



**KONGIWE**  
ENVIRONMENTAL SCIENCE & ENGINEERING

## **APPENDIX D12:**

### **Heritage**



**PGS**  

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**HERITAGE**  

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## **Heritage Impact Assessment**

### **Leslie Coal Mine Project**

**Proposed Leslie Coal Mine near Leandra, Mpumalanga Province**

**Issue Date:** 11 July 2018  
**Revision No.:** 1.2  
**Client:** Kongiwe Environmental Services  
**PGS Project No:** 303 HIA

## DECLARATION OF INDEPENDENCE

This report has been compiled by PGS Heritage (Pty) Ltd, an appointed Heritage Specialist for Kongiwe Environmental (Pty) 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.

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## EXPLANATION OF ACRONYMSUSED IN THIS DOCUMENT

ABBREVIATIONS	DESCRIPTION
AIA	Archaeological Impact Assessment
ASAPA	Association of Southern African Professional Archaeologists
CMP	Conservation Management Plan
CRM	Cultural Resource Management
EIA	Environmental Impact Assessment
EMPR	Environmental Management Programme Report
EMPr	Environmental Management Programme
ESA	Early Stone Age
GPS	Global Positioning System
HIA	Heritage Impact Assessment
HSR	Heritage Scoping Report
LIA	Late Iron Age
LSA	Later Stone Age
MSA	Middle Stone Age
NEMA	National Environmental Management Act
NHRA	National Heritage Resources Act
PGS	PGS Heritage
PHRA	Provincial Heritage Resources Authority
SAHRA	South African Heritage Resources Agency
SAHRIS	South African Heritage Resources Information System

## Terminology

### *Archaeological resources*

- 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 a 10m buffer area;
- 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 according to the heritage agency result in a change to the nature, appearance or physical nature of a place or influence its stability & 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

### *Facies*

Any subgroup of elements within an industry or main culture tradition that is distinguished from the whole on the basis of some aspect of appearance or composition.

### *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

### *Later Stone Age*

The archaeology of the last 20 000 years, associated with fully modern people.

### *Late Iron Age (Early Farming Communities)*

The archaeology of the last 1000 years up to the 1800's associated with ironworking and farming activities such as herding and agriculture.

### *Middle Stone Age*

The archaeology of the Stone Age, dating to between 20 000-300 000 years ago, associated with early modern humans.

### *Palaeontology*

Any fossilised remains or fossil trace of animals or plants which lived in the geological past and any site which contains such fossilised remains or trace.

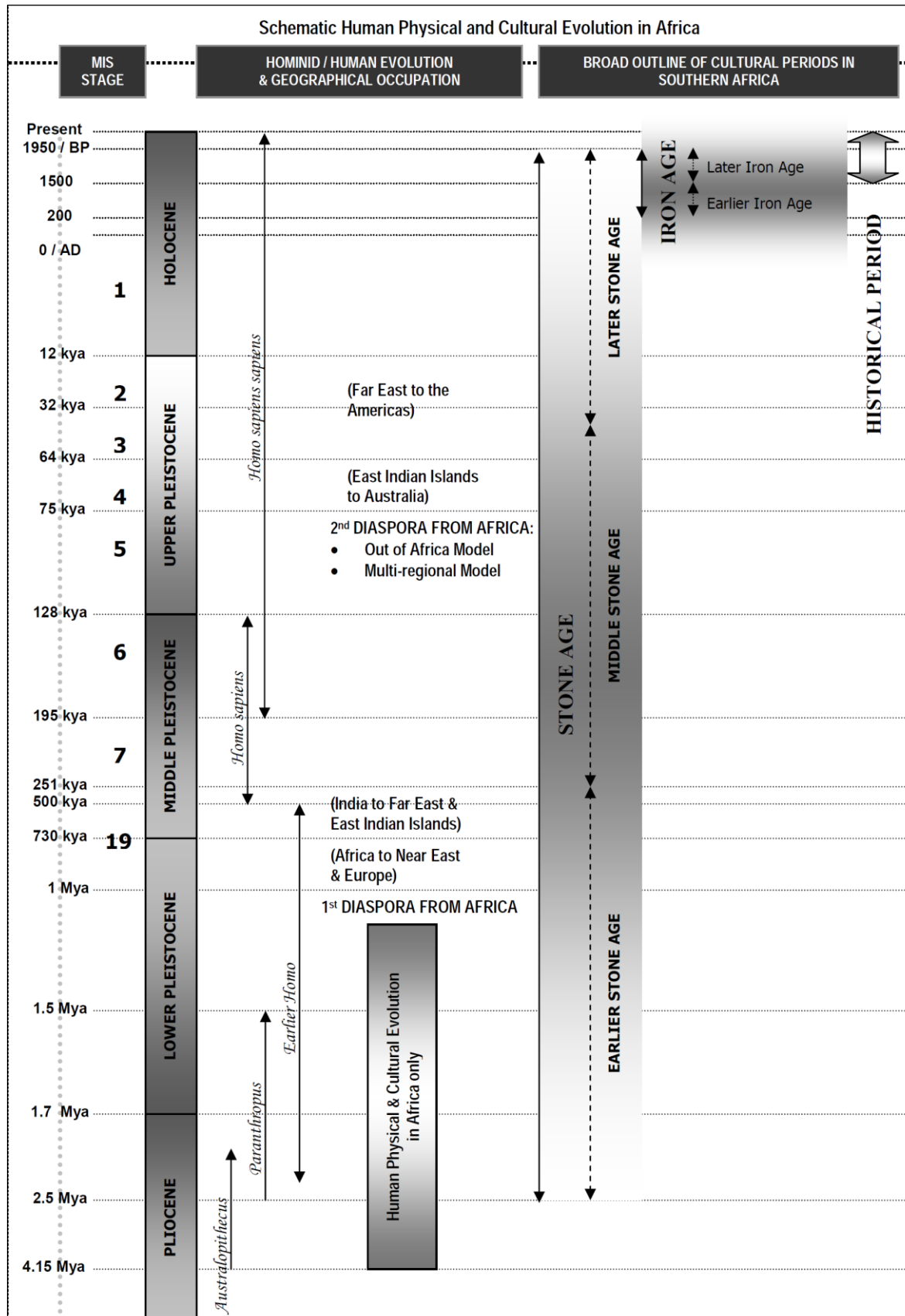


Figure 1 – Human and Cultural Time line in Africa (Morris, 2008)

## EXECUTIVE SUMMARY

PGS Heritage (Pty) Ltd (PGS) was appointed by Kongiwe Environmental (Pty) Ltd (Kongiwe) to undertake a Heritage Impact Assessment (HIA) which forms part of the Environmental Impact Assessment (EIA) for the proposed Leslie Coal Mine Project near Leandra, Mpumalanga Province.

The presence of heritage resources has been confirmed in the proposed study areas through archival research and evaluation of aerial photography and topographical maps of the study area, as well as the fieldwork undertaken for this HIA report.

Evaluation of satellite imagery has indicated the following areas that may be sensitive from a heritage perspective. The analysis of the studies conducted in the area assisted in the development of the following landform type to heritage find matrix in **Table 1**.

*Table 1: Landform type to heritage find matrix*

LANDFORM TYPE	HERITAGE TYPE
Crest and foot hill	LSA and MSA scatters, LIA settlements
Crest of small hills	Small LSA sites – scatters of stone artefacts, ostrich eggshell, pottery and beads
Watering holes/pans	LSA sites, LIA settlements
Farmsteads	Historical archaeological material
Ridges and drainage lines	LSA sites, LIA settlements
Forested areas	LIA sites

The fieldwork for the HIA identified 28 heritage resources with different heritage significance ratings. The stakeholder engagement process further identified two graves sites (**LES029 & LES030**) and an Ndebele initiation ceremony site (**LES031**). These sites consist of 22 burial sites (consisting of approximately 315 burials), one (1) living heritage (initiation) site and eight (8) historical structures. Of these 31 resources, only 10 with heritage significance (**LES002, LES003, LES004, LES007, LES012, LES015, LES017, LES019, LES022, & LES025**) would have been impacted directly by the project activities.

As of 2<sup>nd</sup> July 2018, the proposed layout plans for Leslie 1A & 1C had been altered in order to mitigate their impact upon surface ecology & soils, as well as the heritage resources uncovered by the fieldwork for the original HIA.

Prior to the introduction of the updated infrastructure layouts, the impact significance before mitigation of the heritage resources varied between HIGH negative (**All sites except LES004, LES012 & LES017**) and MEDIUM negative (**LES004, LES012, & LES017**). Implementation of the recommended mitigation measures would have reduced this impact rating to MEDIUM negative. Since the proposed layout changes seem to avoid most of the heritage features within the original study area, except for a high significance feature (**LES015**) and a low significance feature (**LES013**), the impact significance before mitigation of the heritage resources would be HIGH negative. Implementation of the mitigation measures will maintain this impact at MEDIUM negative.

However, as portions of the updated infrastructure layouts have fallen outside of the purview of the original HIA study area, the potential of heritage resources in those portions that have not been surveyed have to be acknowledged. Therefore, until such time as those portions are surveyed, the impact significance on potential heritage resources in those areas have to be set at HIGH negative.

The management and mitigation measures as described in Section 7 of this report have been developed to minimise the project impact on heritage resources.

In terms of the palaeontological impact of the development, it is clear that the study area falls within 'VERY HIGH', 'MODERATE' and 'INSIGNIFICANT' rated sensitivity zones as per the palaeontological sensitivity map accessed via the SAHRIS service and therefore at least required a palaeontological desktop study before development could continue (**Figure 73**). The results of which showed that an EIA level palaeontology report will need to be conducted during construction phase to assess the value and prominence of fossils in the development area and the effect of the proposed development on the palaeontological heritage. This consists of a Phase 1 field-based assessment by a professional palaeontologist. No significant fossils are expected to be found before deep excavation (>1.5m) are completed. Though, it is possible that significant fossils will be documented during excavations (Butler 2018).

The purpose of the EIA Report is to elaborate on the issues and potential impacts identified during the scoping phase. This is achieved by site visits and research in the site-specific study area as well as a comprehensive assessment of the impacts identified during the scoping phase (Butler 2018).

It is the author's considered opinion that the overall impact on heritage resources **after** the implementation of the recommended mitigation measures will be acceptably low and that the project can be approved from a heritage perspective.

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## **1 INTRODUCTION**

PGS Heritage (Pty) Ltd (PGS) was appointed by Kongiwe Environmental (Pty) Ltd (Kongiwe) to undertake a Heritage Impact Assessment (HIA) which forms part of the Environmental Impact Assessment (EIA) for the proposed Leslie Coal Mine Project near Leandra, Mpumalanga Province.

### **1.1 Scope of the Study**

The aim of the study is to identify possible heritage sites and finds that may occur in the proposed development area. The HIA aims to inform the Environmental Assessment Practitioner (EAP) in the development of a comprehensive EIA and Environmental Management Programme (EMPr) to assist the developer in managing the identified heritage resources in a responsible manner to protect, preserve, and develop them within the framework provided by the National Heritage Resources Act of 1999 (Act 25 of 1999) (NHRA).

### **1.2 Specialist Qualifications**

This HIA was compiled by PGS Heritage, the staff of which have a combined experience of nearly 70 years in the heritage consulting industry and extensive experience in managing the HIA process.

Ilan Smeyatsky, the author of this report, holds a Master's degree in Archaeology and is registered as a Professional Archaeologist with the Association of Southern African Professional Archaeologists (ASAPA).

Jessica Angel holds a Master's degree in Archaeology and is registered as a Professional Archaeologist with the Association of Southern African Professional Archaeologists (ASAPA).

Wouter Fourie, the Project Manager, is registered as a Professional Archaeologist with ASAPA and has CRM accreditation within the said organisation, as well as being accredited as a Professional Heritage Practitioner with the Association of Professional Heritage Practitioners – Western Cape (APHP).

### **1.3 Assumptions and Limitations**

Not detracting in any way from the comprehensiveness of the fieldwork undertaken, it is necessary to realise that the heritage resources located during the fieldwork do not necessarily represent all the possible heritage resources present within the area. Various factors account for this, including the subterranean nature of some archaeological sites and the current dense vegetation cover. As such, should any heritage features and/or objects not included in the present inventory be located or observed, a heritage specialist must be contacted immediately.

Such observed or located heritage features and/or objects may not be disturbed or removed in any way until such time that the heritage specialist has been able to make an assessment as to the significance of the site (or material) in question. This applies to graves and cemeteries as well. If any graves or burial places are located during the development, the procedures and requirements pertaining to graves and burials will apply as set out below.

### **1.4 Legislative Context**

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. Mineral and Petroleum Resources Development Act (MPRDA) Act 28 of 2002

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

- i. GNR 982 of 2014 (Government Gazette 38282) promulgated under the NEMA:
  - a. Basic Assessment Report (BAR) – Regulations 19 and 23
  - b. Environmental Scoping Report (ESR) – Regulation 21
  - c. Environmental Impact Report (EIR) – Regulation 23
  - d. Environmental Management Programme Report (EMPr) – Regulations 19 and 23
- 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. MPRDA Regulations of 2004:

- a. Environmental reports to be compiled for application of mining right – Regulation 48.

The NHRA stipulates that cultural heritage resources may not be disturbed without authorization from the relevant heritage authority. Sections 34-36 provide general protection to heritage resources such as structures older than 60 years, archaeological and palaeontological resources and burial grounds and graves.

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(1) of NHRA, and those developments administered through NEMA 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, 2008).

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 in the NEMA 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 (Fourie, 2008).

### **1.5 International Requirements**

The regulatory aspects dealt with above relate solely to the in-house South African laws and regulations and would usually be the only requirements for an application for a Mining Right. However, it may be that international financing is required for a large-scale project, in which case Project Finance Advisory Services, Project Finance, Project-Related Corporate Loans or Bridging Loans may be required. In such a case, the applicant for international financing will



need to comply with the requirements of the International Finance Corporation (IFC) Performance Standards and the Equator Principles observed by most large international financial institutions. Summaries of these requirements are set out below.

### *1.5.1 The International Finance Corporation*

The IFC Performance Standards are an international benchmark for identifying and managing environmental and social risk and have been adopted by many organizations as a key component of their environmental and social risk management. The IFC's Environmental, Health, and Safety (EHS) Guidelines provide technical guidelines with general and industry-specific examples of good international industry practice to meet the IFC's Performance Standards (PS).

