when the village was still a tented settlement.



Figure 5-4: An early photo of the Frankfort Mine (courtesy of the Pilgrim's Rest Museum).



Figure 5-5: An early photo of the Duke's Mine (courtesy of the Pilgrim's Rest Museum).



Figure 5-6: An early photo of the Clewer Mine (courtesy of the Pilgrim's Rest Museum).



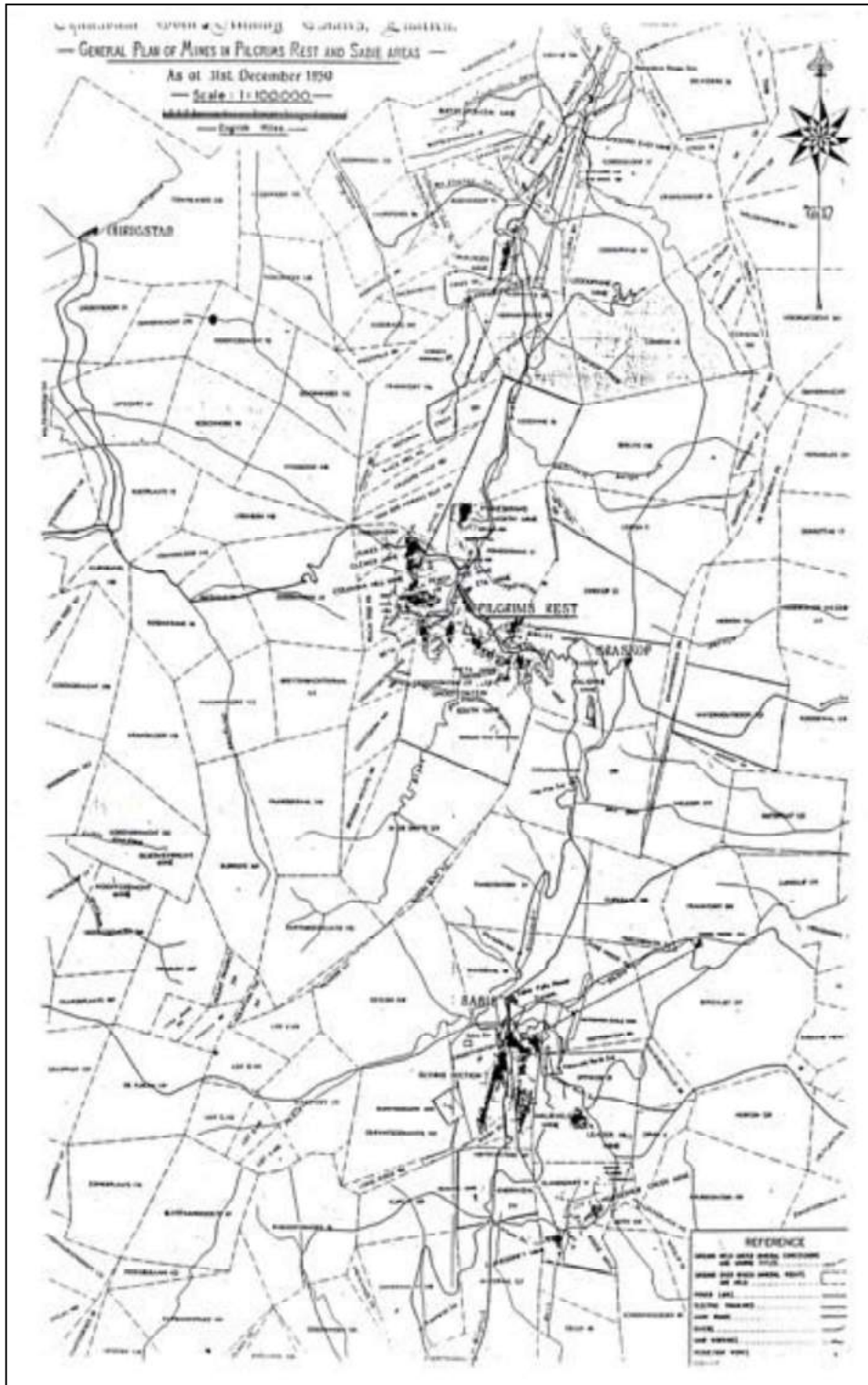


Figure 5-7: A copy of the “General plan of mines in the Pilgrim’s Rest and Sabie areas (Fowler 1968).

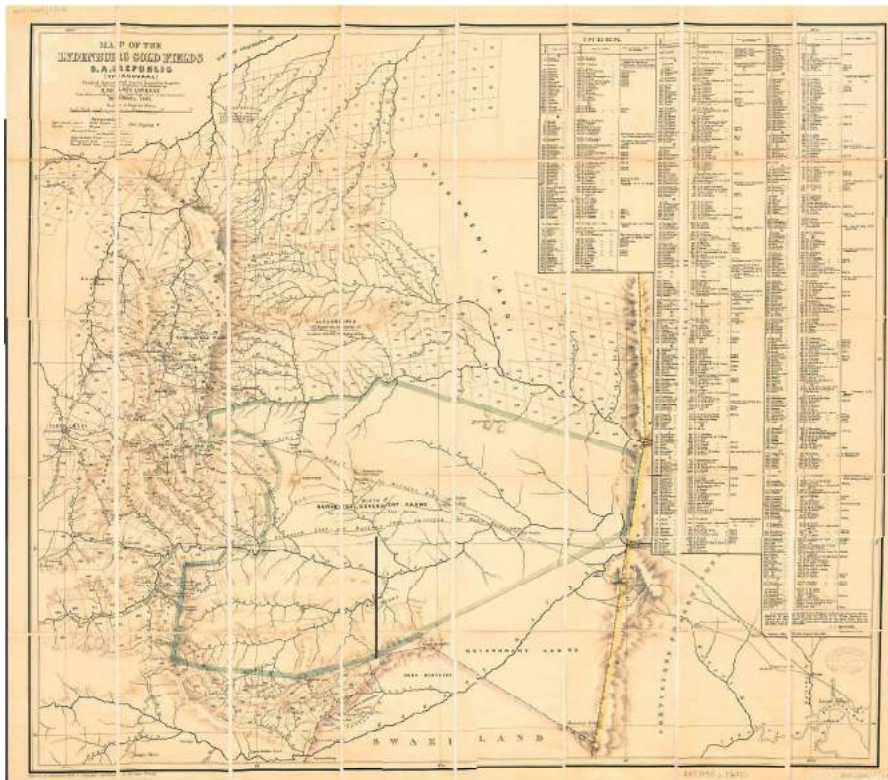


Figure 5-8: Map of the Lydenburg Gold Fields dated 1883 compiled by R Kelsey Loveday.

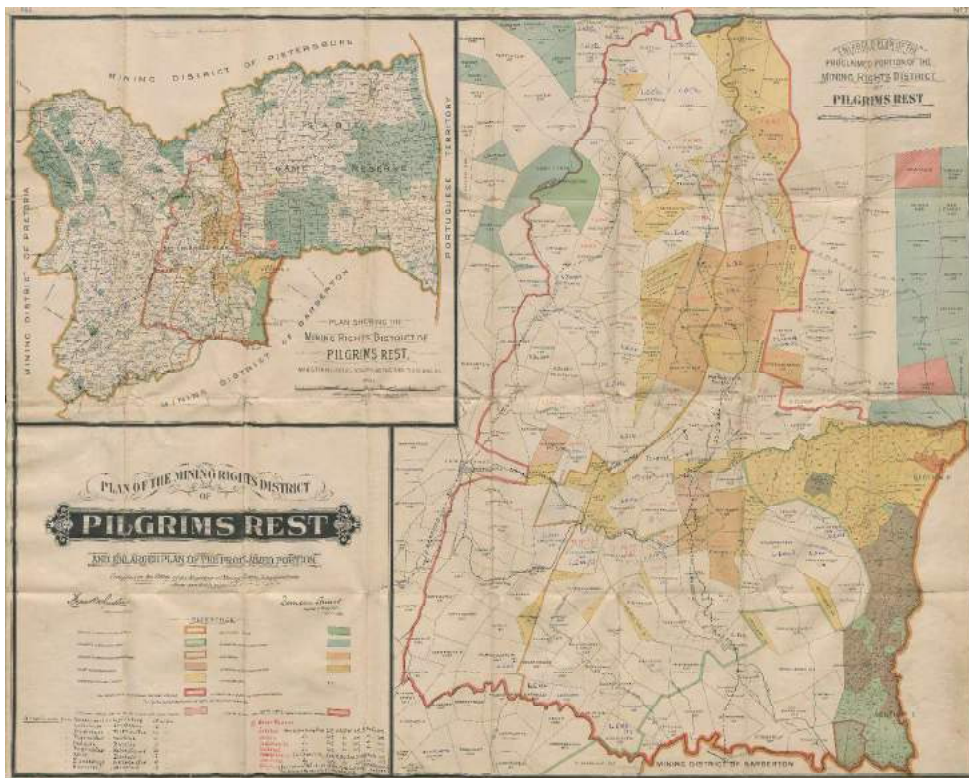


Figure 5-9: "Plan of the Mining Rights District Pilgrim's Rest" compiled by Stuart in 1906.



## 5.2 The Baseline Palaeontological Landscape

- Refer to Butler, E. 2022. *Palaeontological Impact Assessment for the proposed TGME mining project in Mpumalanga*. Banzai Environmental.

The proposed TMGE mining development in Mpumalanga is depicted on the 1:250 000 Pilgrim's Rest 2430 (1986) Geological map (Council of Geoscience, Pretoria). This map indicates that the mining site is underlain by small areas of Quaternary alluvium and scree (Q-yellow), diabase (Vdi-green) and sediments of the Timeball Hill Formation (Vt) (Pretoria Group, Transvaal Supergroup) as well as the Malmani Subgroup (Vmd) (Chuniespoort Group, Transvaal Supergroup) (Figure 3). According to the PalaeoMap of South African Heritage Resources Information System the Palaeontological Sensitivity of the Quaternary superficial sediments is low but locally High, the diabase is igneous in origin and has an insignificant Palaeontological Sensitivity while that of the Timeball Hill Formation is High and the Palaeontological Sensitivity of the Malmani Subgroup (Transvaal Supergroup) is Very High (Almond and Pether 2008, SAHRIS website).

Small patches of Quaternary sediments (alluvium and scree) are present in different areas of development (Figure 3). The Quaternary superficial deposits are the youngest geological deposits formed during the most recent geological period (approximately 2.6 million years ago to present). The rocks and sediments are found at or near the Earth's surface. Most of the superficial deposits are unconsolidated sediments and consist of clay, gravel, sand, silt, that form relatively thin, discontinuous patches of sediments. These sediments comprise of channel, floodplain and stream deposits, talus gravels and glacial drift sediments. The Quaternary deposits are very important due to the palaeoclimatic changes that are reflected in the different geological formations (Hunter et al., 2006). Most geomorphologic features in southern Africa were formed during the Cenozoic climate fluctuations (Maud, 2012). Barnosky (2005) indicated that various warming and cooling events occurred in the Cenozoic. These changes, especially those during the last 1.8 Ma, were the most drastic ever being both drier and wetter than the present and caused changes in river flow patterns, sedimentation processes and vegetation variation (Tooth et al., 2004).

Quaternary alluvium (present in the development) may contain fossils assemblages, but these are generally rare, low in diversity and occur over a wide-ranging geographic area. These fossil assemblages may in some cases occur in extensive alluvial and colluvial deposits cut by dongas. In the past palaeontologists did not focus on Caenozoic superficial deposits although they sometimes comprise of significant fossil deposits. These fossil assemblages resemble modern animals and may comprise of mammalian teeth, bones and horn corns, reptile skeletons and fragments of ostrich eggs. Microfossils, non-marine mollusc shells are also known from Quaternary deposits. Plant material such as foliage, wood, pollens, and peats are recovered as well as trace fossils like vertebrate tracks, burrows, termitaria (termite heaps/ mounds) and rhizoliths (root casts).

The diabase is igneous rocks and are thus considered to have no palaeontological significance. However, the existence of the diabase rocks would have had a thermal metamorphic effect on the adjoining Timeball Hill Formation and would decrease the chance of the fossil preservation in this formation. The Transvaal Supergroup overlays the Archaean basement as well as the Witwatersrand and Ventersdorp Supergroups. The Precambrian Transvaal Supergroup is approximately 2550-2050 Ma years old (Bekker, et al. 2008; Catuneanu, et al 1999) (Late Archaean to Early Proterozoic) and is about 15 km thick. This Supergroup consists of sedimentary, volcanic and unmetamorphosed clastic rocks. The Timeball Hill Formation is known to contain stromatolites and are associated with thin carbonate interbeds within turbidite sequences in the lower part of the formation (Catuneanu & Eriksson 2002). Stromatolites have not been recorded from the overlying fluvio-deltaic Klapperkop Quartzite Member. Other subunits in the Pretoria Group containing stromatolites possibly also contain organic-walled microfossils. Stromatolites are layered mounds, columns and sheet-like sedimentary rocks. These structures were originally formed by the growth of layer upon layer

of cyanobacteria, a single-celled photosynthesizing microbe. Cyanobacteria are prokaryotic cells (simplest form of modern carbon-bases life). Stromatolites are first found in Precambrian rocks and are known as the earliest known fossils. The oxygen atmosphere that we depend on was generated by numerous cyanobacteria photosynthesizing during the Archaean and Proterozoic Era.

The Malmani Subgroup platform carbonates of the Transvaal Basin comprise of an assortment of stromatolites (microbial laminites), ranging from supratidal mats to intertidal columns and large subtidal domes (Eriksson et al. 2006). This Subgroup is approximately 2 km-thick and consists of a series of formations of stromatolitic and oolitic carbonates (limestones and dolomites), minor secondary cherts and black carbonaceous shales. Stromatolites and oolites from the Transvaal Supergroup have been described by various authors (Eriksson and Altermann, 1998). Detailed descriptions of South African Archaean stromatolites are available in the literature (Altermann, 1995; Altermann 2001; Buick, 2001; and Schopf, 2006). Periodic palaeoplacer gold was mined from the Black Reef Formation in the past (e.g., Söhnge, 1986). Meyer, (1988) studied the Sabi-Pilgrim's Rest goldfield in Mpumalanga Province and found that they had produced almost 185 Mt ore at an average grade of c. 8 g/t.

### 5.3 The Baseline Visual / Cultural Landscape

- Refer to Erwee, S. 2022. *Visual Impact Assessment for the proposed MR83 underground (ug) targets near Pilgrim's Rest, Mpumalanga province. Scientific Aquatic Services (SAS).*

In terms of the Visual Landscape (Erwee, 2022), it was noted that the project areas are located within a semi-rural and rural (Frankfort Area) mountainous area, with gentle to steep undulating terrain, which form distinguishing topographical features in the form of prominent hills, outcrops and steep cliffs that are interspersed with thicketed valleys where the Blyde River, streams (Peach Tree Stream) and ephemeral drainage lines are situated. The topography of the area is considered an important ecotourism attraction as tourists traveling on the scenic routes and passes within the area have a pleasant viewing experience. The visual receptors present within a 5 km radius comprise the town of Pilgrim's Rest, farmers, and several nature reserves of which the Mount Sheba Private Nature Reserve (NR) and its hiking trails are of importance due to the Lost City Hiking Trail having a clear line of sight towards the Beta North and Dukes Areas. Furthermore, the R533, Vaalhoek Road and several gravel roads are present within the vicinity of the PROJECT Areas. Permanent residents of the town of Pilgrim's Rest, hikers and people camping in the Mount Sheba Private NR are considered high sensitive receptors. People at their place of work are considered low sensitive receptors, as they are likely to focus on the activities at hand and not the surrounding environment. Motorists and tourists traveling on the scenic roads are considered moderate to highly sensitive receptors, since tourists' attention are focused towards the panoramic scenic landscape. Visual observations of the Project Areas along the R533 however requires knowledge of the exact locations thereof, as such motorists will not directly observe the proposed mining activities in the landscape. Since the town of Pilgrim's Rest is a popular tourist destination for both local and international tourists, these tourist attractions (Pilgrim's Rest, God's Window etc.) are considered exceptionally high sensitive receptor areas. Historic mining infrastructure such as old mine shafts, waste rock dumps and TSFs are present in the area, forming part of the heritage and tourism attraction of the area. No active mining is taking place within the Project Areas, and the existing TGME metallurgical plant, offices and TSF at the Beta Area are still in use and will form part of the operational activities of the proposed project. However historic mining activities have taken place in the Project Areas, which resulted in visual scarring of the terrain. The Visual Absorption Capacity (VAC) of the area is considered high, indicating that the proposed project will be absorbed in the area, resulting in a moderate to low visual intrusion on the surrounding area. The vast mountainous terrain is the main contributing factor of the VAC, since the hills and mountains are blending, making it difficult to observe distinguishing features within the landscape, from significant distances. Additionally, the indigenous forests, commercial plantations and woodlands in the surrounding areas as well as tree lines along the roads, further assist in screening the proposed mining activities from sensitive receptors. The landscape quality of the Project is considered high.

