MASHALA RESOURCES: LEIDEN COLLIERY PROJECT

HERITAGE STUDY: SCOPING LEVEL REPORT

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FOR

ENVIRONMENTAL IMPACT MANAGEMENT SERVICES (PTY) LTD

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DECLARATION OF INDEPENDENCE AND SUMMARY OF EXPERTISE

The report has been compiled by PGS Heritage & Grave Relocation Consultants, an appointed Heritage Specialist for Environmental Impact Management Services (Ltd). The views stipulated in this report are purely objective and no other interests are displayed during the decision making processes discussed in the Heritage Impact Assessment Process.

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Polke D. Birkholtz has been actively involved in the heritage industry since 1997 during which time he has undertaken in excess of 150 heritage and archaeological impact assessments across South Africa. He is well versed in the applicable legislation as it relates to heritage in South Africa.

EXECUTIVE SUMMARY

PGS Heritage was appointed by Environmental Impact Management Services (Ltd) (EIMS) to undertake a Heritage Scoping Report for the proposed Leiden Colliery. The study area is located 13.8km south of Sheepmoor, Mkhondo Local Municipality, Gert Sibande District Municipality, Mpumalanga Province.

The purpose of the Heritage Scoping report is to identify at a desktop level what the probability is of heritage resources being identified in the study area. This is important because heritage resources are protected in terms of the National Heritage Resources Act, No 25 of 1999, (NHRA) from *inter alia*, destruction or damage, excavation or removal, or other disturbance, without a permit from the responsible heritage resources authority. The National Heritage Resources Act, No 25 of 1999, (NHRA) states that heritage resources are unique and non-renewable and, as such, any impact on such resources must be seen as significant (NHRA, section 5(1)(a)). The NHRA specifically protects certain categories of heritage resources, i.e.: structures, archaeological and paleontological (including meteorological) sites and material and graves and burial grounds (NHRA, sections 34, 35 and 36). Furthermore, Section 38 of the NHRA provides for and regulates the compilation of impact assessment reports of heritage resources that may be affected by construction or development activities.

The findings of the desktop research for the Heritage Scoping Report have shown that the study area and surrounding areas have a historical and archaeological history and that there is potential for archaeological and historical sites and material to exist within the study area. The initial research has also identified specific possible heritage sensitive areas within the study area that will need further investigation during the HIA/EIA phase. A site visit was undertaken which identified a total of nine sites comprising six cemeteries, one historic farmstead, one historic rock engraving site as well as one abandoned historic farm worker homestead.

The Heritage Impact Assessment (HIA) phase will consist of a physical walkthrough of the study area, focussing on the areas and sites that were identified during the desktop research phase. This should confirm the presence or absence of sites/areas with heritage significance identified from the scoping assessment. Based on the results of the HIA report, recommendations for mitigation (destruction, recording and/or avoidance) of the confirmed heritage resources will be made for incorporation into the EMP for the project.

Palaeontology

A palaeontological desktop study was undertaken by Dr. Gideon Groenewald. The study area is almost entirely underlain by sedimentary rocks of the Permian aged Vryheid Formation, Ecca Group, Karoo Supergroup, with only a small section along the western edge of the study area underlain by Jurassic aged Dolerite. The Vryheid Formation is known for containing an abundant assemblage of plant fossils and the mining of coal is by definition the mining of fossil plant material. Due to the fact that the Vryheid Formation sediments and coal beds will only be exposed during

the mining operations and associated infrastructure development, it is unlikely that fossils will be observed before the mining takes place. For this reason a moderate palaeontological sensitivity is allocated to the larger portion of the study area. Dolerite will not contain any fossils because of its igneous nature and the small area along the South-western edge underlain by dolerite has thus been allocated a Low palaeontological sensitivity. During the EIA phase the following mitigation measures will be highlighted: (a) the developer and the ECO of the mining project must be made aware of the fact that coal mining is by definition the mining of fossil plant material; (b) the developer must apply for a collection and destruction permit for plant fossils encountered during the mining operation and (c) the developer must employ a qualified palaeontologist to visit the present mining operations to record any fossils. The palaeontologist will look out for exceptionally well preserved fossils and collect representative samples of these fossils for further study at an appropriate institute such as the Bernard Price Institute for Palaeontology at WITS University (Groenewald, 2013).

Archaeological Sites

The desktop study has revealed the potential for archaeological sites such as Later Stone Age shelters (with or without paintings) as well as Late Iron Age sites to be located within the study area. While no such sites were identified during the site visit, it would be important for an archaeological field survey of the final mining development footprint to be undertaken during the EIA Phase of the project to identify the presence of such sites within these areas. Should such sites be identified within the development footprint areas mitigation measures such as archaeological excavations may be required.

Historical Sites and Structures

Evaluation of topographical maps and satellite imagery has indicated the presence of one farmstead as well as a number of farm workers housing. As the age cannot be determined at this stage, field survey and evaluation of each structure and its locality, with regards to the proposed mining activity, will be required to determine the possible impacts on them and suggest appropriate mitigation measures during the detailed EIA Phase.

Graves and Cemeteries

The site visit identified six cemeteries. It is likely that even more cemeteries and grave sites are located within the study area. In this regard it is worth noting that during discussions held with the landowner he indicated that there are a number of grave sites and cemeteries located across his property. Cemeteries and grave sites are protected by various legislations and the best option would be the in situ preservation of the sites. Should this not be possible, a standard grave relocation process (including a detailed social consultation process) must be undertaken.

Unmarked Graves in Homesteads

The desktop study revealed the presence of a number of homesteads within the study area. Based on experience of similar sites and the knowledge of cultural customs and traditions, it is known that stillborn babies and deceased

infants occasionally were buried within the homesteads of black rural communities. These children were sometimes buried underneath the floors and walls of houses and huts and the burials were not marked, but were known to the immediate family. Cemeteries and grave sites are protected by various legislations and the best option would be social consultation with the former (or present) residents of these homesteads to assess whether any such unmarked graves are located within the study area for the HIA. The best option then would be the in situ preservation of the sites. Should this not be possible, a standard grave relocation process (including a detailed social consultation process) must be undertaken.

Historic Rock Engravings

One site comprising historic rock engravings was identified during the site visit. Possible archaeological material in the form of clay potsherds and one Later Stone Age lithic were also observed here. While the engravings are not formally protected by existing heritage legislation, they are of high enough historic significance to warrant their conservation. The possibility exists for the nearby potsherd scatter to be of archaeological age and formally protected. The best option for the site would be in situ preservation. The fact that the site is located high up against a cliff face would in all likelihood mean that no development impacts are expected on the site.

The data on the different types of heritage resources identified from the field work will be compiled in a final HIA report. This report will utilise the Plan of Study for the EIA/HIA (***Section*** 8) as well as the significance rating (***ANNEXURES A and B***) to identify and rank the impacts on the heritage resources into the final detailed EIA investigation.

Potential impacts to be identified and evaluated during the EIA include:

- Disturbance/destruction of archaeological sites or material – Archaeological survey of the impacted area
- Disturbance/destruction of palaeontological material – Recommendations from palaeontological desktop study must be outlined in the EIA and EMP and must be undertaken as mitigation measures.
- Destruction/damage/removal of unidentified cemeteries and graves - Archaeological survey of the impacted area as well as social consultation
- Destruction/damage of historical structures – Physical survey of the impacted area
- Destruction/alteration of cultural landscape – Visual Impact Assessment to address this issue

The desktop evaluation of the study area and surrounds has shown that the possibility exists of finding various heritage resources in the proposed study area, including historical structures as well as graves and cemeteries. A site visit was undertaken during which the findings of the desktop study was confirmed in that nine sites were identified of which six were cemeteries, one a historic farmstead, one historic farm worker dwelling and one historic rock engraving. Once the final study area has been defined, this will have to be assessed by way of detailed walkthroughs

during the HIA phase of the project. This will allow for an assessment of the actual impact of the proposed development on any heritage sites located there i.e. a footprint area specific impact assessment can as a result be undertaken

Table 1- Potential Impacts to Consider for EIA and EMP Phase

	IMPACT	STAGE OF PROJECT
ISSUE	**IMPACT ON ARCHAEOLOGICAL SITES**	**CONSTRUCTION**
DISCUSSION	As seen from the archival work and discussion, the possibility of archaeological finds has been identified and thus further fieldwork is required to develop a comprehensive Heritage Management Plan for the construction activities.	
EXISTING IMPACT	None known.	
PREDICTED IMPACT	Unidentified archaeological sites can seriously hamper construction and development activities and timelines. Destruction or damage of such sites requires a permit from the responsible heritage authority (NHRA, section 35). Fieldwork can provide valuable information on such sites in the study area and provide timeous management of such sites through various mitigation measures, including the realignment of the construction activities, if necessary.	Destruction or damage during construction of surface features such as opencast areas, haul roads, pipelines or pollution control dams
EIA INVESTIGATION REQUIRED	Archaeological and heritage field survey of the entire mining development footprint area with a focus placed on areas identified in the desktop study as heritage sensitive.	
WHEN IS MITIGATION REQUIRED		During design and before construction no-go areas need to be demarcated. Alternatively, mitigation measures such as the archaeological excavation of sites must be planned and scheduled to fit within the timing of the project phases.

	IMPACT	STAGE OF PROJECT
ISSUE	**IMPACT ON HISTORICAL STRUCTURES**	**CONSTRUCTION, OPERATION**
DISCUSSION	As seen from the archival work and discussion, the possible presence of historical structures has been identified as being high and thus fieldwork is required to develop a comprehensive Heritage Management Plan for the development	
EXISTING IMPACT	None known.	
PREDICTED IMPACT	Damage/destruction by blasting (vibration) and other mining activities e.g. bench box cut mining (direct impacts), on historical structures. Destruction or damage of such sites requires a permit from the responsible heritage authority (NHRA, section 34).	Destruction or damage during construction of surface features such as opencast areas, haul roads, pipelines or pollution control dams
EIA INVESTIGATION REQUIRED	Field survey of selected sites within the study area will confirm possible impacted sites and provide timeous management of such sites through various mitigation measures.	
WHEN IS MITIGATION REQUIRED		During design and before construction, - Baseline assessment of structures - Permitting and controlled destruction of sites Operational - Evaluation of structures during mining against baseline data
	IMPACT	**STAGE OF PROJECT**
ISSUE	**IMPACT ON GRAVES AND CEMETERIES SITES**	**CONSTRUCTION**
DISCUSSION	The existence of graves and cemeteries has been confirmed during the site visit. .	
EXISTING IMPACT	None known.	
PREDICTED IMPACT	Unidentified graves and cemeteries and the discovery of such sites can seriously hamper construction and development timelines. Damage, destruction or removal of such sites requires a permit from various responsible	Destruction or damage during construction of surface features such as opencast areas, haul roads, pipelines or pollution control dams.

	authorities, including the Heritage Authority (NHRA, section 36), Provincial Health Department and the SA Police Service. Such a process can take up to 12 months to finalise. Fieldwork can provide valuable information on the presence of such sites in the study area and provide timeous management of such sites, which may include the realignment of the proposed development activities. In the event that identified graves and cemeteries cannot be avoided, a grave relocation process needs to be initiated, bearing in mind that such a process impacts on the spiritual and social fabric of the next of kin and associated communities.	During the operational phase of the mine, the mining direction and subsequent box cutting and earth works can possibly impact on graveyards and cemeteries in the way of the mining activities.
EIA INVESTIGATION REQUIRED	Archaeological field survey of the EIA study area will identify grave sites.	
WHEN IS MITIGATION REQUIRED		During design and before construction no-go areas need to be demarcated. Alternatively, mitigation measures such as the physical relocation of the graves in question (including aspects such as detailed social consultation) needs to be planned and scheduled to fit within the timing of the project phases. It must be understood that such a process impacts on the spiritual and social fabric of the next of kin and associated communities.
	IMPACT	**STAGE OF PROJECT**
ISSUE	**IMPACT ON UNMARKED CHILD GRAVES**	**CONSTRUCTION**
DISCUSSION	From experience on similar sites and the knowledge of cultural customs and traditions, it is known that stillborn babies and deceased	

	infants occasionally were buried within the homesteads of black rural communities. These children were sometimes buried underneath the floors and walls of houses and huts and the burials were not marked, but were known to the immediate family.	
EXISTING IMPACT	None known.	
PREDICTED IMPACT	Unidentified graves and the discovery of such sites can seriously hamper construction and development timelines. Damage, destruction or removal of such sites requires a permit from various responsible authorities, including the Heritage Authority (NHRA, section 36), Provincial Health Department and the SA Police Service. Such a process can take up to 12 months to finalise. Social consultation with former residents of the homesteads in question can provide valuable information on the presence of such sites in the study area and provide timeous management of such sites, which may include the realignment of the proposed development activities. In the event that such graves cannot be avoided, a grave relocation process needs to be initiated, bearing in mind that such a process impacts on the spiritual and social fabric of the next of kin and associated communities.	Destruction or damage during construction of surface features such as opencast areas, haul roads, pipelines or pollution control dams. During the operational phase of the mine, the mining direction and subsequent box cutting and earth works can possibly impact on graves that are located in the way of the mining activities.
EIA INVESTIGATION REQUIRED	A social consultation process with current and former residents of the study area can assess whether such sites are located within the study area. In cases where no former residents for a homestead can be found, test excavations in and around the structure would assess whether any	

	such unmarked graves are located there.	
	IMPACT	**STAGE OF PROJECT**
ISSUE	**IMPACT ON PALAEONTOLOGICAL RESOURCES**	**CONSTRUCTION, OPERATIONAL**
DISCUSSION	A palaeontological desktop study was undertaken by Dr. Gideon Groenewald. The study revealed that large sections of the present study area is underlain by Permian aged sedimentary rocks of the Vryheid Formation (Pv) of the Ecca Group which forms part of the Karoo Supergroup. Only a small section of the study area is underlain by Jurassic aged Dolerite. There is a possibility that fossils could be encountered during excavation of bedrock of the Vryheid Formation within the development footprint.	
EXISTING IMPACT	None known.	
PREDICTED IMPACT	Unidentified palaeontological resources and the discovery of such resources can seriously hamper construction and development timelines. Damage, destruction or removal of such sites requires a permit from the responsible heritage authority (NHRA, section 35).	Destruction or damage during construction of surface features such as opencast areas, haul roads, pipelines or pollution control dams. During the operational phase of the mine, the mining direction and subsequent box cutting and earth works can possibly impact on palaeontological resources.
EIA INVESTIGATION REQUIRED	The mitigation measures recommended in the palaeontological desktop study must be undertaken.	
WHEN IS MITIGATION REQUIRED		During design and before construction, the three mitigation measures outlined in the palaeontological desktop study will have to be undertaken. These are as follows: (a) the developer and the ECO of the mining project must be made aware of the fact that coal mining is by definition the mining

	of fossil plant material; (b) the developer must apply for a collection and destruction permit for plant fossils encountered during the mining operation and (c) the developer must employ a qualified palaeontologist to visit the present mining operations to record any fossils. The palaeontologist will look out for exceptionally well preserved fossils and collect representative samples of these fossils for further study at an appropriate institute such as the Bernard Price Institute for Palaeontology at WITS University (Groenewald, 2013)

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ANNEXURES

1. INTRODUCTION

PGS Heritage & Grave Relocation Consultants was appointed by Environmental Impact Management Services (Ltd) (EIMS) to undertake a Heritage Scoping Report in terms of the proposed Leiden Colliery. The study area is located 13.8km south of Sheepmoor, Mkhondo Local Municipality, Gert Sibande District Municipality, Mpumalanga Province.

2. SCOPE OF WORK

PGS Heritage & Grave Relocation Consultants was appointed by EIMS, to undertake a Heritage Scoping Assessment (HSA), that will be used (with other specialist desktop studies) to assess the feasibility of the proposed project as well as to design the proposed project in such a way that impacts are minimised. The HSR is aimed at identifying potential heritage resources located within the study area and surrounds and to identify the potential impacts that may be experienced by the resources as a result of the proposed project. Additionally, a site visit was undertaken during which some of the potential heritage sites were confirmed as heritage sites. In addition, the scoping study will serve as a Plan of Study for the HIR, which will include a detailed investigation of the heritage resources and the impact the proposed project may have on them. Mitigation measures will then also be suggested that will contribute to the overall EMPR for the whole project.

The scope of work for the Scoping Phase of the project can be itemised as follows:

- Desktop description of the baseline receiving environment specific to the field of expertise (general surrounding as well as site specific environment);
- Identification and description of any sensitive receptors in terms of heritage features that occur in the study area, and the manner in which these sensitive receptors may be affected by the activity;
- Site visit to verify desktop information;
- Screening to identify any critical issues relating to cultural heritage (potential fatal flaws) that may result in project delays or rejection of the application;
- Provide a map identifying sensitive receptors in the study area, based on available maps, database information & site visit verification;
- Provide a GIS sensitivity map of the study area;
- Identification and description of any impacts that may result from the proposed activities (both mining and supplementary) during all phases of the project, including cumulative, residual and latent impacts. All phases of the project should be considered and these phases shall be classified as: (a) Planning and Design (b) Construction (c) Operation (d) Decommissioning and (e) Rehabilitation and Closure.
- Identification of any legislated constraints (e.g. "No-Go" areas or buffer zones) and preparation of a map illustrating No-Go areas and buffers (if relevant);

- Identify any gaps in knowledge, data or information that could hamper the impact identification and evaluation process;
- Identification and justification (screening to obtain key issues) of impacts which require further investigation during the EIA phase (including further specialist inputs);
- Identify any legal provisions relevant to the specific field of expertise and the proposed activity (including relevant legislation, both National and Provincial, Department Guidelines and Management Frameworks);
- Provide a detailed plan of study for the EIA and EMP, including;
- A description of the tasks that should be undertaken and the manner in which these tasks should be undertaken;
- A description of the proposed methodology;
- Presentation of the study findings to Continental Coal and EIMS in Sandton, Johannesburg.

2.1 Site Location

The study area for this report comprises the Remainder of the farm Leiden 340 IT which is located 13.2km south of Sheepmoor. The coordinates defining the study area boundary are as follows:

- S26° 51’ 22.3” E30° 18’ 52.2”
- S26° 53’ 02.4” E30° 18’ 52.0”
- S26° 52’ 44.6” E30° 16’ 29.1”
- S26° 51’ 20.7” E30° 16’ 26.3”
- S26° 51’ 15.8” E30° 16’ 58.7”
- S26° 51’ 17.2” E30° 17’ 18.2”
- S26° 50’ 42.1” E30° 18’ 36.1”
- S26° 51’ 22.5” E30° 18’ 36.0”

As such, the Leiden project covers an area of approximately 1,293 ha and falls within the jurisdiction of the Mkhondo Local Municipality, Gert Sibande District Municipality. A locality map depicting the study area within its regional context can be seen in ***Figure 1***.