In many countries, the scope and intent of the IFC Performance Standards is addressed or partially addressed in the country's environmental and social regulatory framework. The IFC Performance Standards encompass eight topics of which PS 7 and PS 8 have direct relevance to heritage resources:

- i. PS 1 - Environmental and Social Assessment and Management System;
- ii. PS 2 - Labour and Working Conditions;
- iii. PS 3 - Pollution Prevention and Abatement;
- iv. PS 4 - Community Health, Safety and Security;
- v. PS 5 - Land Acquisition and Involuntary Resettlement;
- vi. PS 6 - Biodiversity Conservation and Sustainable Natural Resource Management;
- vii. PS 7 - Indigenous Peoples;
- viii. PS 8 - Cultural Heritage

**Table 2** provides a listing of the relevant sections pertaining to cultural heritage.

*Table 2 :Sections of IFC Standards relevant to heritage resources and their management*

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GUIDELINE	RELEVANT CHAPTER	DESCRIPTION OF THE REQUIREMENT
International Finance Corporations (IFC) Performance Standard	Standard (PS) 5 – Paragraph 3	Minimization and avoidance of impacts from project related activities.
	Standard (PS) 5 – Paragraph 10 (Community Engagement) (2012).	Engagement with affected communities and the disclosure of relevant information of the relocation process.
	Standard (PS) 5 – Paragraph 20	Respecting the social and cultural institutions of the displaced persons and any host communities.
	Standard (PS) 8 – Paragraph 9 (Consultation) (2012).	The need for consultation with affected communities to identify cultural heritage of importance and involve affected communities and involve the relevant national or local regulatory authorities in the decision-making processes.
	Standard (PS) 8 – Paragraph 12 (Removal of Non-Replicable Cultural Heritage) (2012).	The removal of cultural heritage must only be considered when no other alternative is available.

The IFC's Performance Standards offer a framework for understanding and managing environmental and social risks for high profile, complex, international or potentially high impact projects. The financial institution is required to verify, as part of its environmental and social due diligence process, that the commercial client/investee complies with the IFC Performance Standards. To do so, the financial institution needs to be knowledgeable about the environmental and social laws of the country in which it operates and compare these regulatory requirements against those of the IFC Performance Standards to identify gaps. A good understanding of both sets of requirements, as well as potential gaps, ensures that the financial institution will effectively identify and assess the key environmental and social risks and impacts that might be associated with a financial transaction.

If non-compliances with the IFC Performance Standards are identified, and depending on the severity of the issue, the financial institution can require the commercial client/investee to develop a corrective action plan for addressing the issue within a reasonable timeframe and stipulate this as a condition of the financial transaction with the commercial client/investee.

The IFC Performance Standards help the IFC and its clients to manage and improve their environmental and social performance through an outcomes-based approach and provide a solid base from which clients may increase the sustainability of their business operations. The desired outcomes are described in the objectives of each Performance Standard, followed by specific requirements to help clients achieve these outcomes through means that are appropriate to the nature and scale of the project and commensurate with the level of environmental and social risks (likelihood of harm) and impacts.

### *1.5.2 Equator Principles*

The Equator Principles (EP) is a risk management framework, adopted by financial institutions, for determining, assessing and managing environmental and social risk in projects and is primarily intended to provide a minimum standard for due diligence to support responsible risk decision-making.

The EP apply globally, to all industry sectors and to four financial products –

- 1) Project Finance Advisory Services;
- 2) Project Finance;
- 3) Project-Related Corporate Loans; and
- 4) Bridge Loans. The relevant thresholds and criteria for applications are described in detail in the Scope section of the EP.

Equator Principles Financial Institutions (EPFI) commit to implementing the EP in their internal environmental and social policies, procedures and standards for financing projects and will not provide Project Finance or Project-Related Corporate Loans to projects where the client will not, or is unable to, comply with the EP.

The EP have greatly increased the attention and focus on social/community standards and responsibility, including robust standards for indigenous peoples, labour standards, and

consultation with locally affected communities within the Project Finance market. They have also promoted convergence around common environmental and social standards. Multilateral development banks, including the European Bank for Reconstruction & Development, and export credit agencies through the Organisation for Economic Co-operation and Development (OECD) Common Approaches are increasingly drawing on the same standards as the EP.

The EP have also helped spur the development of other responsible environmental and social management practices in the financial sector and banking industry (for example, Carbon Principles in the US, Climate Principles worldwide) and have provided a platform for engagement with a broad range of interested stakeholders, including non-governmental organisations (NGOs), clients and industry bodies.

The EP consist of 10 Principles, outlined below:

i. Principle 1: Review and Categorisation

When a Project is proposed for financing, the EPFI will, as part of its internal environmental and social review and due diligence, categorise it based on the magnitude of its potential environmental and social risks and impacts. Such screening is based on the environmental and social categorisation process of the International Finance Corporation (IFC).

Using categorisation, the EPFI's environmental and social due diligence is commensurate with the nature, scale and stage of the Project, and with the level of environmental and social risks and impacts.

The categories are:

Category A – Projects with potential significant adverse environmental and social risks and/or impacts that are diverse, irreversible or unprecedented;

Category B – Projects with potential limited adverse environmental and social risks and/or impacts that are few in number, generally site-specific, largely reversible and readily addressed through mitigation measures; and

Category C – Projects with minimal or no adverse environmental and social risks and/or impacts

ii. Principle 2: Environmental and Social Assessment

For all Category A and Category B Projects, the EPFI will require the client to conduct an Assessment process to address, to the EPFI's satisfaction, the relevant environmental and social risks and impacts of the proposed Project. The Assessment Documentation should propose measures to manage impacts in a manner relevant and appropriate to the nature and scale of the proposed Project. One or more specialised studies may also need to be

undertaken for the Assessment Documentation. It may, in some cases, be appropriate for the client to complement its Assessment Documentation with specific human rights due diligence.

For all Projects, in all locations, when combined Scope 1 and Scope 2 Emissions are expected to be more than 100,000 tonnes of CO<sub>2</sub> equivalent annually, an alternatives analysis will be conducted to evaluate less Greenhouse Gas (GHG) intensive alternatives.

iii. Principle 3: Applicable Environmental and Social Standards

The Assessment process should, in the first instance, address compliance with relevant host country laws, regulations and permits that pertain to environmental and social issues.

EPFIs operate in diverse markets: some with robust environmental and social governance, legislation systems and institutional capacity designed to protect their people and the natural environment; and some with evolving technical and institutional capacity to manage environmental and social issues.

The EPFI will require that the Assessment process evaluates compliance with the applicable standards for what are known as Designated Countries (the First World countries with robust regulatory systems), where the Assessment process evaluates compliance with relevant host country laws, regulations and permits that pertain to environmental and social issues; and Non-Designated Countries, where the Assessment process evaluates compliance with the then applicable IFC Performance Standards

iv. Principle 4: Environmental and Social Management System and Equator Principles Action Plan

For all Category A and Category B Projects, the EPFI will require the client to develop or maintain an Environmental and Social Management System (ESMS). Further, an Environmental and Social Management Plan (ESMP) will be prepared by the client to address issues raised in the Assessment process and incorporate actions required to comply with the applicable standards. Where the applicable standards are not met to the EPFI's satisfaction, the client and the EPFI will agree an Equator Principles Action Plan (AP). The Equator Principles AP is intended to outline gaps and commitments to meet EPFI requirements in line with the applicable standards.

v. Principle 5: Stakeholder Engagement

For all Category A and Category B Projects, the EPFI will require the client to demonstrate effective Stakeholder Engagement as an ongoing process in a structured and culturally appropriate manner with Affected Communities and, where relevant, Other Stakeholders. For Projects with potentially significant adverse impacts on Affected Communities, the client will conduct an Informed Consultation and Participation process. The engagement process

should be free from external manipulation, interference, coercion and intimidation. The client will take account of, and document, the results of the Stakeholder Engagement process, including any actions agreed resulting from such process. For Projects with environmental or social risks and adverse impacts, disclosure should occur early in the Assessment process, in any event before the Project construction commences, and on an ongoing basis. EPFIs recognise that indigenous peoples may represent vulnerable segments of project-affected communities. Projects affecting indigenous peoples are subject to a more rigorous process of Informed Consultation and Participation.

vi. Principle 6: Grievance Mechanism

For all Category A and, as appropriate, Category B Projects, the EPFI will require the client, as part of the ESMS, to establish a grievance mechanism designed to receive and facilitate resolution of concerns and grievances about the Project's environmental and social performance. The grievance mechanism will seek to resolve concerns promptly, using an understandable and transparent consultative process that is culturally appropriate, readily accessible, at no cost, and without retribution to the party that originated the issue or concern. The mechanism should not impede access to judicial or administrative remedies. The client will inform the Affected Communities about the mechanism in the course of the Stakeholder Engagement process.

vii. Principle 7: Independent Review: Project Finance

For all Category A and, as appropriate, Category B Projects an Independent Environmental and Social Consultant, not directly associated with the client, will carry out an Independent Review of the Assessment Documentation including the ESMPs, the ESMS, and the Stakeholder Engagement process documentation to assist the EPFI's due diligence, and assess Equator Principles compliance.

Project-Related Corporate Loans

An Independent Review by an Independent Environmental and Social Consultant is required for Projects with potential high-risk impacts including, but not limited to, any of the following adverse impacts on indigenous peoples, Critical Habitat impacts, Significant cultural heritage impacts and Large-scale resettlement.

In other Category A, and as appropriate Category B, Project-Related Corporate Loans, the EPFI may determine whether an Independent Review is appropriate or if internal review by the EPFI is sufficient. This may take into account the due diligence performed by a multilateral or bilateral financial institution or an OECD Export Credit Agency, if relevant.

viii. Principle 8: Covenants

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An important strength of the Equator Principles is the incorporation of covenants linked to compliance. For all Projects, the client will covenant in the financing documentation to comply with all relevant host country environmental and social laws, regulations and permits in all material respects.

Furthermore, for all Category A and Category B Projects, the client will covenant the financial documentation:

- a) to comply with the ESMPs and Equator Principles AP (where applicable) during the construction and operation of the Project in all material respects;
- b) to provide periodic reports in a format agreed with the EPFI (with the frequency of these reports proportionate to the severity of impacts, or as required by law, but not less than annually), prepared by in-house staff or third-party experts, that document compliance with the ESMPs and Equator Principles AP (where applicable), and provide representation of compliance with relevant local, state and host country environmental and social laws, regulations and permits; and
- c) to decommission the facilities, where applicable and appropriate, in accordance with an agreed decommissioning plan.
- d) Where a client is not in compliance with its environmental and social covenants, the EPFI will work with the client on remedial actions to bring the Project back into compliance to the extent feasible. If the client fails to re-establish compliance within an agreed grace period, the EPFI reserves the right to exercise remedies, as considered appropriate.

ix. Principle 9: Independent Monitoring and Reporting Project Finance

To assess Project compliance with the Equator Principles and ensure ongoing monitoring and reporting after Financial Close and over the life of the loan, the EPFI will, for all Category A and, as appropriate, Category B Projects, require the appointment of an Independent Environmental and Social Consultant, or require that the client retain qualified and experienced external experts to verify its monitoring information which would be shared with the EPFI.

Project-Related Corporate Loans

For Projects where an Independent Review is required under Principle 7, the EPFI will require the appointment of an Independent Environmental and Social Consultant after Financial Close, or require that the client retain qualified and experienced external experts to verify its monitoring information which would be shared with the EPFI.

x. Principle 10: Reporting and Transparency Client Reporting Requirements

The following client reporting requirements are in addition to the disclosure requirements in Principle 5.

For all Category A and, as appropriate, Category B Projects:

The client will ensure that, at a minimum, a summary of the ESIA is accessible and available online.

The client will publicly report GHG emission levels (combined Scope 1 and Scope 2 Emissions) during the operational phase for Projects emitting over 100,000 tonnes of CO2 equivalent annually.

#### *EPFI Reporting Requirements*

The EPFI will report publicly, at least annually, on transactions that have reached Financial Close and on its Equator Principles implementation processes and experience, taking into account appropriate confidentiality considerations.

There are two important Attachments to the Equator Principles: Annexure A dealing with Climate Change: Alternatives Analysis, Quantification and Reporting of Greenhouse Gas Emissions; and Annexure B dealing with Minimum Reporting Requirements on:

- Data and Implementation Reporting
- Project Finance Advisory Services Data
- Bridge Loans Data
- Implementation Reporting
- Project Name Reporting for Project Finance



## 2 SITE LOCATION AND DESCRIPTION

### 2.1 Locality

The project is located within the Govan Mbeki Local Municipality in the Gert Sibanda District Municipality of the Mpumalanga Province, South Africa. The proposed Leslie Coal Project is situated approximately 52 kilometres East of Springs. The project proposes the establishment of a colliery located on several properties which are situated to the North, North-East and South of the town of Leandra (see map, **Figure 3**).

Anglo Operations (Pty) Ltd, the applicant, holds a Prospecting Right for portions of the following farms:

- Weltevreden 307 IR
- Watervalshoek 350 IR
- Springboklaagte 306 IR
- Saltpeterkranz 351 IR
- Klipfontein 357 IR
- Grootlaagte 311 IR
- Frischgewaag 87 IS
- Brakfontein 310 IR
- Goedehoop 308 IR

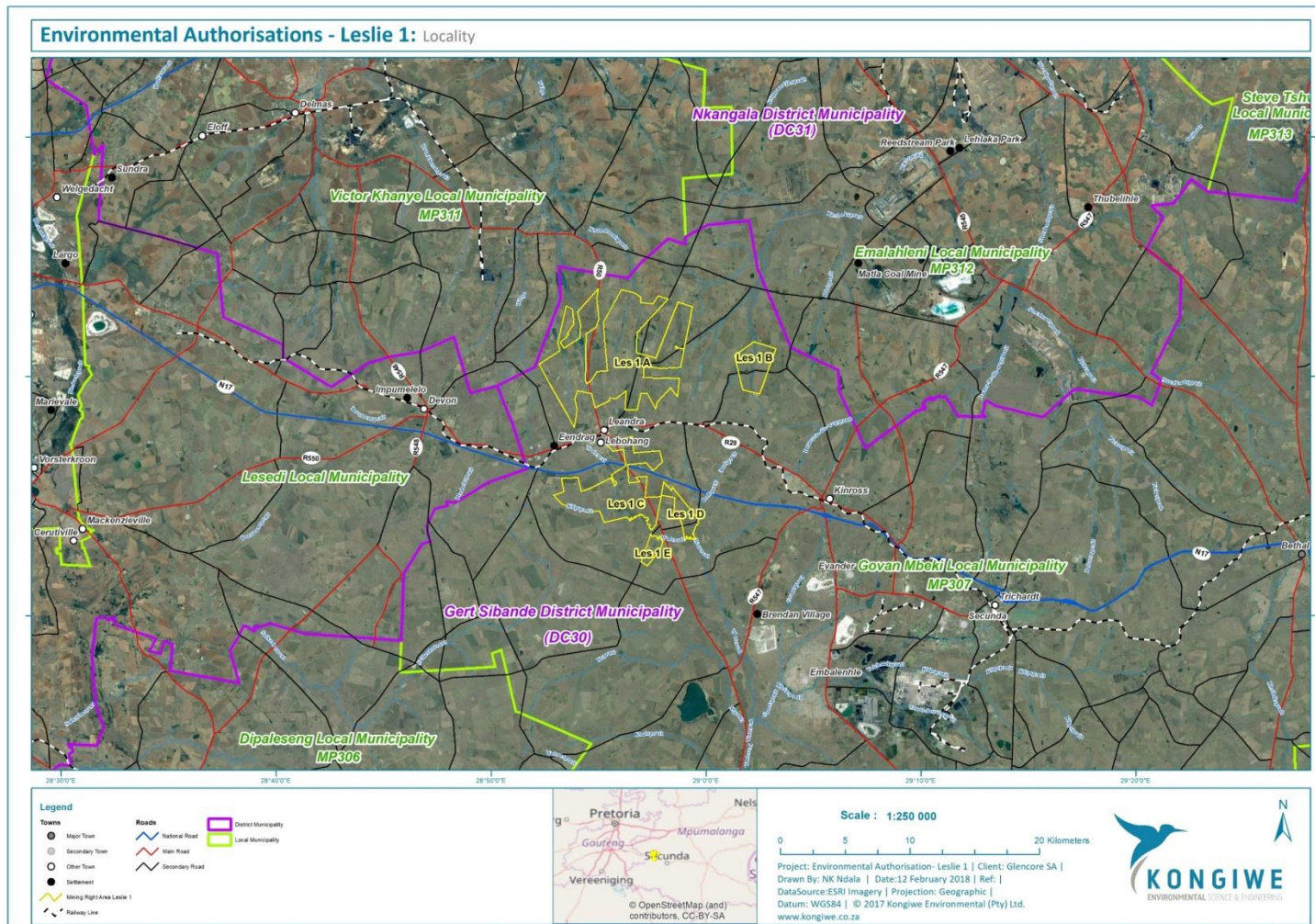


Figure 2 - The proposed development area within its local context (Kongiwe Environmental 2017).