The entire town of Pilgrim's Rest was declared a National Monument in 1986 as a living memory of the early gold rush days in South Africa during the late 1800s / early 1900s. The uniqueness of this historic village is evident in its museums and historic sites, offering the visitor a view into the past, and capturing the spirit of a bygone era of artisanal mining. Additionally, the mountainous terrain forms part of the natural beauty and panoramic scenery of the greater region. The Municipality Spatial Development Framework identifies Pilgrim's Rest and the surrounding area as a protected provincial heritage site and an important tourism node within its area of jurisdiction (SDP, 2007), which is richly imbued with a diversity of natural, cultural and historic gems. Thaba Chweu Local Municipality further hosts numerous events throughout the year that attracts both local residents and visitors to the area including the Long Tom Marathon, Subaru/Ashburton Sabie Classic Mountain Bike race and Sabie Forest Fair (Thaba Chweu, 2016). Given the mountainous terrain, the vast landscape is appealing to one's visual senses, which may fill the observer with a sense of calmness, tranquillity and wellbeing. As such this landscape offers a sense of place which can be described as calm, tranquil and peaceful and being one with nature. The lighting environment associated with the Project Areas is considered intrinsically dark, while taking the larger region into consideration, the area is considered rural with low district brightness, due to the TGME offices and town of Pilgrim's Rest being sources of night time lighting and contributing to sky glow. The proposed project is expected to contribute to the effects of sky glow and artificial lighting in the region, particularly as a result of stationary lighting sources

## **6 RESULTS: ARCHAEOLOGICAL SURVEY**

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### **6.1 The nature of heritage resources in the TGME area**

The TGME mining and project areas revealed some of the types and ranges of heritage resources outlined the National Heritage Resources Act (N0 25 of 1999). These resources included rock art, heritage remains associated with gold mining during the last 130 years, historical villages and settlements, individual historical period houses / structures, historical period features such as telephone lines, power lines and tram track lines and burial sites. For the purposes of this study, general descriptions of heritage resources in the baseline environment are provided but only heritage features directly affected by proposed mining developed are detailed. It should be noted that in many instances historical adits were used by TGME to continue with modern mining operations and many of these portals are today yet again extensively worked by illegal miners. This superimposition of contemporary and more recent mining works on older (historical) workings has been a common occurrence in the Pilgrims Rest gold fields since the discovery of gold 130 years ago.

As noted in previous sections, Pilgrim's Rest and its surrounds have been well documented in terms of its archaeology and history and this assessment particularly drew on a number of Cultural Resources Management (CRM) projects and research projects conducted for TGME Fourie (2008), Henning (1981), Pistorius (2005), Reinders, Mason & Van Wyk (2007), Van Wyk-Rowe (2003), Fourie (2008) and Van Schalkwyk (2019). All of these projects added significantly to a better understanding of the heritage landscape in question.

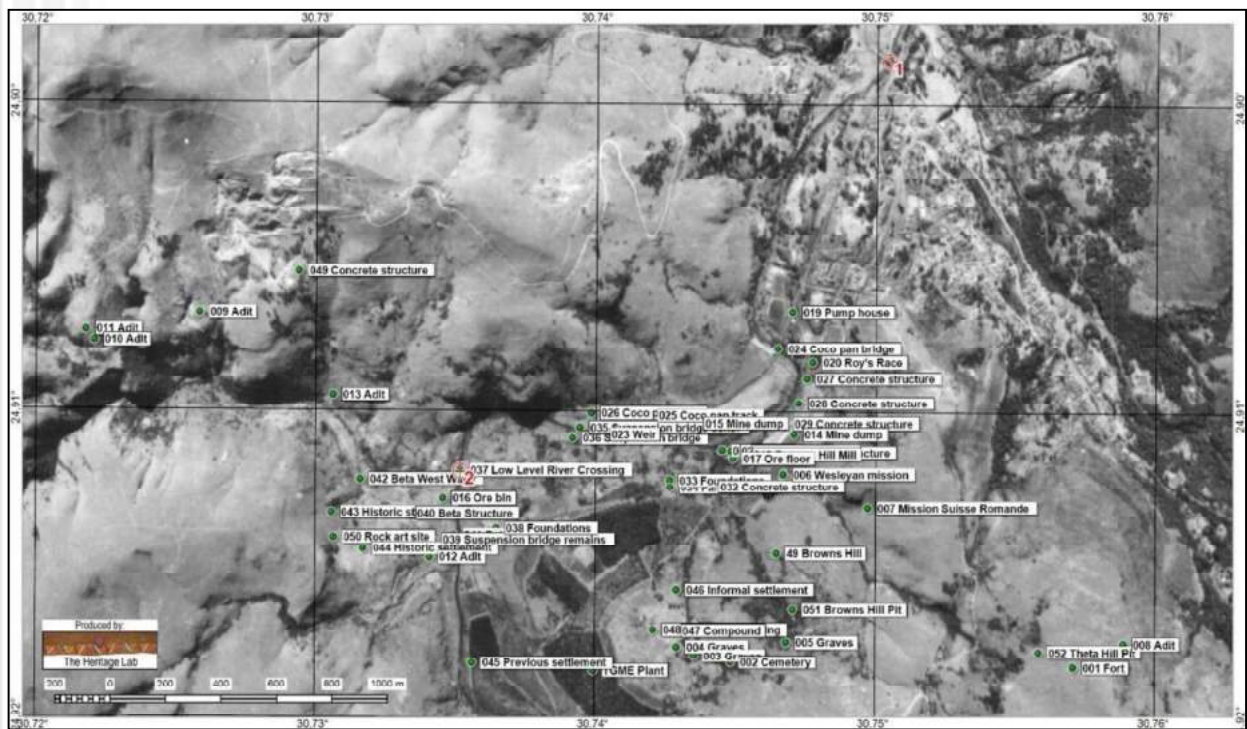


Figure 6-1: Map of sites documented by Van Schalkwyk at the Beta Mine in 2019.

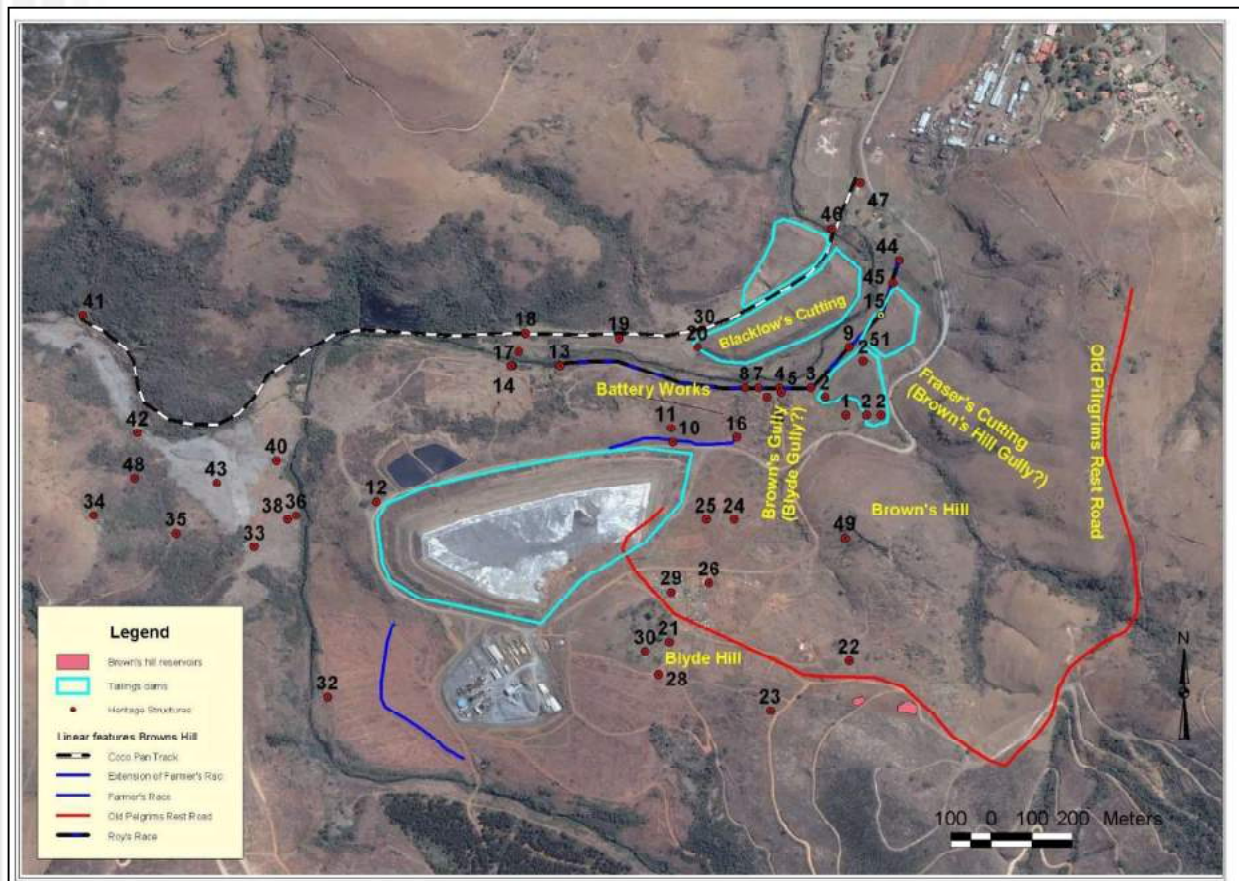


Figure 6-2: Map of sites documented by Fourie (PGS) at the Beta Mine in 2008.



## 6.2 The Archaeological Site Survey

### 6.2.1 The Beta North Mining Area

#### The Site Baseline Heritage Environment:

Pilgrim's Rest and its surroundings have a long and extensive Historical mining and human settlement history. According to Fowler (1968), the Beta Mine was one of the first producing mines in the area working almost uninterrupted, with only a few minor breaks, until 1967. The fortunes of the mine varied between exceedingly rich, with grades of well over an ounce per ton near the outcrop, to a narrow pinching reef at deeper levels. The Mine was one of the first mines started by the Transvaal Gold Exploration and Land Company. A.L. Neale wrote in a report in 1910 that Beta was worked out after 19 years. It was however, the longest functioning mine in the Pilgrim's Rest area, and apart from interruptions, it functioned from 1890 to 1971. During 1957, TGME wanted to liquidate due to the poor yield from other mines, and only Beta kept them going. By 1967 Beta was worked out but a state subsidy kept it alive for another three years. The mine finally closed down in June 1971. North west of Beta, lay Beta North or "New Mine". The farm Ponieskrans 543KT, on which the mine was established, is a declared provincial heritage site in totality holding Stone Age and vast mining heritage features across much of the farm. Amongst the features is a rock art site located against the face of a cliff, high up on one of the mountains within the historical Beta Mining area. The painting site is associated with a cave with several small entrances which bear evidence of Late Iron Age occupation. Christine Rowe indicates that the painting belongs to the "Late Whites" category which is commonly attributed to Northern Sotho-speakers. Further to this, a number of other heritage features such as a fort, a number of cemeteries and graves, a pump house, a cocopan bridge, concrete and foundation structures, settlement remains and a recent occupation area occur around the project area. Mining heritage resources near TGME's current workings consist of a number of adits along the foot of the mountain associated with stone walls and terraces. Two graves were relocated from areas within the project areas in recent years and all of these features will not be impacted directly by the proposed Beta North Mining.

In a report by Coston (1981) many complete and intact structures in good condition are described and a plan to restore the Beta workings to a condition in which it could be used as a site museum was in submitted. This did not however materialize, due to the demolition of the structures by the TGME after 1986 when mining operations resumed. Much of the Beta North mining areas have been destroyed by illegal mining in recent years.



Figure 6-3: View of the dilapidated mining infrastructure in the Beta Mine area.



Figure 6-4: View an informal cemetery in the Beta Mining area.



Figure 6-5: View an informal cemetery in the Beta Mining area (courtesy of Christine Rowe).



Figure 6-6: View of the dilapidated remains of the Historical tram line/cocopan line and power line posts in the Beta Mining area.



Figure 6-7: View of trenches and spill heaps as a result of illegal mining in the Beta Mining area.

The following sites may be affected by the proposed mining activities:

<b>Site</b>	<b>NH-TGME-2430DC-01</b>	
<b>Coordinates</b>	S24.9094644	E30.7E3055718
<b>50K Map Series</b>	2430DC	
<b>Type</b>	Historical / Extant Adit	
<b>Field Rating:</b>	Generally Protected A	
<b>NHRA Category</b>	<b><i>Structures older than 60 years - Section 34</i></b>	

An existing adit occurs along the foot of a mountain on Ponieskrans 543KT within the project area. A number of stone terraces occur around the adit where the slope has been stabilized in former years. According to Pistorius (2005) other historical mining features such as the ruins of a power house, a tipping bay and a concrete structure occurred here as part of the historical Beta mining operations. However, these features have been destroyed where most of this area has been excavated and dug up by illegal miners. The adit has been in used in recent years and is currently being used as an access to underground mining areas by illegal miners. It is a common occurrence in this area that newer mining infrastructure replace older mining heritage sites where mining continues but the site holds significance in terms of its association with historical mining in the area and it is rated moderate significance and graded as Generally Protected A. The site is situated within areas proposed for mining development and the mitigation of direct and indirect impacts to the site will be a requirement.





Figure 6-8: View of Historical / Extant Adit in the Beta North Mining Area.

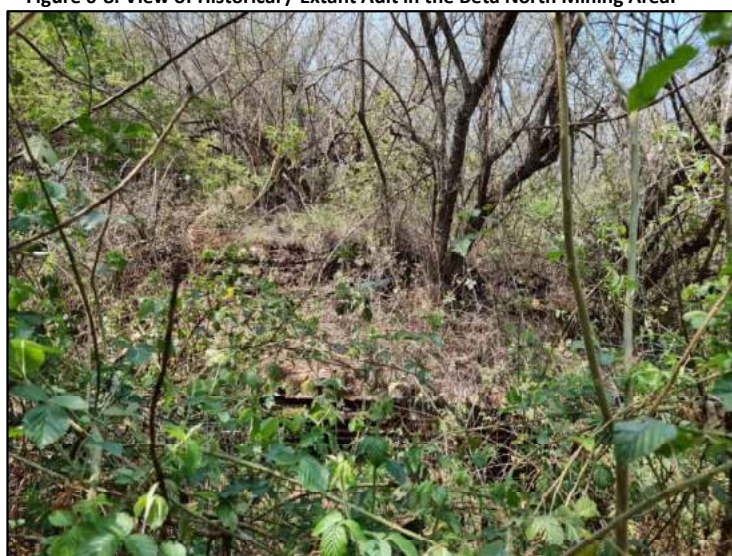


Figure 6-9: View of stone terracing supporting the Historical / Extant Adit in the Beta North Mining Area.

<b>Site</b>	NH-TGME-2430DC-02	
<b>Coordinates</b>	S24.91218324	E30.73162034
<b>50K Map Series</b>	2430DC	
<b>Type</b>	Historical / Extant drainage shaft	
<b>Field Rating:</b>	Generally Protected A	
<b>NHRA Category</b>	<i>Structures older than 60 years - Section 34</i>	

The so-called Beta West shaft was used for draining the water, which was pumped out of the mine into Peach Tree Creek. The entrance to the shaft is supported by wooden beams and an apparent iron access door has been removed. Drainage pipes at the entrance are intact. The site might hold significance in terms of its association with historical mining in the area and it is rated moderate significance and graded as Generally Protected A. The site is situated within areas proposed for mining development and the mitigation of direct and indirect impacts to the site will be a requirement.



Figure 6-10: View of a Historical / extant drainage shaft in the Beta North Mining Area

<b>Site</b>	<b>NH-TGME-2430DC-03</b>
<b>Coordinates</b>	S24.91138905      E30.73157986
<b>50K Map Series</b>	2430DC
<b>Type</b>	Historical Period Mining Site
<b>Field Rating:</b>	<b><i>Provincial Significance Grade 2</i></b>
<b>NHRA Category</b>	<b><i>Structures older than 60 years - Section 34</i></b>

The partial remains of a tram line / cocopan line occurs near the old Beta North mine works next to the site access road. The line runs along a small tributary of the Blyde River along the foot of a mountain towards the central reduction works. Large sections of the tracks have been removed and undercut by illegal mining and excavations and the occurrence is in poor state of preservation. The rail track is nonetheless considered to be of high heritage significance and graded as Provincial Significance Grade 2. The site is situated within areas proposed for mining development and the mitigation of direct and indirect impacts to the site will be a requirement.



Figure 6-11: View of the partial remains of a Historical tram line / cocopan line in the Beta North Mining Area.





Figure 6-12: View of Historical tram line / cocopan lines protruding from a mine heap in the Beta North Mining Area (Pistorius 2005).



Figure 6-13: A historical image of the Historical tram line / cocopan line and power lines in the project landscape.

Site	NH-TGME-2430DC-04
Coordinates	S24.91226438      E30.73193139
50K Map Series	2430DC
Type	Historical Period Mining Site
Field Rating:	<i>Provincial Significance Grade 2</i>
NHRA Category	<i>Structures older than 60 years - Section 34</i>

The partial remains of a concrete water furrow occurs near the old Beta North mine works next to the site access road. The furrow line runs along a small tributary of the Blyde River along the foot of a mountain. The furrow has been destroyed in places by illegal mining and excavations and the occurrence is in poor state of preservation. The feature is nonetheless considered to be of high heritage significance and graded as Provincial Significance Grade 2. The site is situated within areas proposed for mining development and the mitigation of direct and indirect impacts to the site will be a requirement.



Figure 6-14: View of the partial remains of a Historical concrete water furrow in the Beta North Mining Area.

<b>Site</b>	<b>NH-TGME-2430DC-05</b>	
<b>Coordinates</b>	S24.91334388	E30.73328256
<b>50K Map Series</b>	2430DC	
<b>Type</b>	Historical Period Mining Site	
<b>Field Rating:</b>	<b>3. High Significance</b>	
<b>NHRA Category</b>	<b>Structures older than 60 years - Section 34</b>	

The remains of a concrete structure occur near the ore bin in the Beta North area. The structure can possibly be associated with historic mining activity in this area. As such, the site holds significance in terms of its association with historical mining in the area and it is rated moderate significance and graded as Generally Protected A. The site is situated within areas proposed for mining development and the mitigation of direct and indirect impacts to the site will be a requirement.

<b>Site</b>	<b>NH-TGME-2430DC-06</b>	
<b>Coordinates</b>	S24.91421836	E30.7341956
<b>50K Map Series</b>	2430DC	
<b>Type</b>	Historical Period Mining Site	
<b>Field Rating:</b>	<b>3. High Significance</b>	
<b>NHRA Category</b>	<b>Structures older than 60 years - Section 34</b>	

The remains of a suspension bridge over the Blyde River occur in close proximity of the project area. The bridge was used by pedestrians to cross the river to access the mining areas. A concrete base and some cabling remain but the site is generally poorly preserved. The site might hold significance in terms of its association with historical mining in the area and it is rated moderate significance and graded as Generally Protected A. The site is situated within areas proposed for mining development and the mitigation of direct and indirect impacts to the site will be a requirement.