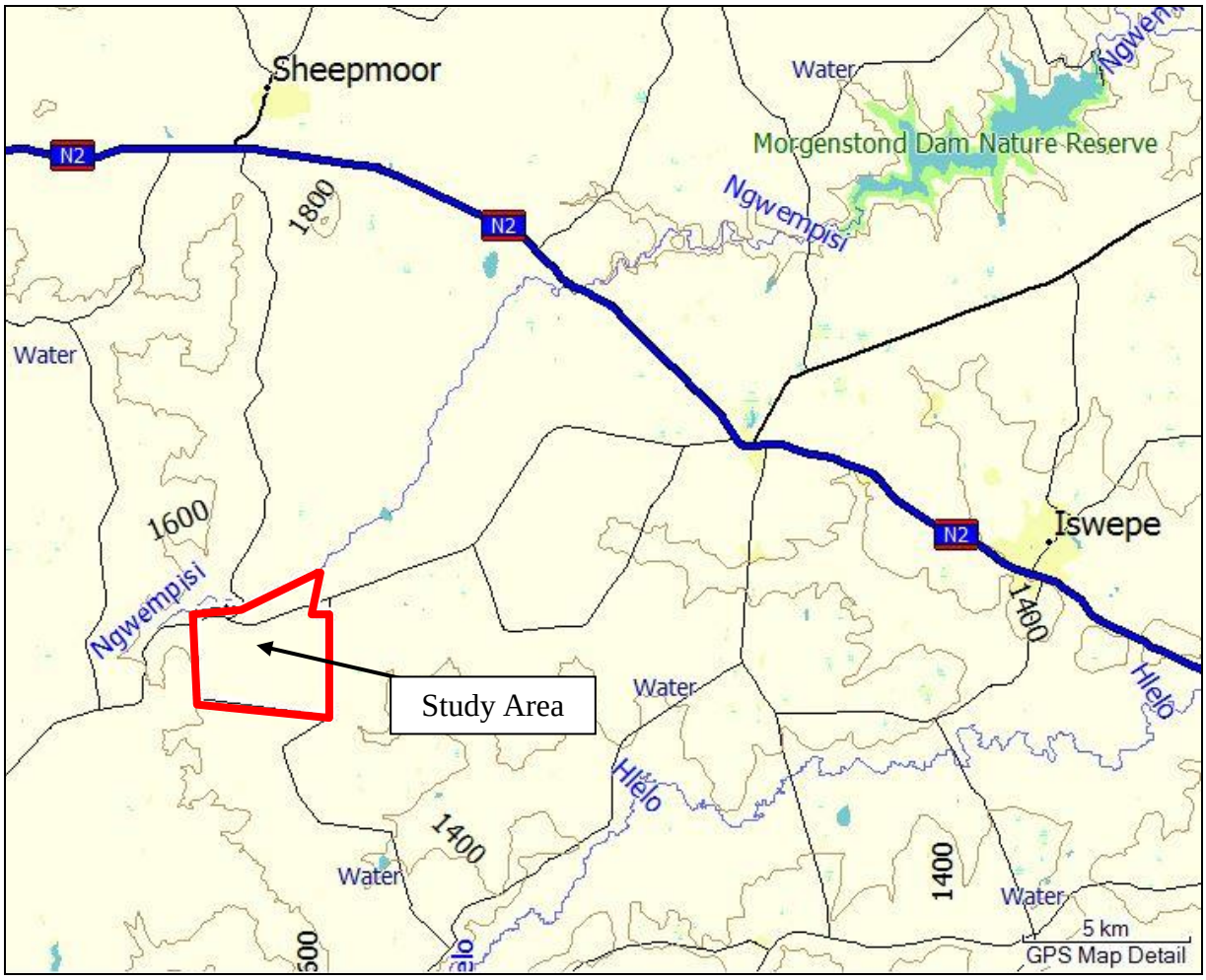

Figure 1 - Leiden study area within its regional context

3. METHODOLOGY

An evaluation of the archaeological and historical background of the study area was required to establish the possible heritage resources to be found. Therefore a literature search of published sources, archival sources and internet sources were undertaken to compile a general background the study area and surrounding landscape. This was followed by study area specific research to identify potential heritage impacts which may be located within the study area. This component comprised an assessment of archival and historical maps as well as an examination of Google Earth satellite imagery. The third component of the research comprised a site visit during which nine heritage sites were identified. As stated elsewhere, these nine heritage sites do not necessarily represent the entire heritage site database of the study area. As such a more detailed heritage inventory would be required during the Heritage Impact Report phase of the project.

4. LEGISLATIVE AND POLICY FRAMEWORK

The identification, evaluation and assessment of any cultural heritage site, artefact or find in the South African context is required and governed by the following legislation:

i. National Environmental Management Act (NEMA), Act 107 of 1998
ii. National Heritage Resources Act (NHRA), Act 25 of 1999
iii. Minerals and Petroleum Resources Development Act (MPRDA), Act 28 of 2002
iv. Development Facilitation Act (DFA), Act 67 of 1995

The following sections in each Act refer directly to the identification, evaluation and assessment of cultural heritage resources:

i. National Environmental Management Act (NEMA), Act 107 of 1998:
   a. Basic Environmental Assessment (BEA) – Section (23)(2)(d)
   b. Environmental Scoping Report (ESR) – Section (29)(1)(d)
   c. Environmental Impacts Assessment (EIA) – Section (32)(2)(d)
   d. Environmental Management Plan (EMP) – Section (34)(b)
ii. National Heritage Resources Act (NHRA), Act 25 of 1999:
   a. Protection of Heritage resources – Sections 34 to 36; and
   b. Heritage Resources Management – Section 38
iii. Minerals and Petroleum Resources Development Act (MPRDA), Act 28 of 2002:
   a. Section 39(3)
iv. Development Facilitation Act (DFA), Act 67 of 1995:
   a. The GNR.1 of 7 January 2000: Regulations and rules in terms of the Development Facilitation Act, 1995. Section 31.

The NHRA stipulates that cultural heritage resources may not be disturbed without authorization from the relevant heritage authority. Section 34(1) of the NHRA states that, “no person may alter or demolish any structure or part of a structure which is older than 60 years without a permit issued by the relevant provincial heritage resources authority…” The NHRA is utilized as the basis for the identification, evaluation and management of heritage resources and in the case of CRM those resources specifically impacted on by development as stipulated in Section 38 of NHRA, and those developments administered through NEMA, MPRDA and the DFA legislation. In the latter cases the feedback from the relevant heritage resources authority is required by the State and Provincial Departments managing these Acts before any authorizations are granted for development. The last few years have seen a significant change towards the inclusion of heritage assessments as a major component of Environmental Impacts Processes required by NEMA and MPRDA. This change requires us to evaluate the Section of these Acts relevant to heritage (Fourie, 2008b):

The NEMA 23(2)(b) states that an integrated environmental management plan should, “…identify, predict and evaluate the actual and potential impact on the environment, socio-economic conditions and cultural heritage”.

A study of subsections (23)(2)(d), (29)(1)(d), (32)(2)(d) and (34)(b)and their requirements reveals the compulsory inclusion of the identification of cultural resources, the evaluation of the impacts of the proposed activity on these resources, the identification of alternatives and the management procedures for such cultural resources for each of the documents noted in the Environmental Regulations. A further important aspect to be taken account of in the Regulations under NEMA is the Specialist Report requirements laid down in Section 33 of the regulations (Fourie, 2008b).

MPRDA defines 'environment' as it is in the NEMA and therefore acknowledges cultural resources as part of the environment. Section 39(3)(b) of this Act specifically refers to the evaluation, assessment and identification of impacts on all heritage resources as identified in Section 3(2) of the National Heritage Resources Act that are to be impacted on by activities governed by the MPRDA. Section 40 of the same Act requires the consultation with any State Department administering any law that has relevance on such an application through Section 39 of the MPRDA. This implies the evaluation of Heritage Assessment Reports in Environmental Management Plans or Programmes by the relevant heritage authorities (Fourie, 2008b).

In accordance with the legislative requirements and EIA rating criteria, the regulations of the South African Heritage Resources Agency (SAHRA) and Association of Southern African Professional Archaeologists (ASAPA) have also been incorporated to ensure that a comprehensive and legally compatible HSR report is compiled.

The heritage impact assessment criteria to be utilised in the HIR are described in more detail in ***Annexure A***; while the Environmental Impact Scoring criteria to be utilised in the HIR, are provided in ***Annexure B***.

4.1 Assumptions and Limitations

The aim of the HSR is to identify the possible types of heritage resources that might be present in the study area, as well as possible hotspots for the locality of such resources. From this, the possible impacts from mining and ancillary activities must be predicted. Although a site visit has already been undertaken to confirm some of these possibilities, it must be noted that the results of this report will require confirmation by undertaking a physical survey as part of the final evaluation of the study area applicable for the EIA Phase. The study area for the EIA Phase will be the mining development footprint area as defined by the client. Since the current information is based only on a literature and archival search and investigation of other desktop resources (maps and satellite imagery), with one brief site visit, **this report can certainly not be seen as at the level required for a HIR**.

4.2 Terminology/Abbreviations

Table 2- Abbreviations

ACRONYMS	*DESCRIPTION*
AIA	**Archaeological Impact Assessment**
ASAPA	**Association of South African Professional Archaeologists**
CRM	**Cultural Resources Management**
DEA	**Department of Environmental Affairs**
DWA	**Department: Water Affairs**
DMR	**Department of Mineral Resources**
EIA practitioner	**Environmental Impact Assessment Practitioner**
EIA	**Environmental Impact Assessment**
EMPR	**Environmental Management Programme Report**
ESA	**Early Stone Age**
GPS	**Global Positioning System**
HIA	**Heritage Impact Assessment**
HIR	**Heritage Impact Report**
HSR	**Heritage Scoping Report**
I&AP	**Interested & Affected Party**
LSA	**Later Stone Age**
LIA	**Late Iron Age**
MSA	**Middle Stone Age**
MIA	**Middle Iron Age**
NEMA	**National Environmental Management Act**
NHRA	**National Heritage Resources Act**
PHRA	**Provincial Heritage Resources Authority**
PSSA	**Palaeontological Society of South Africa**
RoD	**Record of Decision**
SADC	**Southern African Development Community**
SAHRA	**South African Heritage Resources Agency**

The following definitions are taken from the National Heritage Resources Act, no 25 of 1999 (NHRA, section 2):

Archaeological resources

This includes:

i. material remains resulting from human activity which are in a state of disuse and are in or on land and which are older than 100 years including artefacts, human and hominid remains and artificial features and structures;
ii. rock art, being any form of painting, engraving or other graphic representation on a fixed rock surface or loose rock or stone, which was executed by human agency and which is older than 100 years, including any area within 10m of such representation;
iii. wrecks, being any vessel or aircraft, or any part thereof which was wrecked in South Africa, whether on land, in the internal waters, the territorial waters or in the maritime culture zone of the republic as defined in the Maritimes Zones Act, and any cargo, debris or artefacts found or associated therewith, which is older than 60 years or which SAHRA considers to be worthy of conservation;
iv. features, structures and artefacts associated with military history which are older than 75 years and the site on which they are found.

Cultural significance

This means aesthetic, architectural, historical, scientific, social, spiritual, linguistic or technological value or significance

Development

This means any physical intervention, excavation, or action, other than those caused by natural forces, which may in the opinion of the heritage authority in any way result in the change to the nature, appearance or physical nature of a place or influence its stability and future well-being, including:

i. construction, alteration, demolition, removal or change in use of a place or a structure at a place;
ii. carrying out any works on or over or under a place;
iii. subdivision or consolidation of land comprising a place, including the structures or airspace of a place;
iv. constructing or putting up for display signs or boards;
v. any change to the natural or existing condition or topography of land; and
vi. any removal or destruction of trees, or removal of vegetation or topsoil

Fossil

Mineralised bones of animals, shellfish, plants and marine animals. A trace fossil is the track or footprint of a fossil animal that is preserved in stone or consolidated sediment.

Heritage

That which is inherited and forms part of the National Estate (Historical places, objects, fossils as defined by the National Heritage Resources Act 25 of 1999).

Heritage resources

This means any place or object of cultural significance

Holocene

The most recent geological time period which commenced 10 000 years ago.

Palaeontology

Any fossilised remains or fossil trace of animals or plants which lived in the geological past, other than fossil fuels or fossiliferous rock intended for industrial use, and any site which contains such fossilised remains or trace.

5. TECHNICAL DETAILS OF THE PROJECT

The Leiden Project is a project of Mashala Resources who proposes the establishment of the Leiden Colliery on the Remainder of the farm Leiden 340 IT. The project is currently in the feasibility stage.

6. GENERAL BACKGROUND TO THE STUDY AREA AND SURROUNDING LANDSCAPE

6.1 Historical and Archaeological Overview of the Study Area and Surrounding Landscape

The province of Mpumalanga is known to be rich in archaeological sites that tell the story of humans and their predecessors in the region going back some 1.7 million years (Delius & Hay, 2009). The archaeological history of the area can broadly be divided into a Stone Age, Iron Age and Historic Period. Both the Stone and Iron Ages form part of what is referred to as the Pre-Colonial Period (Prehistoric Period) whereas the Historic Period is referred to as the Colonial Period (Historic Period) (refer **Figure 2**).

The archaeological and historical overview of the study area and surrounding landscape is summarised in a chronological manner in table form below. Although this area would have been well suited for human habitation over the last 1.7 million years, very little information is known about especially the archaeological history of the area. This can likely be attributed to a lack of research focus in this area over the past half a century or more and does not necessarily mean that no such sites exist within this area.

In terms of the historical overview provided below, it must be noted that such an overview which is based on available literature and archival research would necessarily reflect a bias toward a traditional white history of the region as this would have been the focus of publications and archival documents during the last 150 years.

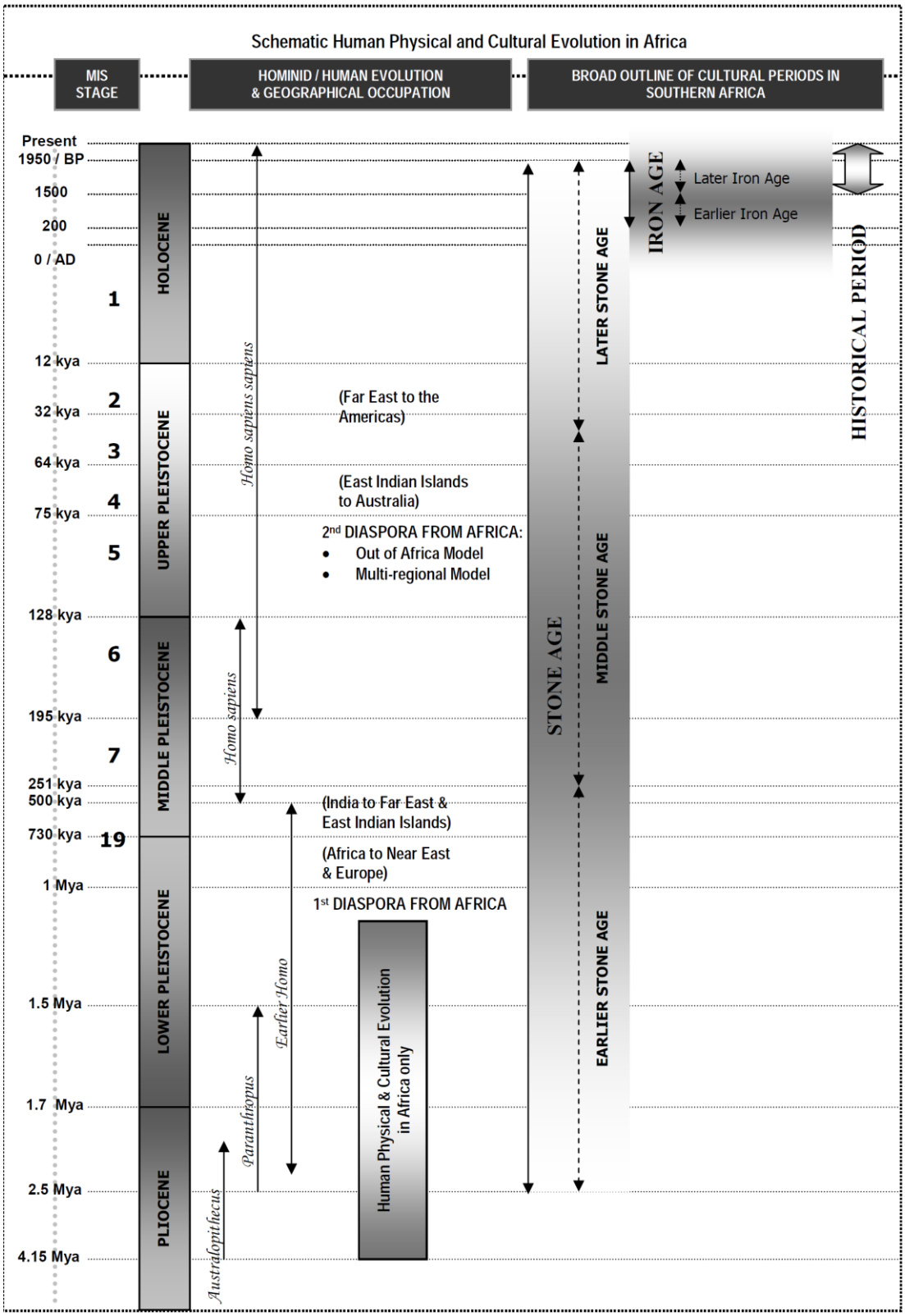

Figure 2 – Human and Cultural Time line in Africa (Morris, 2008)

Table 3- Archaeological and Historical Overview of the Study Area and Surrounding Landscape

DATE	DESCRIPTION
2.5 million to 250 000 years ago	The Earlier Stone Age is the first and oldest phase identified in South Africa's archaeological history and comprises two technological phases. The earliest of these is known as Oldowan and is associated with crude flakes and hammer stones. It dates to approximately 2 million years ago. The second technological phase is the Acheulian and comprises more refined and better made stone artefacts such as the cleaver and bifacial hand axe. The Acheulian dates back to approximately 1.5 million years ago. No Early Stone Age sites are known from the study area or direct vicinity. However, this is likely rather due to lack of research focus in this area than an absence of such sites.
250 000 to 40 000 years ago	The Middle Stone Age is the second oldest phase identified in South Africa's archaeological history. This phase is associated with flakes, points and blades manufactured by means of the so-called 'prepared core' technique. No Middle Stone Age sites are known from the study area or direct vicinity. However, this is likely rather due to lack of research focus in this area than an absence of such sites.
40 000 years ago to the historic past	The Later Stone Age is the third archaeological phase identified and is associated with an abundance of very small artefacts known as microliths. As mentioned elsewhere, a single Later Stone Age lithic was observed within the study area at Site 2. The study area and surrounding landscape are however well suited for Later Stone Age sites due to the many shelters and overhangs located in the sandstone cliffs of this landscape. Such a known site is located on the farm Welgelen 322 IT, situated 27.4km north-west of the present study area.
AD 200 – AD 900	The earliest phase in the Iron Age history of Southern African is known as the Early Iron Age. According to the distribution maps published by Huffman (2007) the only possible presence of Early Iron Age sites in the study area and surrounding landscape would be in the form of the so-called Silver Leaves facies of the Kwale Branch of the Urewe Tradition. This facies is dated to between AD 280 and AD 450. The key features on the decorated ceramics of the Silver Leaves facies comprise multiple facets in the first position (Huffman, 2007).
AD 900 – AD 1300	The second phase in the Iron Age history of Southern Africa is known as the Middle Iron Age. No sites from the Middle Iron Age are known from the study area and surrounding landscape.
Ad 1300 – AD 1850	The third and final phase in the Iron Age history of Southern Africa is known as the Late Iron Age. This period in the Iron Age history of South Africa is associated with the Nguni and Sotho-Tswana speaking people (Huffman, 2007). Bergh (1999) identifies two main Late Iron Age groups within the wider vicinity of the study area, namely the Phuthing and the Khumalo Ndebele (Matabele). Lombard (1980) also mentions a Late Iron Age group he refers to as the Nhlapo people and indicates that when the first white people came to stay in the Ermelo district they already found the Nhlapo people in the vicinity of Maviristad. As mentioned elsewhere, the farm Mavieriestad 321 IT is located some 8.9km north-west of the study area. During these later stages of the Late Iron Age the area under discussion fell under the sphere of influence of the Swazi.

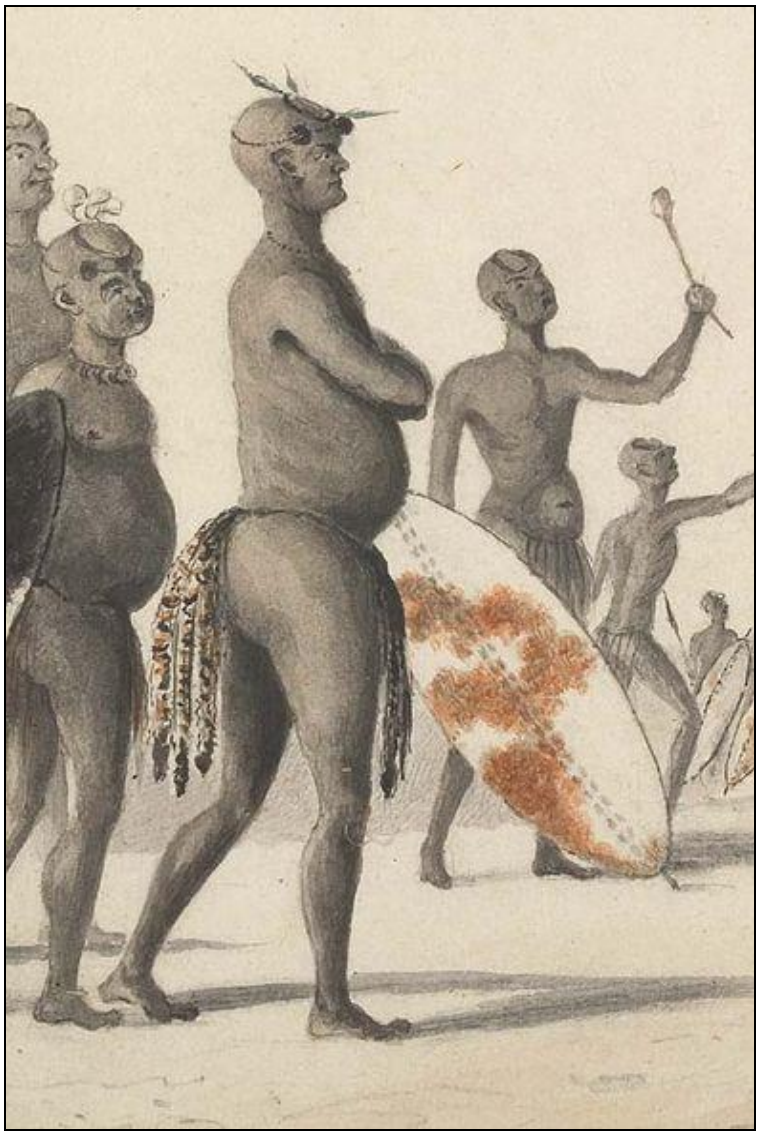

Figure 3

King Mzilikazi of the Matabele. This illustration was made by Captain Cornwallis Harris in c. 1838 (www.sahistory.org.za).