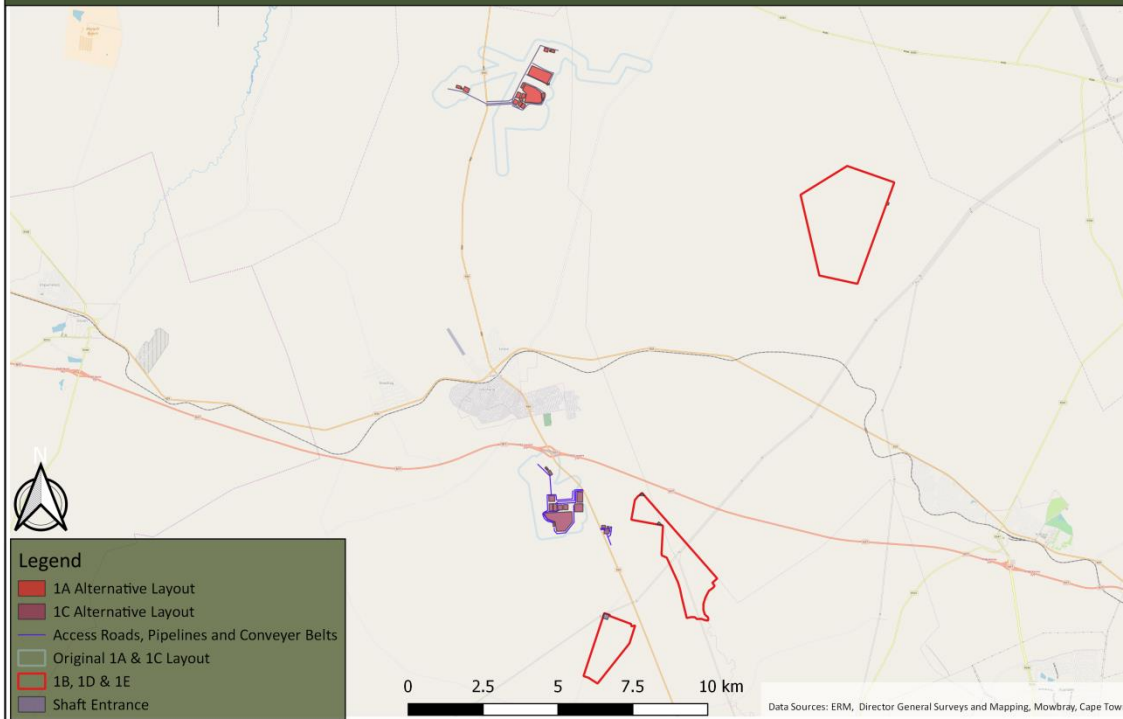


Figure 3 – The proposed footprints for plants 1A & 1C surveyed in this study, lying directly north and south of Leandra respectively, with footprints and shaft entrances for mining areas 1B, 1D & 1E to the east and south-east of 1A & 1C.

## 2.2 Project Background

Anglo Operations (Pty) Ltd (hereafter Anglo) holds a Prospecting Right (PR) over farms covering approximately 9 705 hectares (ha) in the Govan Mbeki Local Municipality (GMLM). Anglo has submitted an application for a Mining Right DMR Reference MP 30/5/1/2/2 10207 MR) through a joint venture company known as Leslie Coal Mine (Pty) Ltd (hereafter Leslie Coal Mine).

It is the intention of Anglo to develop underground mining operations, with mining predominantly exploiting the No. 2 and No 4. coal seams within the Witbank Coalfield (the Leslie 1 Mining Project / or the Project). The mineral proposed to be mined will be Bituminous Coal, with Pseudocoal and Torbanite being mined if encountered. Coal produced by the Project will be for the local South African market, primarily Eskom and possibly other domestic and export markets.

Based on previous prospecting work conducted within the development footprint, five (5) underground mining areas have been identified as containing feasible resources worth developing. It is expected that the total Life of Mine (LOM) period will be approximately **35** years<sup>1</sup>, including a ramp-up period, a tapering-down period and rehabilitation. The mining areas will be designed to process a total of approximately 125 million tonnes of coal during the LOM. The No 5 seam encountered during the construction of the incline shafts will also be mined (approximately 116 000 tonnes Run of Mine coal (ROM) for Leslie 1A).

It is expected that two processing plants will be constructed, one situated at Leslie 1A and the other at Leslie 1C. In the event that the plant situated at Leslie 1C is not constructed, the ROM will be tugged to the plant at Leslie 1A. The proposed mine infrastructure requirements include existing private (farm) and public roads (including the R50 and N17), a railway siding and railway line, as well as Eskom electricity infrastructure. Water will be sourced from boreholes and recycled from pollution control dams. The water usage strategy for the colliery is being designed to operate as a closed water system and most of the water on site is to be recycled where possible. Electricity for the project is to be supplied by Eskom. Other ancillary infrastructure may include stockpile areas, loading bays, water diversion berms for dirty water/clean water separation, storm water management systems, mobile security offices for access control, a weighbridge, potable water tanks, a bulk diesel storage facility, oil storage facilities, explosive storage facilities and stores (for spares and material), ventilation shafts, , and mobile ablution facilities.

At full production, the project is expected to employ approximately up to 685 people, with most of the labour coming from the GMLM and the surrounding areas. All employment will take place in line with all the relevant legislation, codes and statutes. Each mining area may be reached via a network of all-weather gravel roads that branch off from the main tar roads.

As of 2<sup>nd</sup> July 2018, the proposed layout plans for Leslie 1A & 1C had been altered in order to mitigate their impact upon surface ecology & soils, as well as the heritage resources uncovered by the fieldwork for the original HIA. The updated brief from the client read as follows:

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<sup>1</sup> The mining right application is for an initial period of 30 years, in accordance with the limit prescribed by the MPRDA which is subject to renewal

## Leslie 1A

The alternative plant layouts for Leslie 1A are:

- ❖ **Option 1.** The initial layout proposed by the client and per the scoping report.
- ❖ **Option 2.** This option looks at: changing from a boxcut to an access portal to reduce dust impacts and impact on surface ecology and soils; reducing the size of the required infrastructure; and shifting the layout to avoid all sensitive features, as well as removing the eastern access road and rail siding. As follows and per maps attached (**Figure 4**).
  - Incline portal 500m x 70m. Topsoil stockpile and waste rock (overburden) around access portal, for use in rehabilitation. Topsoil to be vegetated.
  - Access roads for heavy vehicles: 32 m wide, tarred from main road to Product Stockpile.
  - Access road for normal vehicles, tarred.
  - Conveyor belt running from the incline portals (x2) to the ROM pad. Includes a dirt access road adjacent to the conveyor, low traffic, only there to service incline portal with light vehicles.
  - Mine residue facility (co-disposal). A second MRF might be constructed if Option 2 for Leslie 1C does not go ahead and Option 3 is chosen.
  - Coal wash plant with product stockpile
  - ROM pad
  - Mine office infrastructure
  - Return water dam (RWD)
  - Pollution control dam + pump station with pipeline to RWD
  - Dirty water trenches (concrete)

The western access point will only have the incline portal, temporary infrastructure, emergency ROM buffer stockpile and a conveyor running to the ROM pad situated at the main surface infrastructure.

- ❖ **Option 3.** This option looks at accessing the underground seams from the open pit areas of the approved, adjacent Springboklaagte mine and to partially make use of Springboklaagte mine's plan and surface infrastructure. This option would require an agreement between Leslie 1 and Springboklaagte Mine. In this case there is no surface impact on the Leslie 1 A area.

***Option is preferred as Springboklaagte does not have approval to run the volume of coal for both projects, and this option is a contingency.***

## Leslie 1C

The alternative surface infrastructure layouts for Leslie 1C are:

- ❖ **Option 1.** The initial layout proposed by the client and per the scoping report.
- ❖ **Option 2.** This option looks at: changing from a boxcut to an access portal to reduce dust impacts and impact on surface ecology and soils; reducing the size of the required infrastructure; and shifting the layout to avoid all sensitive features, as well as removing the eastern access road and rail siding. As follows and per maps attached (**Figure 5**).
  - Incline portal 500m x 70m. Topsoil stockpile and waste rock (overburden) around access portal, for use in rehabilitation. Topsoil to be vegetated.
  - Access roads for heavy vehicles: 32 m wide, tarred from main road to Product Stockpile.
  - Access road for normal vehicles, tarred.
  - Conveyor belt running from the incline portals to the ROM pad. Includes a dirt access road adjacent to the conveyor, low traffic, only there to service incline portal with light vehicles.
  - Mine residue facility (co-disposal)
  - Coal wash plant with product stockpile
  - ROM pad
  - Mine office infrastructure
  - Return water dam (RWD)
  - Pollution control dam + pumpstation with pipeline to RWD
  - Dirty water trenches (concrete)
- ❖ **Option 3.** This option looks at not having substantial surface infrastructure at 1 C, but does include an incline portal with minor surface infrastructure on Salpeterskranz with trucking of unprocessed coal to 1A for beneficiation.

***Option 2 is also the preferred option, while Option 3 is a contingency.***



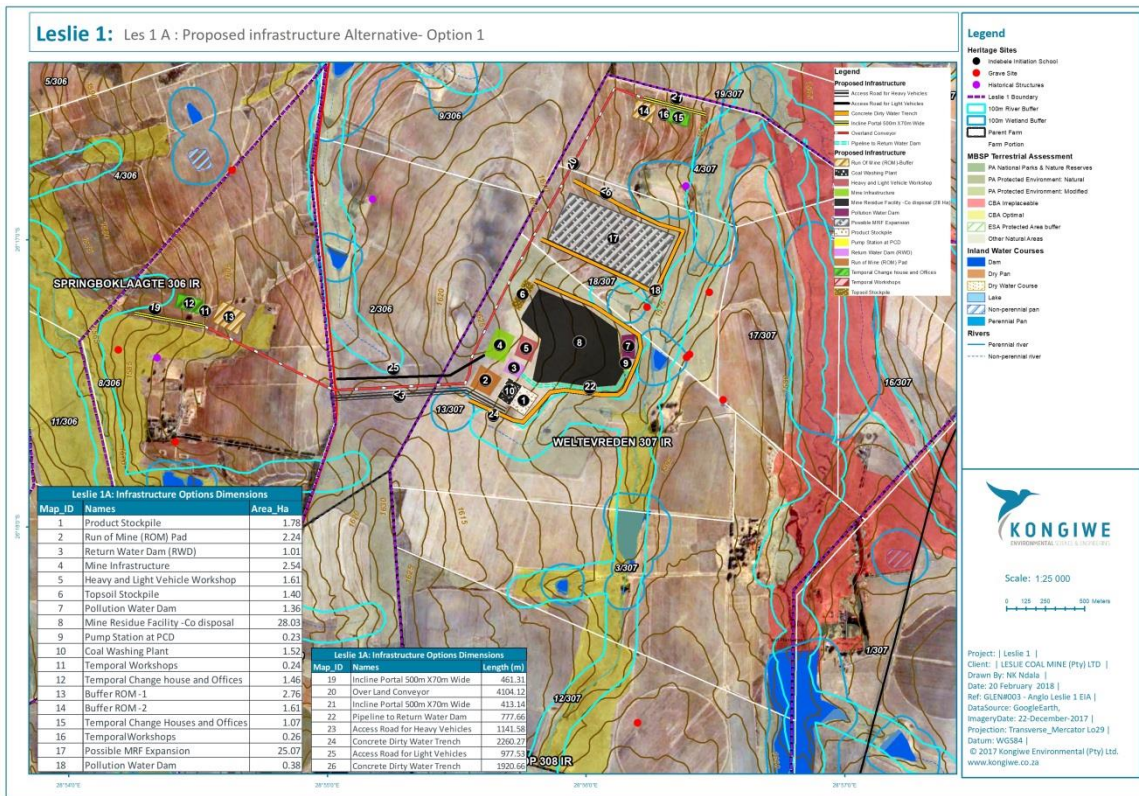


Figure 4 – Alternative Layout for Infrastructure at Leslie 1A (Option 2) (Kongwi Environmental 2018)

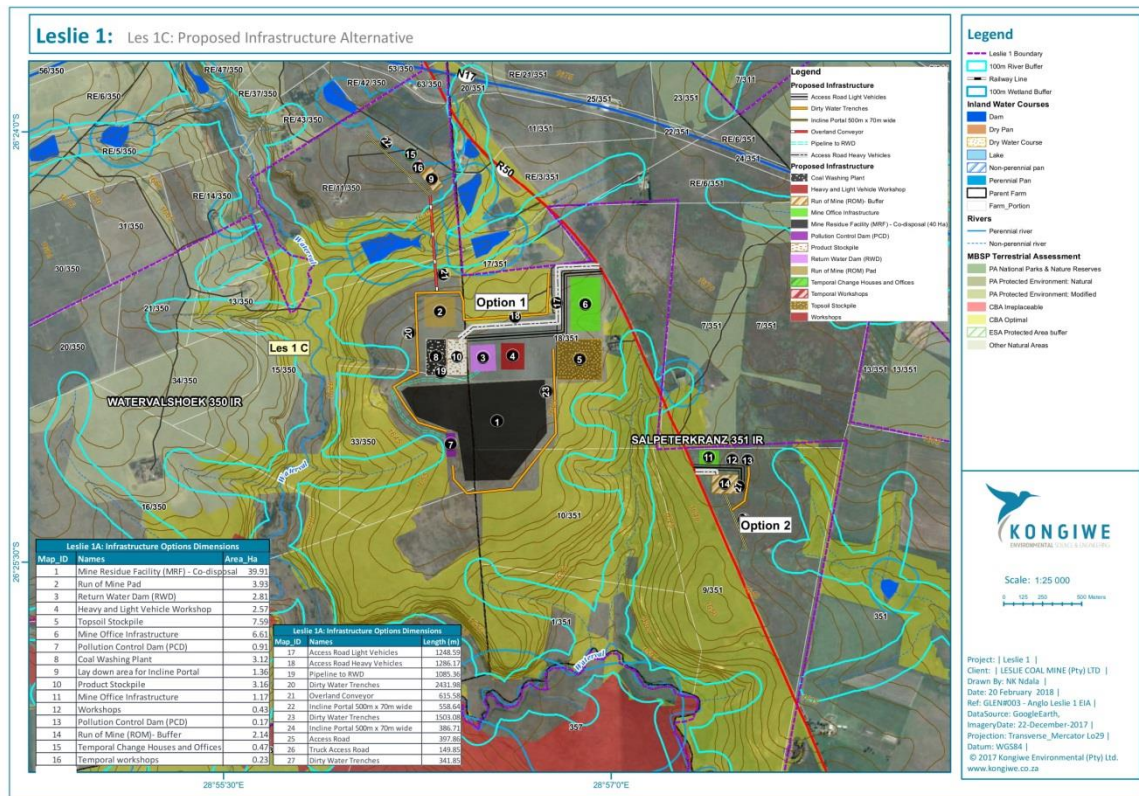


Figure 5 - Alternative Layout for Infrastructure at Leslie 1C (Option 2) (Kongwi Environmental 2018)

### 3 ASSESSMENT METHODOLOGY

The section below outlines the assessment methodologies utilised in the study.