Figure 6-15: View of the remains of a Historical suspension bridge in the Beta North Mining Area (PGS 2008).

Site	NH-TGME-2430DC-07	
Coordinates	S24.91383615	E30.73648151
50K Map Series	2430DC	
Type	Historical Period Mining Site	
Field Rating:	<b>3. High Significance</b>	
NHRA Category	<b>Structures older than 60 years - Section 34</b>	

The remains of a concrete structure occur the main Beta mine in the project area North area. The structure and foundations can possibly be associated with historic mining activity in this area. As such, the site holds significance in terms of its association with historical mining in the area and it is rated moderate significance and graded as Generally Protected A. The site is situated within areas proposed for mining development and the mitigation of direct and indirect impacts to the site will be a requirement.



Figure 6-16: View of a Historical concrete structure in the Beta North Mining Area.



<b>Site</b>	<b>NH-TGME-2430DC-08</b>	
<b>Coordinates</b>	S24.91240494	E30.74267188
<b>50K Map Series</b>	2430DC	
<b>Type</b>	Historical Period Mining Site	
<b>Field Rating:</b>	<b><i>Provincial Significance Grade 2</i></b>	
<b>NHRA Category</b>	<b><i>Structures older than 60 years - Section 34</i></b>	

The old Farmer’s Race occurs extends south and east around the current TGME mine offices and the current slimes dam partially covers a section of the feature. A race is an open channel for conveying water and it can be a simple earth ditch, or lined with timber or metal, or a masonry structure, and often incorporated flumes to cross declivities and maintain a constant fall. The Farmer’s Race was built in 1884 by the Transvaal Gold Exploration and Land Company to supply water to the hydro-electric power station at Brown’s Hill. It was 4.5 kms in length, 1800 mm wide and 1200mm deep. It was lined with metal plates screwed together. Fragmentary metal plates remain in the landscape around the project area and the occurrence is in poor state of preservation. The feature is nonetheless considered to be of high heritage significance and graded as Provincial Significance Grade 2. The site is situated within areas proposed for mining development and the mitigation of direct and indirect impacts to the site will be a requirement.



Figure 6-17: View of a section of the old Farmer’s Race in the Beta North Mining Area (PGS 2008).

<b>Site</b>	<b>NH-TGME-2430DC-09</b>	
<b>Coordinates</b>	S24.91189616	E30.73512783
<b>50K Map Series</b>	2430DC	
<b>Type</b>	Historical Period Mining Site	
<b>Field Rating:</b>	<b><i>3. High Significance</i></b>	
<b>NHRA Category</b>	<b><i>Structures older than 60 years - Section 34</i></b>	

A concrete low-level bridge connects the main Beta mine with the Beta North mining area. The feather can possibly be associated with historic mining activity in this area. As such, the site might hold significance in terms of its association with historical mining in the area and it is rated moderate significance and graded as Generally Protected A. The site is situated within areas proposed for mining development and the mitigation of direct and indirect impacts to the site will be a requirement.



## 6.2.2 The Frankfort Mining Area

### The Site Baseline Heritage Environment:

A number of heritage sites and features were recorded around the Frankfort Mining Area. These include mining heritage remains associated with gold mining, a number of cemeteries and graves, concrete and foundation structures, mining settlement remains and the remains of individual historical period houses. In addition, at least fourteen to fifteen mine adits are scattered at various altitudes along the slope of a mountain in the Frankfort area. These adits may be associated with the workings of the TGME from the 1880s to the 1930s and not all are accessible where some have collapsed while others were closed (rehabilitated) as a measure of safety. Several of these adits are overgrown with dense vegetation. The remains of a complete historical mine with associated workings occurs in the area. Here, an elaborate stone and concrete canal feeding a water wheel and stamping battery existed near a historical period pioneer dwelling but the site was vandalized and largely destroyed in recent years. Other remains at the site consist of trenches, pat holes and stone walls which are all located on several terraces against one of the large mountains on this farm. At least two historical villages occur in the landscape around the Frankfort Mining Area. According to Pistorius (2005) the historical village on Frankfort 509KT is associated with at least eighteen dwellings that were built with stone walls on terraces along the northern slope of the Mankolehlotlo Mountain. The homesteads in the village straggle along the lower slope of the mountain and follow the main dirt road and the Molototse River that enters the farm from the east. Individual homesteads were constructed with stone walls and with mortar and others were plastered with mud. At least two historical houses occur on Frankfort 509KT. These structures are the remains of the mine manager residence and the ruin of a pioneer dwelling. The mine manager residence was used when TGME was active on Frankfort 509KT during the 1930s to the 1960s but is severely vandalized and in a state of disrepair. The second structure is the remains of a typical Pilgrims Rest dwelling dating from the early 20<sup>th</sup> century. Its walls would have consisted out of corrugated iron and fitted with a pitched corrugated iron roof. The house has been destroyed in recent years and the site in a ruined state of preservation. A series of telephone poles dating back several decades occur along the lower foot slope of the Mankolehlotlo Mountain on Frankfort 509KT. This feature has historical significance but will not be affected by TGME's proposed developmental activities. At least two informal graveyards are known to exist on Frankfort 509KT but it will not be impacted on by the proposed developmental activities.



Figure 6-18: View of the remains of the mine manager's house near the Frankfort Mining Area.



Figure 6-19: An archive photo of the mine manager's house dating to 2005 (Pistorius).



Figure 6-20: The ruined remains of a pioneer house near the Frankfort Mining Area.



Figure 6-21: An archive photo of the pioneer house dating to 2005 (Pistorius).





Figure 6-22: The ruined remains of a water wheel and stamping battery near the Frankfort Mining Area.



Figure 6-23: An archive photo of the water wheel and stamping battery dating to 2005 (Pistorius).



Figure 6-24: An aerial view of the contemporary Frankfort adit (courtesy of Christine Rowe).



Figure 6-25: View of the remains of a dwelling in a historical mine settlement near the Frankfort Mining Area.



Figure 6-26: Early image of a historical mine settlement near the Frankfort Mining Area (courtesy of the Pilgrim's Rest Museum).



Figure 6-27: View of cemetery near the Frankfort Mining Area.



The following sites may be affected by the proposed mining activities:

<b>Site</b>	<b>NH-TGME-2430DC-10</b>	
<b>Coordinates</b>	S24.80798168	E30.73723462
<b>50K Map Series</b>	2430DC	
<b>Type</b>	Historical Period Mining Site	
<b>Field Rating:</b>	<b><i>Provincial Significance Grade 2</i></b>	
<b>NHRA Category</b>	<b><i>Structures older than 60 years - Section 34</i></b>	

The poorly preserved remains of a MET plant building occur within the Frankfort Project area. The structure is approximately three stories high and it consists of dilapidated stone and concrete walls, floors and foundations. The building would have been covered with a corrugated iron roof and a section of cocopan track connected the structure to the mining area. The structure was built against the steep slope of the mountain. The feature has largely been destroyed in places by illegal mining and excavations and the occurrence is in poor state of preservation. The site is nonetheless considered to be of high heritage significance and graded as Provincial Significance Grade 2. The site is situated within areas proposed for mining development and the mitigation of direct and indirect impacts to the site will be a requirement.



**Figure 6-28: View of the dilapidated remains of a MET plant in the Frankfort Mining Area.**



**Figure 6-29: View of the dilapidated remains of a MET plant in the Frankfort Mining Area at NH-TGME-2430DC-10.**





Figure 6-30: Archive image of the MET plant in the Frankfort Mining Area in former years (courtesy of Christine Rowe).



Figure 6-31: Aerial view of the MET plant in the Frankfort Mining Area in former years (courtesy of Christine Rowe).

Site	NH-TGME-2430DC-11	
Coordinates	S24.80160624	E30.73392478
50K Map Series	2430DC	
Type	Historical Period Mining Site	
Field Rating:	<b>3. High Significance</b>	
NHRA Category	<i>Structures older than 60 years - Section 34</i>	

The remains of a possible suspension bridge or pulley system occurs in close proximity of the existing Frankfort Mine adit in the project area in a deep valley. Here, a stone support structure as well as cabling suspended on a large tree remain. The site is generally poorly preserved but it might hold significance in terms of its association with historical mining in the area and it is rated moderate significance and graded as Generally Protected A. The site is situated within areas proposed for mining development and the mitigation of direct and indirect impacts to the site will be a requirement.



Figure 6-32: View of a stone support structure at NH-TGME-2430DC-11.



Figure 6-33: View of a pulley system suspended to a tree at NH-TGME-2430DC-11.

### 6.2.3 The CDM Mining Area

#### The Site Baseline Heritage Environment:

Heritage sites and features occur around the CDM Mining Area and can be associated with the Dukes Hill and Clewer Mines which undermine Pilgrims Rest Hill. Historical workings consisting of lines for tramlines, rock waste dumps and stone walls occur along the length of a mountains leading to Upper and Lower Duke Mines. In addition, a number of cemeteries and graves, concrete and foundation structures and mining settlement remains. The remains of a historical village on Morgenzon 525KT have partly been affected by the dirt road running to the former TGME offices. A number of mine adits are scattered at various altitudes along the slope of a mountain in the area. These adits may be associated with the workings of the TGME from the 1880's to the 1930's and not all are accessible where some have collapsed while others were closed (rehabilitated) as a measure of safety. At least two graveyards and a single grave were recorded on Morgenzon 525KT. According to Fowler (1968), the main adits of these mines were located at the foot of picturesque high cliff faces. The workings developed southwards and merged with those of Peach Tree Mine, which in turn mines outcrops in the Peach Tree Creek. Mining on the outcrops around Clewer dates back to the earliest days where the Clewer Mill was erected at around 1880 and numerous other small mills operated in the area at the time, many of which were destroyed in past decades.





Figure 6-34: View of the dilapidated mining infrastructure in the CDM Mining Area at the Lower Dukes mine.



Figure 6-35: The former TGME offices in the CDM Mining Area at the Morgenzon mine.



Figure 6-36: View of a burial site near the CDM Mining Area at the Morgenzon mine.

The following sites may be affected by the proposed mining activities:

<b>Site</b>	<b>NH-TGME-2430DC-12</b>	
<b>Coordinates</b>	S24.88738856	E30.72903293
<b>50K Map Series</b>	2430DC	
<b>Type</b>	Historical Period Ruins	
<b>Field Rating:</b>	<b>Provincial Significance Grade 2</b>	

The partial remains of a tram line / cocopan line occurs near the Lower Duke mine works. The line runs along the hill contour where the tracks have been constructed in an embankment which is still visible. The tracks have largely been removed and the occurrence is in poor state of preservation. The rail track is nonetheless considered to be of high heritage significance and graded as Provincial Significance Grade 2. The site is situated within areas proposed for mining development and the mitigation of direct and indirect impacts to the site will be a requirement.



Figure 6-37: A distant view of the Historical tram line / cocopan line in the CDM Mining Area at the Lower Dukes mine.

<b>Site</b>	<b>NH-TGME-2430DC-13</b>	
<b>Coordinates</b>	S24.88777312	E30.72660604
<b>50K Map Series</b>	2430DC	
<b>Type</b>	Historical Period Mining Site	
<b>Field Rating:</b>	Generally Protected A	
<b>NHRA Category</b>	<b>Structures older than 60 years - Section 34</b>	

A large stormwater concrete water channel occurs at the lower Dukes adit along the slope of the adjacent hill. The channel, which directs water away from the adit and the mining area, remains intact and in a fair state of preservation. The feature probably dates to later mining periods at Dukes during the 1960's but it nonetheless considered to be of heritage significance and graded as Generally Protected A. The site is situated within areas proposed for mining development and the mitigation of direct and indirect impacts to the site will be a requirement.





Figure 6-38: View of a stormwater channel in the CDM Mining Area at the Lower Dukes mine.

Site	NH-TGME-2430DC-14	
Coordinates	S24.88826497	E30.72639582
50K Map Series	2430DC	
Type	Historical Period Mining Site	
Field Rating:	Generally Protected A	
NHRA Category	<i>Structures older than 60 years - Section 34</i>	

A possible historical adit (or ventilation shaft) with associated supporting stone walls and terraces occur around the Lower Dukes adit along the lower slope of a mountain. The adit has collapsed and only a small section of the entrance is visible. The adit nonetheless being used as an access to underground mining areas by illegal miners. The feature it is rated moderate significance and graded as Generally Protected A. The site is situated within areas proposed for mining development and the mitigation of direct and indirect impacts to the site will be a requirement.



Figure 6-39: View of a collapsed Historical Adit in the CDM Mining Area at the Lower Dukes mine.

<b>Site</b>	<b>NH-TGME-2430DC-15</b>	
<b>Coordinates</b>	S24.8882716	E30.7260934
<b>50K Map Series</b>	2430DC	
<b>Type</b>	Historical / Extant Adit	
<b>Field Rating:</b>	<b>3. High Significance</b>	
<b>NHRA Category</b>	<b>Structures older than 60 years - Section 34</b>	

The existing Lower Dukes adit occurs along the foot of a mountain within the project area. According to Pistorius (2005) other historical mining features such as the ruins of a power house, a tipping bay and a concrete structure occurred here as part of the historical Dukes mining operations. However, these features have been destroyed where most of this area has been excavated and dug up by illegal miners. The adit has been in used in recent years and is currently being used extensively as an access to underground mining areas by illegal miners. The site might be significant in terms of its association with historical mining in the area and it is rated moderate significance and graded as Generally Protected A. The site is situated within areas proposed for mining development and the mitigation of direct and indirect impacts to the site will be a requirement.



Figure 6-40: View of the extant Lower Dukes mine adit.

<b>Site</b>	<b>NH-TGME-2430DC-16</b>	
<b>Coordinates</b>	S24.88504498	E30.72539829
<b>50K Map Series</b>	2430DC	
<b>Type</b>	Historical Adit	
<b>Field Rating:</b>	<b>Provincial Significance Grade 2</b>	
<b>NHRA Category</b>	<b>Structures older than 60 years - Section 34</b>	

Another possible historical adit (or ventilation shaft) with associated supporting metal grid, stone walls and terraces occur around the Upper Dukes adit along the lower slope of a mountain. The adit has collapsed and only a small section of the entrance is visible. The adit nonetheless being used as an access to underground mining areas by illegal miners. The feature it is rated moderate significance and graded as Provincial Significance Grade 2. The site is situated within areas proposed for mining development and the mitigation of direct and indirect impacts to the site will be a requirement.





Figure 6-41: View of a collapsed Historical Adit in the CDM Mining Area at the Upper Dukes mine.

Site	NH-TGME-2430DC-17	
Coordinates	S24.87579061	E30.72431015
50K Map Series	2430DC	
Type	Historical / Extant Adit	
Field Rating:	<i>Provincial Significance Grade 2</i>	
NHRA Category	<i>Structures older than 60 years - Section 34</i>	

The existing Morgenzon / Clewer adit occurs along the foot of a mountain within the project area. The site is characterized by an adit with a concrete entrance flanked by elaborate stone wall. A ventilation shaft partially covered with stones and a well-preserved section of stone walling occurs at the site. The adit has been in used in recent years and is currently being used extensively as an access to underground mining areas by illegal miners. The site might be significant in terms of its association with historical mining in the area and it is rated moderate significance and graded as Provincial Significance Grade 2. The site is situated within areas proposed for mining development and the mitigation of direct and indirect impacts to the site will be a requirement.



Figure 6-42: View of the extant Morgenzon/ Clewer adit. Note stone wall structures stabilizing the surrounding mountain slopes.



Figure 6-43: View of a stone wall feature at the extant Morgenzon/ Clewer adit.



Figure 6-44: View of a ventilation shaft at the Morgenzon/ Clewer adit.

Site	NH-TGME-2430DC-018	
Coordinates	S24.87549028	E30.72402382
50K Map Series	2430DC	
Type	Historical Adit	
Field Rating:	<i>Provincial Significance Grade 2</i>	
NHRA Category	<i>Structures older than 60 years - Section 34</i>	

Another possible historical adit with associated supporting metal grid (which has been removed), elaborate stone walls and terraces at the entrance occur around the Morgenzon / Clewer adit along the lower slope of a mountain. The adit and the stone terracing and walling have collapsed around the entrance where access trenches have been dug by illegal miners. The feature it is rated moderate significance and graded as Provincial Significance Grade 2. The site is situated within areas proposed for mining development and the mitigation of direct and indirect impacts to the site will be a requirement.





Figure 6-45: View of a partially collapsed adit in the CDM Mining Area at the extant Morgenzon Mine.

Site	NH-TGME-2430DC-19	
Coordinates	S24.87365289	E30.72676638
50K Map Series	2430DC	
Type	Burial Site	
Field Rating:	<b>3. High Significance</b>	
NHRA Category	<i>Graves, Cemeteries and Burial Grounds - Section 36</i>	

An informal burial site occurs at the former TGME Morgenzon / Clewer offices next to the parking area. The site contains an unknown number of graves and it is indicated by stones, one of which is painted with a yellow cross marking. The site is of high significance, it is situated within areas proposed for mining development and the mitigation of direct and indirect impacts to the site will be essential.



Figure 6-46: View of a burial site in the CDM Mining Area.