1836	The first Voortrekker parties started crossing over the Vaal River.
1845	The district of Lydenburg was established (Bergh, 1999). The study area fell within this district at the time.
Before c. 1855	Before this time, a chief by the name of Mlambo (son of Magonondo) and his Nhlapo Clan were settled "...*at the source of the Ngwempisi river at the foot of the Ntabande mountain*..." (Matsebula, 1972). Although the Ntabande Mountain could not be identified, the remainder of this description of the locality of the settlement of Nhlapo indicate that the area referred to must either be located within the farm Leiden or very close to it. After the death of Mlambo Nhlapo shortly before c. 1855 a dispute arose between his two sons Mhlangala and Bashele over the chieftainship. When Bashele realised that he was about to lose the conflict he called on the protection of the Swazi King Mswati who sent out a regiment to protect Bashele. According to this version of events Mhlangala was killed and Bashele was installed as chief under King Mswati (Matsebula, 1972). Myburgh (1956) provides a slightly different version of events which he recorded from community elders during his research into the oral histories of the tribes of the Carolina District. He also refers to the dispute between the two sons of Mlambo Nhlapo over his chieftainship but indicates that the sons' names were Mhlangala and Gama. In this version of events Gama realised that he was losing the war with his brother and asked the Zulu King Mpande for assistance.

	King Mpande however referred him to the Swazi King Mswati who in turn ordered his elite iNyatsi regiment to assist Gama. Mhlangala's settlement on the farm Mavieriestad 321 IT was attacked by both Gama and the iNyatsi regiment which resulted in Mhlangala deciding to flee. It is worth noting that the farm Maveriestad 321 IT is located 8.9km north of the present study area. From this point on two versions of events exist. According to the Nhlapo the Swazi regiment was halted in their pursuit of Mhlangala by the appearance of a lightning strike. However, according to the Swazi oral histories the iNyatsi regiment met up with the men of Mhlangala on the eMsobotjeni Mountain on the farm Sobbeken 390 IT (located 17.2km south-east of the present study area). However, their attack was restricted by a severe snow storm which allowed Mhlangala and his followers to flee. They eventually settled in the Mlambo area of present day Lesotho (Myburgh, 1956).
November 1859	The town of Marthinus Wesselstroom in the district of Wakkerstroom was formally established. The town later became known as Wakkerstroom as well (Hofmeyr et.al., 2009). Wakkerstroom is located 54.8km south-west of the study area. Although the study area initially fell within Lydenburg, changed made to the boundaries of the Districts of Lydenburg and Wakkerstroom during 1867 resulted in the study area falling within the District of Wakkerstroom (Bergh, 1999).
Early 1860s	During the early 1860s the first Voortrekker families started establishing themselves in the general vicinity of the study area including Hendrik Teodor Bührmann, Nicolaas Jacobus Breytenbach and F.P. van Rhede van Oudtshoorn (Lombard, 1980).
1867	Although the study area fell within the District of Lydenburg during the period 1845 to 1867, this year saw a number of changes made to the southern boundary of the Lydenburg District and the northern boundary of the Wakkerstroom District which resulted in the study area now falling within the Wakkerstroom District (Bergh, 1999).
2 July 1868	The farm Leiden was inspected for the first time on this day by F.P. van Rhede van Oudtshoorn and was transferred to its first owner Hendrik Teodor Bührmann on 3 August 1869. Bürhmann was born in Amsterdam, Netherlands on 17 March 1822 and moved to the Boer republic of Lydenburg in 1848 where he worked as magistrate's clerk and magistrate of Lydenburg and was also member of the Volksraad of Lydenburg. In 1865 he moved to the Highveld and established himself on the farm De Emigratie, roughly 15.2km north-west of the present study area. Bührmann passed away on 12 May 1890 (Lombard, 1980).
2 December 1879	The farm was transferred from H.T. Bührmann to Marthinus Jacobus Johannes Oosthuizen.
12 February 1880	The town of Ermelo was officially proclaimed by the administrator of the Transvaal William Owen Lanyon (Lombard, 1980). Ermelo is located 46.9km north-west of the study area.
26 October 1882	The district of Ermelo was officially proclaimed (Bergh, 1999). The study area still fell within the Wakkerstroom District but the farm Leiden appears to have been located on the boundary between this and the District of Ermelo. Interestingly, an archival document was found in the National Archives which comprises a letter dated 28 September 1886 written by one M. Oosthuizen requesting that his farm Leiden should fall under the District of Ermelo (SS, R5055/86). From the archival research it is known that one Marthinus Jacobus Johannes Oosthuizen owned the farm Leiden between 1872 and 1896. It is therefore evident that at the time the farm did not fall within the Ermelo District but that the owner wanted it to fall under that district. However, the farm remained under Wakkerstroom.
5 November 1896	The farm was transferred from M.J.J. Oosthuizen to Daniel Abraham Groenewald.

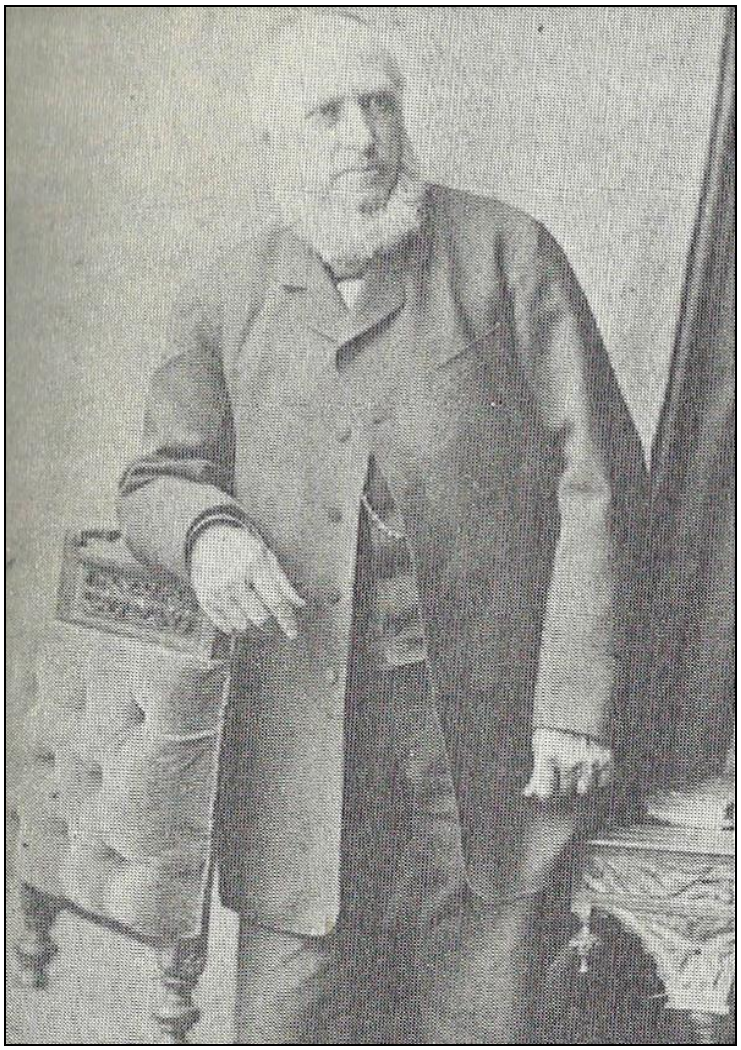

Figure 4

Contemporary studio photograph of Hendrik Teodor Bührmann. On 3 August 1869, Bührmann became the first registered owner of the farm Leiden (Lombard, 1980:7)

1899 - 1902	The South African War took place during this time. Although no battles or skirmishes from this war are known for the study area and no direct association between the war and the farm Leiden could be found, a reference to a skirmish on the farm Rotterdam on 3 January 1902 was found. Although other farms by that name are known from the Free State as well as the Western Cape, a strong likelihood exists for the Rotterdam farm referred to being the farm Rotterdam 323 IT located directly north-west of Leiden. From the surrounding landscape it is known that some events associated with the war years took place on the farm De Emigratie. The farm was owned by the Bürhmann family and is located 15.2km north-west of the study area. For example, on 10 May 1901 a council of war took place on De Emigratie to discuss the situation that the Zuid Afrikaansche Republiek found itself in (Fourie, n.d.).
1912	One of the founding members of the South African Native Congress (later the African National Congress) Pixley ka Izaka Seme established the Native Farmers Association of Africa (NFAA) which aim was to acquire land for Black farmers. In the same year the NFAA purchased three farms for this purpose namely Driefontein, Daggakraal and Driepan (Delius, 2007). Of these three properties, the farm Driefontein 388 IT is situated the closest to the study area and is located 10.8km to the south-east.

1924 - 1924	The town of Sheepmoor appears to have been established during this time.
23 March 1928	The farm Leiden was transferred from D.A. Groenewald to Jozua Joubert Scheepers.
2 September 1932	The farm Leiden was subdivided for the first time and was divided into three sections with a one third portion being transferred from J.J. Scheepers to Daniel Jacobus Elardus Scheepers, Jozua Joubert Scheepers (jnr.) and Gerhardus Francois Scheepers respectively.
1944	Portion 1 of the farm was transferred from G.F. Scheepers and two others to Ernst Heinrich Wilhelm Eggers and Hermann Wilhelm Frederich Eggers.
1945	During this year Portion 2 of the farm was transferred from D.J.E. Scheepers and two others to Helgaard Muller. At the same time the remaining extent of the farm was transferred from D.J. E. Scheepers and two others to Hellenius Le Roux Van Niekerk and Thomas William Joyce. This remaining extent is the portion of the farm comprising the present study area. It seems likely that Mr. Van Niekerk who is the current owner of the portion of the farm under discussion, is the direct descendant of Hellenius Le Roux van Niekerk.
1965 - 1985	In 1965 the Driefontein community was declared a so-called “black spot” by the Apartheid government which meant that the authorities intended to remove the residents of this community to respective homelands. While very little was intitially done by the government to implement these measures, the early 1980s saw increasing pressures placed on the Driefontein community climaxing in the death of community leader and staunch opponent of the proposed removal, Saul Mkhize. His funeral at Driefontein on 16 April 1983 was attended by more than 2,000 people representing various anti-Apartheid organisations. In October 1985 the government decided not to proceed with the planned removal.

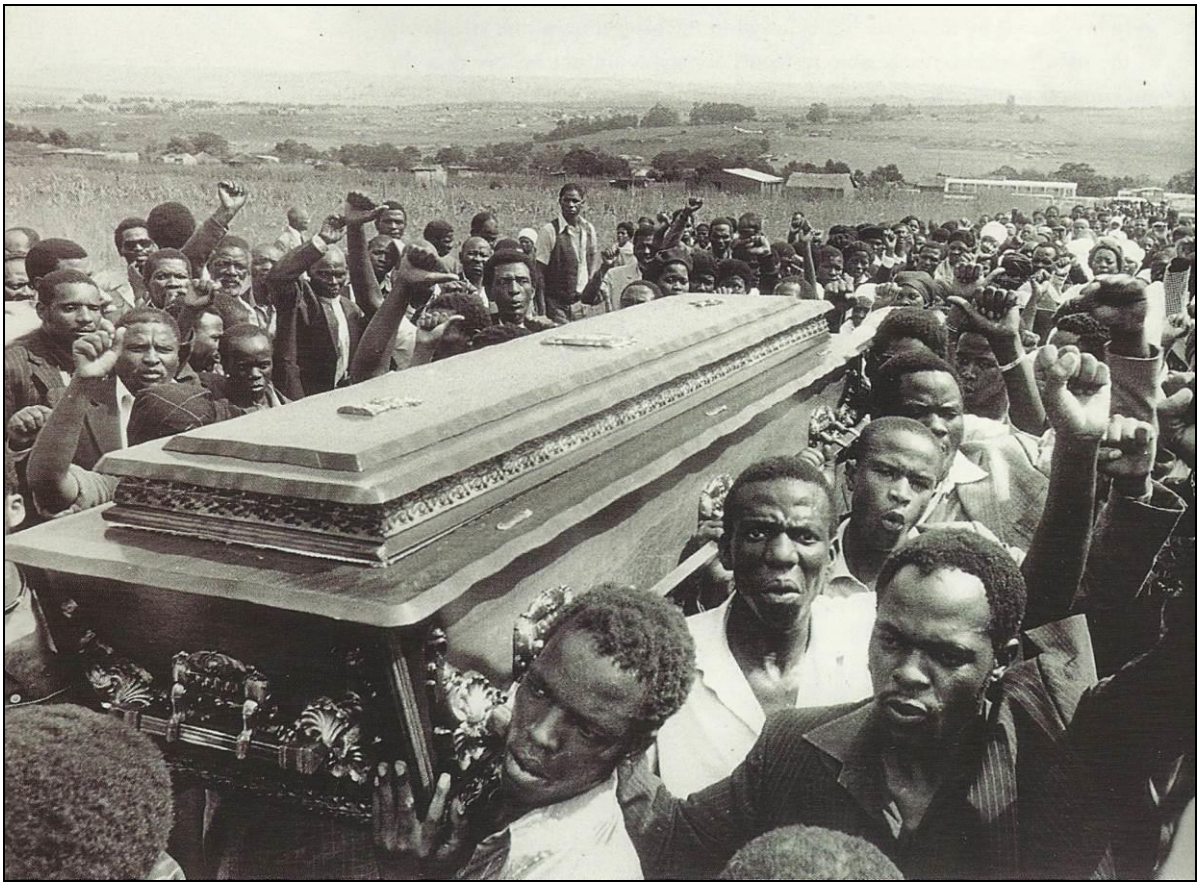

Figure 5 – The funeral of Saul Mkhize on 16 April 1983 at Driefontein (Delius, 2007:283).

7. KNOWN HERITAGE RESOURCES FROM WITHIN THE STUDY AREA

A number of different techniques were used to identify the known heritage resources from within the study area. These will be discussed individually below. A map indicating the positions of heritage resources identified by way of each specific methodological technique will be provided at the end of each discussion.

7.1 Examination of Archival and Historic Maps

7.1.1 First Edition of the 2630CD Topographical Sheet

The image depicted below is from the First Edition of the 2630CD Topographical Sheet that was based on aerial photography undertaken in 1963 and was surveyed and drawn in 1971. Two potential heritage features are depicted on the map namely huts and farm buildings. A total of eight huts are depicted within the study area with five huts located close to one another and the remainder distributed individually. These huts reflect homesteads of black residents of the study area who may either have been farm workers, tenant farmers or land owners. During the site visit a cemetery (see Site 1) was identified in the vicinity of where the five huts are depicted on the map. It seems likely that this cemetery was associated with the cluster of five huts depicted on the map. Furthermore, the remains of an abandoned homestead was also identified in the vicinity of Feature 10 (see Site 3). Two farm buildings are depicted adjacent to one another on the map (see Features 1 and 2) and appears to have formed part of the same farmstead. During the site visit the remains of this farmstead was identified (see Site 9 below). The coordinates for all these features as obtained by way of an image overlay on Google Earth, are listed below.

Table 4- List of coordinates for features depicted on 1971 map.

FEATURE NUMBER	DESCRIPTION	COORDINATES
Feature 1	Farm Building	S 26° 51’ 37.5” E 30° 16’ 39.5”
Feature 2	Farm Building	S 26° 51’ 36.0” E 30° 16’ 41.2”
Feature 3	Hut	S 26° 52’ 03.2” E 30° 18’ 02.4”
Feature 4	Hut	S 26° 52’ 03.9” E 30° 18’ 04.6”
Feature 5	Hut	S 26° 52’ 05.9” E 30° 18’ 05.7”
Feature 6	Hut	S 26° 52’ 07.6” E 30° 18’ 05.7”
Feature 7	Hut	S 26° 52’ 09.6” E 30° 18’ 6.81”
Feature 8	Hut	S 26° 52’ 44.0” E 30° 16’ 44.5”

Feature 9	Hut	S 26° 52’ 37.22” E 30° 16’ 36.5”
Feature 10	Hut	S 26° 52’ 25.3” E 30° 16’ 38.8”

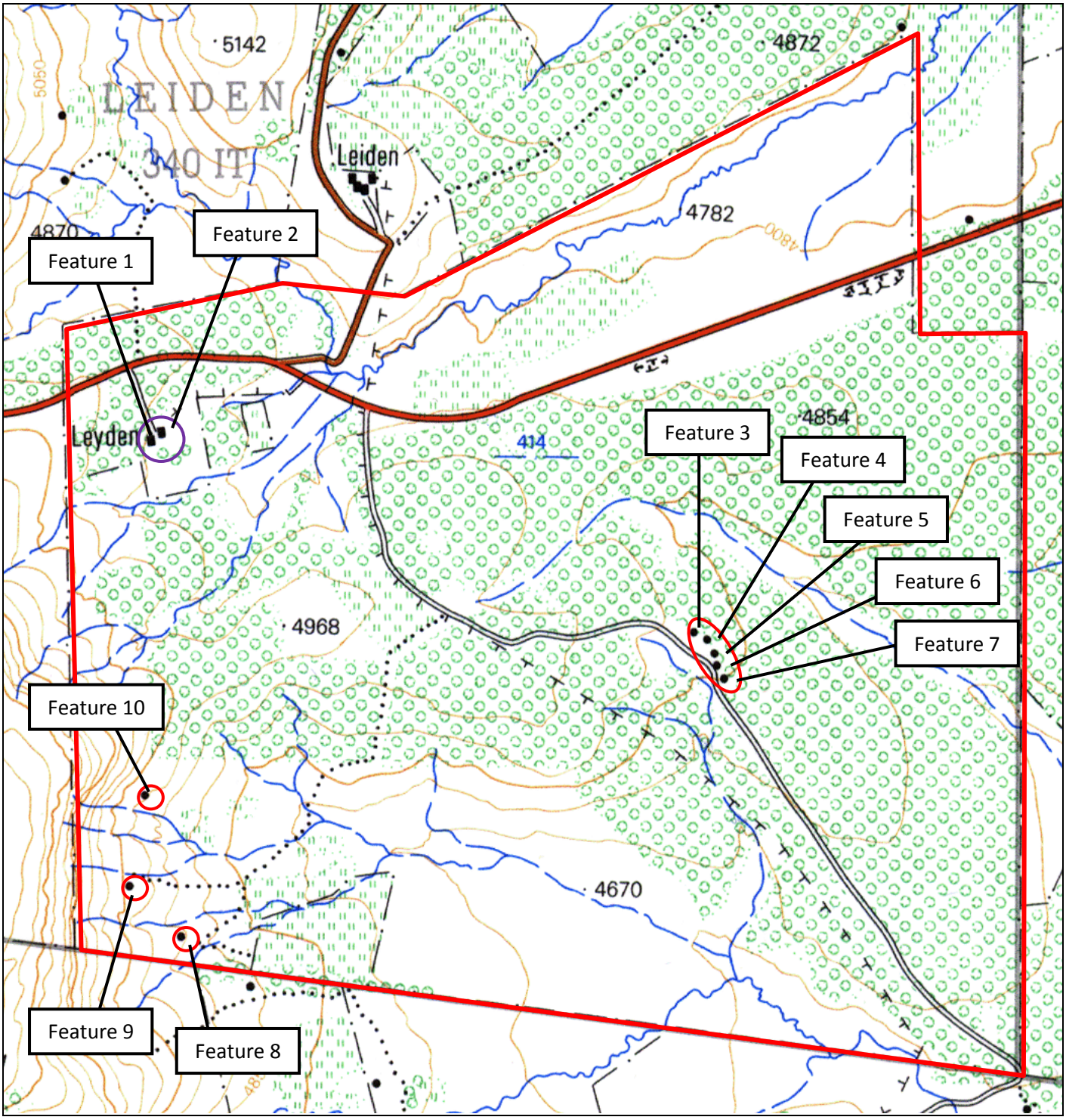

Figure 6–The Remainder of the farm Leiden 340IT as depicted on the First Editions of the 2630CD topographical sheet. This particular sheet was based on aerial photography undertaken in 1963 and was surveyed and printed in 1971. The purple markers indicate the position of farmsteads whereas the red markers indicate the position of huts.