#### 3.1 Methodology for Assessing Heritage Site significance

This HIA report was compiled by PGS for the proposed Leslie Coal Mine project. The applicable maps, tables and figures are included, as stipulated in the NHRA (no 25 of 1999) and the National Environmental Management Act (NEMA) (No. 107 of 1998). The HIA process consists of three steps:

Step I – Literature Review and initial site analysis: The background information to the field survey relies greatly on the Heritage Background Research, which was undertaken through archival research and evaluation of aerial photography and topographical maps of the study area.

#### HIA Report

Step II – Physical Survey: A physical survey was conducted on foot through the proposed project area by two qualified archaeologists and heritage specialists (10-13<sup>th</sup> April 2018), aimed at locating and documenting sites falling within and adjacent to the proposed surface development footprints. A buffer area around the surface development footprint was also surveyed.

Step III – The final step involves the recording and documentation of relevant heritage resources identified in the physical survey, the assessment of these resources in terms of the HIA 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<sup>2</sup>
  - Medium - 10-50/50m<sup>2</sup>
  - High - >50/50m<sup>2</sup>
- 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 development activity position;

D - Preserve site, or extensive data collection and mapping of the site; and

E - Preserve site.

Impacts on these sites by the development will be evaluated as follows:

### 3.1.1 Site Significance

Site significance classification standards prescribed by the SAHRA (2006) and approved by the ASAPA for the Southern African Development Community (SADC) region, were used for the purpose of this report.

Table 3: 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

### 3.2 Methodology used in determining the significance of environmental impacts

The impact significance rating process serves two purposes: firstly, it helps to highlight the critical impacts requiring consideration in the management and approval process; secondly, it shows the primary impact characteristics, as defined above, used to evaluate impact significance.

The impact significance rating system is presented in **Table 4** and involves three parts:

**Part A:** Define impact consequence using the three primary impact characteristics of magnitude, spatial scale/ population and duration;

**Part B:** Use the matrix to determine a rating for impact consequence based on the definitions identified in Part A; and

**Part C:** Use the matrix to determine the impact significance rating, which is a function of the impact consequence rating (from **Part B**) and the probability of occurrence.

Table 4: Significance Rating Methodology

PART A: DEFINING CONSEQUENCE IN TERMS OF MAGNITUDE, DURATION AND SPATIAL SCALE <i>Use these definitions to define the consequence in Part B</i>		
Impact characteristics	Definition	Criteria
<b>MAGNITUDE</b>	Major -	Substantial deterioration or harm to receptors; receiving environment has an inherent value to stakeholders; receptors of impact are of conservation importance; or identified threshold often exceeded
	Moderate -	Moderate/measurable deterioration or harm to receptors; receiving environment moderately sensitive; or identified threshold occasionally exceeded
	Minor -	Minor deterioration (nuisance or minor deterioration) or harm to receptors; change to receiving environment not measurable; or identified threshold never exceeded
	Minor +	Minor improvement; change not measurable; or threshold never exceeded
	Moderate +	Moderate improvement; within or better than the threshold; or no observed reaction

	Major +	Substantial improvement; within or better than the threshold; or favourable publicity
<b>SPATIAL SCALE OR POPULATION</b>	Site or local	Site specific or confined to the immediate project area
	Regional	May be defined in various ways, e.g. cadastral, catchment, topographic
	National/ International	Nationally or beyond
<b>DURATION</b>	Short term	Up to 18 months.
	Medium term	18 months to 5 years
	Long term	Longer than 5 years

**PART B: DETERMINING CONSEQUENCE RATING**

*Rate consequence based on definition of magnitude, spatial extent and duration*

		SPATIAL SCALE/ POPULATION			
		Site or Local	Regional	National/ international	
<b>MAGNITUDE</b>					
Minor	DURATION	Long term	Medium	Medium	High
		Medium term	Low	Low	Medium
		Short term	Low	Low	Medium
Moderate	DURATION	Long term	Medium	High	High
		Medium term	Medium	Medium	High
		Short term	Low	Medium	Medium
Major	DURATION	Long term	High	High	High
		Medium term	Medium	Medium	High
		Short term	Medium	Medium	High

**PART C: DETERMINING SIGNIFICANCE RATING**

*Rate significance based on consequence and probability*

		CONSEQUENCE		
		Low	Medium	High
<b>PROBABILITY (of exposure)</b>	Definite	Medium	Medium	High

to impacts)	Possible	Low	Medium	High
	Unlikely	Low	Low	Medium

#### 4 DESKTOP STUDY FINDINGS

##### 4.1 Historic Overview of Study Area and Surrounding Landscape

###### 4.1.1 Archaeological Background

DATE	DESCRIPTION
<b>2.5 million to 250 000 years ago</b>	<p>The Earlier Stone Age (ESA) is the first 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 to approximately 1.5 million years ago.</p> <p>No Early Stone Age sites are known in the vicinity of the study area. However, this is probably due more to a lack of research on the surroundings of the study area rather than a lack of sites.</p>
<b>250 000 to 40 000 years ago</b>	<p>The Middle Stone Age (MSA) 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.</p> <p>A Middle Stone Age site is known from Primrose Ridge in Germiston (Harcus, 1945), as well as two sites near Brakpan (Gaigher, 2013). However, no Middle Stone Age sites are known in the direct vicinity of the study area. However, this is probably due to a lack of research on the surroundings of the study area rather than a lack of sites.</p>
<b>40 000 years ago, to the historic past</b>	<p>The Later Stone Age (LSA) is the third archaeological phase identified and is associated with an abundance of very small artefacts known as microliths.</p>

	<p>No Later Stone Age sites are known in the vicinity of the study area. However, this is in all likelihood rather due to a lack of research focus on the surroundings of the study area than a lack of sites.</p>
<p><b>AD 1450 – AD 1650</b></p>	<p>The Uitkomst facies of the Blackburn Branch of the Urewe Ceramic Tradition represents the first Iron Age period to be identified for the surroundings of the study area. This facies can likely be dated to between AD 1650 and AD 1820. The decoration on the ceramics associated with this facies is characterised by stamped arcades, appliqué of parallel incisions, stamping, as well as cord impressions, and is described as a mixture of the characteristics of both Ntsuanatsatsi (Nguni) and Olifantspoort (Sotho).</p> <p>The Uitkomst facies (with the Makgwareng facies) is seen as the successor to the Ntsuanatsatsi facies. The Ntsuanatsatsi facies is closely related to the oral histories of the Early Fokeng and represents the earliest known movement of Nguni people out of Kwazulu-Natal into the inland areas of South Africa. In terms of this theory, the Bafokeng settled at Ntsuanatsatsi Hill in the present-day Free State Province. Subsequently, the BaKwena lineage broke away from the Bahurutshe cluster and crossed southward over the Vaal River to come in contact with the Bafokeng. As a result of this contact, a Bafokeng-Bakwena cluster was formed, which moved northward and became further ‘Sotho-ised’ by coming into increasing contact with other Sotho-Tswana groups. This eventually resulted in the appearance of Uitkomst facies type pottery which contained elements of both Nguni- and Sotho-Tswana speakers (Huffman, 2007).</p> <p>No sites associated with the Uitkomst facies are known from the surroundings of the study area.</p>
<p><b>AD 1700 – AD 1840</b></p>	<p>The Buispoort facies of the Moloko branch of the Urewe Ceramic Tradition is the next phase to be identified within the study area’s surroundings. It is most likely dated to between AD 1700 and AD 1840. The key features on the decorated ceramics include rim notching, broadly incised chevrons and white bands, all with red ochre (Huffman, 2007). It is believed that the Madikwe facies developed into the Buispoort facies. The Buispoort facies is associated with sites such as Boschhoek, Buffelshoek, Kaditshwene, Molokwane and Olifantspoort (Huffman, 2007).</p>

	<p>No sites associated with the Buispoort facies are known from the surroundings of the study area.</p>
<p><b>AD 1821 – AD 1823</b></p>	<p>After leaving present-day KwaZulu-Natal, the Khumalo Ndebele (more commonly known as the Matabele) of Mzilikazi migrated through the general vicinity of the study area under discussion before reaching the central reaches of the Vaal River in the vicinity of Heidelberg in 1823 (<a href="http://www.mk.org.za">www.mk.org.za</a>).</p> <p>Two different settlement types have been associated with the Khumalo Ndebele. The first of these is known as Type B walling and was found at Nqabeni in the Babanango area of KwaZulu-Natal. These walls stood in the open without any military or defensive considerations and comprised an inner circle of linked cattle enclosures (Huffman, 2007). The second settlement type associated with the Khumalo Ndebele is known as Doornspruit and comprises a layout which, from the air, has the appearance of a ‘beaded necklace’. This layout comprises long scalloped walls (which mark the back of the residential area) which closely surround a complex core, which in turn comprises a number of stone circles. The structures from the centre of the settlement can be interpreted as kitchen areas and enclosures for keeping small stock.</p> <p>It is important to note that the Doornspruit settlement type is associated with the later settlements of the Khumalo Ndebele, in areas such as the Magaliesberg Mountains and Marico, and represents a settlement under the influence of the Sotho with whom the Khumalo Ndebele intermarried. The Type B settlement is associated with the early Khumalo Ndebele settlements and conforms more to the typical Zulu form of settlement. As the Khumalo Ndebele passed through the general vicinity of the study areas shortly after leaving Kwazulu-Natal, one can assume that their settlements here would have conformed more to the Type B than the Doornspruit type of settlement. It must be stressed however that no published information could be found which indicates the presence of Type B sites in the general vicinity of the study area.</p> <p>No sites associated with this period of the archaeological history of the surroundings of the study area are presently known.</p>

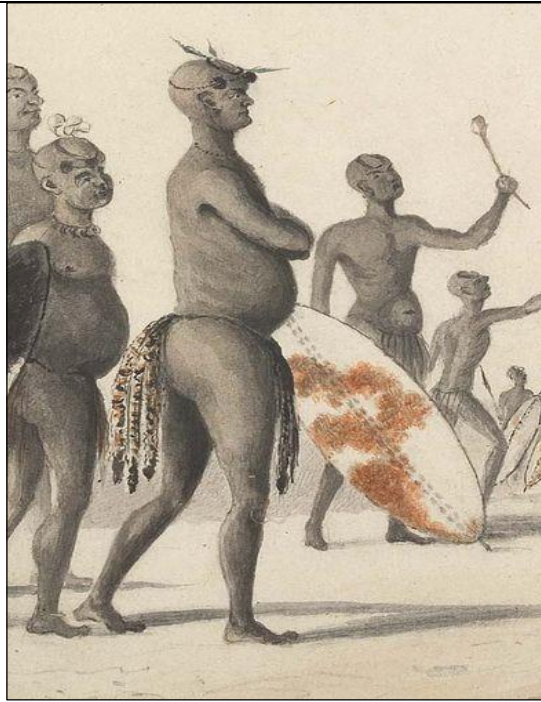


Figure 6: King Mzilikazi of the Matabele. This illustration is by Captain Cornwallis Harris in c. 1838 ([www.sahistory.org.za](http://www.sahistory.org.za)).

<p><b>1832</b></p>	<p>At this time, a Zulu impi of King Dingane moved through the general vicinity of the study area on their way to attack the Matabele of Mzilikazi, who were settled along the Magaliesberg Mountains (Bergh, 1999).</p>
<p><b>1836</b></p>	<p>The first Voortrekker parties started crossing over the Vaal River at this time. The earliest Voortrekker party to cross over the Vaal River was the one under the leadership of Louis Trichardt and Johannes Jacobus Janse van Rensburg. Although the exact route followed by the Trichardt-Janse van Rensburg party was not recorded, one suggestion is that they passed through the strip of land in-between the Bronkhorst Spruit in the west and the Wilge River to the east (Bergh, 1999).</p>
<p><b>1841 – 1850</b></p>	<p>These years saw the early establishment of farms by the Voortrekkers in the general vicinity of the study area (Bergh, 1999).</p>
<p><b>1899 – 1902</b></p>	<p>The South African War took place during this time. No events or activities during the war can be associated with the present study area. However, a number of such events and activities are known from the general vicinity. These will be briefly mentioned in the paragraphs below.</p>

	<p>Skirmishes or battles from the surrounding landscape include an action between a British force under the command Lieutenant-General J.D.P. French and a Boer commando of some 1 000 men on 23 July 1900. (Changuion, 2001).</p> <p>Another incident occurred during the early morning of 26 December 1900, when a section of the Heidelberg Commando of some 350 men attacked the town of Benoni, as well as some of the gold mines surrounding the town, including the Kleinfontein Mine. The attack was a success, and according to some eye witnesses resulted in 22 British casualties (eight killed and 14 wounded), as well as the capture of three prisoners by the Boer commando (Blake, 2012).</p> <p>It is also interesting to note that the Boer Commando used the farm Rietkol as a meeting place from where the attack on Benoni proceeded (Blake, 2012).</p>
<p><b>1984</b></p>	<p>During the 1980s, Leandra became a symbol of defiance during one of the most turbulent stages in South Africa's recent history. Forced removals were part and parcel of life for many township residents across the country during that period as a form of control over the people, and Leandra was no exception.</p> <p>Since the 1970s, the old Administration Board had made many attempts to forcibly move the residents of Leandra. While their latest attempt in the early 1980s had only been to move a portion of its residents, the majority of the people of Leandra stood up to the Administration board to halt these forced removals. Under the leadership of the Leandra Action Committee (LAC), the community had resisted these attempts to divide it, by demanding that the entire population be allowed to remain as is. On the 7<sup>th</sup> June 1984, the Leandra Community and LAC received a letter through their lawyers from the Ministry of Co-operation and Development that they had received a reprieve from the government allowing the community to remain whole.</p> <p>While objectively it was only a small victory, there is no doubt that this small incident could have added momentum to the fast growing movement across the country that eventually overthrew the Apartheid Regime (TRAC, 1985).</p>



## 4.2 Previous Archaeological and Heritage Studies around the Study Area

An electronic web search was undertaken to locate information from previous studies and relevant archaeological and historical texts were also consulted. In this regard, the South African Heritage Resources Information System (SAHRIS) was especially helpful (see <http://www.sahra.org.za/sahris>). The studies found are listed below:

- Kusel, U.S. 2010. Cultural heritage resources impact assessment for Harmony Gold, Evander. This assessment located memorial sites, initiation sites, burial grounds and structural remains dating from the relatively recent past.
- Van Vollenhoven, A.C. 2017. A report on a cultural heritage impact assessment for additional infrastructure at the Evander Gold Mine, Mpumalanga Province. This assessment located burial grounds and structural remains dating from the relatively recent past.
- Higgitt, N. 2014. Heritage statement for the Onverwacht Prospecting EMP, Onverwacht 97IS, 2629AC Evander, Kinross, Mpumalanga Province. This assessment located historical structures and burial grounds.
- Gaigher, S. 2011. Heritage impact assessment for three alternative sites for the relocation of the Devon Landfill Site. This assessment located no relevant heritage resources.