**Figure 6-47: View of the burial site in the CDM Mining Area. Note the occurrence of the painted stone marker.**



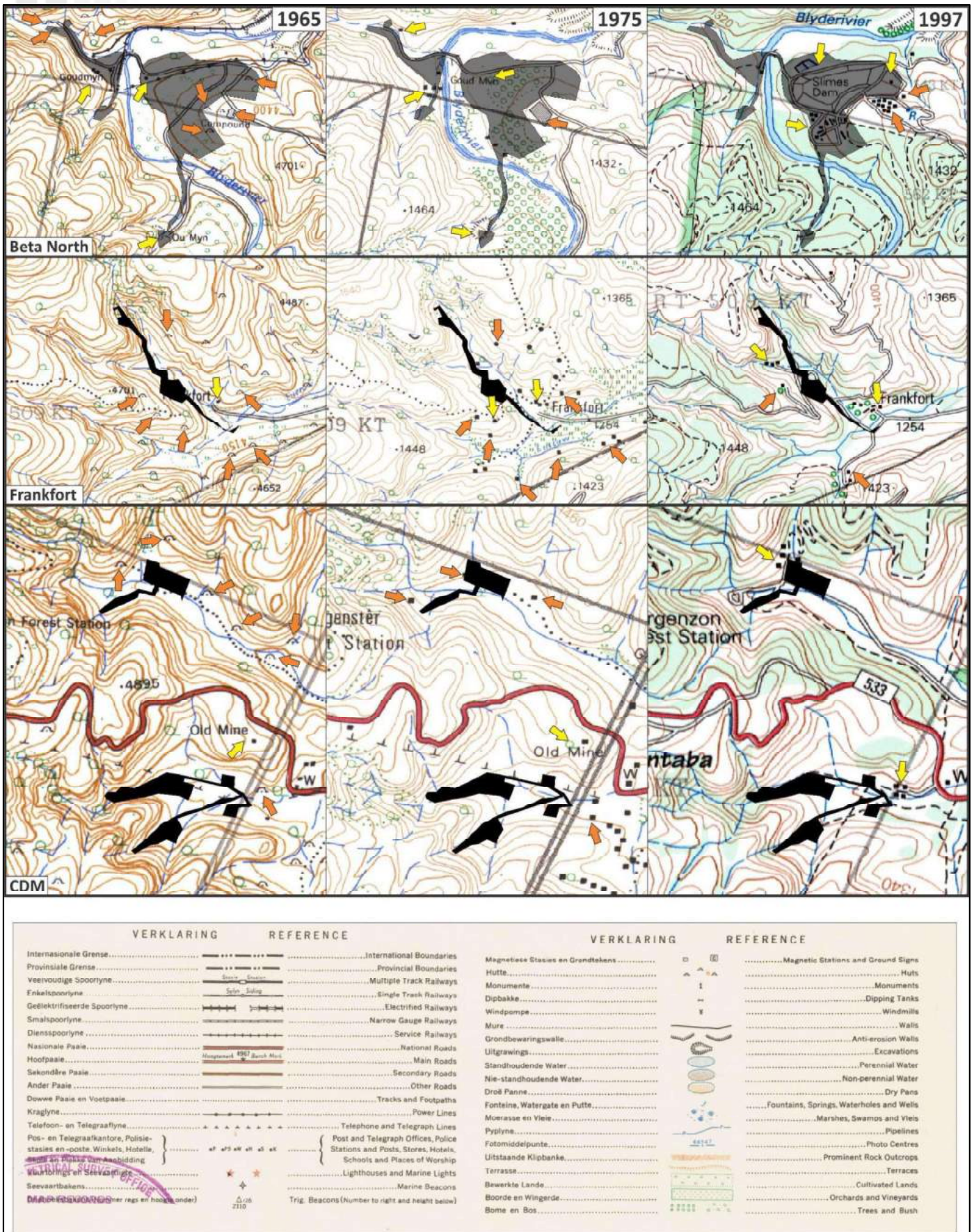


Figure 6-48: Historical topographic maps of the project area indicating the location of the project areas (black fill) in the past decades. Human settlements are indicated by orange arrows and yellow arrows indicated mining infrastructure.



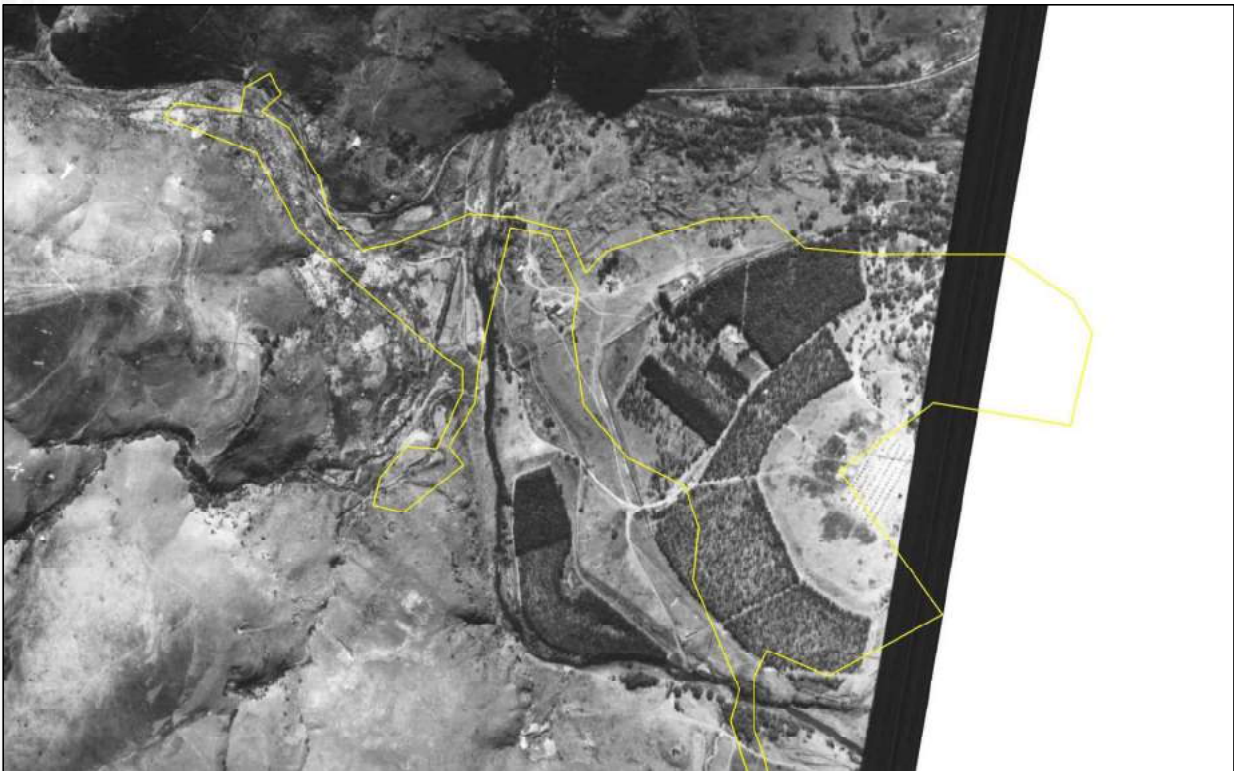


Figure 6-49: A historical aerial image of the Beta North Mining Area project site dating to 1938 (yellow outline). Note the presence of mines, dumps and infrastructure across the landscape.



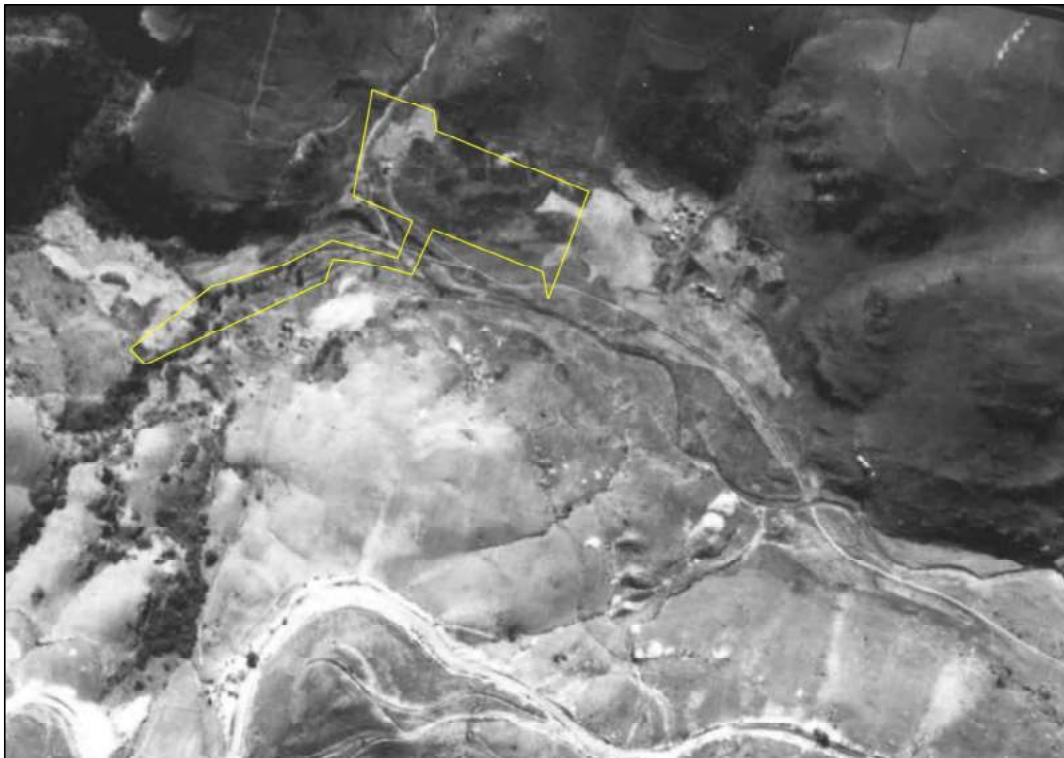


Figure 6-50: A historical aerial image of the CDM Mining Area at the Morgenzon/Clewer Mine dating to 1938 (yellow outline). Note the presence of settlements and infrastructure east of the mine.

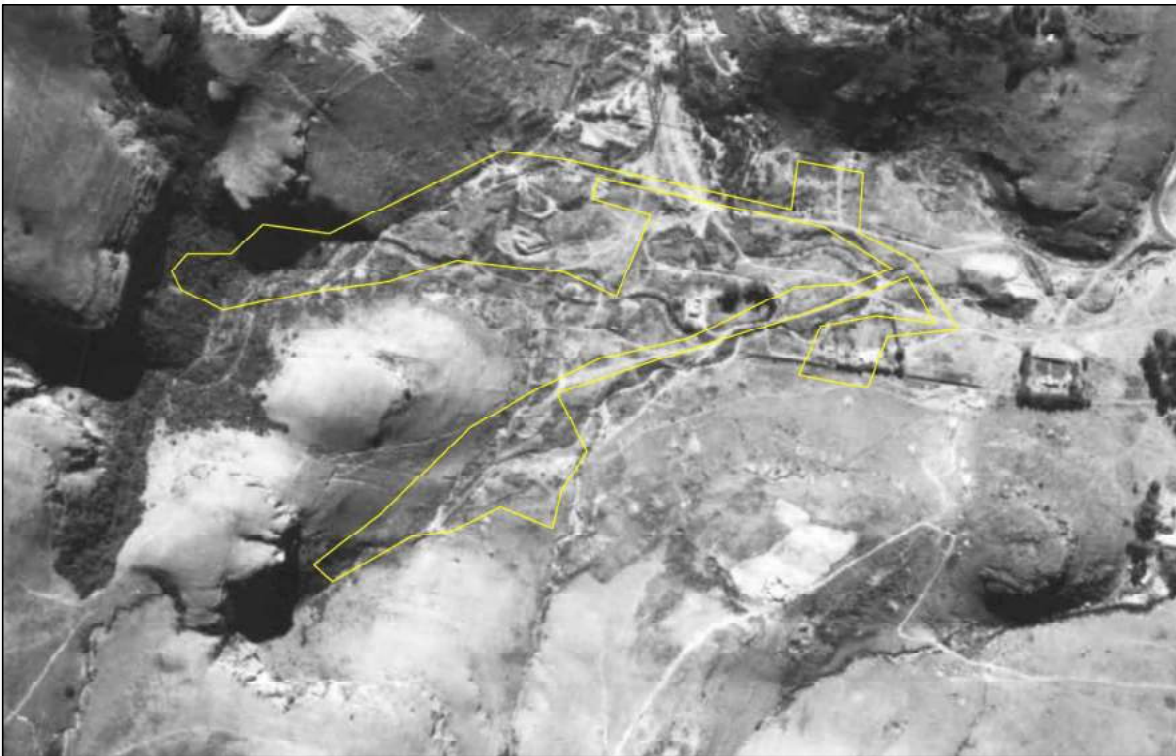


Figure 6-51: A historical aerial image of the CDM Mining Area at the Dukes operations dating to 1938 (yellow outline). Note the presence of mines, dumps and infrastructure across the landscape.

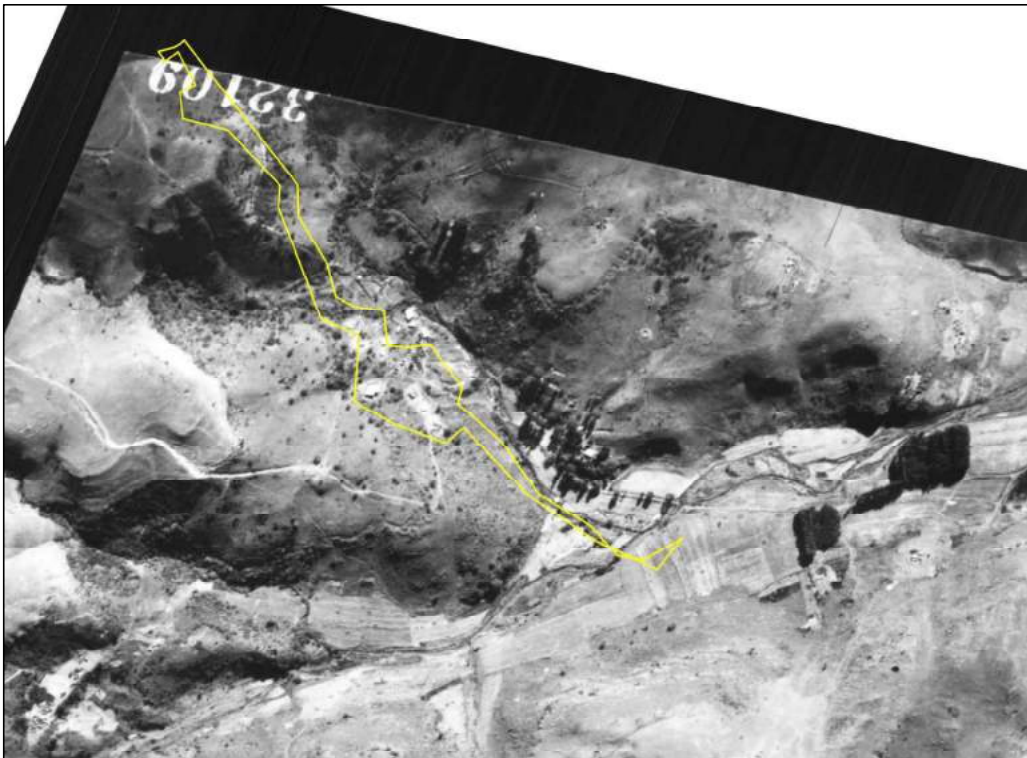


Figure 6-52: A historical aerial image of the Frankfort Mining Area project site dating to 1938 (yellow outline). Note the presence of farmlands and infrastructure in the landscape.

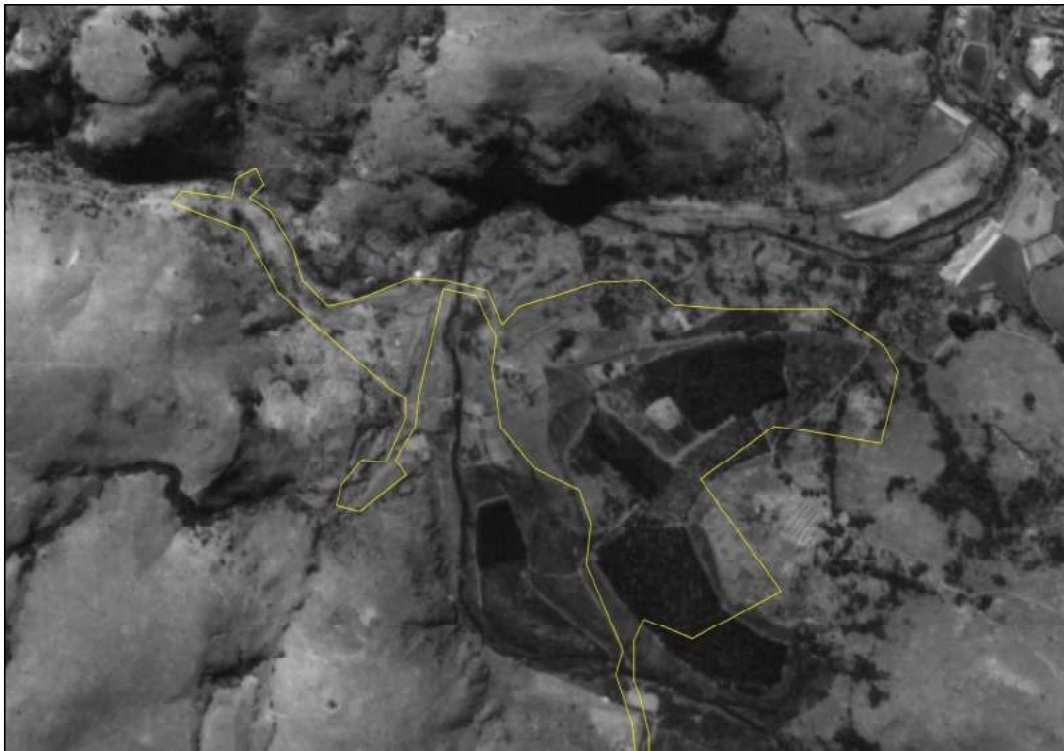


Figure 6-53: A historical aerial image of the Beta North Mining Area project site dating to 1954 (yellow outline). Note the presence of mines, dumps and infrastructure across the landscape.