7.1.2 Second Edition of the 2630CD Topographical Sheet

The image depicted below is from the Second Edition of the 2630CD Topographical Sheet that was compiled in 1985 and printed in 1990. Two potential heritage feature types are depicted on the map namely black homesteads and farm buildings.

Four farm buildings are depicted in proximity to one another on the map (see Feature 1, Feature 2, Feature 3 and Feature 4) and appear to have formed part of the same farmstead. During the site visit the remains of original farmstead was identified (see Site 9 below). The coordinates for all these features as obtained by way of an image overlay on Google Earth, are listed below.

A total of 26 black homesteads are depicted within the study area and are distributed in the landscape with three homesteads distributed individually, 12 homesteads in six cluster of two each, one cluster comprising three homesteads and two clusters comprising four homesteads each. These huts reflect homesteads of black residents of the study area who may either have been farm workers, tenant farmers or land owners.

During the fieldwork a number of sites depicted on this map were identified in the field. These are as follows:

- A cemetery (see Site 1) was identified in the vicinity of where the black homesteads at Feature 18, Feature 19, Feature 20 and Feature 21 are located.
- An abandoned black homestead (see Site 3) was identified where Feature 29 and Feature 30 are depicted.
- A cemetery (see Site 4) was identified in the vicinity of where the black homestead (which was also observed in the field) at Feature 27 is located.
- A cemetery (see Site 5) was identified directly north of the black homesteads depicted on this map at Feature 8, Feature 9, Feature 10 and Feature 11. These homesteads were observed in the field.
- A cemetery (see Site 6) was identified in the vicinity of where the black homestead (which was also observed in the field) at Feature 7 is located.
- A cemetery (see Site 7) was identified in the vicinity of where the black homestead (which was also observed in the field) at Feature 6 is located.
- A cemetery (see Site 8) was identified where the black homestead at Feature 5 is depicted. The remains of this homestead was also observed in the field.
- The old farmstead (see Site 9) was identified where the farm buildings at Feature 3 and Feature 4 are depicted.

If a comparison is drawn between the features depicted on this map compared to the First Edition of the 2630CD topographical sheet, the following observations can be made:

- Feature 1 from the previous map corresponds to Feature 3 from this map.
- Feature 2 from the previous map corresponds to Feature 4 from this map.
- Feature 5 from the previous map corresponds to Feature 19 from this map.
- Feature 6 from the previous map corresponds to Feature 20 from this map.
- Feature 7 from the previous map corresponds to Feature 21 from this map.
- Feature 10 from the previous map corresponds to Features 29 and 30 from this map.

The suggestion therefore would be that all the features not listed above which are depicted on this Second Edition, would have been built or established between 1971 and 1985.

Table 5- List of coordinates for features depicted on 1985 map.

FEATURE NUMBER	DESCRIPTION	COORDINATES
Feature 1	Farm Building	S 26° 51' 43.5” E 30° 16’ 30.5”
Feature 2	Farm Building	S 26° 51’ 42.4” E 30° 16’ 34.8”
Feature 3	Farm Building	S 26° 51’ 37.5” E 30° 16’ 40.7”
Feature 4	Farm Building	S 26° 51’ 36.0” E 30° 16’ 42.6”
Feature 5	Black Homestead	S 26° 51’ 19.7” E 30° 16’ 40.3”
Feature 6	Black Homestead	S 26° 51’ 21.8” E 30° 16’ 51.4”
Feature 7	Black Homestead	S 26° 51’ 23.7” E 30° 16’ 51.5”
Feature 8	Black Homestead	S 26° 51’ 24.3” E 30° 17’ 12.6”
Feature 9	Black Homestead	S 26° 51’ 22.4” E 30° 17’ 12.5”
Feature 10	Black Homestead	S 26° 51’ 22.1” E 30° 17’ 15.2”
Feature 11	Black Homestead	S 26° 51’ 20.7” E 30° 17’ 17.1”
Feature 12	Black Homestead	S 26° 51’ 49.9” E 30° 18’ 05.6”

Feature 13	Black Homestead	S 26° 51’ 50.2” E 30° 18’ 07.9”
Feature 14	Black Homestead	S 26° 51’ 51.5” E 30° 18’ 09.4”
Feature 15	Black Homestead	S 26° 51’ 54.4” E 30° 18’ 12.9”
Feature 16	Black Homestead	S 26° 51’ 58.3” E 30° 18’ 24.8”
Feature 17	Black Homestead	S 26° 51’ 55.6” E 30° 18’ 26.9”
Feature 18	Black Homestead	S 26° 52’ 02.0” E 30° 17’ 58.5”
Feature 19	Black Homestead	S 26° 52’ 05.0” E 30° 18’ 05.3”
Feature 20	Black Homestead	S 26° 52’ 07.0” E 30° 18’ 06.4”
Feature 21	Black Homestead	S 26° 52’ 09.2” E 30° 18’ 07.3”
Feature 22	Black Homestead	S 26° 52’ 30.8” E 30° 18’ 16.4”
Feature 23	Black Homestead	S 26° 52’ 32.5” E 30° 18’ 17.3”
Feature 24	Black Homestead	S 26° 52’ 34.5” E 30° 18’ 12.2”
Feature 25	Black Homestead	S 26° 52’ 36.3” E 30° 18’ 11.3”
Feature 26	Black Homestead	S 26° 52’ 52.6” E 30° 18’ 24.3”
Feature 27	Black Homestead	S 26° 52’ 45.4” E 30° 18’ 18.3”
Feature 28	Black Homestead	S 26° 52’ 46.8” E 30° 18’ 15.7”
Feature 29	Black Homestead	S 26° 52’ 21.3” E 30° 16’ 41.5”
Feature 30	Black Homestead	S 26° 52’ 19.4” E 30° 16’ 39.1”

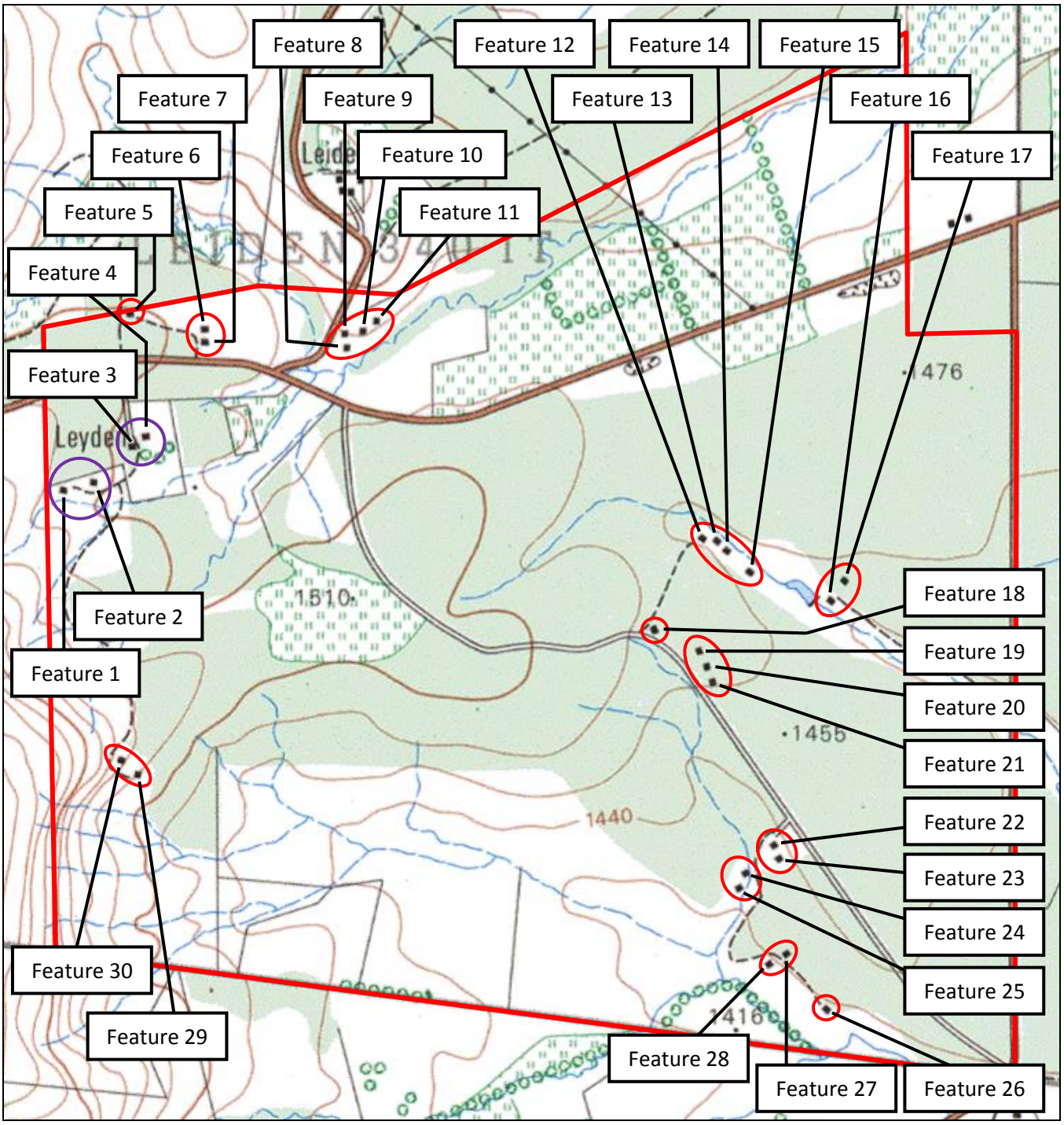

Figure 7–The Remainder of the farm Leiden 340IT as depicted on the Second Edition of the 2630CD topographical sheet. This particular sheet was compiled in 1985 and was printed by the Government Printer in 1990. The purple markers indicate the position of farmsteads and the red markers black homesteads.

7.2 Examination of Google Earth Satellite Imagery

A copy of the locality plan of the study area was overlaid on Google Earth satellite images to compare and verify the presence of potential heritage sites, and specifically built structures. No indications of possible archaeological sites were visible, which is probably due to the current use of extensive portions of the land for forestry. This usually obscures the visibility of any above surface archaeological remains. However, there is still a possibility that archaeological material is present.

7.2.1 Structures

In this section a separation was made by perceived farmsteads on the one hand and perceived homesteads of black people on the other hand. This was done throughout the report. The reason for this is that through experience of similar sites and the knowledge of cultural customs and traditions, it is known that stillborn babies and deceased infants occasionally were buried within the homesteads of black rural communities. These children were sometimes buried underneath the floors and walls of houses and huts and the burials were not marked, but were known to the immediate family. One area comprising an old farmstead was identified. In terms of black homesteads visible on Google Earth, five areas where identified, two of which represent individual homesteads. The remainder of the identified areas comprise two homesteads, three homesteads and six homesteads (excluding an associated school building) respectively. It is also important to note that of the five areas where homesteads were identified on Google Earth, two comprised abandoned homesteads and the remaining three homesteads still resided in.

The coordinates for these features as obtained directly from Google Earth, are listed below.

Table 6- List of coordinates for structures depicted on 1965 composite map.

DESCRIPTION	COORDINATES
Farmsteads	S 26° 51’ 39.75” E 30° 16’ 39.24”
Black Homesteads	S 26° 51’ 19.88” E 30° 16’ 39.11”
Black Homesteads	S 26° 51’ 21.91” E 30° 16’ 48.62”
Black Homesteads	S 26° 51’ 20.57” E 30° 16’ 15.21”
Black Homesteads	S 26° 52’ 49.00” E 30° 18’ 20.16”
Black Homesteads	S 26° 52’ 21.05” E 30° 16’ 39.14”

7.2.2 Areas with Potential for Heritage Sites

In this section the Google Earth image was scanned for any areas where experience has shown the potential for finding heritage sites might be higher than the areas surrounding it. This proved reasonably difficult in that large sections of the study area are covered by plantations. However, an area associated with the dolerite cliffs on the south-western end of the study area were highlighted in that it is believed that from the entire study area this particular area has the highest potential for containing archaeological sites in the form of Later Stone Age rock shelters with the possibility for paintings also present. It must be noted however that at no point can it be guaranteed that any heritage sites would be located within this area.

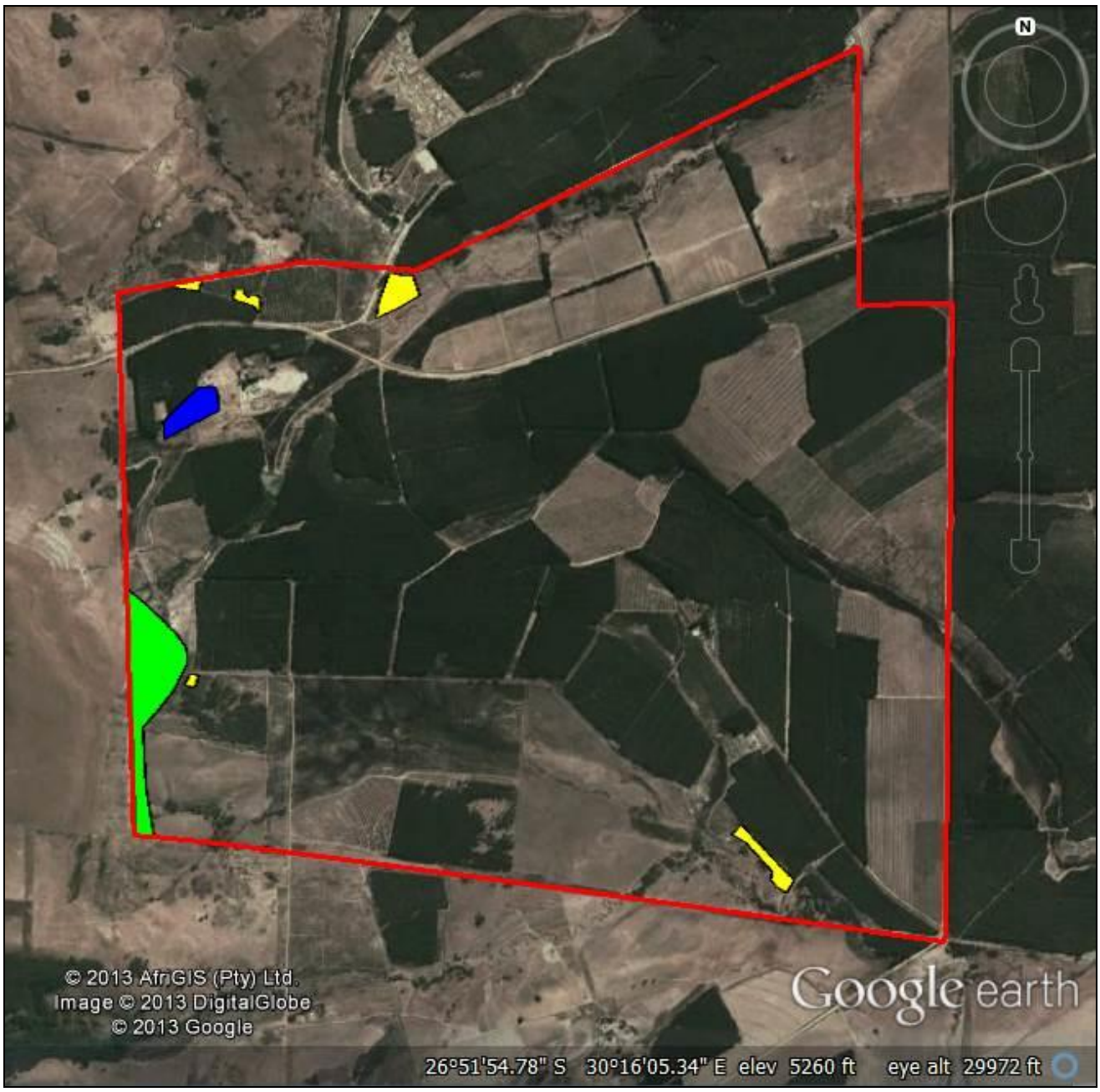

Figure 8–Depiction of the results of the examination of the Google Earth satellite imagery. Blue features represent farmsteads, yellow features black homesteads and the green features areas with the potential for heritage sites.

7.3 Previous Archaeological and Heritage Research undertaken within the Study Area

As far as could be established, no known archaeological or heritage research has ever been undertaken within the study area or the farm Leiden 340 IT as a whole. The South African Heritage Resources Information System (SAHRIS) contains no information on previous reports, permit applications and the like with regard to this farm.

As mentioned elsewhere in the report, the study area is located in a landscape which would have been suitable for pre-colonial settlement i.e. during the Stone and Iron Ages of South Africa's history. However, known archaeological sites in this landscape are few and far between and no pre-colonial archaeological sites are known for the study area. This can likely be more attributed to a lack of research focus in this area than necessarily a lack of sites.

A number of archaeological and heritage assessments have been undertaken in the general vicinity of the study area. The typical heritage sites identified in these reports comprise cemeteries and farm buildings. It is therefore evident that cemeteries and farm buildings would likely represent a significant component of the potential heritage resource base located within the study area.

One reasonably well known archaeological site from the wider vicinity of the study area is a Later Stone Age site with associated paintings located on the farm Welgelegen 322 IT, situated 27.4km north-west of the present study area.

7.4 Archival Research in terms of the Study Area

Although research was undertaken at the National Archives in Pretoria, the only aspects of note that were identified there comprise the early farm ownership history as well as the letter by the second registered owner of the farm Marthinus Jacobus Johannes Oosthuizen dated 28 September 1886 for the farm to fall under the Ermelo District (SS, R5055/86). These aspects are discussed in more detail in the historic overview provided above.

7.5 Palaeontological Desktop Study

PGS Heritage commissioned Dr. Gideon Groenewald to undertake a desktop survey, assessing the potential palaeontology impact for the proposed activities on the farm Leiden 340 IT. Refer Annexure D for a copy of the report.

In preparing a palaeontological desktop study the potential fossiliferous rock units (groups, formations etc.) represented within the study area are determined from geological maps. The known fossil heritage within each rock

unit is inventoried from the published scientific literature and previous palaeontological impact studies in the same region.

The likely impact of the proposed development on local fossil heritage is determined on the basis of the palaeontological sensitivity of the rock units concerned and the nature and scale of the development itself, most notably the extent of fresh bedrock excavation envisaged. The different sensitivity classes used are explained below.

The following colour coding method is used in Dr. Groenewald's report to classify a development area's palaeontological impact and respective sensitivities.

Sensitivity	Description
Low Sensitivity	Areas where a negligible impact on the fossil heritage is likely. This category is reserved largely for areas underlain by igneous rocks. However, development in fossil bearing strata with shallow excavations or with deep soils or weathered bedrock can also form part of this category.
Moderate Sensitivity	Areas where fossil bearing rock units are present but fossil finds are localised or within thin or scattered sub-units. Pending the nature and scale of the proposed development the chances of finding fossils are moderate.A field-based assessment by a professional palaeontologist is usually warranted.
High Sensitivity	Areas where fossil bearing rock units are present with a very high possibility of finding fossils of a specific assemblage zone. Fossils will most probably be present in all outcrops and the chances of finding fossils during a field-based assessment by a professional palaeontologist are very high. Palaeontological mitigation measures need to be incorporated into the Environmental Management Plan

The study area is almost entirely underlain by sedimentary rocks of the Permian aged Vryheid Formation, Ecca Group, Karoo Supergroup, with only a small section along the western edge of the study area underlain by Jurassic aged Dolerite.