## 4.3 Spatial analysis findings

A spatial and landscape analysis of the study area was conducted through the analysis of historical maps, topocadastral maps and satellite imagery. The aim was to identify landscape forms, natural features and structures that potentially have heritage significance or have associated features and structures that have heritage significance.

The analysis of the studies conducted in the area assisted in the development of the landform type to heritage find matrix in **Table 1**.

## 4.4 Archival and Historic Maps of the Study Area and Surrounding Landscape

### 4.4.1 *First Edition of the 2628BD Topographical Sheet*

A portion of the First Edition of the 2529DB Topographical Sheet is depicted below (**Figure 7**, **Figure 8**). The map was based on aerial photography undertaken in 1958 and was surveyed in 1965 and drawn in 1966 by the Trigonometrical Survey Office.

The following observations can be made from the above-mentioned map:

- Several structures occur within the study area, all of which are representative of farming infrastructure.
- Possible heritage features are represented as “huts”. Several of these occur in the study area.

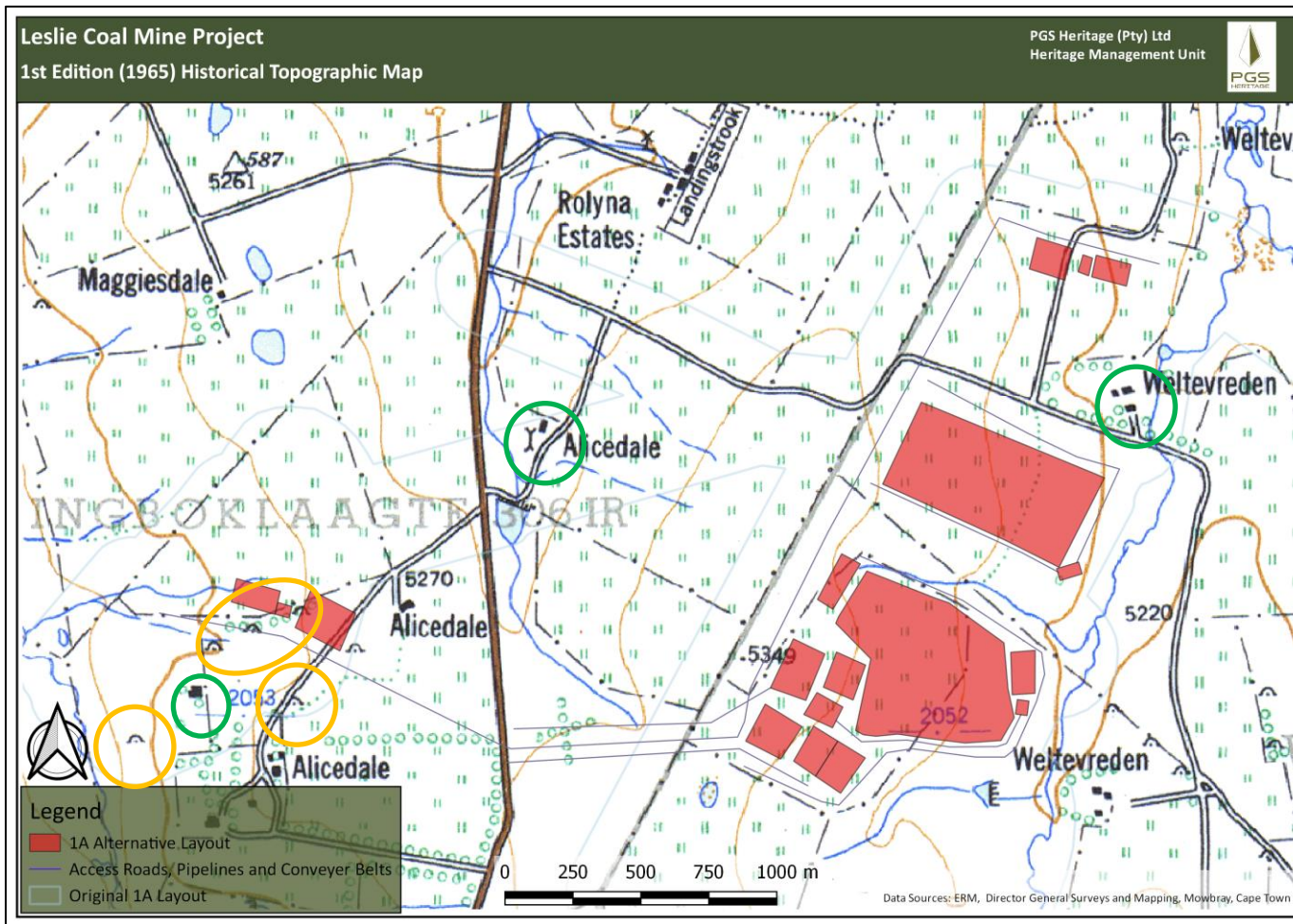


Figure 7 – Enlarged section of study area 1A showing topographic map features. Five huts can be seen on the eastern side of the area (yellow circles) while several structures and a cattle dipping station can be seen on the same side with a farming compound on the western side (green circles).

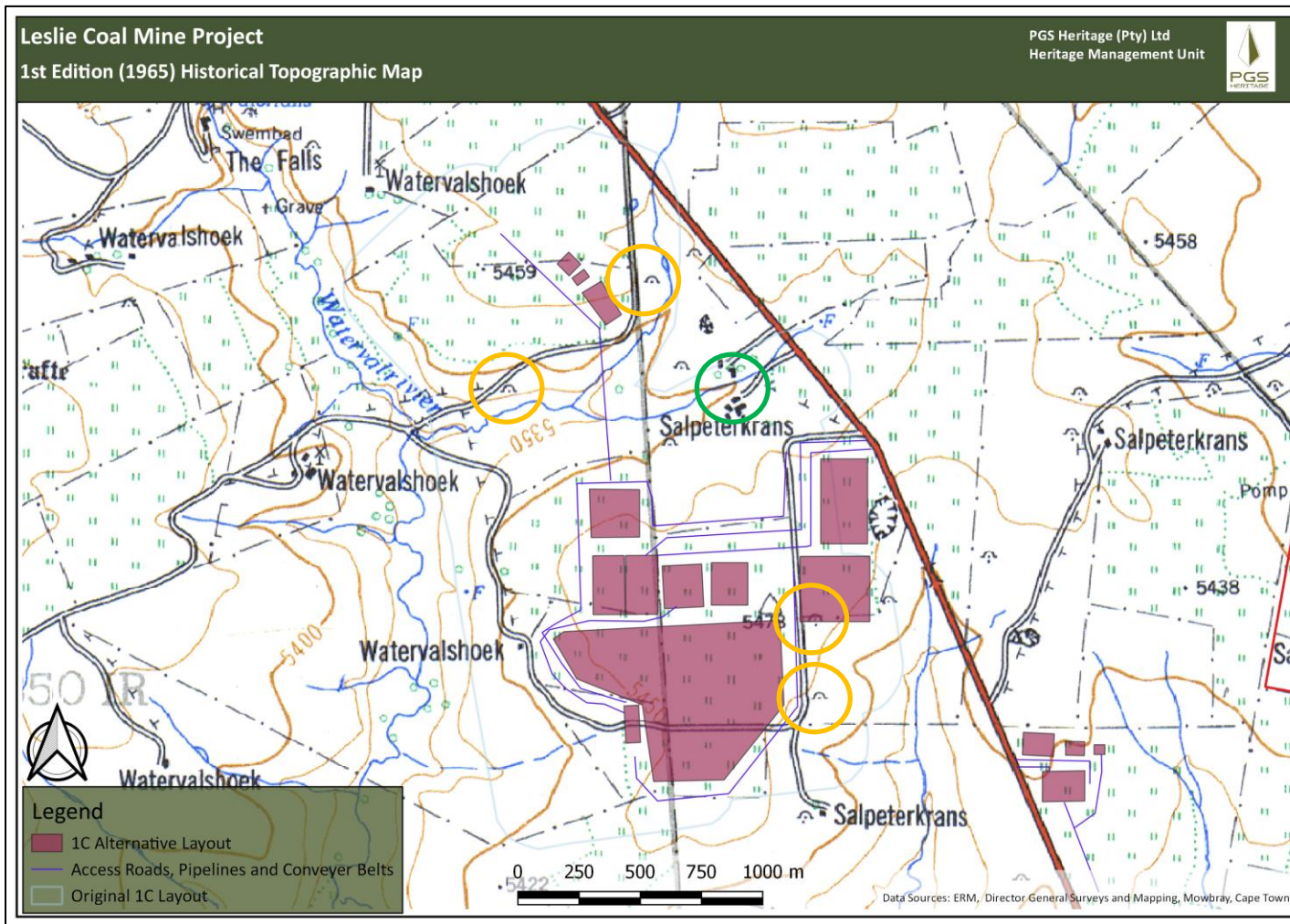


Figure 8 – Enlarged section of study area 1C showing topographic map features. Four huts can be seen distributed across the study area (yellow circle), as well a farming compound (green circle)

#### *4.4.2 Google Earth satellite imagery analysis*

After the analysis of the historical topocadastral maps had been completed, an analysis of available satellite imagery was undertaken. The aim was to identify man-made structures, as well as landforms that can possibly be associated with settlement patterns of historical people. These landforms, as identified in **Table 1**, guided the focussed fieldwork to assist in the identification of potential heritage resources. Attention was given to distinguish between man-made watering holes and naturally occurring watering holes, as the latter often have associated heritage resources and features (**Figure 9 & Figure 10**).

#### *4.4.3 Heritage sensitivities*

The evaluation of the possible heritage resource finds and their heritage significance linked to mitigation requirements was linked to the types of landform. This enabled the development of a heritage sensitivity map. These landforms do not indicate “no-go” areas, but the possibility of finding heritage significant sites that could require mitigation work.

#### *4.4.4 Possible finds*

The evaluation of satellite imagery has indicated areas that may be sensitive from a heritage perspective. The analysis of the studies conducted in the area assisted in the development of the landform type to heritage find matrix in **Table 1**, above.



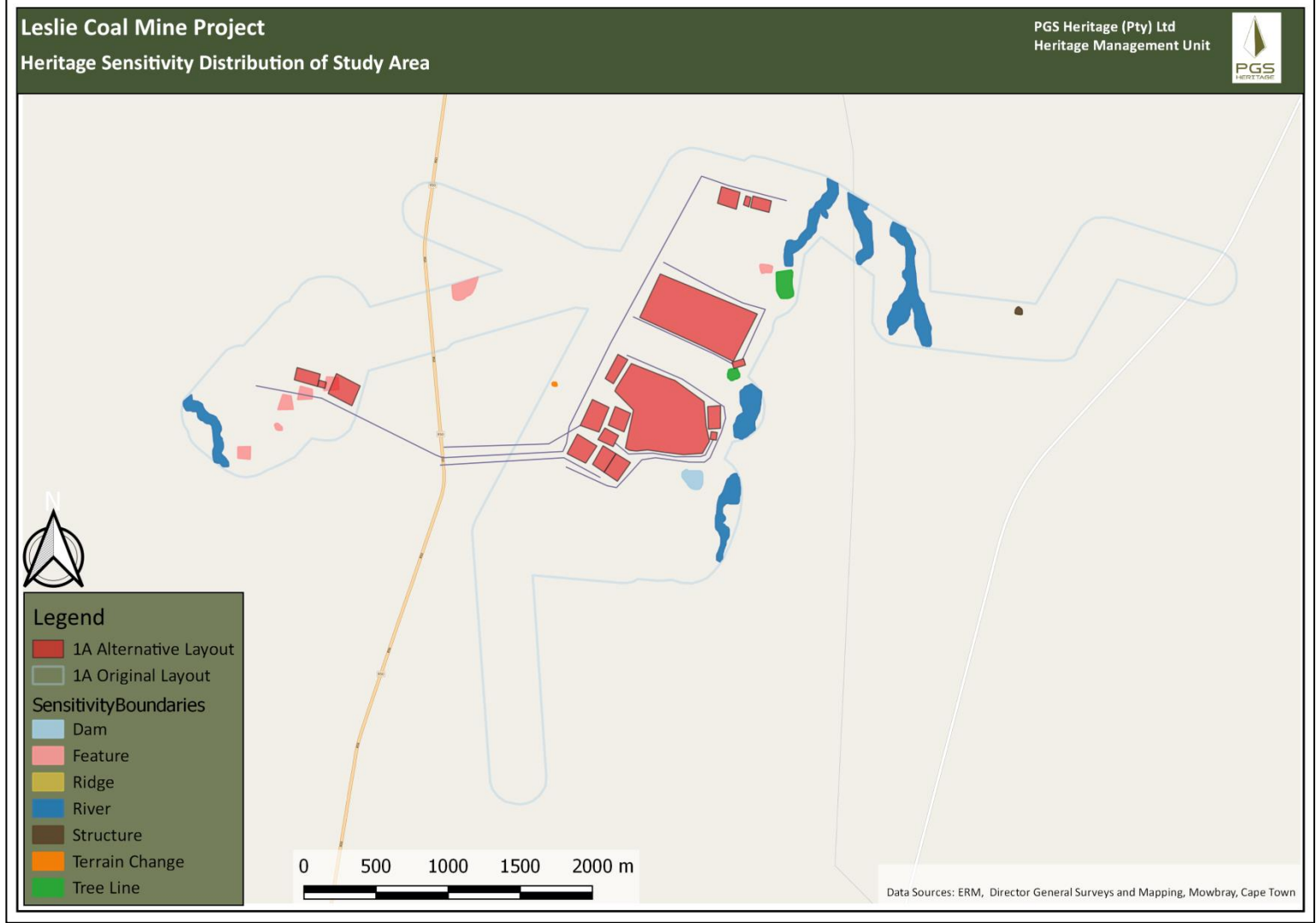


Figure 9 – Correlation of landforms and structures identified from the aerial photographic analysis in study area 1A