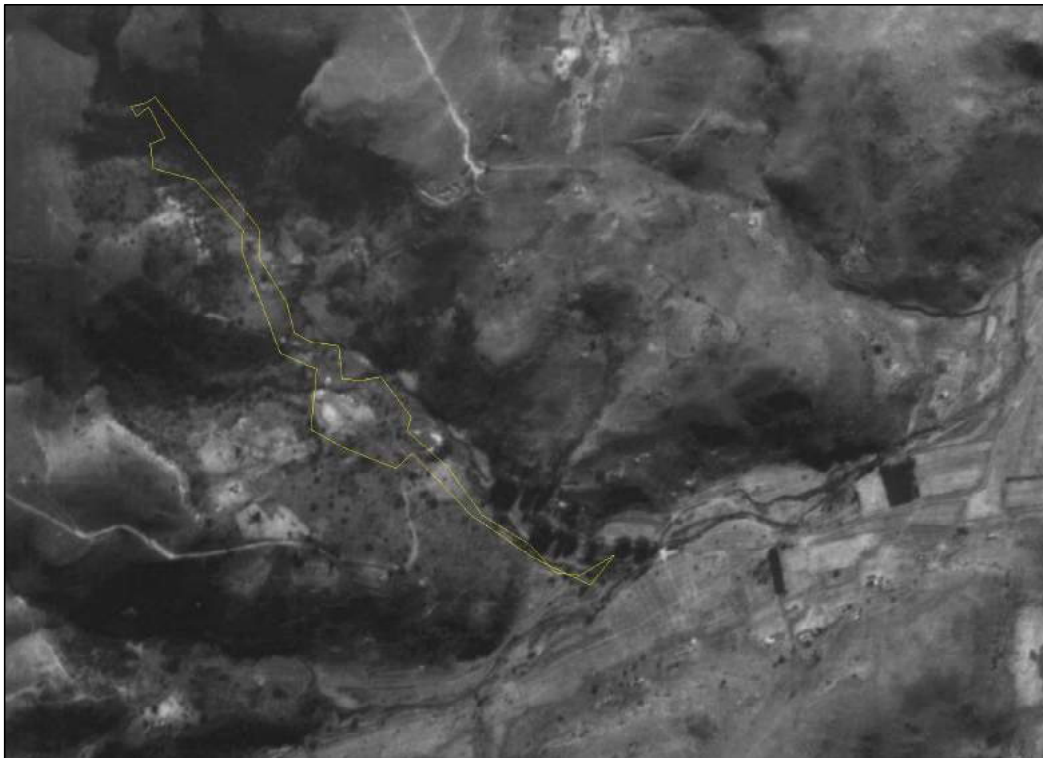


Figure 6-54: A historical aerial image of the Frankfort Mining Area project site dating to 1954 (yellow outline). Note the presence of farmlands, mining and infrastructure in the landscape.

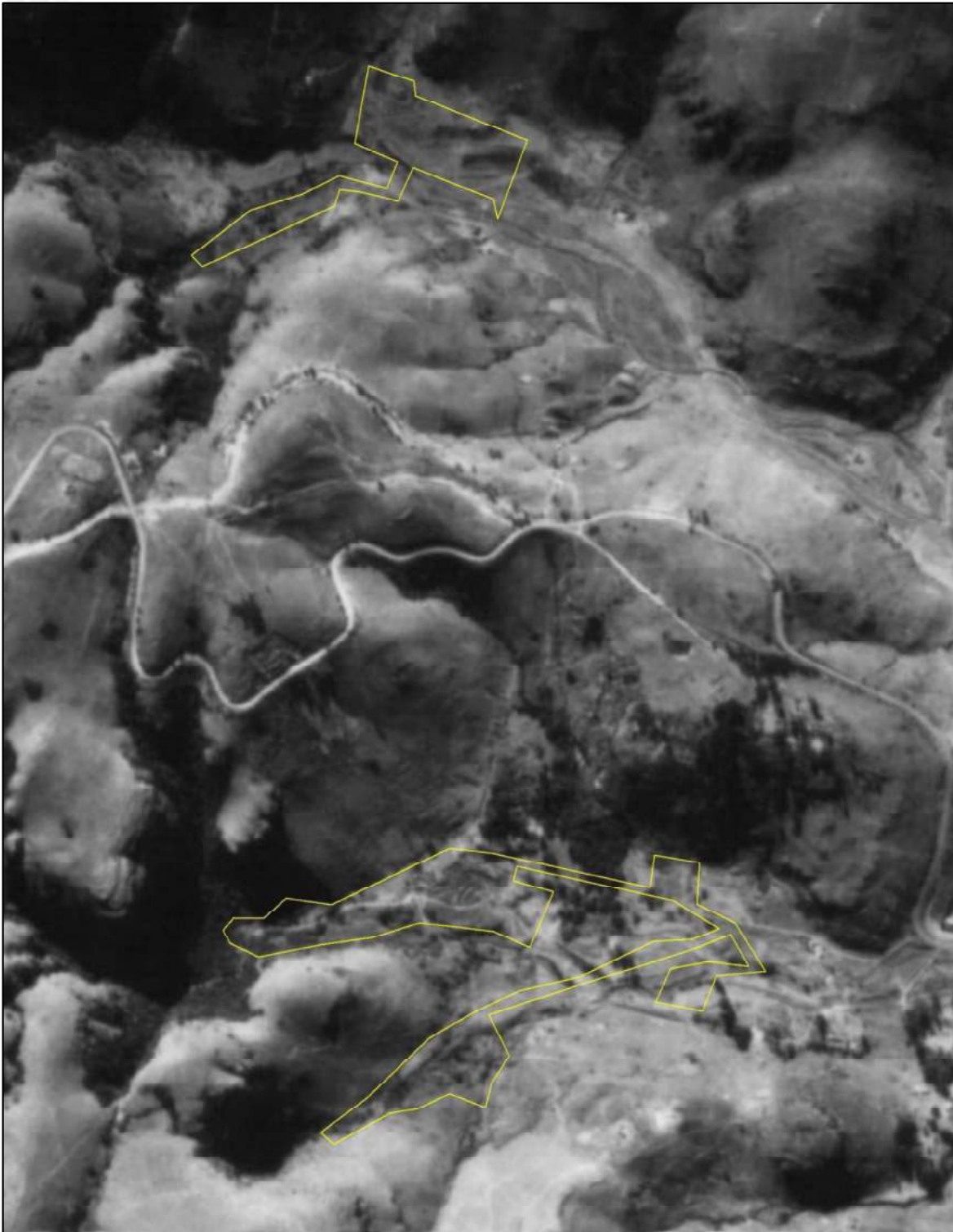


Figure 6-55: A historical aerial image of the CDM Mining Area dating to 1954 (yellow outline). Note the presence of settlements, mines, dumps and infrastructure across the landscape.

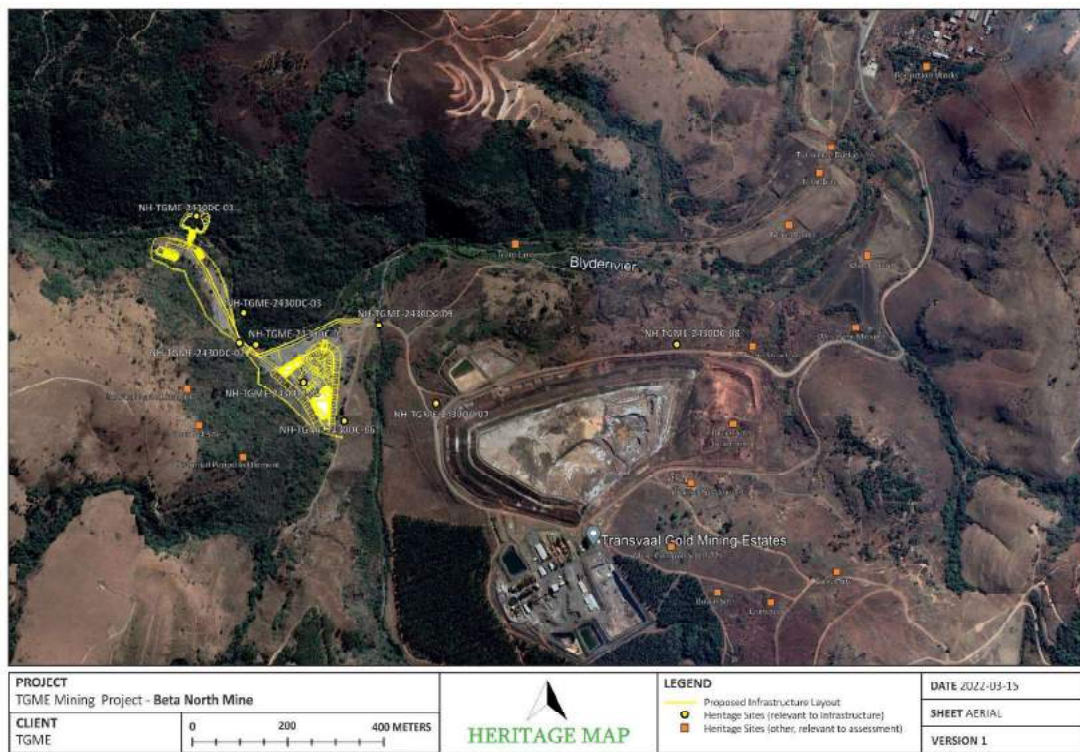


Figure 6-56: Aerial map indicating the heritage sites in the Beta North Mining Area discussed in the text.





Figure 6-57: Aerial map indicating the heritage sites in the Frankfort Mining Area discussed in the text.





Figure 6-58: Aerial map indicating the heritage sites in the CDM Mining Area discussed in the text.

## 7 IMPACT PREDICTION AND RATING

The following section provides a background to the identification and assessment of possible impacts and alternatives, as well as a range of risk situations and scenarios commonly associated with heritage resources management. A guideline for the rating of impacts and recommendation of management actions for areas of heritage potential within the study area is supplied in Section 10.2 of Addendum 3.

### 7.1 General assessment of impacts on resources<sup>2</sup>

Generally, the value and significance of archaeological and other heritage sites might be impacted on by any activity that would result immediately or in the future in the destruction, damage, excavation, alteration, removal or collection from its original position, of any archaeological material or object (as indicated in the National Heritage Resources Act (No 25 of 1999)). Thus, the destructive impacts that are possible in terms of heritage resources would tend to be direct, once-off events occurring during the initial construction period. However, in the long run, the proximity of operations in any given area could result in secondary indirect impacts. The EIA process therefore specifies impact assessment criteria which can be utilized from the perspective of a heritage specialist study which elucidates the overall extent of impacts.

#### 7.1.1 Direct, indirect and cumulative effects

**Direct or primary effects** on heritage resources occur at the same time and in the same space as the activity, e.g., loss of historical fabric through demolition work. **Indirect effects or secondary effects** on heritage resources occur later in time or at a different place from the causal activity, or as a result of a complex pathway, e.g. restriction of access to a heritage resource resulting in the gradual erosion of its significance, which is dependent on ritual patterns of access (refer to Section 10.3 in the Addendum for an outline of the relationship between the significance of a heritage context, the intensity of development and the significance of heritage impacts to be expected).

### 7.2 Direct Impact Rating Criteria

#### 7.2.1 Extent

Local	extend only as far as the footprint of the proposed activity/development
Site	Impact extends beyond the site footprint to immediate surrounds
Regional	within which development takes place, i.e. farm, suburb, town, community
National	Impact is on a national level

#### 7.2.2 Duration

Short term	The impact will disappear with through mitigation or through natural processes
Medium term	The impact will last up to the end of the phases, where after it will be negated
Long term	impact will persist indefinitely, possibly beyond the operational life of the activity, either because of natural processes or by human intervention
Permanent	Permanent where mitigation either by natural process or by human intervention will not occur in such a way or in such a time span that the impact can be considered transient

#### 7.2.3 Magnitude severity

Low	where the impact affects the resource in such a way that its heritage value is not affected
Medium	where the affected resource is altered but its heritage value continues to exist albeit in a modified way
High	where heritage value is altered to the extent that it will temporarily or permanently be damaged or destroyed

#### 7.2.4 Probability

Improbable	where the possibility of the impact to materialize is very low either because of design or historic experience;
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<sup>2</sup> Based on: Winter, S. & Baumann, N. 2005. *Guideline for involving heritage specialists in EIA processes: Edition 1.*

Probable	where there is a distinct possibility that the impact will occur
Highly	probable, where it is most likely that the impact will occur; or
Definite	where the impact will definitely occur regardless of any mitigation measures.

### 7.2.5 Impact Significance

Low	negligible effect on heritage – no effect on decision
Medium	where it would have a moderate effect on heritage and – influences the decision
High	high risk of, a big effect on heritage. Impacts of high significance should have a major influence on the decision
Very high	high risk of, an irreversible and possibly irreplaceable impact on heritage – central factor in decision-making

### 7.3 Weighting matrix

Aspect	Description	Weight
<b>Extent</b>		
	Local	1
	Site	2
	Regional	3
<b>Duration</b>		
	Short term	1
	Medium term	3
	Long term	4
	Permanent	5
<b>Magnitude/Severity</b>		
	Low	2
	Medium	6
	High	8
<b>Probability</b>		
	Improbable	1
	Probable	2
	Highly Probable	4
	Definite	5
<b>Significance</b>	<b>Sum (Duration, Scale, Magnitude) x Probability</b>	
Negligible	<20	
Low	<40	
Moderate	<60	
High	>60	

The following table summarizes impacts to sensitive **heritage sites and receptors** within and in close proximity of the project areas.

Aspect affected	Potential Impact	Without or With Mitigation	Nature (Negative or Positive Impact)	Probability		Duration		Scale		Magnitude/ Severity		Significance		Management Measures	Management objective	Mitigation Effect	Potential for residual risk	Compliance with Standards (where applicable)
				Magnitude	Score	Magnitude	Score	Magnitude	Score	Magnitude	Score	Magnitude	Score					
<b>Construction Phase</b>																		
Heritage	Damage/destruction of high significance heritage resources in the Beta North Mining Area, Frankfort Mining Area and CDM Mining Area.	WOM	Negative	Highly Probable	4	Permanent	5	Regional	3	High	8	64	High	Site Management Plan: Compile a heritage Site Management Plan (SMP) detailing a plan of action and measures for the long-term conservation and management of the heritage resource and its historical fabric. Phase 2 Mitigation: Integrated and Legally compliant Phase 2 Study and assessment. Site Monitoring: Strict monitoring (construction and commissioning) by the heritage consultant or an ECO familiar with the heritage occurrences of the sites. Site Declaration Status: Engage the relevant heritage authority (SAHRA, SAHRA Built Environment) in terms of site declaration status as Grade II Provincial Heritage Resources subject to the NHRA 1999 (Section 7). Further Research: Engage with tertiary institutions, academics and relevant specialists to document and further research the Pilgrim's	Mitigate heritage resources, manage and preserve historical fabric of the sites.	May cause irreplaceable loss of resources	No	
		WM	Negative	Definite	5	Permanent	5	Local	1	Low	2	40	Low			Can be avoided, managed or mitigated	No	



		WM	Negative	Probable	2	Short term	1	Local	1	Low	2	8	Negligible	Rest and Penieskrants historical horizon. Site Monitoring: General site monitoring by informed ECO on a bi-weekly basis during construction. Burials - Avoidance: Implement a heritage conservation buffer of at least 100m around the graves / cemetery, redesign the project layouts to avoid the heritage resource and the proposed conservation buffer. Fence all burial places and apply access control. Implement a site management plan detailing strict site management conservation measures. Burials - Site Management Plan: Compile a heritage Site Management Plan (SMP) detailing a plan of action and measures for the long-term conservation and management of the heritage resource and its historical fabric. Burials - Grave Relocation: Relocation of burials and documentation of site, full social consultation with affected parties, possible conservation management and protection measures. Subject to authorisations and relevant permitting from heritage authorities and affected parties.	Can be avoided, managed or mitigated	No
Operational Phase																

Heritage	Damage/destruction of high significance heritage resources in the Beta North Mining Area, Frankfort Mining Area and CDM Mining Area.	WOM	Negative	Highly Probable	4	Permanent	5	Regional	3	High	8	64	High	Site Management Plan: Implement heritage Site Management Plan (SMP) detailing a plan of action and measures for the long-term conservation and management of the heritage resource and its historical fabric. Phase 2 Mitigation: Integrated and Legally compliant Phase 2 Study and assessment. Site Monitoring: Strict monitoring (construction and commissioning) by the heritage consultant or an ECO familiar with the heritage occurrences of the sites. Further Research: Engage with tertiary institutions, academics and relevant specialists to document and further research the Pilgrim's Rest and Poneskrants historical horizon. Site Monitoring: General site monitoring by informed ECO on a bi-weekly basis during construction. Burials - Avoidance: Implement a heritage conservation buffer of at least 100m around the graves / cemetery, redesign the project layouts to avoid the heritage resource and the proposed conservation buffer. Fence all burial places and apply access control. Implement a site management plan detailing strict site management conservation measures. Burials - Site Management Plan: Implement a heritage Site Management Plan (SMP) detailing a plan of action and measures for the long-term conservation and management of the heritage resource and its historical fabric.	May cause irreplaceable loss of resources	No
		WM	Negative	Probable	2	Long term	4	Regional	3	High	8	30	Low	Mitigate heritage resources, manage and preserve historical fabric of the sites	Can be avoided, managed or mitigated	No
		WM	Negative	Highly Probable	4	Long term	4	Site	2	Low	2	32	Low	Mitigate heritage resources, manage and preserve historical fabric of the sites	Can be avoided, managed or mitigated	No

Closure and Post closure																	
Heritage	Damage/destruction of high significance heritage resources in the Beta North Mining Area, Frankfort Mining Area and CDM Mining Area.	WOM	Negative	Improbable	1	Permanent	5	Regional	3	High	8	16	Negligible	<p>Site Management Plan: Implement heritage Site Management Plan (SMP) detailing a plan of action and measures for the long-term conservation and management of the heritage resource and its historical fabric.</p> <p>Site Monitoring: Strict monitoring (construction and commissioning) by the heritage consultant or an ECO familiar with the heritage occurrences of the sites.</p> <p>Further Research: Engage with tertiary institutions, academics and relevant specialists to document and further research the Pilgrim's Rest and Ponieskrants historical horizon.</p> <p>Burials - Site Monitoring: General site monitoring by informed ECO on a bi-weekly basis during construction.</p> <p>Burials - Avoidance: Implement a heritage conservation buffer of at least 100m around the graves / cemetery, redesign the project layouts to avoid the heritage resource and the proposed conservation buffer.</p> <p>Burials -site Management Plan: Compile a Heritage Site Management Plan (SMP) detailing a plan of action and measures for the long-term conservation and management of the heritage resource and its historical fabric.</p>	Mitigate heritage resources, manage and preserve historical fabric of the sites	Can be avoided, managed or mitigated	No
		WM	Negative	Improbable	1	Long term	4	Site	2	High	8	14	Negligible			Can be avoided, managed or mitigated	No
		WOM	Negative	Improbable	1	Long term	4	Regional	3	Low	2	9	Negligible			Can be avoided, managed or mitigated	No

The following table summarizes impacts to sensitive visual receptors within and in close proximity of the project areas.