The Vryheid Formation is known for containing an abundant assemblage of plant fossils and the mining of coal is by definition the mining of fossil plant material.

Due to the fact that the Vryheid Formation sediments and coal beds will only be exposed during the mining operations and associated infrastructure development, it is unlikely that fossils will be observed before the mining takes place. For this reason a moderate palaeontological sensitivity is allocated to the larger portion of the study area. Dolerite will not contain any fossils because of its igneous nature and the small area along the south-western edge underlain by dolerite has thus been allocated a low palaeontological sensitivity.

The following recommendations are made:

- The developer and the ECO of the mining project must be made aware of the fact that coal mining is by definition the mining of fossil plant material.
- The developer must apply for a collection and destruction permit for plant fossils encountered during the mining operation.
- The developer must employ a qualified palaeontologist to visit the present mining operations to record any fossils. The palaeontologist will look out for exceptionally well preserved fossils and collect representative samples of these fossils for further study at an appropriate institute such as the Bernard Price Institute for Palaeontology at WITS University.

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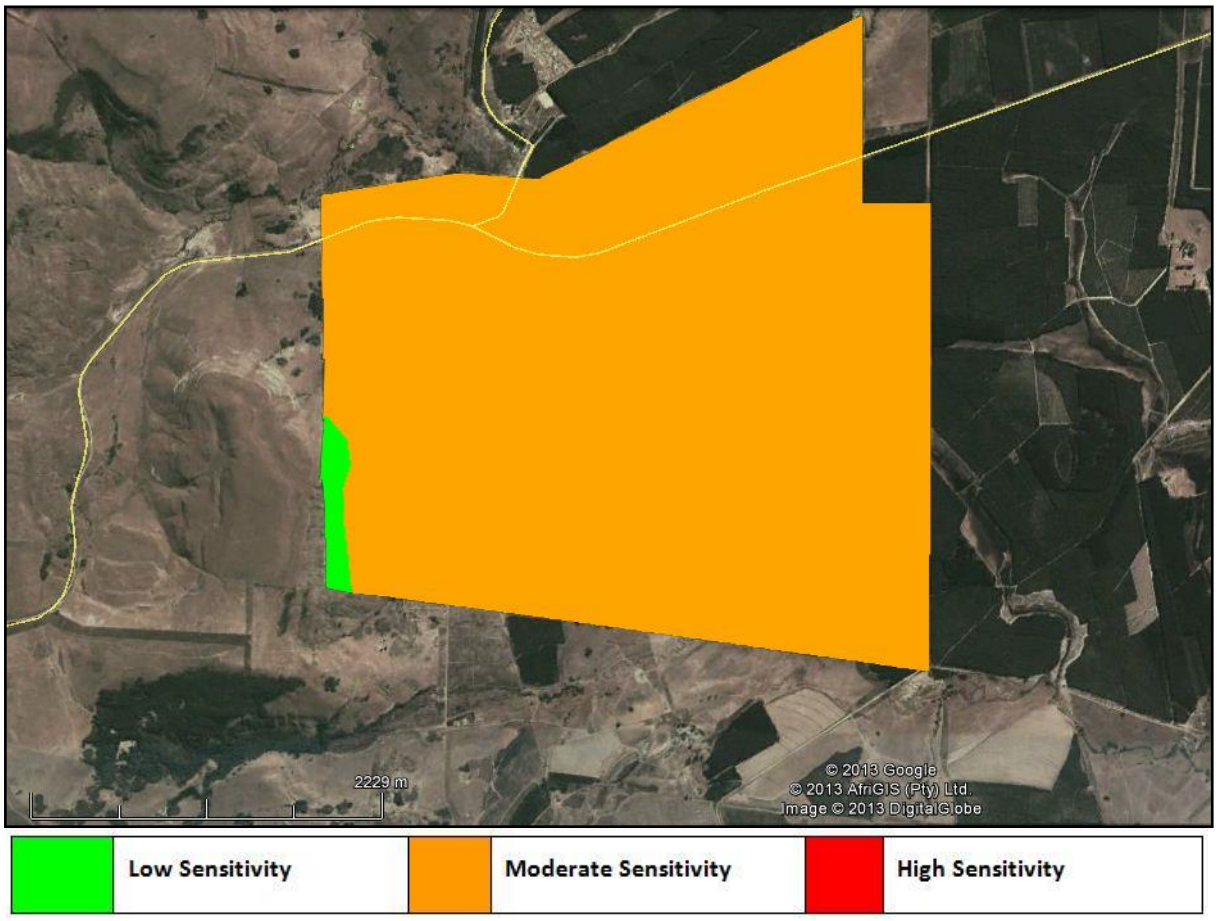


Figure 9–Depiction of the study area's palaeontological sensitivity taken from the report of Dr Gideon Groenewald.

8. FIELDWORK FINDINGS

This section deals with the findings of the site visit that was undertaken. The heritage sites identified during the site visit represent the only heritage sites identified thus far which can be considered as confirmed. This said the list of heritage resources provided here does not represent the full heritage inventory of the study area. This will only be achieved once detailed fieldwork in the form of walkthroughs of the study area has been conducted. For the purposes of this report, nine heritage sites have been confirmed. They are summarised in the table below, after which a detailed description of each heritage site is provided.

Table 7- List of identified heritage sites with coordinates and a short description for each.

SITE NUMBER	COORDINATES	DESCRIPTION
SITE 1	S 26° 52’ 01.7” E 30° 17’ 41.9”	Cemetery containing approximately 54 graves
SITE 2	S 26° 52’ 13.6” E 30° 16’ 33.2”	Historic engravings
SITE 3	S 26° 52’ 21.0” E 30° 16’ 39.9”	Historic farm worker homestead
SITE 4	S 26° 52’ 44.1” E 30° 18’ 16.8”	Cemetery containing approximately six graves
SITE 5	S 26° 51’ 16.9” E 30° 17’ 16.0”	Cemetery containing approximately 16 graves
SITE 6	S 26° 51’ 22.8” E 30° 16’ 49.9”	Cemetery containing approximately seven graves
SITE 7	S 26° 51’ 21.5” E 30° 16’ 47.4”	Cemetery containing one possible grave
SITE 8	S 26° 51’ 20.3” E 30° 16’ 39.8”	Cemetery containing approximately five graves
SITE 9	S 26° 14’ 30.0” E 28° 47’ 03.0”	Historic farmstead

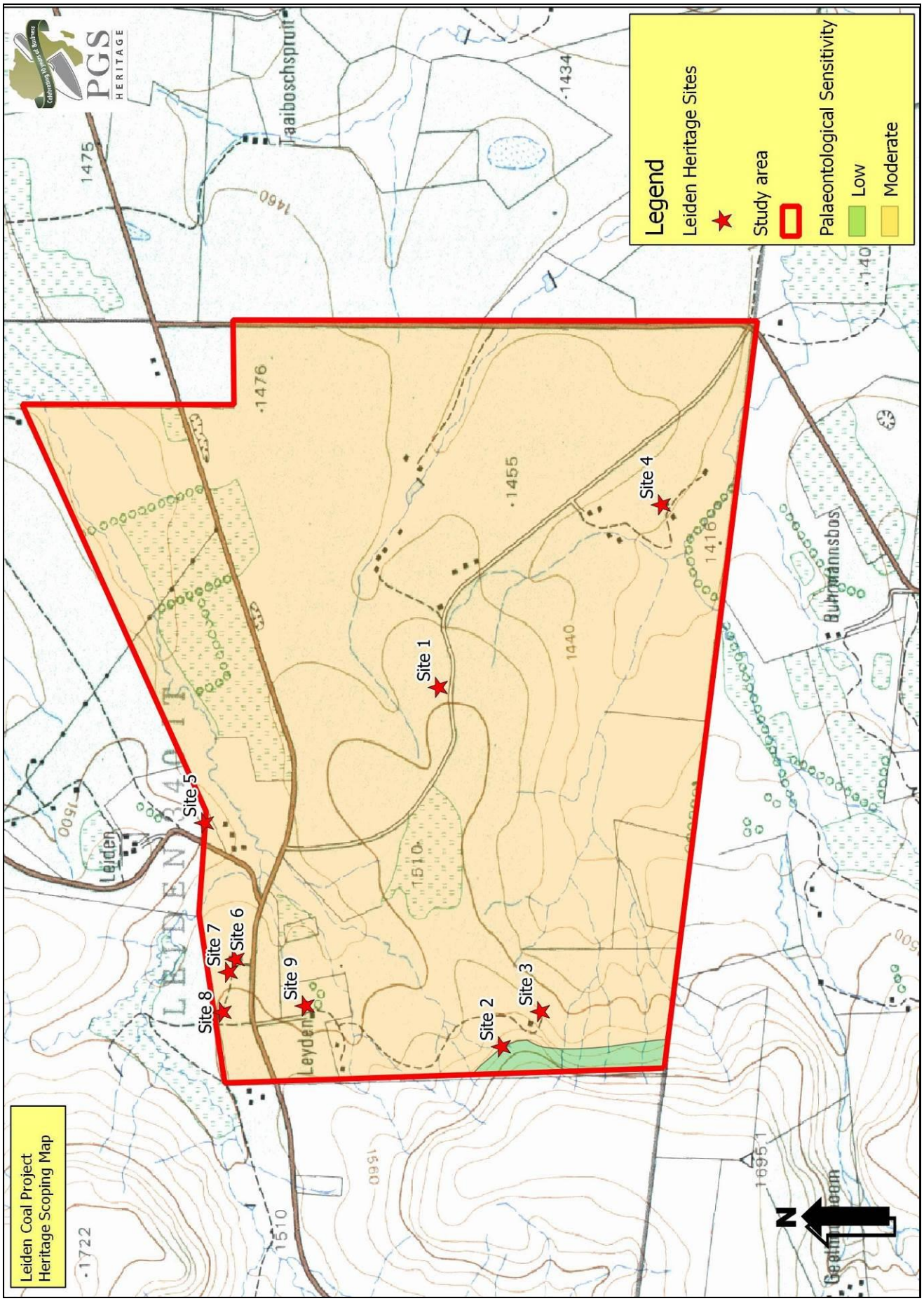


Figure 10–Map depicting both the distribution of identified heritage sites and the palaeontological sensitive areas.

8.1 SITE 1

Site Coordinates:

S 26° 52’ 01.7”
E 30° 17’ 41.9”

Site Description:

The site is comprised of an extensive informal cemetery consisting of approximately 54 graves. The cemetery is located within a pine plantation and is situated roughly 30m from the nearest road. All the graves are orientated along the east-west axis in the Western/Christian tradition which signifies that they were buried in the last approximately 150 years.

The cemetery comprises three sections which had been cleared of vegetation and which are evidently still being visited by families, with more graves located in the overgrown sections in-between these three cleared sections. These four components of the cemetery can be described as follows:

- The first component to be identified is located on the eastern end of the cemetery and comprises an extensive cleared section with 22 graves distributed in two rows. The western row has 12 graves and the eastern row 10 graves. All the graves from the eastern row are small and it is evident that children were buried in this row. The western row contain both adult and children graves.

  The surface features of all the graves from this section consist of rectangular and oval shaped stone dressings with upright stones as headstones. One such circular stone dressing was also observed. A poorly preserved inscription was found on one of these upright stones which seem to identify the buried individual as Amos Ndwande.

  The grave goods observed on the surface of these grave dressings comprise a painted clay pot, a saucer, tea cup as well as a South African sixpence bearing the date 1937. While this coin does of course not date the actual grave, it does indicate that this particular grave was already in existence during the late 1930s or early 1940s.

- The second identified component from the cemetery is located north-west of the section described above and consists of three graves buried in one row. One of the graves from this section has a triangular slate headstone with a rectangular cement lined dressing with another grave containing an irregularly shaped

headstone with a similar lined dressing. The third grave has an oval stone dressing with an unmarked upright stone on its western end. Both slate headstones have inscriptions painted on them, identifying both graves as belonging to the Nkosi family. The southern of the two graves which has a triangular slate headstone bears the name Aizik Nkosi as well as the date of death, but only the date and year remains namely 25 and 70. This indicates that the deceased passed away on the 25th of a presently unknown month in 1970.

The grave goods observed on the surface of these grave dressings comprise a tin cup, a tin bowl, plastic plates and well as plastic cups.

- The third section comprises two graves which had been cleared of vegetation. One of these graves has a stepped headstone built of brick and cement with a cement lined dressing whereas the second grave has a triangular slate headstone. The brick and cement headstone contains a date only, namely 1985.

- The fourth section comprises the graves located in-between the three sections which had been cleared by family members. As a result these graves are mostly overgrown with vegetation. At least 27 individual graves are found in these sections in-between the cleared sections, but due to the dense vegetation this number might be higher. All these graves have oval and rectangular stone dressings.

It seems possible for the cemetery to have been the burial place for a community of farm workers who worked and stayed on the farm. From the inscriptions on some of the graves at least two of these farm worker families can be identified namely Nkosi and Ndwandwe.

Site size: Approximately 75m x 75m.

Current Protection Status:

Graves and burial grounds fall under various legislative protections, depending on factors such as where the graves are located as well as their age. Such legislation may include the National Heritage Resources Act 25 of 1999, the Removal of Graves and Dead Bodies Ordinance (Ordinance no. 7 of 1925), the Human Tissue Act 65 of 1983, the Ordinance on Excavations (Ordinance no. 12 of 1980) as well as any local and regional provisions, laws and by-laws that may be in place.

Site Significance:

Graves and burial grounds have high levels of emotional, religious and historical significance. As a result the site has a **GP. A - High Significance**.

Figure 11–General view of one of the cleared sections of the cemetery. The graves from this section appear to be associated with the Ndwandwe family.

Figure 12–Another view of the same section of the cemetery which might be associated with the Ndwandwe family. Note the painted clay pot on the grave dressing in the front.

Figure 13–The section of the cemetery that appears to be associated with the Nkosi family

Figure 14–One of the graves from the third section of the site. The top end of the brick and cement headstone appears to have broken off. Note the date.

8.2 SITE 2

Site Coordinates:

S 26° 52’ 13.6”
E 30° 16’ 33.2”

Site Description:

The site is comprised of historic engravings on a cliff face as well as two rock shelters located nearby. It is situated near the western boundary of the study area at the base of a cliff face high up on a mountain.

The site comprises the following elements:

- Historic engravings on the cliff face including two swastikas associated with letters as well as a possible date. The engravings are in a poor condition seemingly as a result of natural weathering of the sandstone cliff face. The letters which can be discerned include two “Ld” sets separated by a vertical line. It is possible that at least some of these letters may be symbols. The date appears to be shown in the DD/MM/YY format and although it is quite difficult to accurately discern the numbers, it is possible that the date reads 20/9/41 (20 September 1941).
- A reasonably small and low rock shelter was identified a short distance north of the engravings and is located along the same cliff face. Although no archaeology was observed within the shelter, a large number of undecorated potsherds (roughly 100) were observed along the slope directly below the shelter. It is not presently known how old these potsherds are and whether they had any direct association with the shelter itself.
- A very long but low rock shelter was identified at the back of an enclosed space created by large boulders which had broken off the edge of the mountain. Three undecorated potsherd and one Later Stone Age flake was observed on the surface of the shelter. However, it is apparent that the floor of the shelter becomes a drainage line and it would appear that the shelter would not have been occupied during the summer months.

The existence of the site was indicated to the fieldwork team by the son of the landowner, Mr. Van Niekerk. According to his knowledge the swastikas and associated inscriptions were made by Nazi Germans who were hiding away there. From a historical basis three potential scenarios exists within which the Nazi Swastikas would have been engraved on the cliff face. These three potential interpretations for the site are as follows:

- During the Second World War (1939 – 1945) the Union of South Africa fought on the side of Great Britain and the other Allies against Nazi Germany. Germans (and descendants of Germans) living in South Africa at the time were in some cases interned. In the words of Delport (2013): "*...foreign citizens of the Axis powers residing in the Union had their own problems. Some German nationals were recalled to the Third Reich, others faced internment, ordered by the Union government, as enemy aliens."* In this scenario one or more Germans (or descendants of Germans) who may have resided in the surrounding area hid away at the site for fear of being interned. In support of this scenario, the area surrounding the study area has a strong presence of German-descendants. Many German settlers arrived in this area during the late 19th century and in all likelihood followed on the establishment of the Lüneburg mission station in 1854 by the Hermannsburg Missionary Society (Erasmus, 2004). Lüneburg is situated approximately 59km south-east of the present study area.
- During the war an organisation by the name of the Ossewa Brandwag (OB) was established on 4 February 1939 by a number of pro-Nazi Afrikaners in protest against the declaration of war against Nazi Germany. The organisation had a paramilitary wing known as the Stormjaers, who committed attacks of sobotage and vandfalism against government installations and infrastructure. The government of the Union of South Africa under its Prime Minister Field Marshall Jan Smuts retaliated by arresting thousands of Ossewa Brandwag members and interning them for the duration of the war. In this scenario members of the Ossewa Brandwag were hiding away at the site to avoid being arrested and interned by the police.
- The third scenario entails a person by the name of Sidney Robey Leibbrandt. In April 1941 Leibbrandt was dropped off on the Namaqualand Coast of South Africa by a Nazi German vessel. He was a South African champion boxer who had stayed in Nazi Germany before the outbreak of hostilities and during the early days of the war was trained as a German parachute solider. He was sent to South Africa to start an uprising and attempt to overthrow the government of the Union of South Africa. This plan was known as Project Weissdorn and was the brainchild of Nazi Admiral Wilhelm Canaris (Potgieter & Liebenberg, 2012). Although Leibbrandt personally never visited the vicinity of the study area (Leibbrandt, 1966), it is possible that some of his supporters or followers may have hid away at the site to avoid capture by the police.

It is presently impossible to state which of these three scenarios is correct. Furthermore, although a number of potsherds were observed in association with the site, these were all undecorated. As a result it is impossible to state whether these artefacts are of an archaeological nature or simply ceramics from a more recent past.

Site size: Approximately 100m x 100m.

Current Protection Status:

The engravings appear to date to the year 1941. As such they are not formally protected by existing heritage legislation, although they can be considered to be of high enough historic value to allow them to be protected. Furthermore, it is presently not known how old the potsherds are that were observed at the site. However, a worst case scenario would be accepted for the purposes of this report whereby it is assumed that these potsherds are older than 100 years. In terms of Section 35(4) of the National Heritage Resources Act (25 of 1999) man-made features and artefacts older than 100 years are defined as being archaeological. In the same section the act also states that such archaeological sites and objects may not be disturbed, altered, modified or destroyed without a suitable permit from the South African Heritage Resources Agency (SAHRA).

Site Significance:

The site can be considered to contain high historic value and is also quite unique. As a result the site has a **GP. B – Medium Significance**.