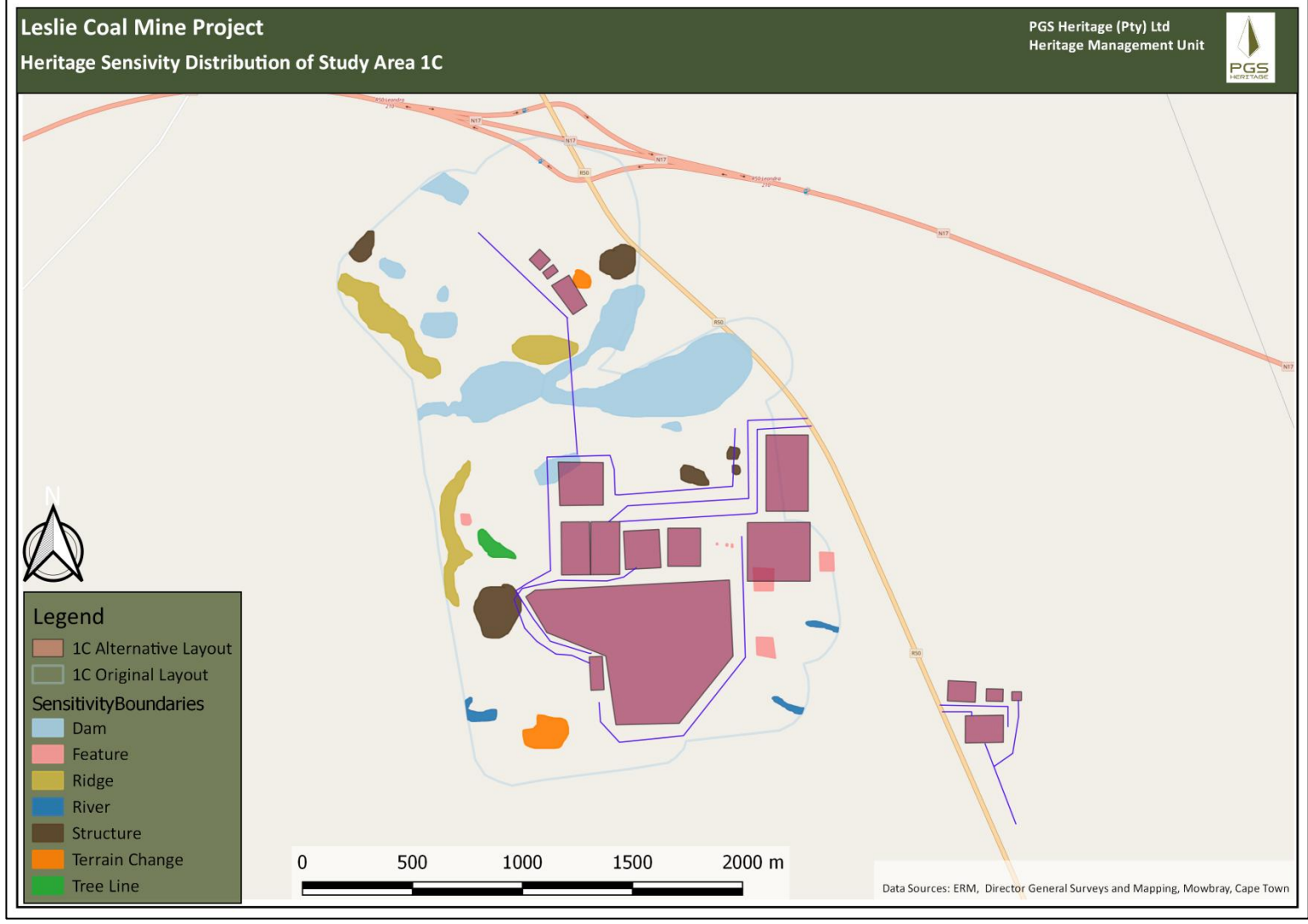


Figure 10 – Correlation of landforms and structures identified from the aerial photographic analysis in study area 1C

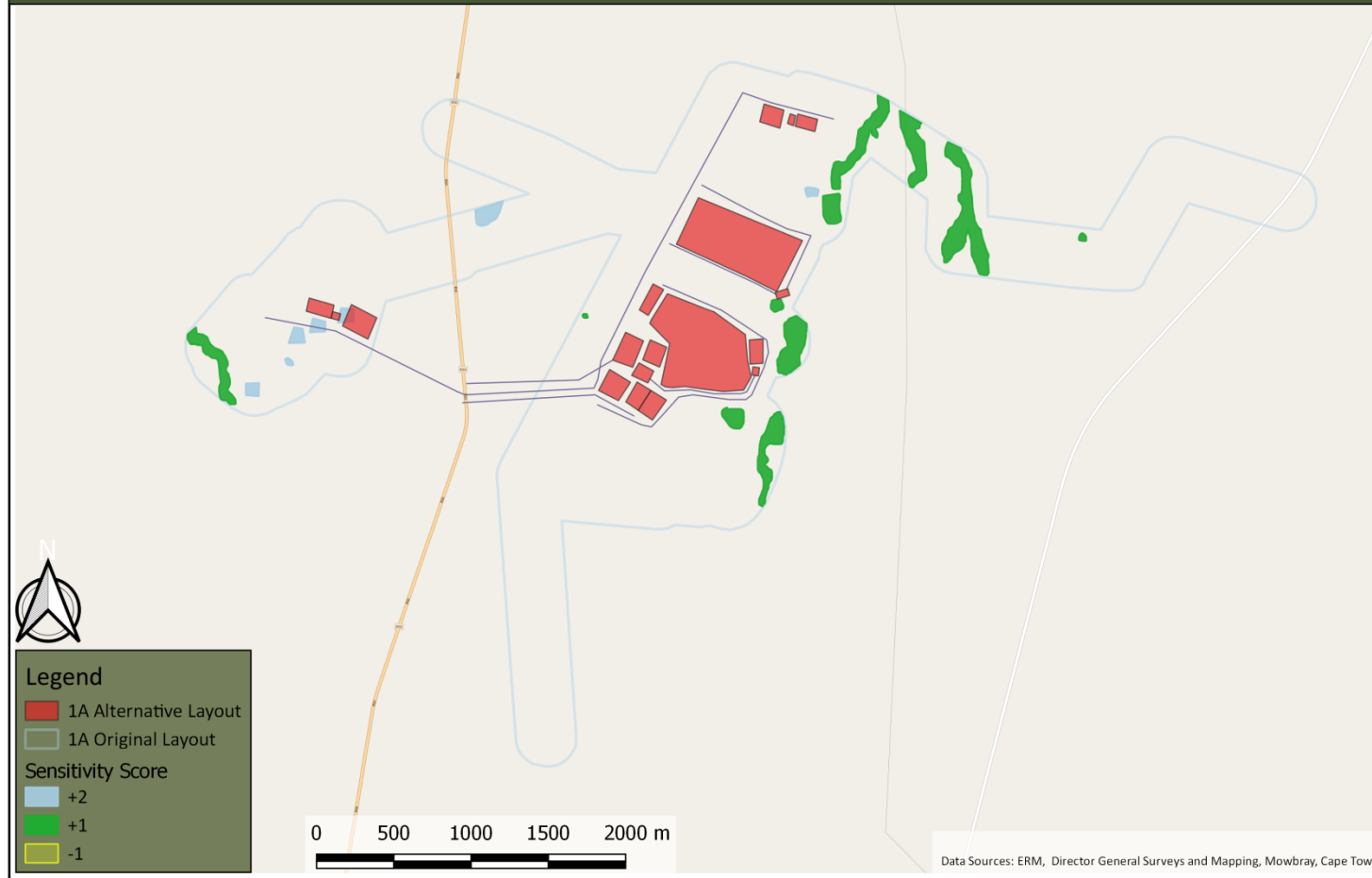


Figure 11 – Heritage sensitivity score for Area 1A



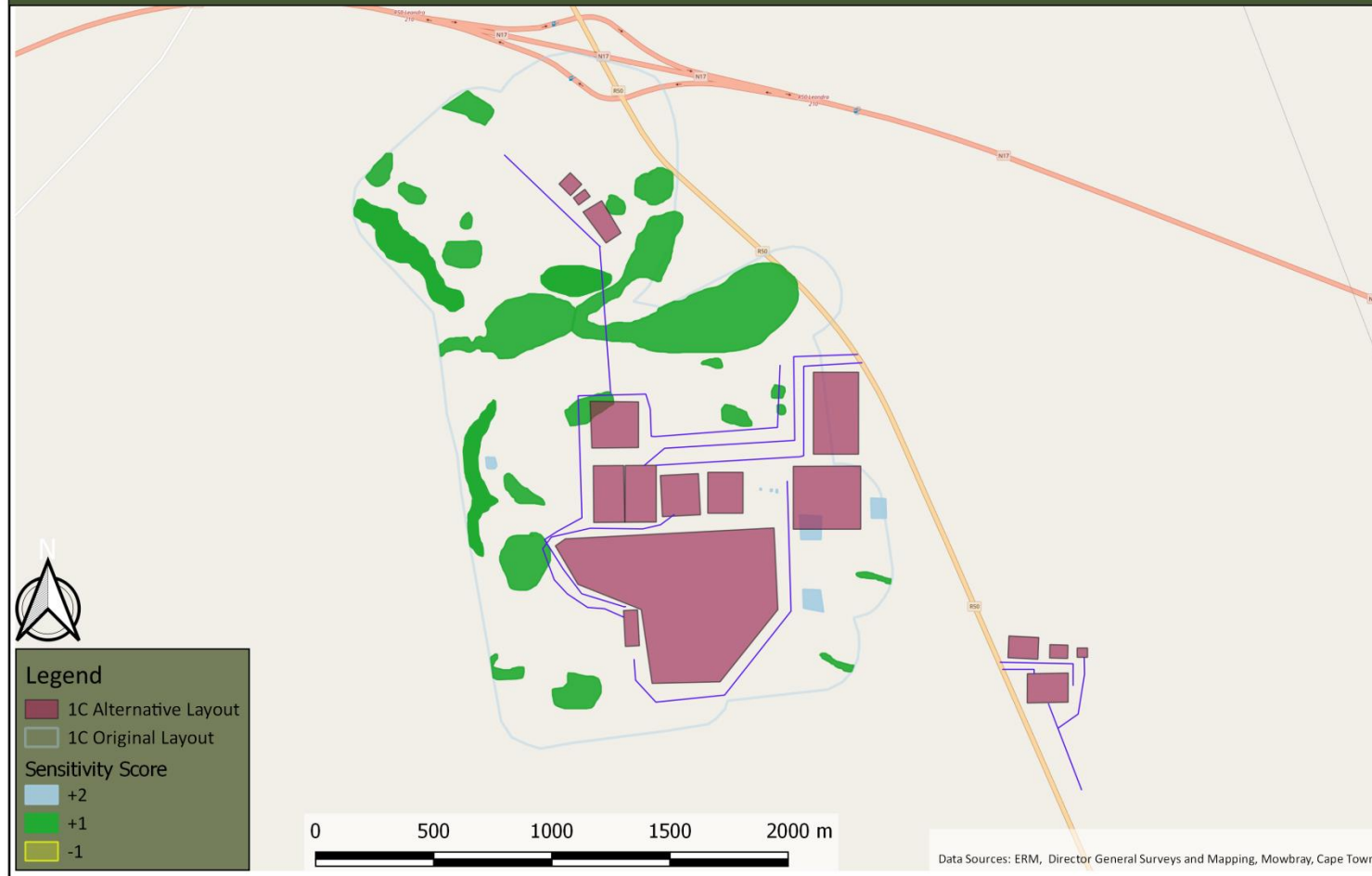


Figure 12 - Heritage sensitivity score for Area 1C

#### 4.4.5 Stakeholder Engagement

The current stakeholder engagement process has identified three sets of graves and an initiation site located on the farm Watervalshoek. The one set of graves was confirmed during the fieldwork phase of the HIA, however the two other sets of graves and the initiation site fell outside of the purview of the study area and were not located during the fieldwork phase. Coordinates of these other sites are known and are represented below.

## 5 FIELDWORK FINDINGS

### 5.1 Methodology

A survey of the mining footprint was conducted between 10-14 April 2018. Two archaeologists from PGS conducted a vehicle and foot-survey that covered the study area. The fieldwork was logged with a GPS to provide a tracklog of the areas covered (**Figure 13**).

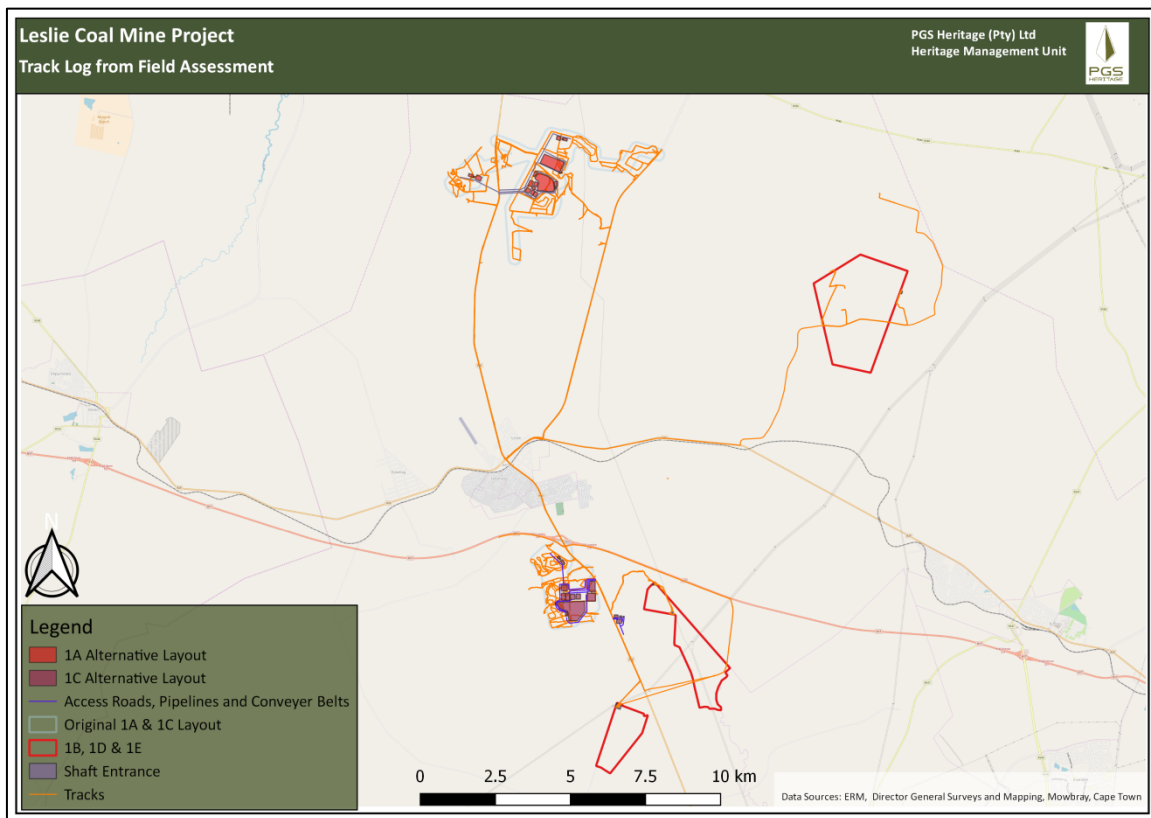


Figure 13 – Footprint area (red polygons) with fieldwork tracklogs (orange).