Activity	Potential Impact	With/without Migration	Nature (- or + Impact)		Probability		Duration		Scale		Magnitude/Severity		Significance		Management Measures
			Nature	Magnitude	Score	Magnitude	Score	Magnitude	Score	Magnitude	Score	Magnitude	Score		
Site clearing of the project footprint areas associated with the shafts WRDs, RoM Stockpiles, PCDs, DMS Plant, other supporting infrastructure, access roads and associated contractor laydown areas.	<ul style="list-style-type: none"> <li>Further removal of vegetation leading to visual contrast, potential loss of Visual Absorption Capacity of the landscape and visual intrusion on sensitive receptors especially the town of Pilgrim's Rest.</li> <li>Erosion and loss of topsoil leading to visual contrast, and possible loss of Visual Absorption Capacity of the landscape.</li> <li>Construction related earthworks activities resulting in increased dust suspension.</li> <li>Increased vehicular movement in the vicinity of the study area.</li> <li>Yellow construction vehicles visible from the lush green background, increasing the likelihood of motorists observing the proposed construction activities.</li> </ul>	WOM	Negative	Definite	5	Long term	4	Regional	3	Medium	6	55	High	<ul style="list-style-type: none"> <li>It must be ensured that existing vegetation in the vicinity of MR 83 UG Areas is retained during the construction phase to ensure that visual scarring of landscape and vegetation clearing does not occur beyond the mining footprint area.</li> <li>Excavation is to be kept to a minimum and limited to essential areas.</li> <li>Where mining infrastructure is sited within view of visually sensitive areas, vegetation around the mining footprints should be retained to assist in screening. In particular the areas around the WRDs of the Dukes mining activities.</li> <li>Erosion, which may lead to high levels of visual contrast and further detract from the visual environment, must be prevented throughout the lifetime of the project by means of putting soil stabilisation measures in place and concurrent rehabilitation.</li> <li>It must be ensured that topsoil, run of mine stockpiles and WRDs are not steeply sloped, so as to blend in with the undulating terrain.</li> <li>The siles should be kept neat and tidy at all times.</li> <li>The height of structures should be a low as possible, where this can be achieved without increasing the infrastructure footprint.</li> <li>Painting or coating infrastructure components to match darker colours in the natural surroundings may reduce the distance required for effective screening.</li> <li>Visually cluttered material storage yards and laydown areas should be screened through the use of material fencing, which will result in a more unified and tidy appearance.</li> <li>Natural colours should be used in all instances and the use of highly reflective material should be avoided. Any metal surfaces should be painted to fit in with the natural environment in a colour that blends in effectively with the background. White structures are to be avoided as these will contrast significantly with the natural surroundings.</li> <li>The identification of appropriate colours and textures for facility materials should take into account both summer and winter appearance.</li> <li>The use of permanent signs and project construction signs should be minimised and visually unobtrusive.</li> <li>During rehabilitation, the removal of infrastructure, ripping of roads and reshaping of impacted areas should</li> </ul>	
		WOM	Negative	Highly Probable	4	Medium term	3	Regional	3	Medium	6	48	Moderate		



Activity	Potential Impact	Wider/With Mitigation	Nature (+ or - Impact)	Probability		Duration		Scale		Magnitude/Severity		Significance		Management Measures
				Magnitude	Score	Magnitude	Score	Magnitude	Score	Magnitude	Score	Magnitude	Score	
Construction and excavation activities related to the shafts, PCDs, WRDs, RoM Stockpiles and access roads.	<ul style="list-style-type: none"> <li>Excavation during construction of mining infrastructure will lead to visual intrusion and visual exposure of receptors.</li> <li>Mine infrastructure including buildings, stockpiles and dumps being visible and creating contrast with the surrounding landscape.</li> <li>An increase in construction vehicular and human activity in the area, leading to an increase in dust.</li> <li>Excavation resulting in increased dust suspension.</li> <li>Use of security lighting.</li> </ul>	WOM	Negative	Definite	5	Long term	4	Regional	3	Medium	5	65	High	<p style="text-align: center;">take place</p> <ul style="list-style-type: none"> <li>The relevant exposed construction site areas and access roads should be irrigated on a regular basis, with just enough moisture to keep the dust down without creating undue runoff.</li> <li>Construction activities should be restricted to daylight hours as far as possible, in order to limit the need to bright floodlighting and the potential for skyglow.</li> <li>All lights used for illumination (except for lighting associated with security) should be faced inwards and shielded to avoid light escaping above the horizon.</li> <li>Making use of motion detectors on security lighting, at office areas and the maintenance area, ensures that the site will remain in relative darkness, until lighting is required for security and maintenance purposes.</li> </ul>
		WM	Negative	Highly Probable	4	Medium term	3	Site	2	Medium	6	44	Moderate	
On-going mining activities. Increase in trucks on the surrounding roads, transporting the material extracted.	<ul style="list-style-type: none"> <li>Continual stockpiling of material, including the resource, and potentially increasing heights of stockpiles and WRD during operational activities.</li> <li>Generation of dust, leading to visual intrusion, visual exposure of receptors and impacts on the overall landscape character.</li> <li>Additional vehicular traffic</li> </ul>	WOM	Negative	Highly Probable	4	Medium term	3	Site	2	Medium	6	44	Moderate	<ul style="list-style-type: none"> <li>The design and height increase of stockpiles must be monitored to ensure that these components relate to acceptable environmental standards in terms of slope and elevation.</li> <li>All access roads will require effective dust suppression such as regular watering.</li> <li>An effective dust management plan taking into account stockpile and dump areas, as well as access roads must be designed and implemented in order to mitigate the impact of dust on sensitive receptors throughout all mining phases.</li> <li>Vehicle speed on unpaved roads must be reduced to limit dust generation.</li> <li>As far as possible, existing roads are to be utilised, also for construction purposes, to prevent cumulative impacts from roads and traffic.</li> <li>Transport of the mined resource should be optimised as far as possible to limit the number of additional vehicles on local and district roads.</li> <li>A lighting engineer may be consulted to assist in the planning and placement of light fixtures for the mining facility and all ancillary infrastructures in order to reduce visual impacts associated with glare and light</li> </ul>
		WM	Negative	Highly Probable	4	Medium term	3	Site	2	Medium	6	44	Moderate	

Activity	Potential Impact	Without/With Mitigation	Nature (- or + Impact)		Probability		Duration		Scale		Magnitude/Severity		Significance		Management Measures
			Magnitude	Score	Magnitude	Score	Magnitude	Score	Magnitude	Score	Magnitude	Score	Magnitude	Score	
	impacting on the character of the region and leading to visual exposure of receptors further from the MR 83 UG Areas to mining activities. • Night time lighting due to security lighting, adding to the skyglow of the area.	YIM	Negative	Highly Probable	4	Short term	1	Site	2	Medium	6	36	Low	trespass. • As far as possible, operational activities should take place during the daylight hours, in order to limit the use of bright floodlighting and to avoid the use of additional night-time lighting which may add to skyglow. As underground mining activities will take place 24 hours 7 days a week, it must be ensured that up-lighting structures be avoided. • Outdoor lighting must be strictly controlled. • The use of high light masts and high pole top security lighting should be avoided along the periphery of the operations. Any high lighting masts should be covered to reduce sky glow. • Up-lighting of structures must be avoided, with lighting installed at downward angles that provide precisely directed illumination beyond the immediate surrounding of the mining infrastructure, thereby minimising the light spill and trespass. • Care should be taken when selecting luminaries to ensure that appropriate units are chosen and that their location will reduce spill light and glare to a minimum. Only "full cut-off" light fixtures that direct light only below the horizontal must be used on the building. • Censored and motion lighting may be installed at office areas, workshops and other buildings to prevent use of lights when not needed. • Minimum wattage light fixtures should be used, with the minimum intensity necessary to accomplish the light's purpose. • Vehicle-mounted lights or portable light towers are preferred over permanently mounted lighting for night-time maintenance activities. If possible, such lighting should be equipped with hoods or louvers and be aimed toward the ground to avoid causing glare and skyglow (BLM, 2013). • The use of low-pressure sodium lamps, yellow LED lighting, or an equivalent reduces skyglow and wildlife impacts. Bluish-white lighting is more likely to cause glare and attract insects, and is associated with other human physiological issues (BLM, 2013).	

Activity	Potential Impact	Without/With Mitigation		Probability		Duration		Scale		Magnitude/Severity		Significance		Management Measures
		Nature (- or + Impact)	Magnitude	Score	Magnitude	Score	Magnitude	Score	Magnitude	Score	Score	Magnitude		
Demolition of surface infrastructure	<ul style="list-style-type: none"> <li>Removal of infrastructure and general decommissioning and closure activities leading to potential visual intrusion on sensitive receptors.</li> <li>Potential ineffective rehabilitation leading to landscape scarring, permanent visual contrast and a permanent alteration of the landscape character and sense of place within the region.</li> </ul>	WOM	Negative	Highly Probable	4	Medium term	3	Site	2	Medium	6	44	Moderate	<ul style="list-style-type: none"> <li>Decommissioning footprints and disturbed areas should be kept as small as possible and no further vegetation should be cleared or soils exposed for this purpose.</li> <li>All areas where infrastructure is removed must be resloped to and revegetated as soon as possible.</li> <li>Concurrent/ progressive rehabilitation must be implemented and disturbed areas must be rehabilitated as soon as possible and as soon as areas become available by replacing topsoil and revegetating disturbed areas.</li> <li>Indigenous and locally occurring plant species selected for use in re-vegetation should be selected taken quick growth rates into consideration in order to cover bare areas and prevent soil erosion.</li> <li>Upon final rehabilitation, it must be aimed to remove as much surface infrastructure where practically feasible and to reshape the landscape to blend in with the surrounding mountainous terrain.</li> </ul>
		WM	Negative	Highly Probable	4	Medium term	3	Site	2	Low	2	28	Low	

The following table summarizes impacts to sensitive **palaeontological receptors** within and in close proximity of the project areas.

Impact	Probability	Duration	Scale	Significance	Mitigation Effect
Pre-Mitigation	Highly Probable	Permanent	Site	High	
Post-mitigation	Probable	Permanent	Site	Moderate	Can be avoided, managed, or mitigated

#### 7.4 Prediction of Project Impacts and Site Significance

The Pilgrim’s Rest landscape represents the most dramatic visual images of mining where the landscape evokes images of time, place, and historical patterns associated with past mining epochs. Here, the landscape created by mining provide clues to past activity and many historical layers form part of this significant landscape. However, historical landscape and the project area is unfortunately highly compromised with vast site transformation in past decades - and in recent years in particular – evident as a result of the following:

- In this mining landscape, it is a common occurrence that newer mining infrastructure replace older mining heritage sites where mining continues, for example it has been noted that some of TGME's current portals may have been superimposed on old mining adits. An obvious consequence is that historical layering of mine features become intertwined and indistinct which also makes the accurate dating and sequencing of mining remains in the project areas challenging.
- Natural processes such as surface wash, erosion and a change in vegetation have a largely inevitable on heritage features and the heritage landscape.
- Large-scale illegal informal mining activities by so-called “Zamas” in the landscape and areas subject to this assessment have resulted in an almost complete destruction of infrastructure associated with historical and recent mining. This includes heritage resources and features which, until relatively recently, remained in a well-preserved state. In addition, natural resources such as vegetation, geomorphological stability and water courses are also affected by illegal mining which has sterilized large portions of the landscape from heritage remnants.

##### 7.4.1 Archaeology

As noted above, the project area and the baseline environment has been affected by historical, recent and ongoing formal and informal mining activities which has probably sterilized the landscape from prehistorical archaeological remnants. It is unlikely that the project development will impact on archeological sites, features or artefacts.

##### 7.4.2 Built Environment and Cultural Landscape

Historical Period remains of high significance litter the landscape around Pilgrim’s Rest and the Project Areas. Even though many of these sites are poorly preserved, the farm Ponieskrans is a declared Provincial Heritage site and site Mitigation of project impacts will be of vital importance.



### 7.4.3 Graves / Human Burials Sites

In the historical rural areas of the Mpumalanga Province and the Witwatersrand, graves and cemeteries often occur around mining compounds and farmsteads in family burial grounds, but they are also randomly scattered around archaeological and historical settlements. The probability of informal human burials encountered during development should thus not be excluded. In addition, human remains and burials are commonly found close to archaeological sites; they may be found in "lost" graveyards, or occur sporadically anywhere as a result of prehistoric activity, victims of conflict or crime. It is often difficult to detect the presence of archaeological human remains on the landscape as these burials, in most cases, are not marked at the surface. Human remains are usually observed when they are exposed through erosion. In some instances, packed stones or rocks may indicate the presence of informal pre-colonial burials. If any human bones are found during the course of construction work then they should be reported to an archaeologist and work in the immediate vicinity should cease until the appropriate actions have been carried out by the archaeologist. Where human remains are part of a burial, they would need to be exhumed under a permit from either SAHRA (for pre-colonial burials as well as burials later than about AD 1500). Should any unmarked human burials/remains be found during the course of construction, work in the immediate vicinity should cease and the find must immediately be reported to the archaeologist, or the South African Heritage Resources Agency (SAHRA). Under no circumstances may burials be disturbed or removed until such time as necessary statutory procedures required for grave relocation have been met.

### 7.4.4 Palaeontological Landscape

It is highly probable that the impact will occur. The duration of the impact will be permanent. Only the site will be affected by the proposed development. The magnitude of the impact occurring will High. In the absence of mitigation procedures (should fossil material be present within the affected area) the damage or destruction of any palaeontological materials will be permanent and irreversible. The significance of the impact occurring will be High pre-mitigation and moderate post- mitigation. A negative impact on the palaeontological heritage can be reduced by the application of adequate damage mitigation procedures. If mitigation measures are implemented the impact on fossil Heritage could be positive.

### 7.4.5 Visual Receptors

#### - Cumulative Impacts

The Project Areas is located in an area where commercial forestry, historic and existing mining activities, agricultural activities, villages and the town of Pilgrim's Rest are present in the landscape. Cumulative impacts as a result of these land uses results in the loss of the intrinsic value of the natural vegetation associated with the aesthetically pleasing mountainous terrain. Due to the abovementioned land uses, the panoramic landscape can no longer be referred to as unspoilt and natural in terms of vegetation, especially due to the periodic contrast in soil from exposure of bare ground during the logging of plantations. The proposed Project Project has the potential to further contribute to soil contrast, thus affecting the quality and character of the landscape. The cumulative impact of additional traffic on the local and regional roads as well as combined impacts from night-time lighting will also affect the sense of place of the larger region. Furthermore, if all surface infrastructure is not removed post closure and the stripped areas are not shaped and revegetated to a condition similar to the surrounding mountainous landscape, long term impacts on the terrain, landscape character and quality, and sense of place may occur. This is likely to further contribute to cumulative impacts on the visual environment, leading to further loss of the mountainous scenic landscape. It should be noted that the proposed Project Project is a "pilot" project and may be the catalyst for additional gold mining within the greater Pilgrim's Rest area. Thus, whilst the cumulative impacts associated with the proposed Project are not expected to be extensive, the cumulative impacts associated with future mining activities in the greater area, should such projects come to fruition, may have a regional and potentially provincial influence on the receiving visual environment.

- Residual Impacts

Despite the relatively small footprint areas of concern it is possible that after all surface infrastructure have been removed scarring of the terrain may remain present post-closure, especially if the rehabilitated and revegetated areas post decommissioning and closure is not similar to that of the pre-mining environment. The possibility exists that rehabilitation efforts, including revegetation of impacted areas are unsuccessful with residual areas of bare ground, alien vegetation and altered topography, which will lead to a long-term visual impact in the area.

## 7.5 Statement of Site Significance

The TGME Mine Project on the Farms Frankfort 509KT, Krugers Hoop 527KT, Van Der Merwes Reef 526KT, Morgenzon 525KT, Peach Tree 544KT and Ponieskrans 543KT is situated within the larger Pilgrim's Rest heritage landscape which is regarded as highly significant and of National significance. As such, Pilgrim's Rest and the farm Ponieskrans was declared a Provincial Heritage Site in 1986 and an application for World Heritage Site status for the Reduction works was lodged in November 2006 but the site was not declared as such. Ponieskrans is a rich and significant historic landscape with regards to Section 3(3) of the National Heritage Resources Act in particular, as a result of, as follows:

*(a) its importance in the community, or pattern of South Africa's history;*

Within the Pilgrim's Rest landscape, the farm Ponieskrans represents a historic epoch where gold mining introduced a momentous period of world trade, industrial and commercial expansion, and social development. This period was instrumental in attracting thousands immigrant prospectors to the goldfields of South African and the subsequent discovery of gold on the Witwatersrand.

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

The mining and industrial heritage of South Africa has for long been neglected in terms of heritage conservation. The commercial development on historical mining areas such as Barberton, the Witwatersrand and Pilgrim's Rest during the past 50 years has destroyed much remains of early mining activities. Pilgrim's Rest is one of the final localities where the pioneering years of gold mining of the late 1800's are still displayed through heritage structures and landscapes.