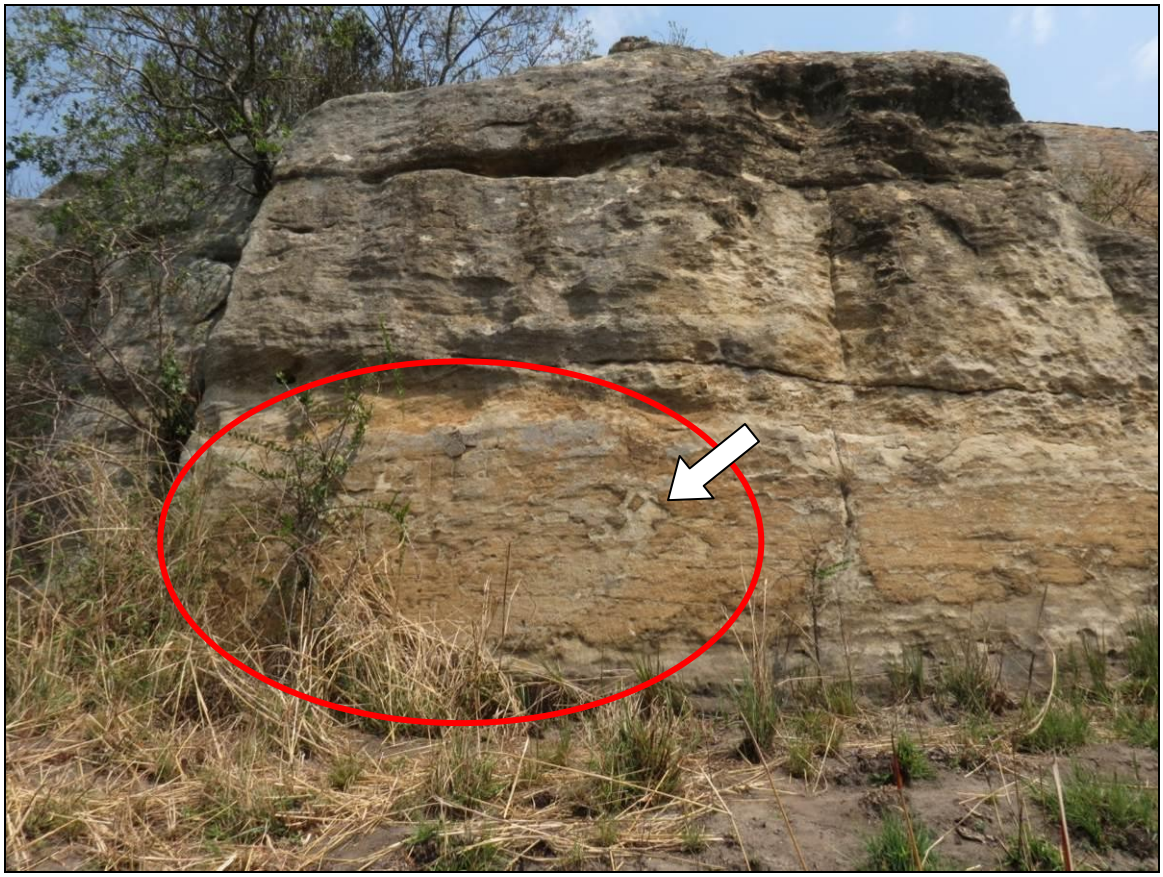


Figure 15–General view of the cliff face where the engravings are located. The engravings are all located within the area earmarked in red. One of the swastikas is just visible to the right of the demarcated area (see arrow).

Figure 16–One of the swastikas engraved on the cliff face.

Figure 17–The second swastika from the site.

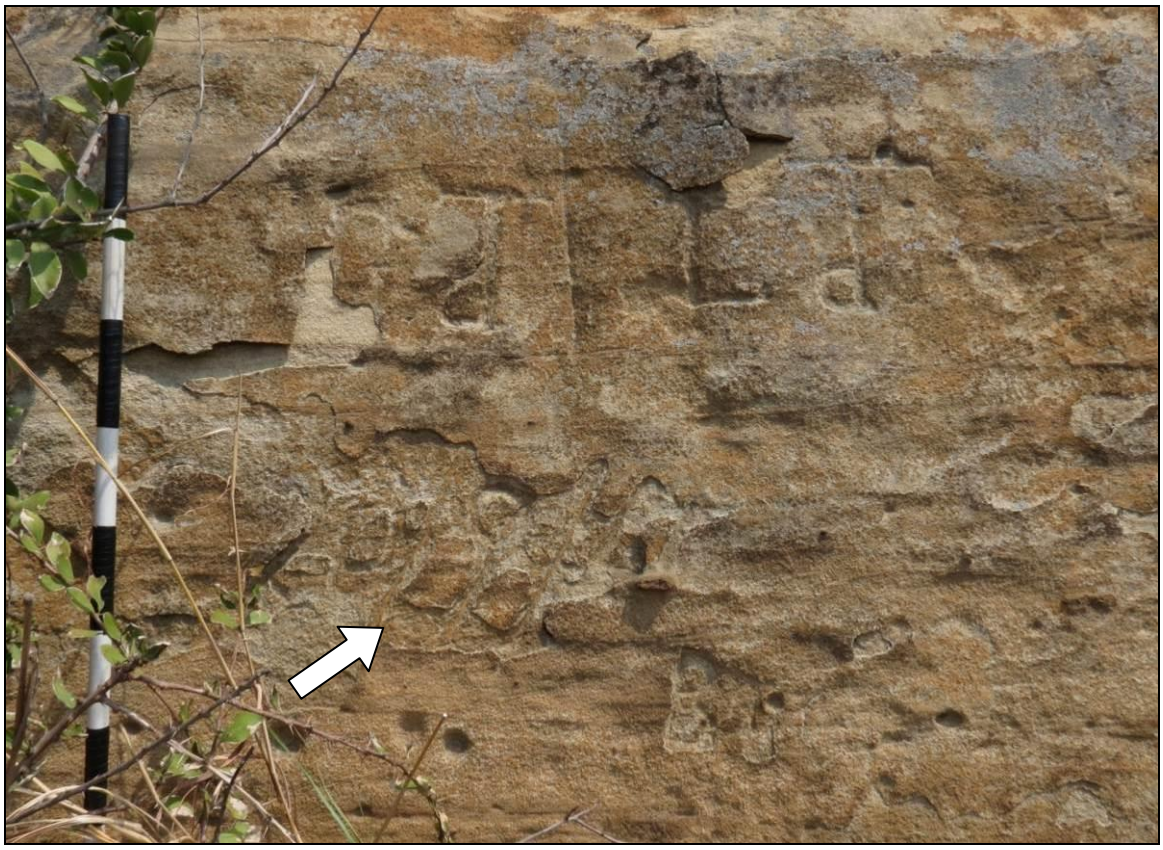


Figure 18–General view of the letters and date found in association with the two swastikas. The position of the date is indicated with the arrow.

Figure 19–General view of the small rock shelter associated with the site.

Figure 20–General view from below the small shelter looking up along the slope toward the shelter. A large number of undecorated potsherds were observed along the section of slope visible in this image.

Figure 21–General view of the large rock shelter associated with the site.

8.3 SITE 3

Site Coordinates:

S 26° 52’ 21.0”
E 30° 16’ 39.9”

Site Description:

The site comprises of a historic to recent homestead located on a spur against the slope of the escarpment on the western end of the study area. As a result the site is located on a topographically level section of land with good views toward the south, south-east and east.

The site comprises at least six poorly preserved rectangular stone structures of which one appears to have been a multi-roomed one. While some of the structures appear to be the remains of foundations of dwellings, other structures may have been used for the keeping of small livestock.

A small number of objects were observed on the surface of the site including wire, paraffin tins, a pedal from a toy pedal car, a cement brick with hole in the middle, a glass base, glass rim, clay potsherds as well as a glass fragment on which the words “Pepsi Cola (Pty) Ltd” was embossed. Most of these artefacts point to the last 20 to 60 years, with the fragment from the Pepsi bottle certainly dating to before 1985.

Although the exact age of the site is not presently known, it is depicted on the First Edition of the 2630CD Topographical sheet that was based on aerial photography undertaken in 1963 and was surveyed and drawn in 1971. This indicates that the site is at least 42 years old and may very well be older than that.

Based on the information that is presently available, it would appear that the structure was built and used by black people, possibly black farm workers. Past experience has shown that in some cases stillborn babies were buried in close proximity to the homes of their parents and aspecially along the sides of the parents’ dwelling. This seems to be especially true for older sites. As this site was abandoned some time ago, no direct information with regards to the presence (or not) of stillborn graves are presently available. For the purposes of this report a worst case scenario will be used within which it is assumed that graves of stillborn babies are indeed buried at the site. This scenario can only be refuted by either conclusive social consultation findings or archaeological test excavations.

Site size: Approximately 60m x 60m.

Current Protection Status:

Structures older than 60 years fall under the protection of Section 34(1) of the National Heritage Resources Act 25 of 1999.

Graves and burial grounds fall under various legislative protections, depending on factors such as where the graves are located as well as their age. Such legislation may include the National Heritage Resources Act 25 of 1999, the Removal of Graves and Dead Bodies Ordinance (Ordinance no. 7 of 1925), the Human Tissue Act 65 of 1983, the Ordinance on Excavations (Ordinance no. 12 of 1980) as well as any local and regional provisions, laws and by-laws that may be in place.

Site Significance:

The significance of the structures themselves without the presence of graves can be considered to be of Generally Protected A (GP. C) or High/Medium Significance. However, until such time that the presence of graves here has been confirmed or disproved, the site must be viewed as containing graves. All graves have high levels of emotional, religious and in some cases historical significance. As such the site is of **Generally Protected A (GP. A) or High/Medium Significance**.

Figure 22–General view of the site as seen from higher up against the mountain slope. The approximate position of the site is indicated.

Figure 23–One of the poorly preserved structures from the site is just visible on this photograph.

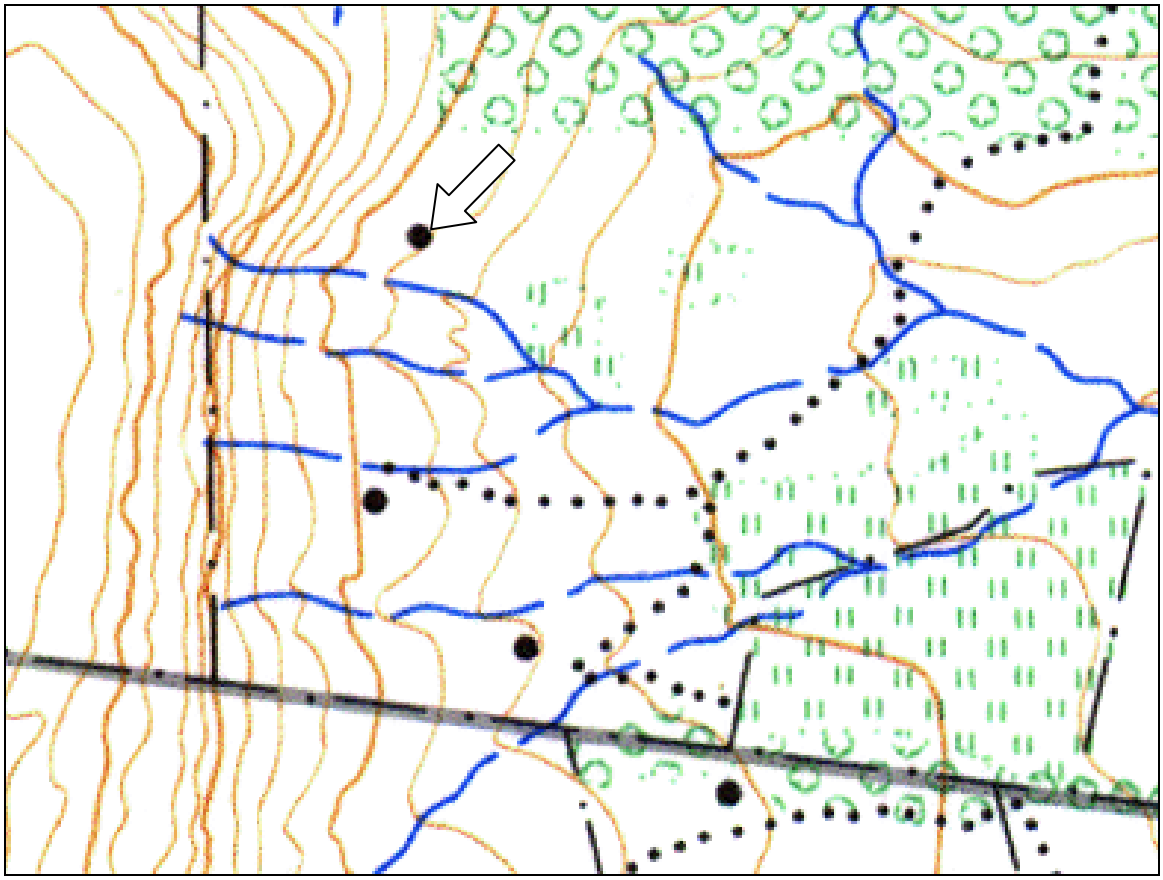


Figure 24–Enlarged section of the First Edition of the 2630CD Topographical Sheet that was surveyed in 1971. The depiction of the site is indicated with an arrow. These circular symbols were used at the time to represent "huts".

8.4 SITE 4

Site Coordinates:

S 26° 52’ 44.1”
E 30° 18’ 16.8”

Site Description:

The site is comprised of an informal cemetery consisting six graves and is associated with a homestead where people still reside. The homestead comprises a rondavel and two rectangular structures.

Five of the graves from this cemetery have surface features consisting of oval and rectangular shaped stone dressings of which some had upright stones as headstones. One of the six graves has a dressing consisting of only an upright slate. No formal headstones were observed. All the graves are orientated along the east-west axis in the Western/Christian tradition which signifies that they were buried in the last approximately 150 years. Furthermore, the general appearance of the cemetery indicates that it dates from the relatively recent past, an observation which is proven by the association of the cemetery with the nearby homestead where people still reside.

It is possible for graves of stillborn babies to be buried at the homestead.

Site size: Approximately 50m x 50m.

Current Protection Status:

Graves and burial grounds fall under various legislative protections, depending on factors such as where the graves are located as well as their age. Such legislation may include the National Heritage Resources Act 25 of 1999, the Removal of Graves and Dead Bodies Ordinance (Ordinance no. 7 of 1925), the Human Tissue Act 65 of 1983, the Ordinance on Excavations (Ordinance no. 12 of 1980) as well as any local and regional provisions, laws and by-laws that may be in place.

Site Significance:

Graves and burial grounds have high levels of emotional, religious and historical significance. As a result the site has a **GP. A - High Significance**.

Figure 25–General view of the cemetery in the foreground with the associated homestead in the back.

Figure 26–Another view of the cemetery.

8.5 SITE 5

Site Coordinates:

S 26° 51’ 16.9”
E 30° 17’ 16.0”

Site Description:

The site is comprised of an informal cemetery consisting of 16 graves and which is located directly south of a fence which also represents the northern boundary of the study area. The cemetery is associated with a nearby settlement which consists of a number of dwellings as well as a school.

Thirteen of the graves from this cemetery have surface features consisting of oval and rectangular shaped stone dressings of which some have upright stones as headstones. Two of the graves from this cemetery have cement headstones with rectangular cement lined dressings while one grave has a rectangular granite lined dressing with a rectangular headstone on which the following details of the deceased are provided: Shorty Johannes Nkosi (11 January 1942 – 6 June 1995). Grave goods were observed on some of the graves.

All the graves are orientated along the east-west axis in the Western/Christian tradition which signifies that they were buried in the last approximately 150 years. Furthermore, the general appearance of the cemetery indicates that it dates from the relatively recent past, an observation which is proven by the abovementioned date, the association of the cemetery with the nearby settlement where people still reside as well as the fact that the settlement is not depicted on the First Edition of the 2630CD Topographical sheet that was based on aerial photography undertaken in 1963 and was surveyed and drawn in 1971. This indicates that the settlement is at least younger than 42 years old and may even be younger than that.

It is possible for graves of stillborn babies to be buried at the settlement.

Site size: Approximately 100m x 100m.

Current Protection Status:

Graves and burial grounds fall under various legislative protections, depending on factors such as where the graves are located as well as their age. Such legislation may include the National Heritage Resources Act 25 of 1999, the Removal of Graves and Dead Bodies Ordinance (Ordinance no. 7 of 1925), the Human Tissue Act 65 of 1983, the

Ordinance on Excavations (Ordinance no. 12 of 1980) as well as any local and regional provisions, laws and by-laws that may be in place.

Site Significance:

Graves and burial grounds have high levels of emotional, religious and historical significance. As a result the site has a **GP. A - High Significance**.

Figure 27–General view of the cemetery in the foreground with the associated settlement visible in the back.

8.6 SITE 6

Site Coordinates:

S 26° 51’ 22.8”
E 30° 16’ 49.9”

Site Description:

The site consists of an informal cemetery with seven graves which is associated with a nearby abandoned homestead comprising two poorly preserved rectangular mud brick structures and one rectangular facebrick structure. All seven graves have surface features consisting of oval and rectangular shaped stone dressings of which six have upright stones as headstones. Two of the graves are of adults whereas the remaining five graves appear to be those of children. No formal headstones are located here and no grave goods were observed.

All the graves are orientated along the east-west axis in the Western/Christian tradition which signifies that they were buried in the last approximately 150 years. Although it is impossible to say exactly how old the cemetery is, the nearby abandoned homestead is not depicted on the First Edition of the 2630CD Topographical sheet that was based on aerial photography undertaken in 1963 and was surveyed and drawn in 1971. This indicates that the settlement is at least younger than 42 years old and may even be younger than that.

The general unkept appearance of the cemetery without any grave goods and with a fallen down tree lying on top of one of the graves seem to suggest that the family has not been at the cemetery in the recent past. This is supported by the abandoned appearance of the nearby homestead.

It is possible for graves of stillborn babies to be buried at the settlement.

Site size: Approximately 50m x 50m.

Current Protection Status:

Graves and burial grounds fall under various legislative protections, depending on factors such as where the graves are located as well as their age. Such legislation may include the National Heritage Resources Act 25 of 1999, the Removal of Graves and Dead Bodies Ordinance (Ordinance no. 7 of 1925), the Human Tissue Act 65 of 1983, the Ordinance on Excavations (Ordinance no. 12 of 1980) as well as any local and regional provisions, laws and by-laws that may be in place.

Site Significance:

Graves and burial grounds have high levels of emotional, religious and historical significance. As a result the site has a **GP. A - High Significance**.

Figure 28–General view of the cemetery in the foreground with the associated settlement visible to the right.

Figure 29–Two of the graves from the cemetery.

8.7 SITE 7

Site Coordinates:

S 26° 51’ 21.5”
E 30° 16’ 47.4”

Site Description:

The site consists of one possible grave which is located almost directly south of a homestead where people still reside. The possible grave comprises an oval stone dressing with a plant growing out of the features southern end.

The dressing of the possible grave is orientated along the east-west axis in the Western/Christian tradition which signifies that they were buried in the last approximately 150 years. Furthermore, the general appearance of the possible grave indicates that it dates from the relatively recent past, an observation which is proven by the association of the possible grave with the nearby settlement where people still reside as well as the fact that the settlement is not depicted on the First Edition of the 2630CD Topographical sheet that was based on aerial photography undertaken in 1963 and was surveyed and drawn in 1971. This indicates that the settlement is at least younger than 42 years old and may even be younger than that.

It is possible for graves of stillborn babies to be buried at the homestead.

Site size: Approximately 40m x 40m.

Current Protection Status:

Graves and burial grounds fall under various legislative protections, depending on factors such as where the graves are located as well as their age. Such legislation may include the National Heritage Resources Act 25 of 1999, the Removal of Graves and Dead Bodies Ordinance (Ordinance no. 7 of 1925), the Human Tissue Act 65 of 1983, the Ordinance on Excavations (Ordinance no. 12 of 1980) as well as any local and regional provisions, laws and by-laws that may be in place.

Site Significance:

Graves and burial grounds have high levels of emotional, religious and historical significance. As a result the site has a **GP. A - High Significance**.

Figure 30–General view of the possible grave in the foreground with the associated homestead visible in the back.

8.8 SITE 8

Site Coordinates:

S 26° 51’ 20.3”
E 30° 16’ 39.8”

Site Description:

The site is comprised of an informal cemetery consisting of five graves and which is located directly adjacent to foundation remains of a former homestead. According to a local resident the graves are associated with the Mthethwa and Madonsela families.

All the graves from this cemetery have surface features consisting of oval and rectangular shaped stone dressings with upright stones on their western ends for headstones. Two of the graves dressings from the cemetery are large and appear to be those of adult graves whereas the remaining three graves seem to be those of children. The upright stones on the three children graves have the following inscribed on them: “1983 26”, “11 10 81 11 10” and “82”. These three inscriptions appear to represent the respective dates of death namely 1981, 1982 and 1983. One of the adult graves also has an upright stone with an inscription of which only the word “Simon” can be read.

All the graves are orientated along the east-west axis in the Western/Christian tradition which signifies that they were buried in the last approximately 150 years. Furthermore, the general appearance of the cemetery indicates that it dates from the relatively recent past, an observation which is proven by the abovementioned dates as well as the fact that the settlement is not depicted on the First Edition of the 2630CD Topographical sheet that was based on aerial photography undertaken in 1963 and was surveyed and drawn in 1971. This indicates that the settlement is at least younger than 42 years old and may even be younger than that.

It is possible for graves of stillborn babies to be buried at the foundation remains of the abandoned settlement.

Site size: Approximately 30m x 30m.

Current Protection Status:

Graves and burial grounds fall under various legislative protections, depending on factors such as where the graves are located as well as their age. Such legislation may include the National Heritage Resources Act 25 of 1999, the Removal of Graves and Dead Bodies Ordinance (Ordinance no. 7 of 1925), the Human Tissue Act 65 of 1983, the

Ordinance on Excavations (Ordinance no. 12 of 1980) as well as any local and regional provisions, laws and by-laws that may be in place.