The proposed site is characterised by agricultural land with patches of bushveld, and sporadic forested areas.




*Figure 14- General bushveld conditions around a ridge*      *Figure 15- General agricultural landscape*

## 5.2 Findings


During the survey 28 heritage resources sites were identified. The identified sites are described in the table below (**Table 5**).

Table 5: Heritage resources identified

Site <sup>2</sup> number	Lat	Lon	Infrastructure	Description	Heritage Significance	Heritage Rating
LES001	S26.29508°	E28.90688°	1A	Burial site consisting of a single grave that is apparently a child from a Jewish family according to the owner of the property, Mr Saaiman. However, the grave is marked with a cross, which is associated with Christianity. The grave is at least 50-60 years old as it existed when the owner's grandfather bought the farm. <b>Site extent: 5x5m.</b> <i>Outside of study area so mitigation impact is low, however caution is still advised if the development layout plan changes.</i>	High	GP.A
				 <p>Figure 16 - Burial site at LES001, single grave</p>		

<sup>2</sup> Site in this context refers to a place where a heritage resource is located and not a proclaimed heritage site as contemplated under s27 of the NHRA.

Site number	Lat	Lon	Infrastructure	Description	Heritage Significance	Heritage Rating
LES002	S26.28972°	E28.90321°	1A	<p>Burial ground consisting of 60-70 graves. It is still being visited by at least one family according to the property owner, Mr Saaiman. The burial ground is overgrown with vegetation and many of the headstones and dressings are deteriorated to varying degrees. There is also no demarcation or fencing present. The oldest grave with a known burial date is from 1958.</p> <p><b>Site extent: 30x10m</b></p>	High	GP.A

Site <sup>2</sup> number	Lat	Lon	Infrastructure	Description	Heritage Significance	Heritage Rating
 <p data-bbox="241 762 1070 791"><i>Figure 17 - Burial site at LES002, showing overgrown nature of burial ground</i></p>				 <p data-bbox="1435 772 1800 801"><i>Figure 18 – Example of headstone</i></p>		
 <p data-bbox="427 1276 887 1305"><i>Figure 19 – Inscribed headstone at LES002</i></p>				 <p data-bbox="1382 1276 1856 1305"><i>Figure 20 - Inscribed head marker at LES002</i></p>		



Site <sup>2</sup> number	Lat	Lon	Infrastructure	Description	Heritage Significance	Heritage Rating
LES003	S26.27931°	E28.91056°	1A	Burial ground consisting of 50-60 graves located between two maize fields. The burial ground is overgrown with vegetation and many of the headstones and dressings are deteriorated to varying degrees. There is also no demarcation or fencing present. The oldest grave with a known burial date is from the 1960s, while some of the graves are of more recent origin. <b>Site extent: 50x10m</b>	High	GP.A



Figure 21 – Burial site at LES003



Figure 22 - Burial site at LES003

Site number	Lat	Lon	Infrastructure	Description	Heritage Significance	Heritage Rating
LES004	S26.29019°	E28.90572°	1A	The remains of an old brick structure with a concrete foundation, with a stone-and-brick structural addition behind it. Concrete and brick lintels are visible on both sections of the structure with iron bars on some of the windows. According to the farmer, the structure was allegedly utilised as some kind of jail. The structure has an unusual layout with most rooms leading straight out into the courtyard and no indoor passages. Some of the rooms are painted. It is possible that the structure was used for storage or perhaps even as a school. This site is visible on the 1 <sup>st</sup> Edition 1965 topographic map therefore confirming that it is at least almost 60 years old. <b>Site extent: 30x30m</b>	Low	GP.B





*Figure 23 – Front view of brick structure at LES004*




*Figure 24 –Rear view of structure with stone-built addition at LES004*



*Figure 25 – Iron bars in window LES004*



*Figure 26 – Painted room LES004*

Site number	Lat	Lon	Infrastructure	Description	Heritage Significance	Heritage Rating	
LES005	S26.29264°	E28.94217°	1A	Burial site consisting of a single grave. The grave has a granite headstone and dressing. The date of the grave is 1955. <b>Site extent: 5x5m.</b> <i>Outside of study area so mitigation impact is low, however caution is still advised if the development layout plan changes.</i>	High	GP.A	
				 <p><i>Figure 27 – Single grave at LES005</i></p>			

Site number	Lat	Lon	Infrastructure	Description	Heritage Significance	Heritage Rating
LES006	S26.28640°	E28.94129°	1A	Burial site consisting of a single grave. Stone headstone (with no inscription) and dressing. Deterioration indicates that it is likely to be quite old. Size of the grave indicates it belongs to a child. <b>Site extent: 5x5m</b> <i>Outside of study area so mitigation impact is low, however caution is still advised if the development layout plan changes.</i>	High	GP.A



Figure 28 - Burial site at LES006, single grave



Site number	Lat	Lon	Infrastructure	Description	Heritage Significance	Heritage Rating
LES007	S26.28727°	E28.93728°	1A	Burial site with single grave having a granite headstone and dressing. The date of the grave is 1933. There is a possible second grave located immediately adjacent to this grave, but it is more likely to be the remains of an old dressing for this grave. <b>Site extent: 5x5m.</b>	High	GP.A



Figure 29 – Single grave at LES007



Figure 30 – Remains of old dressing at LES007

Site number	Lat	Lon	Infrastructure	Description	Heritage Significance	Heritage Rating
LES008	S26.29019°	E28.93983°	1A	Burial ground consisting of five very old stone packed graves facing East to West. One of them has been disturbed by an animal burrow . <b>Site extent: 15x5m.</b> <i>Outside of study area so mitigation impact is low, however caution is still advised if the development layout plan changes.</i>	High	GP.A



Figure 31 – Burial site at LES008



Figure 32 – Example of one of the stone packed graves at LES008

Site number	Lat	Lon	Infrastructure	Description	Heritage Significance	Heritage Rating
LES009	S26.29001°	E28.94002°	1A	Burial site consisting of a single grave. This is a stone packed grave like those at LES008, heavily overgrown with aloes. It could be of a similar age as it is situated only 30m to the NE of LES008. <b>Site extent: 5x5m.</b> <i>Outside of study area so mitigation impact is low, however, caution is still advised.</i>	High	GP.A



Figure 33 - Single grave at LES009

Site number	Lat	Lon	Infrastructure	Description	Heritage Significance	Heritage Rating
LES010	S26.28404°	E28.96680°	1A	Burial ground consisting of 19 graves situated at the side of the Ogies Road, 250m South of the proposed access road on the Eastern side of study area 1A. Most of the graves have granite headstones and dressings. The oldest grave is dated 1942. <b>Site extent: 15x15m</b> <i>Outside of study area so mitigation impact is low, however caution is still advised if the development layout plan changes.</i>	High	GP.A



Figure 34 – Burial ground at LES010



Site number	Lat	Lon	Infrastructure	Description	Heritage Significance	Heritage Rating
LES011	S26.28100°	E28.91961°	1A	The remains of an old farmstead consisting of: a) a stone cattle kraal; b) a brick silo; c) a stone structure with multiple rooms; d) a derelict brick house with iron lintels; and e) a well-preserved sheep dipping station. This site is visible on the 1 <sup>st</sup> Edition 1965 topographic map, therefore confirming that it is likely to be 60 years old. <b>Site extent: 100x100m.</b>	None	None



Figure 35 – a) Cattle kraal at LES011



Figure 36 – b) Brick silo at LES011





*Figure 37 – c) Derelict brick structure at LES011*



*Figure 38 – d) Remains of stone structure at LES011*



*Figure 39 – e) Sheep dipping station at LES011*

Site number	Lat	Lon	Infrastructure	Description	Heritage Significance	Heritage Rating
LES012	S26.28024°	E28.93978°	1A	The site comprises an a) old brick structure with stone foundation which may have been a stable, with concrete troughs along the inner edges of the building; b) a stone-and-brick outbuilding; and c) a small 3-roomed brick house with concrete lintels. The site most likely dates to the 1930s due to the Imperial brick style and a stone foundation. This site is visible on the 1 <sup>st</sup> Edition 1965 topographic map therefore confirming that it is likely to be 60 years old. <b>Site extent: 70x20m.</b>	Low	GP.B



*Figure 40 – a) Brick stable at LES012*



*Figure 41 – Concrete trough within stable at LES012*



*Figure 42 – b) Stone-and-brick structure at LES012*

*Figure 43 – c) Brick structure at LES012*

Site number	Lat	Lon	Infrastructure	Description	Heritage Significance	Heritage Rating
LES013	S26.41222°	E28.94926°	1C	The site comprises relatively old agricultural infrastructure which is currently being utilised. The structures are of little heritage significance. <b>Site extent: 50x20m</b>	None	None



*Figure 44 – Agricultural infrastructure at LES013*

Site number	Lat	Lon	Infrastructure	Description	Heritage Significance	Heritage Rating
LES014	S26.41823°	E28.95012°	1C	Burial ground consisting of 30-40 graves, that is still being visited as the surrounding grass has been cut. However the portion of the burial ground on the other side of the fence is partially overgrown. The graves are mostly stone-packed, with a few having granite headstones and dressings. The oldest known grave is dated 1961. The burial ground is situated approx. 100m East of (outside) the southern portion of study area 1C. <b>Site extent: 15x10m</b> <i>Outside of study area so mitigation impact is low, however caution is still advised if the development layout plan changes.</i>	High	GP.A



Figure 45 – Burial site at LES014



Figure 46 – Overgrown nature of a portion of the burial ground at LES014



Site number	Lat	Lon	Infrastructure	Description	Heritage Significance	Heritage Rating
LES015	S26.32320°	E29.05077°	1B	Burial ground consisting of 20-30 graves, however, the number is not clear due to the heavily overgrown vegetation. At least one of the graves is still being visited. The graves are mostly stone-packed, with some graves having concrete headstones and dressings, and one having a granite headstone. The burial ground is situated close to the proposed shaft entrance of Area 1B. <b>Site extent: 30x5m.</b>	High	GP.A



*Figure 47 - Burial ground at LES015*



*Figure 48 – Concrete headstones at LES015*




Site number	Lat	Lon	Infrastructure	Description	Heritage Significance	Heritage Rating
LES016	S26.41745°	E28.93229°	1C	Burial site consisting of two graves situated within derelict brick walling. The graves are marked with wooden crosses and one has a marble dressing. The state of the burial ground indicates that it is quite old. According to Cobus Rolf, owner of the neighbouring properties, the graves belong to Johan Wasserman, a previous owner, who subsequently sold it to Aron Bogatsu. <b>Site extent: 10x10m.</b> <i>Outside of study area so mitigation impact is low, however caution is still advised if the development layout plan changes.</i>	High	GP.A



Figure 49 - Burial site at LES016



Figure 50 – One of the graves at LES016

Site number	Lat	Lon	Infrastructure	Description	Heritage Significance	Heritage Rating
LES017	S26.41756°	E28.93251°	1C	The remains of several stone structures comprising an old colonial farmstead. The site consists of the remains of: a) two stone-built houses, one with sandstone cornerstones indicating historical age; b) a small circular stone pen; and c) a large rectangular stone cattle kraal (with two conjoined pens). <b>Site extent: 50x50m</b>	Low	GP.B
				 <p>Figure 51 – a) Remains of stone structure with sandstone cornerstones at LES017</p>		
				 <p>Figure 52 – b) Remains of circular pen at LES017</p>		
				 <p>Figure 53 – c) Remains of stone cattle kraal at LES017</p>		



Site number	Lat	Lon	Infrastructure	Description	Heritage Significance	Heritage Rating
LES018	S26.42055°	E28.94891°	1C	The remains of a stone structure, probably of colonial origin. Sitting 40m South East outside of the boundary of 1C. <b>Site extent: 20x10m.</b> <i>Outside of study area so mitigation impact is low, however caution is still advised if the development layout plan changes.</i>	Low	GP.C



Figure 54 – Stone structure at LES018



Figure 55 – Stone structure at LES018

Site number	Lat	Lon	Infrastructure	Description	Heritage Significance	Heritage Rating
LES019	S26.40471°	E28.93918°	1C	Burial ground consisting of 24 visible graves, that are mostly stone packed with a few graves having concrete headstones and dressings. The graves are not being visited. However, according to the farm owner, one belongs to an old woman who used to live in the farmstead nearby. The ages of the graves are unknown. <b>Site extent: 20x20m.</b>	High	GP.A



Figure 56 - Burial site at LES019



Figure 57 – Burial site at LES019



Site number	Lat	Lon	Infrastructure	Description	Heritage Significance	Heritage Rating
LES020	S26.40253°	E28.92926°	1C	A low stone wall built in front of a rock shelter. No visible signs of occupation within the shelter. According to the property owner Douglas Kelly, the wall was built by the previous farm owner. <b>Site extent: 10x5m.</b>	None	None



*Figure 58 – Low stone wall in front of rock shelter LES020*



*Figure 59 – Different view of low stone wall at LES020*

Site number	Lat	Lon	Infrastructure	Description	Heritage Significance	Heritage Rating
LES021	S26.40392°	E28.94488°	1C	Burial site consisting of a single grave of a child with a concrete headstone. The grave is dated 1922. <b>Site extent: 5x5m.</b> <i>Outside of study area so mitigation impact is low however caution is still advised.</i>	High	GP.A



Figure 60 - Single grave at LES021

Site number	Lat	Lon	Infrastructure	Description	Heritage Significance	Heritage Rating
LES022	S26.40651°	E28.94081°	1C	Burial ground consisting of 8 graves. Some have granite dressings and headstones, others have concrete dressings and headstones, and some are stone packed with stone head markers. The oldest known grave is dated 1955. Some of the graves are still being visited. <b>Site extent: 15x10m.</b>	High	GP.A



Figure 61 - Burial ground at LES022



Figure 62 – Oldest known grave at LES022



Site number	Lat	Lon	Infrastructure	Description	Heritage Significance	Heritage Rating
LES023	S26.41190°	E28.93368°	1C	The remains of a stone cattle kraal. <b>Site extent: 35x15m.</b>	None	None