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

The rich cultural heritage and heritage structures within the area still holds research interest and can provide valuable information on social, mining and rural development within the framework of the historic and pioneering years of 19<sup>th</sup> century gold mining.

*(d) its importance in demonstrating the principal characteristics of a particular class of South Africa's natural or cultural places or objects;*

Mine developments in the general landscape (such as those at the Beta-North, Frankfort and CDM mines) and their association with the subsequent Pilgrim's Rest town layout demonstrates the evolution of a small mining community over a century, from pioneering years to the subsequent demise of mining activities and social structures. Pilgrim's Rest is also a prime example of the transformation of a historic mining town to a popular heritage tourism destination.

*(f) its importance in demonstrating a high degree of creative or technical achievement at a particular period;*

Mining at Beta-North, Frankfort and CDM mines (and in particular the Reduction Works at the Beta Mine), demonstrates the development of mining activities from primitive panning techniques for placer gold in the Blyde River, the working of alluvial deposits through sluicing, the discovery of gold bearing reefs and the working of the ore through batteries, the use of water races and water wheels, to the development of a reduction works over a period of 20 years.

## 8 RECOMMENDATIONS

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Pilgrim's Rest and its surroundings have a long and extensive Colonial Period settlement history. From around the first half of the 19th century, the area was frequented by explorers and farmers who all contributed to a history of farming, settlement and industrialization. The Pilgrim's Rest landscape represents the most dramatic visual images of mining where the landscape evokes images of time, place, and historical patterns associated with past mining epochs. Here, the landscape created by mining provide clues to past activity and many historical layers form part of this significant landscape. However, historical landscape and the project area is unfortunately highly compromised with vast site transformation in past decades - and in recent years in particular. This assessment attempted to capture as much of the remaining mining heritage in the baseline environment and the project development areas within notable project constraints, including site safety, restricted site movement during surveys, visibility constraints and a rapidly disintegrating heritage horizon. The assessment relied heavily on previously work conducted on the Pilgrim's Rest heritage landscape in order to compliment potential limitations in the study. Cognizant of the above, the following observations and recommendations are made based on sites within the TGME Mining Project areas that risk direct impact from the project activities:

- In the proposed *Beta North Mining Area*, a number of features of significance were noted. These include Historical / extant adits and a Historical / extant drainage shaft (**NH-TGME-2430DC-01** , **NH-TGME-2430DC-02**), the remains of the Historical tram line / cocopan line (**NH-TGME-2430DC-03**), the remains of a Historical concrete water furrow (**NH-TGME-2430DC-04**), Historical suspension bridge remains (**NH-TGME-2430DC-06**), the Historical Farmer's Race remains (**NH-TGME-2430DC-08**), Historical concrete structures (**NH-TGME-2430DC-05**, **NH-TGME-2430DC-07**) and a Historical concrete low-level bridge (**NH-TGME-2430DC-09**). In the proposed *Frankfort Mining Area*, the remains of the Historical MET plant building (**NH-TGME-2430DC-10**) and the remains of a Historical suspension bridge or pulley system (**NH-TGME-2430DC-11**) were noted. In the *CDM Mining Area*, Historical / extant adits (**NH-TGME-2430DC-14**, **NH-TGME-2430DC-15**, **NH-TGME-2430DC-16**, **NH-TGME-2430DC-17**, **NH-TGME-2430DC-18**), the remains of the Historical tram line / cocopan line (**NH-TGME-2430DC-12**) a Historical / contemporary water furrow (**NH-TGME-2430DC-13**) and a burial site (**NH-TGME-2430DC-19**) were noted. In many instances, these features are poorly preserved or destroyed but the sites are nonetheless intrinsically linked to the highly significant Pilgrim's Rest Mining legacy thus bearing high heritage value. In addition, the sites and features are older than 60 years and protected under the National Heritage Resource Act (NHRA 1999). The sites will be directly impacted on by the proposed project where the significance of the impact is essentially high. As the farm Ponieskrans is a declared Provincial Heritage site, retaining and conserving the sites would essentially be required but there remains little to conserve at most of the sites and uncontrolled destruction of the landscape by illegal miners is ongoing. For this reason, it is recommended that a comprehensive research-driven Phase 2 heritage mitigation plan is implemented to include all these sites, informed a robust research framework. The framework should (1) determine the extent of the heritage horizons within the project areas and immediate surroundings, (2) investigate the nature, extent and historical context of mining at each of the project sites, (3) provide a description and interpretation of these mining sites within the context of the Pilgrim's Rest heritage landscape and the Ponieskrans Provincial Heritage Site values, and (4) aim to preserve the historical fabric of the mining legacy at the project areas and in particular, development areas for the purposes of future research in the Pilgrim's Rest landscape. This process should include a detailed desktop assessment, reappraisal of previous publications and a literature study of sources on the Pilgrim's Rest area whereby robust research driven mitigation methodology based on current research themes is formulated. All features should be documented by means of systematic surveys, site mapping

and the complete recording of all heritage resources in the project areas. This heritage mitigation plan should culminate in the publication of research findings. The mitigation plan should be undertaken subject to close liaison with the relevant heritage authorities and the process should include a comprehensive Public Participation and Social Engagement process whereby all relevant stakeholders (SAHRA, MP-PHRA, the SAHRA Built Environment Unit, TGME, Pilgrim's Rest Museum, the Thaba Chweu Municipality and others) are adequately consulted. Finally, destruction permits should be obtained from SAHRA after completion of the Phase 2 Mitigation Plan and prior to the alteration or destruction of heritage remains at the sites.

- For the burial site in the CDM Mining Area (**NH-TGME-2430DC-19**) it is primarily recommended that the burial site be conserved *in situ* and that a conservation buffer of at least 50m be implemented around the heritage receptor. The site should be fenced and an access gate should provide controlled access to the sites. A distance of at least 2m should be maintained between the grave and fence which should be at least 1,5m high. A clear signboard should be erected indicating the heritage sensitivity of the site and contact details for visitation of the graves should be provided. The sites should be monitored on a weekly basis during initial site clearing and earth moving activities by an ECO familiar with the sensitivity of receptors, or the Heritage Consultant in order to detect any impact at the earliest opportunity. Should this measure prove unachievable, the graves should be relocated by a qualified archaeologist, and in accordance with relevant legislation, permitting, statutory permissions and subject to any local and regional provisions and laws and by-laws pertaining to human remains. A full social consultation process should occur in conjunction with the mitigation of cemeteries and burials (see Addendum 1). Generally, it is recommended that the EIA public participation and social consultative process address the possibility of further graves occurring in the project area.
- It is further recommended that TGME engage the relevant heritage authority (SAHRA, SAHRA Built Environment Unit, MP-PHRA) with regards to the impact of the project on the Ponieskrans Provincial Heritage Site and proposed mitigation measures.
- A careful watching brief monitoring process is recommended whereby an informed ECO inspect the construction site on regular basis in order to monitor possible impact on heritage resources. Should any previously undetected paleontological, archaeological or historical material, heritage resources, graves or human remains be exposed during construction activities, the operations in the affected area must be suspended and a qualified archaeologist be contacted for an assessment of the find.

The mining landscape around the project areas holds countless traces of historical mining, settlement and industrial expansion. These include mining heritage remains associated with gold mining, many cemeteries and burial sites, mining settlement remains and the remains of individual historical period pioneer houses. In addition, the hills surrounding Pilgrim's Rest are littered with mine adits, ventilation shafts and underground drainage channels. The following recommendations are made based on the baseline environment around the TGME Mining Project area that risk indirect impact from the project activities:

- As noted above, the mining landscape of Pilgrim's Rest is unique and the proposed project should be planned and executed in such a way as to shield historic landscapes as much as possible from uncontrolled destruction. Here, it is recommended that a **Site Conservation Management Plan** for heritage resources in the baseline be implemented. The plan should be developed in order to manage and conserve heritage resources in the landscape surrounding the project areas during construction and operation of the mines. The plan should include basic training for construction staff on possible heritage finds, chance find procedures and action steps for mitigation measures as well as communication routes to follow in the case of a discovery. It is recommended that key stakeholders such as the Pilgrim's Rest Museum be closely involved in the compilation and implementation of the management plan.



- It would be advisable to conduct regular blast vibration monitoring during the initial stages of mining at the Beta North site to assess potential effects of blasting on the nearby rock art. This measure should include frequent site monitoring by a suitably qualified Rock Art Specialist. Should it be established that the site is deteriorating or the adjacent geological feature is destabilizing due to mining activities the possibility of relocation of the rock art site must be considered and investigated.
- Human burial sites are highly significant and sensitive heritage resources and every measure should be taken to avoid impact on these receptors. It is generally recommended that burial sites be conserved *in situ* and that conservation buffers of at least 50m be implemented around the heritage receptors. Where possible, sites should be fenced and access gates should provide controlled access to the sites. Clear signboards should be erected indicating the heritage sensitivity of the sites and contact details for visitation of the graves should be provided. Cemeteries and graves situated in close proximity of proposed mining developments should be monitored on a frequent basis during initial site clearing and earth moving activities by an ECO familiar with the sensitivity of receptors, or the Heritage Consultant in order to detect any impact at the earliest opportunity. Monthly monitoring of burial sites is recommended during operational stages of the development, the details of which should be stipulated in the Site Conservation Management Plan. The developer should carefully liaise with the heritage specialist and the SAHRA Burial Ground and Graves (BGG) Unit with regards to these recommended management measures.
- It should be stated that it is likely that further undetected archaeological remains might occur elsewhere in the project landscape at archeological sites, along water sources and drainage lines, fountains and pans would often have attracted human activity in the past. Also, since Stone Age material seems to originate from below present soil surfaces in eroded areas, the larger landscape should be regarded as potentially sensitive in terms of possible subsurface deposits. Burials and historically significant structures dating to the Colonial Period occur on farms in the area and these resources should be avoided during all phases of construction and development, including the operational phases of the development.

In terms of the Paleontological Landscape (Butler, 2022), it was concluded that the proposed development will not lead to detrimental impacts on the palaeontological reserves of the area and construction of the development may be authorised in its whole extent. The following recommendations were made for the Palaeontological Landscape:

- The ECO for this project must be informed that the Palaeontological Sensitivity of the Timeball Hill Formation is High while that of the Malmani Subgroup (Transvaal Supergroup) is Very High.
- If Palaeontological Heritage is uncovered during surface clearing and excavations the **Chance find Protocol** attached should be implemented immediately. Fossil discoveries ought to be protected and the ECO/site manager must report to South African Heritage Resources Agency (SAHRA) (Contact details: SAHRA, 111 Harrington Street, Cape Town. PO Box 4637, Cape Town 8000, South Africa. Tel: 021 462 4502. Fax: +27 (0)21 462 4509. Web: [www.sahra.org.za](http://www.sahra.org.za)) so that mitigation (recording and collection) can be carried out.
- Before any fossil material can be collected from the development site the specialist involved would need to apply for a collection permit from SAHRA. Fossil material must be housed in an official collection (museum or university), while all reports and fieldwork should meet the minimum standards for palaeontological impact studies proposed by SAHRA (2012).
- These recommendations should be incorporated into the Environmental Management Plan for the proposed mining Development

In terms of the Visual Landscape (Erwee, 2022), it was noted that the Project will have a moderate visual impact on the receiving environment, even though it is situated within close proximity to the town of Pilgrim's Rest.

With the proposed Project Areas located at the foothills and in disturbed areas, and the mountainous backdrop, the sensitive receptors present is not likely to experience significant visual intrusion. As evident from the viewshed analysis and confirmed during the field assessment, only small portions within the town of Pilgrim's Rest and small stretches along the R533 will observe portions of the proposed mining activities. Night-time lighting as a result of potential 24-hour mining operations will reduce the visibility of starry skies within the intrinsically dark to rural landscape. Should 24-hour mining activities take place, the night-time lighting associated with the Project Areas will have a moderately high impact. With mitigation and management measures implemented, with particular reference to lighting design and placement, and mining activities taking place during the day 06:00 to 18:00 the impact of night-time lighting may result in the impact being reduced to moderately low levels. Should the project be authorised to proceed, it is imperative that all mitigation measures as stipulated in this report be strictly adhered to. Said mitigation measures would need to comprise concurrent rehabilitation throughout the construction and operational phases and effective management of dust generation

## 9 GENERAL COMMENTS AND CONDITIONS

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This HIA report serves to confirm the extent and significance of the heritage landscape of the proposed TGME Mining Project area in terms of the baseline environment as well as area directly affected by the proposed project.

The larger heritage horizon encompasses rich and diverse archaeological landscapes and cognizance should be taken of heritage resources and archaeological material that might be present in surface and sub-surface deposits. If, during construction, any possible archaeological material culture discoveries are made, the operations must be stopped and a qualified archaeologist be contacted for an assessment of the find. Such material culture might include:

- Formal Earlier Stone Age stone tools.
- Formal MSA stone tools.
- Formal LSA stone tools.
- Potsherds
- Iron objects.
- Beads made from ostrich eggshell and glass.
- Ash middens and cattle dung deposits and accumulations.
- Faunal remains.
- Human remains/graves.
- Stone walling or any sub-surface structures.
- Historical glass, tin or ceramics.
- Fossils.

If such sites were to be encountered or impacted by any proposed developments, recommendations contained in this report, as well as endorsement of mitigation measures as set out by MP-PHRA, SAHRA, the National Heritage Resources Act and the CRM section of ASAPA will be required. It must be emphasized that the conclusions and recommendations expressed in this archaeological heritage sensitivity investigation are based on the visibility of archaeological sites/features and may not therefore, represent the area's complete archaeological legacy. Many sites/features may be covered by soil and vegetation and might only be located during sub-surface investigations. If subsurface archaeological deposits, artefacts or skeletal material were to be recovered in the area during construction or operation activities, all activities should be suspended and the archaeological specialist should be notified immediately (*cf. NHRA (Act No. 25 of 1999), Section 36 (6)*). It must also be clear that Archaeological Specialist Reports will be assessed by the relevant heritage resources authority (SAHRA).

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***For this assessment, Me Christine Rowe (TGME) was consulted with regard to the types and ranges of heritage resources which occur in the project area, the location of some of these remains and the identity of some of the mining heritage sites. Her acute knowledge of the local and regional history proved invaluable to this assessment and the author owes her a depth of gratitude.***

## 11 ADDENDUM 1: HERITAGE LEGISLATION BACKGROUND

### 11.1 CRM: Legislation, Conservation and Heritage Management

The broad generic term Cultural Heritage Resources refers to any physical and spiritual property associated with past and present human use or occupation of the environment, cultural activities and history. The term includes sites, structures, places, natural features and material of palaeontological, archaeological, historical, aesthetic, scientific, architectural, religious, symbolic or traditional importance to specific individuals or groups, traditional systems of cultural practice, belief or social interaction.

#### 11.1.1 Legislation regarding archaeology and heritage sites

The South African Heritage Resources Agency (SAHRA) and their provincial offices aim to conserve and control the management, research, alteration and destruction of cultural resources of South Africa. It is therefore vitally important to adhere to heritage resource legislation at all times.

#### d. National Heritage Resources Act No 25 of 1999, section 35

According to the National Heritage Resources Act of 1999 a historical site is any identifiable building or part thereof, marker, milestone, gravestone, landmark or tell older than 60 years. This clause is commonly known as the "60-years clause". Buildings are amongst the most enduring features of human occupation, and this definition therefore includes all buildings older than 60 years, modern architecture as well as ruins, fortifications and Iron Age settlements. "Tell" refers to the evidence of human existence which is no longer above ground level, such as building foundations and buried remains of settlements (including artefacts).

The Act identifies heritage objects as:

- objects recovered from the soil or waters of South Africa including archaeological and palaeontological objects, meteorites and rare geological specimens
- visual art objects
- military objects
- numismatic objects
- objects of cultural and historical significance
- objects to which oral traditions are attached and which are associated with living heritage
- objects of scientific or technological interest
- any other prescribed category

With regards to activities and work on archaeological and heritage sites this Act states that:

*"No person may alter or demolish any structure or part of a structure which is older than 60 years without a permit by the relevant provincial heritage resources authority." (34. [1] 1999:58)*

and

*"No person may, without a permit issued by the responsible heritage resources authority-*

- (d) destroy, damage, excavate, alter, deface or otherwise disturb any archaeological or palaeontological site or any meteorite;*
- (e) destroy, damage, excavate, remove from its original position, collect or own any archaeological or palaeontological material or object or any meteorite;*
- (f) trade in, sell for private gain, export or attempt to export from the Republic any category of archaeological or palaeontological material or object, or any meteorite; or*

- (g) *bring onto or use at an archaeological or palaeontological site any excavation equipment or any equipment which assist in the detection or recovery of metals or archaeological and palaeontological material or objects, or use such equipment for the recovery of meteorites. (35. [4] 1999:58)."*

and

*"No person may, without a permit issued by SAHRA or a provincial heritage resources agency-*

- (h) *destroy, damage, alter, exhume or remove from its original position or otherwise disturb the grave of a victim of conflict, or any burial ground or part thereof which contains such graves;*
- (i) *destroy, damage, alter, exhume, remove from its original position or otherwise disturb any grave or burial ground older than 60 years which is situated outside a formal cemetery administered by a local authority;*
- (j) *bring onto or use at a burial ground or grave referred to in paragraph (a) or (b) and excavation equipment, or any equipment which assists in the detection or recovery of metals (36. [3] 1999:60)."*

#### **e. Human Tissue Act of 1983 and Ordinance on the Removal of Graves and Dead Bodies of 1925**

Graves 60 years or older are heritage resources and fall under the jurisdiction of both the National Heritage Resources Act and the Human Tissues Act of 1983. However, graves younger than 60 years are specifically protected by the Human Tissues Act (Act 65 of 1983) and the Ordinance on the Removal of Graves and Dead Bodies (Ordinance 7 of 1925) as well as any local and regional provisions, laws and by-laws. Such burial places also fall under the jurisdiction of the National Department of Health and the Provincial Health Departments. Approval for the exhumation and re-burial must be obtained from the relevant Provincial MEC as well as the relevant Local Authorities.