Site Significance:

Graves and burial grounds have high levels of emotional, religious and historical significance. As a result the site has a **GP. A - High Significance**.

Figure 31–General view of the cemetery at the site.

8.9 SITE 9

Site Coordinates:

S 26° 51’ 36.06”
E 30° 16’ 40.97”

Site Description:

The site comprises an old farmstead consisting of a number of buildings. It is located at the formal entrance on the northern end of the modern farmstead. The following structures from the site will be discussed in more detail below.

- **Original Farmhouse**

  This building is a small rectangular structure located a short distance east of the main entrance gate to the farmstead. The original component of the building would have been a small rectangular structure with a hipped corrugated iron roof. Flat roofed additions to the original core appear to have been added later as was a small veranda on the southern end of the building.

- **Second Farmhouse**

  A rectangular face brick structure with a pitched corrugated iron roof is located here and has a covered veranda extending along the entire southern facade of the building. This building is more recent than the original farmhouse and may have been a second farmhouse erected on the farmstead.

- **Rondavel**

  A circular stone rondavel with a pitched roof is located to the west of the main entrance gate to the farmstead. The original part of the structure would have been the cylindrical stone base on top of which a conical thatch roof was in all likelihood originally built. At present a pitched corrugated iron roof covers the structure. Rondavels were often used on historic farmsteads as meat and milk rooms.

- **Shed**

  A rectangular stone shed is located behind the rondavel. This shed may have been used as a wagon shed or alternatively to house livestock or for the storage of agricultural equipment and material.

While it is currently difficult to provide an accurate date for the site, features such as the rondavel, the stone foundation of the original dwelling as well as the stone shed point to at least the early part of the 20th century, and may even be older than that as well.

Site size: Approximately 60m x 60m.

Current Protection Status:

Structures older than 60 years fall under the protection of Section 34(1) of the National Heritage Resources Act 25 of 1999. In terms of Section 35(4) of the National Heritage Resources Act (25 of 1999) man-made features and artefacts older than 100 years are defined as being archaeological. In the same section the act also states that such archaeological sites and objects may not be disturbed, altered, modified or destroyed without a suitable permit from the South African Heritage Resources Agency (SAHRA).

Site Significance:

The site possesses high levels of historic and emotional significance. The buildings have however been modified over time. As a result the site has a **GP. B – Medium Significance**.

Figure 32–General view of the southern facade of the original farmhouse.

Figure 33–General view of the second farmhouse.

Figure 34–The rondavel comprising the original stone cylindrical base and upon which a corrugated iron pitched roof was in all likelihood added at a later stage.

9. DESCRIPTION OF POTENTIAL IMPACTS

9.1 Potential Fatal Flaws

Fatal flaws would constitute environmental characteristics which cannot or may not interact with the proposed development. From a heritage point of view, fatal flaws can be seen as a heritage resource/s present on the site that will halt the project and that cannot be mitigated due to site constraints such as limited space to implement buffer or no-go zones. In most case the implementation of buffer zones and extensive conservation management plans can change possible fatal flaws as noted in ***Table 8***.

Table 8—Examples of heritage resources are provided below that could constitute a fatal flaw on a development site where buffer zones and exclusion zones are impossible to implement

Heritage Resource	Example
Rock Art	Rock art, in the form of paintings or engravings situated within a development area are seen as immovable resources and can only be moved under exceptional circumstances
National or Provincial Heritage Sites	Site specific monuments like battles or major sites or structures with considerable significance
Sacred Sites	Immovable sites associated with religion or cultural groupings, such as sacred pools, historic initiation school sites, etc.
Archaeological sites of National Significance	Sites such as Mapungubwe Hill or an archaeological landscape such as the Limpopo Valley or The Cradle of Humankind
Cultural Landscapes of significance	Landscapes such as valleys and vistas held as being of national or international importance

9.2 Identified Non-Fatal Flaws

i. Within the study area, the main heritage sites identified at the desk top level are various built structures, some of which are likely to be of historical date. However, the significance of these built structures can only be assessed at the ground verification stage. A heritage architect would probably need to be appointed to provide specialist input on these structures. It is also important to note that the presence of historical structures is often associated with individual graves or cemeteries. The possible presence of graves can only be verified at the ground verification stage. Furthermore, and as indicated elsewhere, experience has shown that graves of small children were traditionally buried in close proximity to the house of the parents. This feature should be addressed as part of the social consultation process of the project.

ii. During the site visit a total of nine heritage sites were identified. These sites comprise six cemeteries, one historic farmstead, one old farm worker dwelling as well as one site comprising historic rock engravings.

9.3 Identification of Areas for Further Specific Fieldwork

As noted previously, various structures and areas have been identified from historic map analysis. Further potential sites were also identified during the archival research undertaken for the study. Lastly, an examination of the Google Earth imagery has identified a number of areas with the potential for heritage sites. The structures and sites will be evaluated during the field verification stage and incorporated into the HIR. This said, it is also important to note that the entire study area as defined during the impact assessment phase will have to be covered by detailed fieldwork.

9.4 Identification of Areas of Heritage Sensitivity

All the relevant sources of heritage information used in this study was summarised in a heritage sensitivity map. This map provides a zoned depiction of the study area wherein areas of varying heritage sensitivity are indicated. This map will be used in conjunction with the other sensitivity maps produced by the specialists to assess the feasibility of the proposed development and to allow the planning of the layout of the proposed development in such a way that the least possible impact is generated.

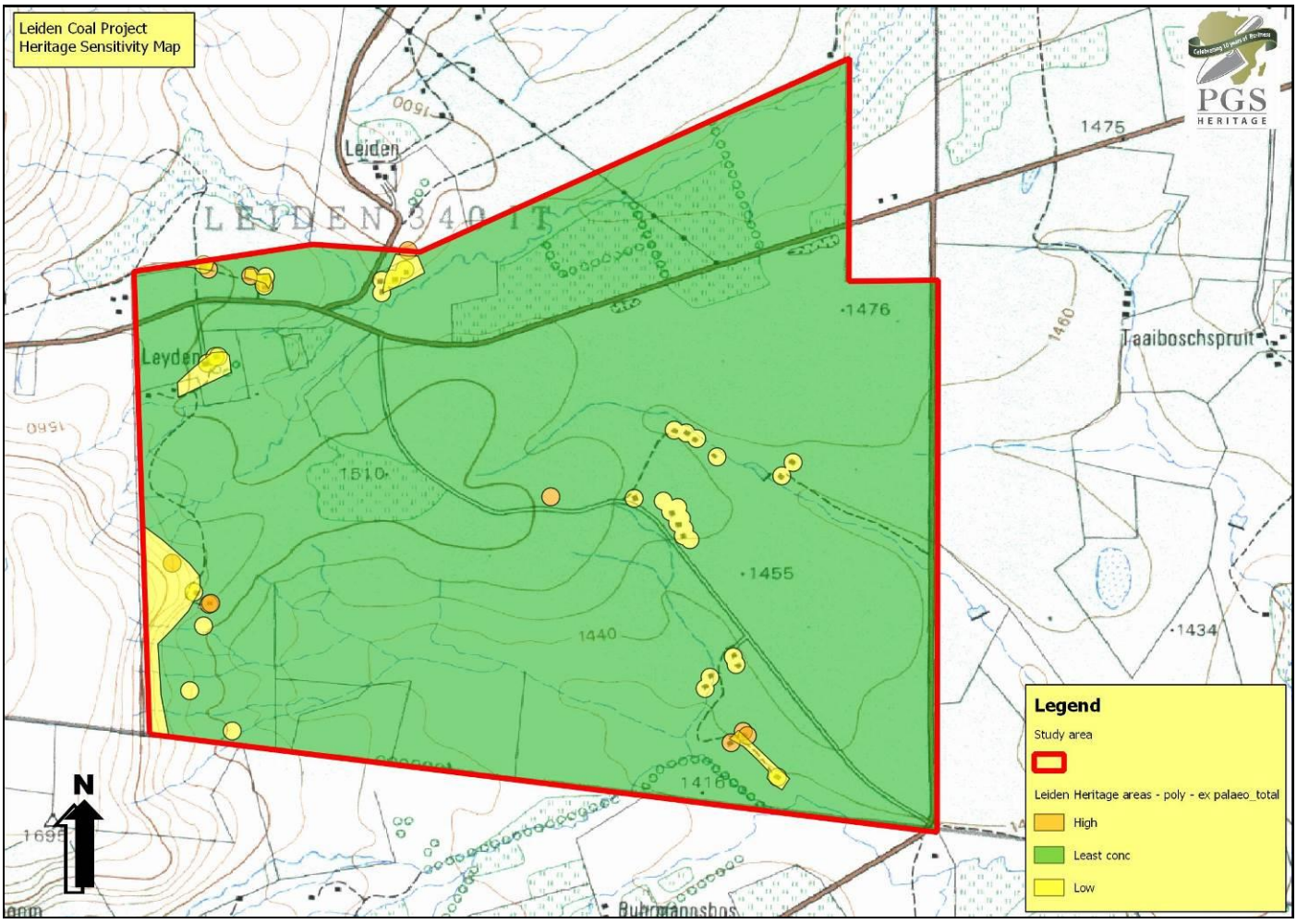


Figure 35 – Map depicting the combined heritage sensitivity areas.

10. DETAILED PLAN OF STUDY FOR THE EIA AND EMP

The following will be required to develop a final HIA to manage the heritage resources within the proposed mining area.

10.1 Methodology

10.1.1 Physical Surveying

The fieldwork component will consist of a detailed walk through of the proposed mining area and is aimed at locating heritage resources falling within (and directly adjacent to) the proposed study area. The locations of all heritage resources that are recorded during the survey will be documented using a hand-held GPS. Furthermore, the documentation will reflect a brief qualitative description and statement of significance for each site and include a photographic record of all the sites.

It is important to also note that informal social consultation (i.e. with local community members, residents and knowledgeable individuals) will be undertaken during the fieldwork component. The aim of social consultation is to identify any tangible and intangible resources (i.e. sacred places, myths and indigenous knowledge resources) that may exist.

10.1.2 Deliverables

A report will be written which would include the following components:

- The identification and mapping of all heritage resources in the affected area;
- An assessment of the significance of such resources in terms of the heritage assessment criteria;
- An assessment of the impact of the development of such heritage resources;
- If heritage resources will be adversely affected by the proposed development, consideration of the alternatives;
- Proposed mitigation of any adverse effects during and after the completion of the proposed development.

11. POTENTIAL IMPACTS AND FURTHER WORK FOR EIA PHASE

The desktop evaluation of the study area and surrounds has shown that the possibility exists of finding various heritage resources in the proposed study area, including historical structures as well as graves and cemeteries. A site visit was undertaken during which the findings of the desktop study was confirmed in that nine sites were identified of which six were cemeteries, one a historic farmstead, one historic farm worker dwelling and one historic rock engraving. Once the final study area has been defined, this will have to be assessed by way of detailed walkthroughs during the HIA phase of the project. This will allow for an assessment of the actual impact of the proposed development on any heritage sites located there i.e. a footprint area specific heritage impact assessment.

Table 9- Potential Impacts to Consider for EIA and EMP Phase

	IMPACT	STAGE OF PROJECT
ISSUE	**IMPACT ON ARCHAEOLOGICAL SITES**	**CONSTRUCTION**
DISCUSSION	As seen from the archival work and discussion, the possibility of archaeological finds has been identified and thus further fieldwork is required to develop a comprehensive Heritage Management Plan for the construction activities.	
EXISTING IMPACT	None known.	
PREDICTED IMPACT	Unidentified archaeological sites can seriously hamper construction and development activities and timelines. Destruction or damage of such sites requires a permit from the responsible heritage authority (NHRA, section 35). Fieldwork can provide valuable information on such sites in the study area and provide timeous management of such sites through various mitigation measures, including the realignment of the construction activities, if necessary.	Destruction or damage during construction of surface features such as opencast areas, haul roads, pipelines or pollution control dams
EIA INVESTIGATION REQUIRED	Archaeological and heritage field survey of the entire mining development footprint area with a focus placed on areas identified in the desktop study as heritage sensitive.	
WHEN IS MITIGATION REQUIRED		During design and before construction no-go areas need to be demarcated. Alternatively, mitigation measures such as the archaeological excavation of sites must be planned and scheduled to fit within the timing of the project phases.
	IMPACT	**STAGE OF PROJECT**
ISSUE	**IMPACT ON HISTORICAL STRUCTURES**	**CONSTRUCTION, OPERATION**
DISCUSSION	As seen from the archival work and discussion, the possible presence of historical structures has	

	been identified as being high and thus fieldwork is required to develop a comprehensive Heritage Management Plan for the development	
EXISTING IMPACT	None known.	
PREDICTED IMPACT	Damage/destruction by blasting (vibration) and other mining activities e.g. bench box cut mining (direct impacts), on historical structures. Destruction or damage of such sites requires a permit from the responsible heritage authority (NHRA, section 34).	Destruction or damage during construction of surface features such as opencast areas, haul roads, pipelines or pollution control dams
EIA INVESTIGATION REQUIRED	Field survey of selected sites within the study area will confirm possible impacted sites and provide timeous management of such sites through various mitigation measures.	
WHEN IS MITIGATION REQUIRED		During design and before construction, - Baseline assessment of structures - Permitting and controlled destruction of sites Operational - Evaluation of structures during mining against baseline data
	IMPACT	**STAGE OF PROJECT**
ISSUE	**IMPACT ON GRAVES AND CEMETERIES SITES**	**CONSTRUCTION**
DISCUSSION	The existence of graves and cemeteries has been confirmed during the site visit. .	
EXISTING IMPACT	None known.	
PREDICTED IMPACT	Unidentified graves and cemeteries and the discovery of such sites can seriously hamper construction and development timelines. Damage, destruction or removal of such sites requires a permit from various responsible authorities, including the Heritage Authority (NHRA, section 36), Provincial Health Department and the SA Police Service. Such a process can take up to 12 months to finalise.	Destruction or damage during construction of surface features such as opencast areas, haul roads, pipelines or pollution control dams. During the operational phase of the mine, the mining direction and subsequent box cutting and earth works can possibly impact on graveyards and cemeteries in

	Fieldwork can provide valuable information on the presence of such sites in the study area and provide timeous management of such sites, which may include the realignment of the proposed development activities. In the event that identified graves and cemeteries cannot be avoided, a grave relocation process needs to be initiated, bearing in mind that such a process impacts on the spiritual and social fabric of the next of kin and associated communities.	the way of the mining activities.
EIA INVESTIGATION REQUIRED	Archaeological field survey of the EIA study area will identify grave sites.	
WHEN IS MITIGATION REQUIRED		During design and before construction no-go areas need to be demarcated. Alternatively, mitigation measures such as the physical relocation of the graves in question (including aspects such as detailed social consultation) needs to be planned and scheduled to fit within the timing of the project phases. It must be understood that such a process impacts on the spiritual and social fabric of the next of kin and associated communities.
	IMPACT	**STAGE OF PROJECT**
ISSUE	**IMPACT ON UNMARKED CHILD GRAVES**	**CONSTRUCTION**
DISCUSSION	From experience on similar sites and the knowledge of cultural customs and traditions, it is known that stillborn babies and deceased infants occasionally were buried within the homesteads of black rural communities. These children were sometimes buried underneath the floors and walls of houses and huts and the	

	burials were not marked, but were known to the immediate family.	
EXISTING IMPACT	None known.	
PREDICTED IMPACT	Unidentified graves and the discovery of such sites can seriously hamper construction and development timelines. Damage, destruction or removal of such sites requires a permit from various responsible authorities, including the Heritage Authority (NHRA, section 36), Provincial Health Department and the SA Police Service. Such a process can take up to 12 months to finalise. Social consultation with former residents of the homesteads in question can provide valuable information on the presence of such sites in the study area and provide timeous management of such sites, which may include the realignment of the proposed development activities. In the event that such graves cannot be avoided, a grave relocation process needs to be initiated, bearing in mind that such a process impacts on the spiritual and social fabric of the next of kin and associated communities.	Destruction or damage during construction of surface features such as opencast areas, haul roads, pipelines or pollution control dams. During the operational phase of the mine, the mining direction and subsequent box cutting and earth works can possibly impact on graves that are located in the way of the mining activities.
EIA INVESTIGATION REQUIRED	A social consultation process with current and former residents of the study area can assess whether such sites are located within the study area. In cases where no former residents for a homestead can be found, test excavations in and around the structure would assess whether any such unmarked graves are located there.	
	IMPACT	**STAGE OF PROJECT**
ISSUE	**IMPACT ON PALAEONTOLOGICAL RESOURCES**	**CONSTRUCTION, OPERATIONAL**
DISCUSSION	A palaeontological desktop study was	

	undertaken by Dr. Gideon Groenewald. The study revealed that large sections of the present study area is underlain by Permian aged sedimentary rocks of the Vryheid Formation (Pv) of the Ecca Group which forms part of the Karoo Supergroup. Only a small section of the study area is underlain by Jurassic aged Dolerite. There is a possibility that fossils could be encountered during excavation of bedrock of the Vryheid Formation within the development footprint.	
EXISTING IMPACT	None known.	
PREDICTED IMPACT	Unidentified palaeontological resources and the discovery of such resources can seriously hamper construction and development timelines. Damage, destruction or removal of such sites requires a permit from the responsible heritage authority (NHRA, section 35).	Destruction or damage during construction of surface features such as opencast areas, haul roads, pipelines or pollution control dams. During the operational phase of the mine, the mining direction and subsequent box cutting and earth works can possibly impact on palaeontological resources.
EIA INVESTIGATION REQUIRED	The mitigation measures recommended in the palaeontological desktop study must be undertaken.	
WHEN IS MITIGATION REQUIRED		During design and before construction, the three mitigation measures outlined in the palaeontological desktop study will have to be undertaken. These are as follows: (a) the developer and the ECO of the mining project must be made aware of the fact that coal mining is by definition the mining of fossil plant material; (b) the developer must apply for a collection and destruction permit for plant fossils encountered during the mining operation and (c) the

	developer must employ a qualified palaeontologist to visit the present mining operations to record any fossils. The palaeontologist will look out for exceptionally well preserved fossils and collect representative samples of these fossils for further study at an appropriate institute such as the Bernard Price Institute for Palaeontology at WITS University (Groenewald, 2013)

12. CONCLUSIONS AND RECOMMENDATIONS

The findings of the desktop research for the Heritage Scoping Report have shown that the study area and surrounding areas have a historical and archaeological history and that there is potential for archaeological and historical sites and material to exist within the study area. The initial research has also identified specific possible heritage sensitive areas within the study area that will need further investigation during the HIA/EIA phase. A site visit was undertaken which identified a total of nine sites comprising six cemeteries, one historic farmstead, one historic rock engraving site as well as one abandoned historic farm worker homestead.

The Heritage Impact Assessment (HIA) phase will consist of a physical walkthrough of the study area, focussing on the areas and sites that were identified during the desktop research phase. This should confirm the presence or absence of sites/areas with heritage significance identified from the scoping assessment. Based on the results of the HIA report, recommendations for mitigation (destruction, recording and/or avoidance) of the confirmed heritage resources will be made for incorporation into the EMP for the project.

Palaeontology

A palaeontological desktop study was undertaken by Dr. Gideon Groenewald. The study area is almost entirely underlain by sedimentary rocks of the Permian aged Vryheid Formation, Ecca Group, Karoo Supergroup, with only a small section along the western edge of the study area underlain by Jurassic aged Dolerite.The Vryheid Formation is known for containing an abundant assemblage of plant fossils and the mining of coal is by definition the mining of fossil plant material. Due to the fact that the Vryheid Formation sediments and coal beds will only be exposed during the mining operations and associated infrastructure development, it is unlikely that fossils will be observed before the mining takes place. For this reason a moderate palaeontological sensitivity is allocated to the larger portion of the study area. Dolerite will not contain any fossils because of its igneous nature and the small area along the South-

western edge underlain by dolerite has thus been allocated a Low palaeontological sensitivity. During the EIA phase the following mitigation measures will be highlighted: (a) the developer and the ECO of the mining project must be made aware of the fact that coal mining is by definition the mining of fossil plant material; (b) the developer must apply for a collection and destruction permit for plant fossils encountered during the mining operation and (c) the developer must employ a qualified palaeontologist to visit the present mining operations to record any fossils. The palaeontologist will look out for exceptionally well preserved fossils and collect representative samples of these fossils for further study at an appropriate institute such as the Bernard Price Institute for Palaeontology at WITS University (Groenewald, 2013).

Archaeological Sites

The desktop study has revealed the potential for archaeological sites such as Later Stone Age shelters (with or without paintings) as well as Late Iron Age sites to be located within the study area. While no such sites were identified during the site visit, it would be important for an archaeological field survey of the final mining development footprint to be undertaken during the EIA Phase of the project to identify the presence of such sites within these areas. Should such sites be identified within the development footprint areas mitigation measures such as archaeological excavations may be required.

Historical Sites and Structures

Evaluation of topographical maps and satellite imagery has indicated the presence of one farmstead as well as a number of farm workers housing. As the age cannot be determined at this stage, field survey and evaluation of each structure and its locality, with regards to the proposed mining activity, will be required to determine the possible impacts on them and suggest appropriate mitigation measures during the detailed EIA Phase.

Graves and Cemeteries

The site visit identified six cemeteries. It is likely that even more cemeteries and grave sites are located within the study area. In this regard it is worth noting that during discussions held with the landowner he indicated that there are a number of grave sites and cemeteries located across his property. Cemeteries and grave sites are protected by various legislations and the best option would be the in situ preservation of the sites. Should this not be possible, a standard grave relocation process (including a detailed social consultation process) must be undertaken.

Unmarked Graves in Homesteads

The desktop study revealed the presence of a number of homesteads within the study area. Based on experience of similar sites and the knowledge of cultural customs and traditions, it is known that stillborn babies and deceased infants occasionally were buried within the homesteads of black rural communities. These children were sometimes buried underneath the floors and walls of houses and huts and the burials were not marked, but were known to the immediate family. Cemeteries and grave sites are protected by various legislations and the best option would be

social consultation with the former (or present) residents of these homesteads to assess whether any such unmarked graves are located within the study area for the HIA. The best option then would be the in situ preservation of the sites. Should this not be possible, a standard grave relocation process (including a detailed social consultation process) must be undertaken.

Historic Rock Engravings

One site comprising historic rock engravings was identified during the site visit. Possible archaeological material in the form of clay potsherds and one Later Stone Age lithic were also observed here. While the engravings are not formally protected by existing heritage legislation, they are of high enough historic significance to warrant their conservation. The possibility exists for the nearby potsherd scatter to be of archaeological age and formally protected. The best option for the site would be in situ preservation. The fact that the site is located high up against a cliff face would in all likelihood mean that no development impacts are expected on the site.

The data on the different types of heritage resources identified from the field work will be compiled in a final HIA report. This report will utilise the Plan of Study for the EIA/HIA (***Section*** 8) as well as the significance rating (***ANNEXURES A and B***) to identify and rank the impacts on the heritage resources into the final detailed EIA investigation.

Potential impacts to be identified and evaluated during the EIA include:

- Disturbance/destruction of archaeological sites or material – Archaeological survey of the impacted area
- Disturbance/destruction of palaeontological material – Recommendations from palaeontological desktop study must be outlined in the EIA and EMP and must be undertaken as mitigation measures.
- Destruction/damage/removal of unidentified cemeteries and graves - Archaeological survey of the impacted area as well as social consultation
- Destruction/damage of historical structures – Physical survey of the impacted area
- Destruction/alteration of cultural landscape – Visual Impact Assessment to address this issue

The desktop evaluation of the study area and surrounds has shown that the possibility exists of finding various heritage resources in the proposed study area, including historical structures as well as graves and cemeteries. A site visit was undertaken during which the findings of the desktop study was confirmed in that nine sites were identified of which six were cemeteries, one a historic farmstead, one historic farm worker dwelling and one historic rock engraving. Once the final study area has been defined, this will have to be assessed by way of detailed walkthroughs during the HIA phase of the project.

13. REFERENCES

Published References

Bergh, J.S. (ed.). 1999. *Geskiedenis Atlas van Suid-Afrika: Die Vier Noordelike Provinsies*. J.L. van Schaik. Pretoria.

Delius, P. 2007. *Mpumalanga: History and Heritage*. University of KwaZulu-Natal Press, Scottsville.

Delport, A. 2013. *Changing attitudes of South Africans toward Italy and its people during the Second World War, 1939 to 1945* in Historia, vol. 58 no. 1.

Erasmus, B.J. *On Route in South Africa*. Jonathan Ball Publishers, Johannesburg.

Hofmeyr, H., K. Smith & C. Smith. 2009. *Wakkerstroom: Jewel of Mpumalanga*. Mediakor, Pretoria.

Huffman, T.N. 2007. *Handbook to the Iron Age: The archaeology of Pre-Colonial Farming Societies in Southern Africa*. University of KwaZulu-Natal Press, Scottsville.

Leibbrandt, S.R. 1966. *Robey Leibbrandt vertel alles in Geen Genade*. S.R. Leibbrandt, Pretoria.

Lombard, R.T.J. 1980. *Ermelo: 1880 – 1980*. Ermelo City Council, Ermelo.

Matsebula, J.S.M. 1972. *A History of Swaziland*. Longman, Cape Town.

Myburgh, A.C. 1956. *Die Stamme van die Distrik Carolina*. Government Printer, Pretoria.

Potgieter, T & I Liebenberg. 2012. *Reflections on War: Preparedness and Consequences*. Sun Media, Stellenbosch.

Unpublished References

Groenewald, G. 2012. Palaeontological Desktop Assessment for the Leiden Colliery on the Remainder of the Farm Leiden 340 IT, Mkhondo Local Municipality, Gert Sibande District Municipality, Mpumalanga Province.

Archival References

SS, R5055/86

Historic Topographic Maps

All the historic topographic maps used in this report were obtained from the Directorate: National Geo-spatial Information of the Department of Rural Development and Land Reform in Cape Town.

Google Earth

All the aerial depictions used in this report are from Google Earth.

Internet References

www.sahistory.org.za
www.wikipedia.org

ANNEXURES A

HERITAGE ASSESSMENT METHODOLOGY

The section below outlines the assessment methodologies to be utilised in the HIA.

The Heritage Impact Assessment (HIA) report to be compiled by PGS Heritage and Grave Relocation Consultants (PGS) for the proposed project will assess the heritage resources found on site. This report will contain the applicable maps, tables and figures as stipulated in the National Heritage Resources Act (NHRA) (no 25 of 1999), the National Environmental Management Act (NEMA) (no 107 of 1998) and the Minerals and Petroleum Resources Development Act (MPRDA) (28 of 2002). The HIA process consisted of three steps:

- Step I – Literature Review: The background information to the field survey leans greatly on the Heritage Scoping Report completed by PGS for this site.

- Step II – Physical Survey: A physical survey will be conducted on foot through the proposed project area by qualified archaeologists', aimed at locating and documenting sites falling within and adjacent to the proposed development footprint.

- Step III – The final step involves the recording and documentation of relevant archaeological resources, as well as the assessment of resources in terms of the heritage impact assessment criteria and report writing, as well as mapping and constructive recommendations

The significance of heritage sites is based on four 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)
        - Low - <10/50m^2
        - Medium - 10-50/50m^2
        - High - >50/50m^2
- **uniqueness** and
- **potential** to answer present research questions.

Management actions and recommended mitigation, which will result in a reduction in the impact on the sites, will be expressed as follows:

A - No further action necessary;
B - Mapping of the site and controlled sampling required;
C - No-go or relocate pylon position
D - Preserve site, or extensive data collection and mapping of the site; and
E - Preserve site

Site Significance

Site significance classification standards prescribed by the South African Heritage Resources Agency (2006) and approved by the Association for Southern African Professional Archaeologists (ASAPA) for the Southern African Development Community (SADC) region, will be used for the purpose of this report.

Table 10: Site significance classification standards as prescribed by SAHRA

FIELD RATING	**GRADE**	**SIGNIFICANCE**	**RECOMMENDED MITIGATION**
National Significance (NS)	Grade 1	-	Conservation; National Site nomination
Provincial Significance (PS)	Grade 2	-	Conservation; Provincial Site nomination
Local Significance (LS)	Grade 3A	High Significance	Conservation; Mitigation not advised
Local Significance (LS)	Grade 3B	High Significance	Mitigation (Part of site should be retained)
Generally Protected A (GP.A)	-	High / Medium Significance	Mitigation before destruction
Generally Protected B (GP.B)	-	Medium Significance	Recording before destruction
Generally Protected C (GP.C)	-	Low Significance	Destruction

ANNEXURE B

THE SIGNIFICANCE RATING SCALES FOR THE EIA

Method of Assessing Impacts

The impact assessment methodology is guided by the requirements of the NEMA EIA Regulations (2010). The broad approach to the significance rating methodology is to determine the environmental risk (ER) by considering the consequence (C) of each impact (comprising Nature, Extent, Duration, Magnitude, and Reversibility) and relate this to the probability/ likelihood (P) of the impact occurring. This determines the environmental risk. In addition other factors, including cumulative impacts, public concern, and potential for irreplaceable loss of resources, are used to determine a prioritisation factor (PF) which is applied to the ER to determine the overall significance (S).

Determination of Environmental Risk:

The significance (S) of an impact is determined by applying a prioritisation factor (PF) to the environmental risk (ER).

The environmental risk is dependent on the consequence (C) of the particular impact and the probability (P) of the impact occurring. Consequence is determined through the consideration of the Nature (N), Extent (E), Duration (D), Magnitude (M), and Reversibility (R) applicable to the specific impact.

For the purpose of this methodology the consequence of the impact is represented by:

$$C = \frac{(E+D+M+R)}{4} \times N$$

Each individual aspect in the determination of the consequence is represented by a rating scale as defined in Table 11:

Table 11: Criteria for determination of impact consequence.

Aspect	Score	Definition
Nature	- 1	Likely to result in a negative/ detrimental impact
	+1	Likely to result in a positive/ beneficial impact
Extent	1	Activity (i.e. limited to the area applicable to the specific activity)
	2	Site (i.e. within the development property boundary),
	3	Local (i.e. the area within 5 km of the site),
	4	Regional (i.e. extends between 5 and 50 km from the site
	5	Provincial / National (i.e. extends beyond 50 km from the site)
Duration	1	Immediate (<1 year)
	2	Short term (1-5 years),
	3	Medium term (6-15 years),
	4	Long term (the impact will cease after the operational life span of the project),
	5	Permanent (no mitigation measure of natural process will reduce the impact after construction).
Magnitude/ Intensity	1	Minor (where the impact affects the environment in such a way that natural, cultural and social functions and processes are not affected),
	2	Low (where the impact affects the environment in such a way that natural, cultural and social functions and processes are slightly affected),
	3	Moderate (where the affected environment is altered but natural, cultural and social functions and processes continue albeit in a modified way),

	4	High (where natural, cultural or social functions or processes are altered to the extent that it will temporarily cease), or
	5	Very high / don't know (where natural, cultural or social functions or processes are altered to the extent that it will permanently cease).
Reversibility	1	Impact is reversible without any time and cost.
	2	Impact is reversible without incurring significant time and cost.
	3	Impact is reversible only by incurring significant time and cost.
	4	Impact is reversible only by incurring prohibitively high time and cost.
	5	Irreversible Impact

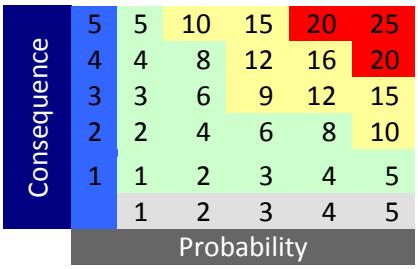
Once the C has been determined the ER is determined in accordance with the standard risk assessment relationship by multiplying the C and the P. Probability is rated/scored as per Table 12.

Table 12: Probability scoring.

Probability	1	Improbable (the possibility of the impact materialising is very low as a result of design, historic experience, or implementation of adequate corrective actions; <25%),
	2	Low probability (there is a possibility that the impact will occur; >25% and <50%),
	3	Medium probability (the impact may occur; >50% and <75%),
	4	High probability (it is most likely that the impact will occur- > 75% probability), or
	5	Definite (the impact will occur),

The result is a qualitative representation of relative ER associated with the impact. ER is therefore calculated as follows:

ER= C x P



The outcome of the environmental risk assessment will result in a range of scores, ranging from 1 through to 25. These ER scores are then grouped into respective classes as described in Table 13.

Table 13: Significance classes.

Environmental Risk Score	
Value	**Description**
< 9	Low (i.e. where this impact is unlikely to be a significant environmental risk),
≥9; <17	Medium (i.e. where the impact could have a significant environmental risk),
≥ 17	High (i.e. where the impact will have a significant environmental risk).

The impact ER will be determined for each impact without relevant management and mitigation measures (pre-mitigation), as well as post implementation of relevant management and mitigation measures (post-mitigation). This allows for a prediction in the degree to which the impact can be managed/ mitigated.

Impact Prioritisation

In accordance with the requirements of Regulation 31 (2)(l) of the EIA Regulations (GNR 543), and further to the assessment criteria presented in Section 0 it is necessary to assess each potentially significant impact in terms of:

- Cumulative impacts; and
- The degree to which the impact may cause irreplaceable loss of resources.

In addition it is important that the public opinion and sentiment regarding a prospective development and consequent potential impacts is considered in the decision making process.

In an effort to ensure that these factors are considered, an impact prioritisation factor (PF) will be applied to each impact ER (post-mitigation). This prioritisation factor does not aim to detract from the risk ratings but rather to focus the attention of the decision-making authority on the higher priority / significance issues and impacts. The PF will be applied to the ER score based on the assumption that relevant suggested management/ mitigation impacts are implemented.

Table 14: Criteria for the determination of prioritisation.

Public response (PR)	Low (1)	Not raised as a concern by the I&AP's
	Medium (2)	Issue/ impact raised by the I&AP's
	High (3)	Significant and meaningful response from the I&AP's
Cumulative Impact (CI)	Low (1)	Considering the potential incremental, interactive, sequential, and synergistic cumulative impacts, it is unlikely that the impact will result in spatial and temporal cumulative change.
	Medium (2)	Considering the potential incremental, interactive, sequential, and synergistic cumulative impacts, it is probable that the impact will result in spatial and temporal cumulative change.

	High (3)	Considering the potential incremental, interactive, sequential, and synergistic cumulative impacts, it is highly probable/definite that the impact will result in spatial and temporal cumulative change.
Irreplaceable loss of resources (LR)	Low (1)	Where the impact is unlikely to result in irreplaceable loss of resources.
	Medium (2)	Where the impact may result in the irreplaceable loss (cannot be replaced or substituted) of resources but the value (services and/or functions) of these resources is limited.
	High (3)	Where the impact may result in the irreplaceable loss of resources of high value (services and/or functions).

The value for the final impact priority is represented as a single consolidated priority, determined as the sum of each individual criteria represented in Table 14. The impact priority is therefore determined as follows:

Priority = PR + CI + LR

The result is a priority score which ranges from 3 to 9 and a consequent PF ranging from 1 to 2 (refer to Table 15).

Table 15: Determination of prioritisation factor.

Priority	Ranking	Prioritisation Factor
= 3	Low	1
3 > 9	Medium	1.5
= 9	High	2

In order to determine the final impact significance the PF is multiplied by the ER of the post mitigation scoring. The ultimate aim of the PF is to be able to increase the post mitigation environmental risk rating by a full ranking class, if all the priority attributes are high (i.e. if an impact comes out with a medium environmental risk after the conventional impact rating, but there is significant cumulative impact potential, significant public response, and significant potential for irreplaceable loss of resources, then the net result would be to upscale the impact to a high significance).

Environmental Significance Rating	
Value	**Description**
< 9	Low (i.e. where this impact would not have a direct influence on the decision to develop in the area),
≥9; <17	Medium (i.e. where the impact could influence the decision to develop in the area),
≥ 17	High (i.e. where the impact must have an influence on the decision process to develop in the area).

For ease of use a template impact assessment form has been drafted which will need to be completed by each specialist for each relevant impact, and where necessary for each alternative. The significance ratings and additional considerations applied to each impact will be used to provide a quantitative comparative assessment of the alternatives being considered. In addition, professional expertise and opinion of the specialists and the environmental consultants will be applied to provide a qualitative comparison of the alternatives under consideration. This process will identify the best alternative for the proposed project.

ANNEXURES C

POSSIBLE HERITAGE SENSITIVE AREAS

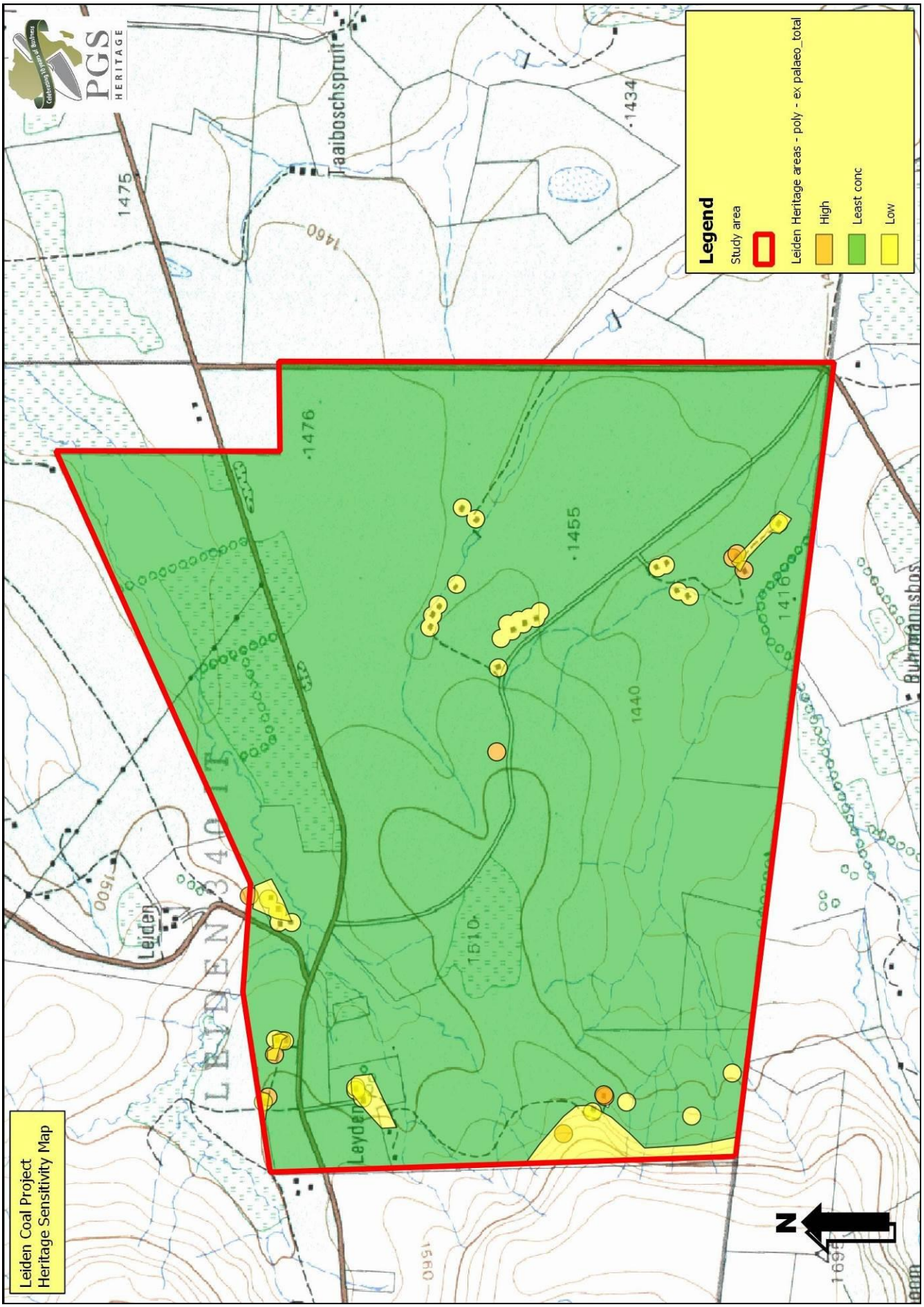


Figure 36–Cartographic depiction of the possible heritage sensitivity areas within the study area.

ANNEXURES D

PALAEONTOLOGICAL DESKTOP STUDY