#### **11.1.2 Background to HIA and AIA 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. Heritage sites are frequently threatened by development projects and both the environmental and heritage legislation require impact assessments (HIAs & AIAs) that identify all heritage resources in areas to be developed. Particularly, these assessments are required to make recommendations for protection or mitigation of the impact of the sites. HIAs and AIAs should be done by qualified professionals with adequate knowledge to (a) identify all heritage resources including archaeological and palaeontological sites that might occur in areas of developed and (b) make recommendations for protection or mitigation of the impact on the sites.

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 m<sup>2</sup> 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 m<sup>2</sup> 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:

*“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:*

- (k) The identification and mapping of all heritage resources in the area affected;*
- (l) 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;*
- (m) an assessment of the impact of the development on such heritage resources;*
- (n) 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;*
- (o) the results of consultation with communities affected by the proposed development and other interested parties regarding the impact of the development on heritage resources;*
- (p) if heritage resources will be adversely affected by the proposed development, the consideration of alternatives; and*
- (q) plans for mitigation of any adverse effects during and after the completion of the proposed development (38. [3] 1999:64).”*

Consequently, section 35 of the Act requires Heritage Impact Assessments (HIAs) or Archaeological Impact Assessments (AIAs) to be done for such developments in order for all heritage resources, that is, all places or objects of aesthetics, architectural, historic, scientific, social, spiritual, linguistic or technological value or significance to be protected. Thus, any assessment should make provision for the protection of all these heritage components, including archaeology, shipwrecks, battlefields, graves, and structures older than 60 years, living heritage, historical settlements, landscapes, geological sites, palaeontological sites and objects. Heritage resources management and conservation.

## **11.2 Assessing the Significance of Heritage Resources**

Archaeological sites, as previously defined in the National Heritage Resources Act (Act 25 of 1999) are places in the landscape where people have lived in the past – generally more than 60 years ago – and have left traces of their presence behind. In South Africa, archaeological sites include hominid fossil sites, places where people

of the Earlier, Middle and Later Stone Age lived in open sites, river gravels, rock shelters and caves, Iron Age sites, graves, and a variety of historical sites and structures in rural areas, towns and cities. Palaeontological sites are those with fossil remains of plants and animals where people were not involved in the accumulation of the deposits. The basic principle of cultural heritage conservation is that archaeological and other heritage sites are valuable, scarce and *non-renewable*. Many such sites are unfortunately lost on a daily basis through development for housing, roads and infrastructure and once archaeological sites are damaged, they cannot be re-created as site integrity and authenticity is permanently lost. Archaeological sites have the potential to contribute to our understanding of the history of the region and of our country and continent. By preserving links with our past, we may not be able to revive lost cultural traditions, but it enables us to appreciate the role they have played in the history of our country.

#### **- Categories of significance**

Rating the significance of archaeological sites, and consequently grading the potential impact on the resources is linked to the significance of the site itself. The significance of an archaeological site is based on the amount of deposit, the integrity of the context, the kind of deposit and the potential to help answer present research questions. Historical structures are defined by Section 34 of the National Heritage Resources Act, 1999, while other historical and cultural significant sites, places and features, are generally determined by community preferences. The guidelines as provided by the NHRA (Act No. 25 of 1999) in Section 3, with special reference to subsection 3 are used when determining the cultural significance or other special value of archaeological or historical sites. In addition, ICOMOS (the Australian Committee of the International Council on Monuments and Sites) highlights four cultural attributes, which are valuable to any given culture:

##### **- *Aesthetic value:***

Aesthetic value includes aspects of sensory perception for which criteria can and should be stated. Such criteria include consideration of the form, scale, colour, texture and material of the fabric, the general atmosphere associated with the place and its uses and also the aesthetic values commonly assessed in the analysis of landscapes and townscape.

##### **- *Historic value:***

Historic value encompasses the history of aesthetics, science and society and therefore to a large extent underlies all of the attributes discussed here. Usually, a place has historical value because of some kind of influence by an event, person, phase or activity.

##### **- *Scientific value:***

The scientific or research value of a place will depend upon the importance of the data involved, on its rarity, quality and on the degree to which the place may contribute further substantial information.

##### **- *Social value:***

Social value includes the qualities for which a place has become a focus of spiritual, political, national or other cultural sentiment to a certain group.

It is important for heritage specialist input in the EIA process to take into account the heritage management structure set up by the NHR Act. It makes provision for a 3-tier system of management including the South Africa Heritage Resources Agency (SAHRA) at a national level, Provincial Heritage Resources Authorities (PHRAs) at a provincial and the local authority. The Act makes provision for two types or forms of protection of heritage resources; i.e., formally protected and generally protected sites:

#### **Formally protected sites:**

- Grade 1 or national heritage sites, which are managed by SAHRA
- Grade 2 or provincial heritage sites, which are managed by the provincial HRA (MP-PHRA).
- Grade 3 or local heritage sites.

**Generally protected sites:**

- Human burials older than 60 years.
- Archaeological and palaeontological sites.
- Shipwrecks and associated remains older than 60 years.
- Structures older than 60 years.

With reference to the evaluation of sites, the certainty of prediction is definite, unless stated otherwise and if the significance of the site is rated high, the significance of the impact will also result in a high rating. The same rule applies if the significance rating of the site is low. The significance of archaeological sites is generally ranked into the following categories.

Significance	Rating Action
No significance: sites that do not require mitigation.	None
Low significance: sites, which may require mitigation.	2a. Recording and documentation (Phase 1) of site; no further action required 2b. Controlled sampling (shovel test pits, auguring), mapping and documentation (Phase 2 investigation); permit required for sampling and destruction
Medium significance: sites, which require mitigation.	3. Excavation of representative sample, C14 dating, mapping and documentation (Phase 2 investigation); permit required for sampling and destruction [including 2a & 2b]
High significance: sites, where disturbance should be avoided.	4a. Nomination for listing on Heritage Register (National, Provincial or Local) (Phase 2 & 3 investigation); site management plan; permit required if utilized for education or tourism
High significance: Graves and burial places	4b. Locate demonstrable descendants through social consulting; obtain permits from applicable legislation, ordinances and regional by-laws; exhumation and reinterment [including 2a, 2b & 3]

Furthermore, the significance of archaeological sites was based on six main criteria:

- Site integrity (i.e., primary vs. secondary context),
- Amount of deposit, range of features (e.g., stonewalling, stone tools and enclosures),
- Density of scatter (dispersed scatter),
- Social value,
- Uniqueness, and
- Potential to answer current and future research questions.

## 12 ADDENDUM 2: CONVENTIONS USED TO ASSESS THE SIGNIFICANCE OF HERITAGE

### 12.1 Site Significance Matrix

According to the NHRA, Section 2(vi) the **significance** of heritage sites and artefacts is determined by its 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. The following matrix is used for assessing the significance of each identified site/feature.

2. SITE EVALUATION			
2.1 Heritage Value (NHRA, section 2 [3])	High	Medium	Low
It has importance to the community or pattern of South Africa's history or pre-colonial history.			
It possesses unique, uncommon, rare or endangered aspects of South Africa's natural or cultural heritage.			
It has potential to yield information that will contribute to an understanding of South Africa's natural and cultural heritage.			
It is of importance in demonstrating the principle characteristics of a particular class of South Africa's natural or cultural places or objects.			
It has importance in exhibiting particular aesthetic characteristics valued by a particular community or cultural group.			
It has importance in demonstrating a high degree of creative or technical achievement at a particular period.			
It has marked or special association with a particular community or cultural group for social, cultural or spiritual reasons (sense of place).			
It has strong or special association with the life or work of a person, group or organisation of importance in the history of South Africa.			
It has significance through contributing towards the promotion of a local sociocultural identity and can be developed as a tourist destination.			
It has significance relating to the history of slavery in South Africa.			
It has importance to the wider understanding of temporal changes within cultural landscapes, settlement patterns and human occupation.			
2.2 Field Register Rating			
National/Grade 1 [should be registered, retained]			
Provincial/Grade 2 [should be registered, retained]			
Local/Grade 3A [should be registered, mitigation not advised]			
Local/Grade 3B [High significance; mitigation, partly retained]			
Generally Protected A [High/Medium significance, mitigation]			
Generally protected B [Medium significance, to be recorded]			
Generally Protected C [Low significance, no further action]			
2.3 Sphere of Significance	High	Medium	Low
International			
National			
Provincial			
Local			
Specific community			

### 12.2 Impact Assessment Criteria

The following table provides a guideline for the rating of impacts and recommendation of management actions for sites of heritage potential.



**Significance of the heritage resource**

This is a statement of the nature and degree of significance of the heritage resource being affected by the activity. From a heritage management perspective, it is useful to distinguish between whether the significance is embedded in the physical fabric or in associations with events or persons or in the experience of a place; i.e., its visual and non-visual qualities. This statement is a primary informant to the nature and degree of significance of an impact and thus needs to be thoroughly considered. Consideration needs to be given to the significance of a heritage resource at different scales (i.e., site-specific, local, regional, national or international) and the relationship between the heritage resource, its setting and its associations.

**Nature of the impact**

This is an assessment of the nature of the impact of the activity on a heritage resource, with some indication of its positive and/or negative effect/s. It is strongly informed by the statement of resource significance. In other words, the nature of the impact may be historical, aesthetic, social, scientific, linguistic or architectural, intrinsic, associational or contextual (visual or non-visual). In many cases, the nature of the impact will include more than one value.

**Extent**

Here it should be indicated whether the impact will be experienced:

- On a site scale, i.e., extend only as far as the activity;
- Within the immediate context of a heritage resource;
- On a local scale, e.g., town or suburb
- On a metropolitan or regional scale; or
- On a national/international scale.

**Duration**

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

- Short term, (needs to be defined in context)
- Medium term, (needs to be defined in context)
- Long term where the impact will persist indefinitely, possibly beyond the operational life of the activity, either because of natural processes or by human intervention; or
- Permanent where mitigation either by natural process or by human intervention will not occur in such a way or in such a time span that the impact can be considered transient.

Of relevance to the duration of an impact are the following considerations:

- Reversibility of the impact; and
- Renewability of the heritage resource.

**Intensity**

Here it should be established whether the impact should be indicated as:

- Low, where the impact affects the resource in such a way that its heritage value is not affected;
- Medium, where the affected resource is altered but its heritage value continues to exist albeit in a modified way; and
- High, where heritage value is altered to the extent that it will temporarily or permanently be damaged or destroyed.

**Probability**

This should describe the likelihood of the impact actually occurring indicated as:

- Improbable, where the possibility of the impact to materialize is very low either because of design or historic experience;
- Probable, where there is a distinct possibility that the impact will occur;
- Highly probable, where it is most likely that the impact will occur; or
- Definite, where the impact will definitely occur regardless of any mitigation measures

**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.

**Impact Significance**

The significance of impacts can be determined through a synthesis of the aspects produced in terms of the nature and degree of heritage significance and the nature, duration, intensity, extent, probability and confidence of impacts and can be described as:

- Low; where it would have a negligible effect on heritage and on the decision
- Medium, where it would have a moderate effect on heritage and should influence the decision.
- High, where it would have, or there would be a high risk of, a big effect on heritage. Impacts of high significance should have a major influence on the decision;
- Very high, where it would have, or there would be high risk of, an irreversible and possibly irreplaceable negative impact on heritage. Impacts of very high significance should be a central factor in decision-making.

**12.3 Direct Impact Assessment Criteria**

The following table provides an outline of the relationship between the significance of a heritage context, the intensity of development and the significance of heritage impacts to be expected

HERITAGE CONTEXT	TYPE OF DEVELOPMENT			
	CATEGORY A	CATEGORY B	CATEGORY C	CATEGORY D
<b>CONTEXT 1</b> High heritage Value	Moderate heritage impact expected	High heritage impact expected	Very high heritage impact expected	Very high heritage impact expected
<b>CONTEXT 2</b> Medium to high heritage value	Minimal heritage impact expected	Moderate heritage impact expected	High heritage impact expected	Very high heritage impact expected
<b>CONTEXT 3</b> Medium to low heritage value	Little or no heritage impact expected	Minimal heritage impact expected	Moderate heritage impact expected	High heritage impact expected
<b>CONTEXT 4</b> Low to no heritage value	Little or no heritage impact expected	Little or no heritage impact expected	Minimal heritage value expected	Moderate heritage impact expected

**NOTE: A DEFAULT "LITTLE OR NO HERITAGE IMPACT EXPECTED" VALUE APPLIES WHERE A HERITAGE RESOURCE OCCURS OUTSIDE THE IMPACT ZONE OF THE DEVELOPMENT.**

HERITAGE CONTEXTS	CATEGORIES OF DEVELOPMENT
<p><b>Context 1:</b> Of high intrinsic, associational and contextual heritage value within a national, provincial and local context, i.e. formally declared or potential Grade 1, 2 or 3A heritage resources</p> <p><b>Context 2:</b> Of moderate to high intrinsic, associational and contextual value within a local context, i.e. potential Grade 3B heritage resources.</p> <p><b>Context 3:</b> Of medium to low intrinsic, associational or contextual heritage value within a national, provincial and local context, i.e. potential Grade 3C heritage resources</p> <p><b>Context 4:</b> Of little or no intrinsic, associational or contextual heritage value due to disturbed, degraded conditions or extent of irreversible damage.</p>	<p><b>Category A: Minimal intensity development</b></p> <ul style="list-style-type: none"> <li>- No rezoning involved; within existing use rights.</li> <li>- No subdivision involved.</li> <li>- Upgrading of existing infrastructure within existing envelopes</li> <li>- Minor internal changes to existing structures</li> <li>- New building footprints limited to less than 1000m2.</li> </ul> <p><b>Category B: Low-key intensity development</b></p> <ul style="list-style-type: none"> <li>- Spot rezoning with no change to overall zoning of a site.</li> <li>- Linear development less than 100m</li> <li>- Building footprints between 1000m2-2000m2</li> <li>- Minor changes to external envelop of existing structures (less than 25%)</li> <li>- Minor changes in relation to bulk and height of immediately adjacent structures (less than 25%).</li> </ul> <p><b>Category C: Moderate intensity development</b></p> <ul style="list-style-type: none"> <li>- Rezoning of a site between 5000m2-10 000m2.</li> <li>- Linear development between 100m and 300m.</li> <li>- Building footprints between 2000m2 and 5000m2</li> <li>- Substantial changes to external envelop of existing structures (more than 50%)</li> <li>- Substantial increase in bulk and height in relation to immediately adjacent buildings (more than 50%)</li> </ul> <p><b>Category D: High intensity development</b></p> <ul style="list-style-type: none"> <li>- Rezoning of a site in excess of 10 000m2</li> </ul>

	<ul style="list-style-type: none"> <li>- Linear development in excess of 300m.</li> <li>- Any development changing the character of a site exceeding 5000m<sup>2</sup> or involving the subdivision of a site into three or more erven.</li> <li>- Substantial increase in bulk and height in relation to immediately adjacent buildings (more than 100%)</li> </ul>
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## 12.4 Management and Mitigation Actions

The following table provides a guideline of relevant heritage resources management actions is vital to the conservation of heritage resources.

<p><b>No further action / Monitoring</b></p> <p>Where no heritage resources have been documented, heritage resources occur well outside the impact zone of any development or the primary context of the surroundings at a development footprint has been largely destroyed or altered, no further immediate action is required. 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.</p> <p><b>Avoidance</b></p> <p>This is appropriate 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. Mitigation is not acceptable or not possible. This measure often includes the change / alteration of development planning and therefore impact zones in order not to impact on resources.</p> <p><b>Mitigation</b></p> <p>This is appropriate where development occurs in a context of heritage significance and where the impact is such that it can be mitigated to a degree of medium to low significance, e.g. the high to medium impact of a development on an archaeological site could be mitigated through sampling/excavation of the remains. Not all negative impacts can be mitigated.</p> <p><b>Compensation</b></p> <p>Compensation is generally not an appropriate heritage management action. The main function of management actions should be to conserve the resource for the benefit of future generations. Once lost it cannot be renewed. The circumstances around the potential public or heritage benefits would need to be exceptional to warrant this type of action, especially in the case of where the impact was high.</p> <p><b>Rehabilitation</b></p> <p>Rehabilitation is considered in heritage management terms as a intervention typically involving the adding of a new heritage layer to enable a new sustainable use. It is not appropriate when the process necessitates the removal of previous historical layers, i.e. restoration of a building or place to the previous state/period. It is an appropriate heritage management action in the following cases:</p> <ul style="list-style-type: none"> <li>- The heritage resource is degraded or in the process of degradation and would benefit from rehabilitation.</li> <li>- Where rehabilitation implies appropriate conservation interventions, i.e. adaptive reuse, repair and maintenance, consolidation and minimal loss of historical fabric.</li> <li>- Where the rehabilitation process will not result in a negative impact on the intrinsic value of the resource</li> </ul>
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13 ADDENDUM 3: PILGRIM’S REST MUSEUM MEETING ATTENDANCE REGISTER

HERITAGE IMPACT ASSESSMENT (HIA) ON PORTIONS 1, 2, 3, 4, 5 AND THE REMAINING EXTENT OF THE FARM FRANKFORT 509KT, THE FARM KRUGERS HOOP 527KT, PORTION 1 AND THE REMAINING EXTENT OF THE FARM VAN DER MERWES REEF 526KT, PORTIONS 1, 2 AND THE REMAINING EXTENT OF PORTIONS OF THE FARM MORGENZON 525KT, THE FARM PEACH TREE 544KT, AND PORTIONS 18, 42, 43, 44 AND THE REMAINING EXTENT OF THE FARM POMIESKRANS 543KT FOR THE PROPOSED TGME MINING PROJECT IN THE EHLANZENI DISTRICT MUNICIPALITY, MPUMALANGA PROVINCE

Consultation Meeting: Pilgrim’s Rest Museum 8 February 2022

Attendance Register

Name and Surname	Institution	Telephone	Email	Signature
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J. WITH MASON	P REST MUSEUM	0832897219	j.mason@mpg.gov.za	<i>[Signature]</i>
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