*Figure 63 – Remains of old stone cattle kraal at LES023*



*Figure 64 – Detailed view of stone wall at LES023*

Site number	Lat	Lon	Infrastructure	Description	Heritage Significance	Heritage Rating
LES024	S26.41078°	E28.92712°	1C	Burial ground consisting of 15-20 graves, however the site is heavily overgrown so there could be 30 or more. The graves mostly have granite headstones and dressings, with a few made of concrete. The graves date to the early 1900s and according to Cobus Rolf, the cemetery was the original cemetery for the town of Leandra. The burial ground lies 450m West outside of the western boundary of 1C. <b>Site extent: 30x30m.</b> <i>Outside of study area so mitigation impact is low, however caution is still advised if the development layout plan changes.</i>	High	GP.A




Figure 65 – Burial site at LES024



Figure 66 – One of the more visible graves at LES024



Site number	Lat	Lon	Infrastructure	Description	Heritage Significance	Heritage Rating
LES025	S26.40547°	E28.93092°	1C	Four possible stone packed graves are situated about halfway along the line of the remains of a low, old stone wall running up the hill, according to Douglas Kelly, the farm owner. However, it was not possible to confirm the location due to the heavily overgrown nature of the grass. The graves should become visible if the grass is burned. <b>Site extent: 50x5m.</b> <i>The entire portion of the wall should be considered highly sensitive until the exact location of the graves is confirmed.</i>	High	GP.A
				<p><i>Figure 67 – General environment within which LES025 lies, view looking up-hill along the remains of the stone wall following the direction of the blue arrow (on the left hidden by vegetation)</i></p>		

Site number	Lat	Lon	Infrastructure	Description	Heritage Significance	Heritage Rating
LES026	S26.28697°	E28.96350°	1A	An old culvert found outside the study area. <b>Site extent: 5x5m.</b> <i>Outside of study area so mitigation impact is low, however caution is still advised if the development layout plan changes.</i>	Low	None



Figure 68 – Old culvert at LES026

Site number	Lat	Lon	Infrastructure	Description	Heritage Significance	Heritage Rating
LES027	S26.31545°	E29.02894°	1B	Burial ground consisting of 10-20 graves. The site is outside the study area. <b>Site extent: 15x5m.</b> <i>Outside of study area so mitigation impact is low, however caution is still advised if the development layout plan changes.</i>	High	GP.A



*Figure 69 - Burial ground at LES027*

Site number	Lat	Lon	Infrastructure	Description	Heritage Significance	Heritage Rating
LES028	S26.39790°	E28.92869°	1C	Burial site that is not affected by the development. This site was not visited due to being outside the study area however, we were notified of its existence by the property owner, Albertus Hanekom. <b>Site extent: Unknown.</b> <i>Outside of study area so mitigation impact is low, however caution is still advised if the development layout plan changes.</i>	High	GP.A

Site number	Lat	Lon	Infrastructure	Description	Heritage Significance	Heritage Rating
LES029	S26.31139197° *Estimate	E28.93666318° *Estimate	1A	During the stakeholder engagement process, it was stated that several burials occur at this location on the farm Goedehoop 308 IR. This site was not visited due to being outside the study area. <b>Site extent: Unknown.</b> <i>Outside of study area so mitigation impact is low, however caution is still advised if the development layout plan changes. No photo as site was uncovered through stakeholder engagement process.</i>	High	GP.A

Site number	Lat	Lon	Infrastructure	Description	Heritage Significance	Heritage Rating
LES030	S26.32318719 ° *Estimate	E28.93693173 ° *Estimate	1A	During the stakeholder engagement process, it was stated that several burials occur at this location on the farm Goedehoop 308 IR. This site was not visited due to being outside the study area. <b>Site extent: Unknown.</b> <i>Outside of study area so mitigation impact is low, however caution is still advised if the development layout plan changes. No photo as site was uncovered through stakeholder engagement process.</i>	High	GP.A

Site number	Lat	Lon	Infrastructure	Description	Heritage Significance	Heritage Rating
LES031	S26.31042905 ° *Estimate	E28.92887513 ° *Estimate	1A	During the stakeholder engagement process, it was stated that the site of an Ndebele initiation school occurs at this location on the farm Goedehoop 308 IR. This site was not visited due to being outside the study area and due to cultural reasons from the stakeholders. <i>Outside of study area so mitigation impact is low, however caution is still advised if the development layout plan changes. No photo as site was uncovered through stakeholder engagement process.</i>	High	GP.A

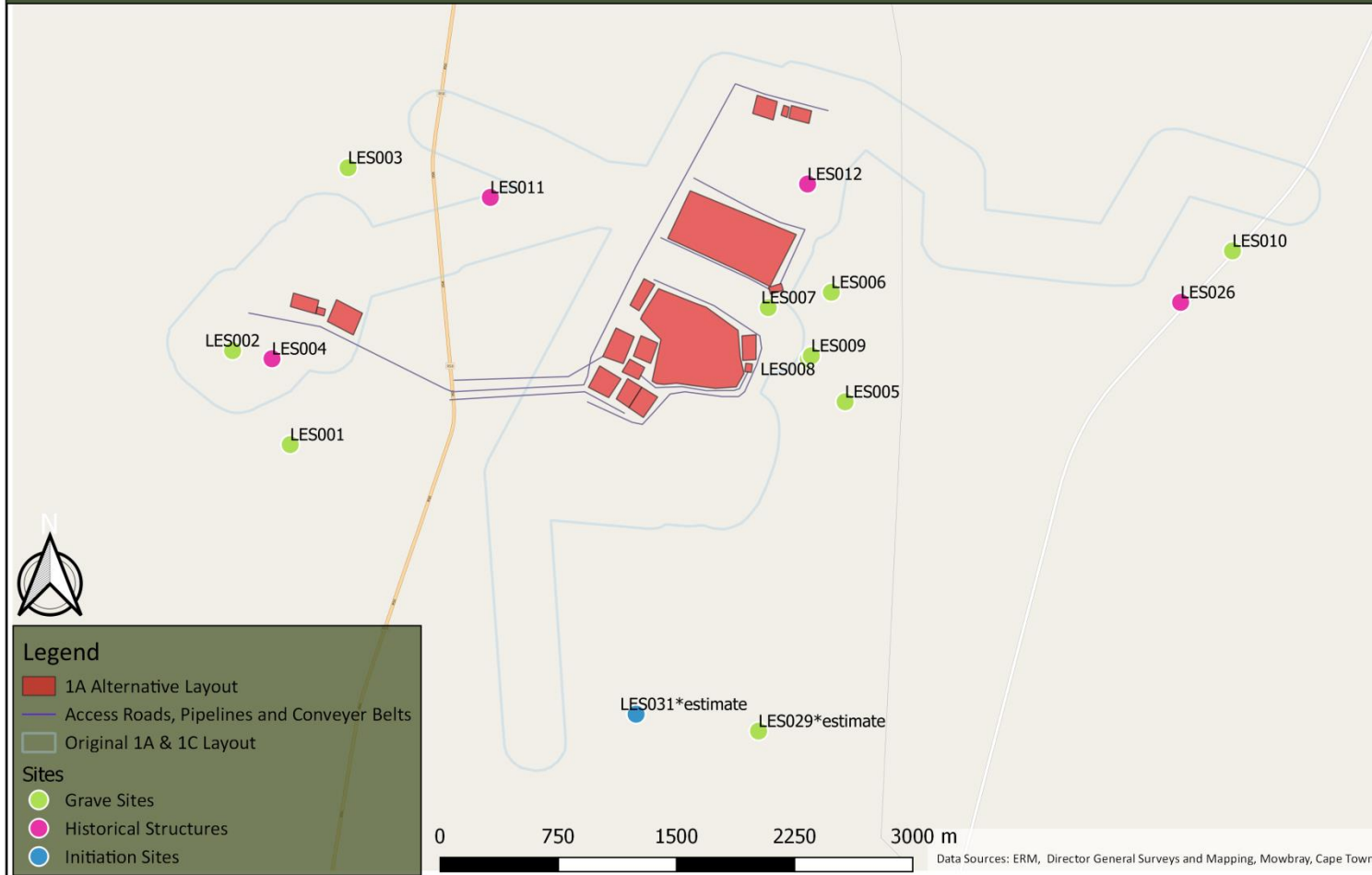


Figure 70 - Distribution of heritage resources on Area 1A



Figure 71 - Distribution of heritage resources on Area 1B



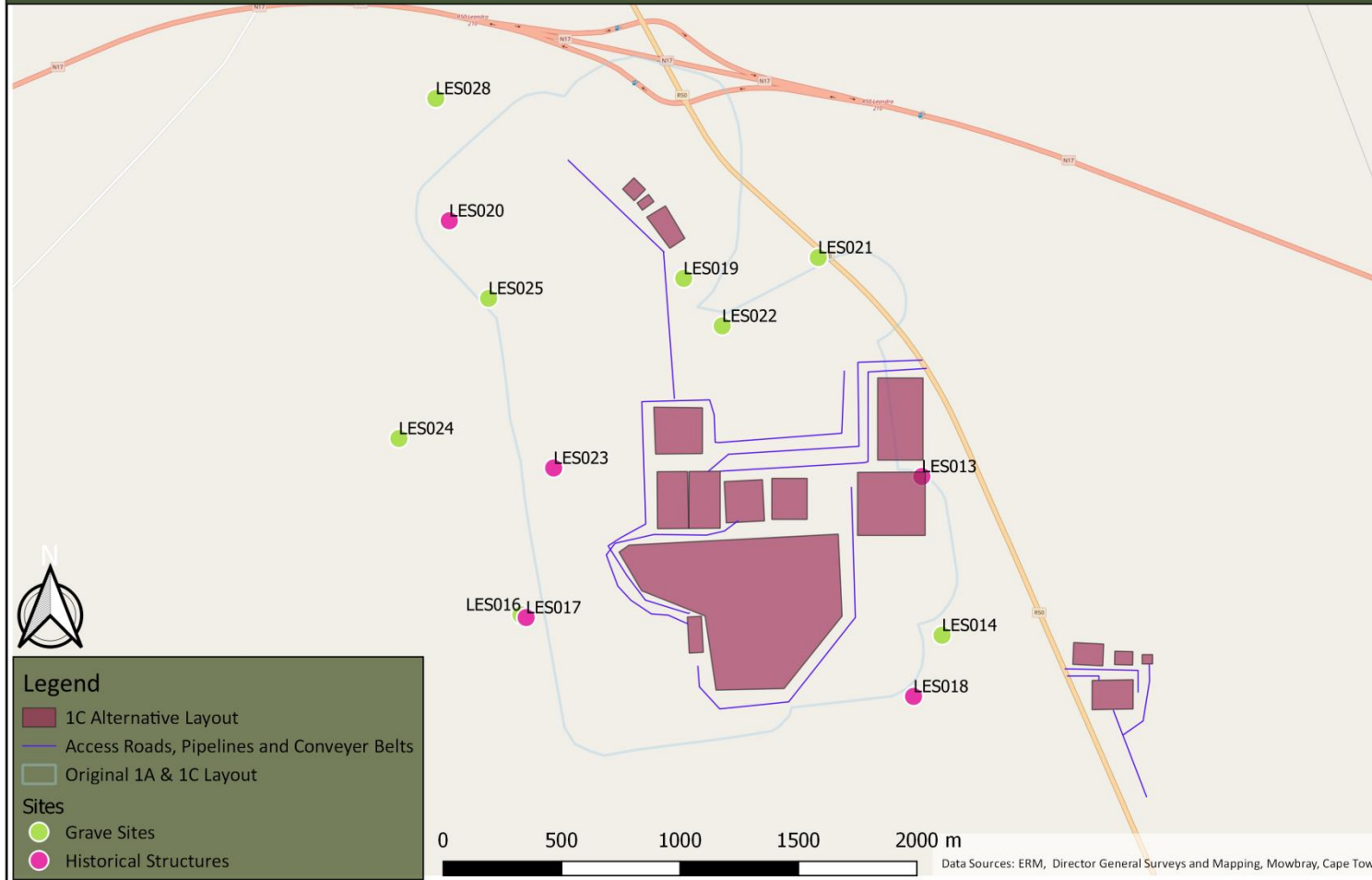


Figure 72 - Distribution of heritage resources on Area 1C

## 6 PALAEOLOGICAL SENSITIVITY

According to the palaeontological sensitivity map accessed via the SAHRIS database, it is clear that the study areas fall within 'VERY HIGH', 'MODERATE' and 'INSIGNIFICANT' rated sensitivity zones. Even though there are 'MODERATE' and 'INSIGNIFICANT' ratings, the highest rating being 'VERY HIGH' will have to be adhered to and therefore a palaeontological field assessment will be required before development can continue (**Figure 73**). A Palaeontological Desktop Assessment was commissioned in order to confirm this assumption.

The results of which showed that the proposed development footprint is underlain by the Permian aged Vryheid Formation, (Ecca Group, Karoo Supergroup) as well as Jurassic aged Dolerite (Karoo Supergroup) (**Figure 74**) (Butler 2018). The Vryheid Formation of the Ecca Group is well-known for the presences of coal beds which have been formed due to the accumulation of plant material over long periods of time (Butler 2018). Trace fossils, fish, small crustaceans, insects, as well as plant fossils are common in this Formation (Butler 2018). According to the SAHRIS PalaeoMap the sedimentary rocks of the Vryheid Formation have a very high palaeontological sensitivity while the Dolerite of the Jurassic has a very low palaeontological sensitivity as these rocks are unfossiliferous (Butler 2018).

Alternatives have been suggested for this project but they all fall in the same geology and thus not one is a preferred alternative in palaeontological terms (Butler 2018).

No significant fossils are expected to be found before deep excavation (>1.5m) are completed. Though, it is possible that significant fossils will be documented during excavations. The recording of fossils will enhance our knowledge of the Palaeontological Heritage of the development area (Butler 2018).

It is thus recommended that an EIA level palaeontology report will be conducted during deep excavation to assess the value and importance of fossils in the development area and the effect of the proposed development on the palaeontological heritage. This involves a Phase 1 field-based assessment by a professional palaeontologist. The purpose of the EIA Report is to elaborate on the concerns and potential impacts identified during the scoping phase. This is accomplished by site visits and research in the site-specific study area as well as a comprehensive assessment of the impacts identified during the scoping phase (Butler 2018)a.

It is recommended that:

- The EAP and ECO must be informed that a Very High Palaeontological Sensitivity is allocated to the whole study area. A Phase 1 PIA document and “Chance Find Protocol” must be completed during the first month of excavation.
- The developer must apply for a collection and destruction permit for plant fossils encountered during the mining operation.
- A qualified palaeontologist must be employed to visit the present mining operations to record any fossils where the palaeontologist will look out for extraordinarily well preserved fossils and collect representative samples of these fossils for further study at an appropriate institution.

These recommendations must be incorporated in the EMPr of this project.

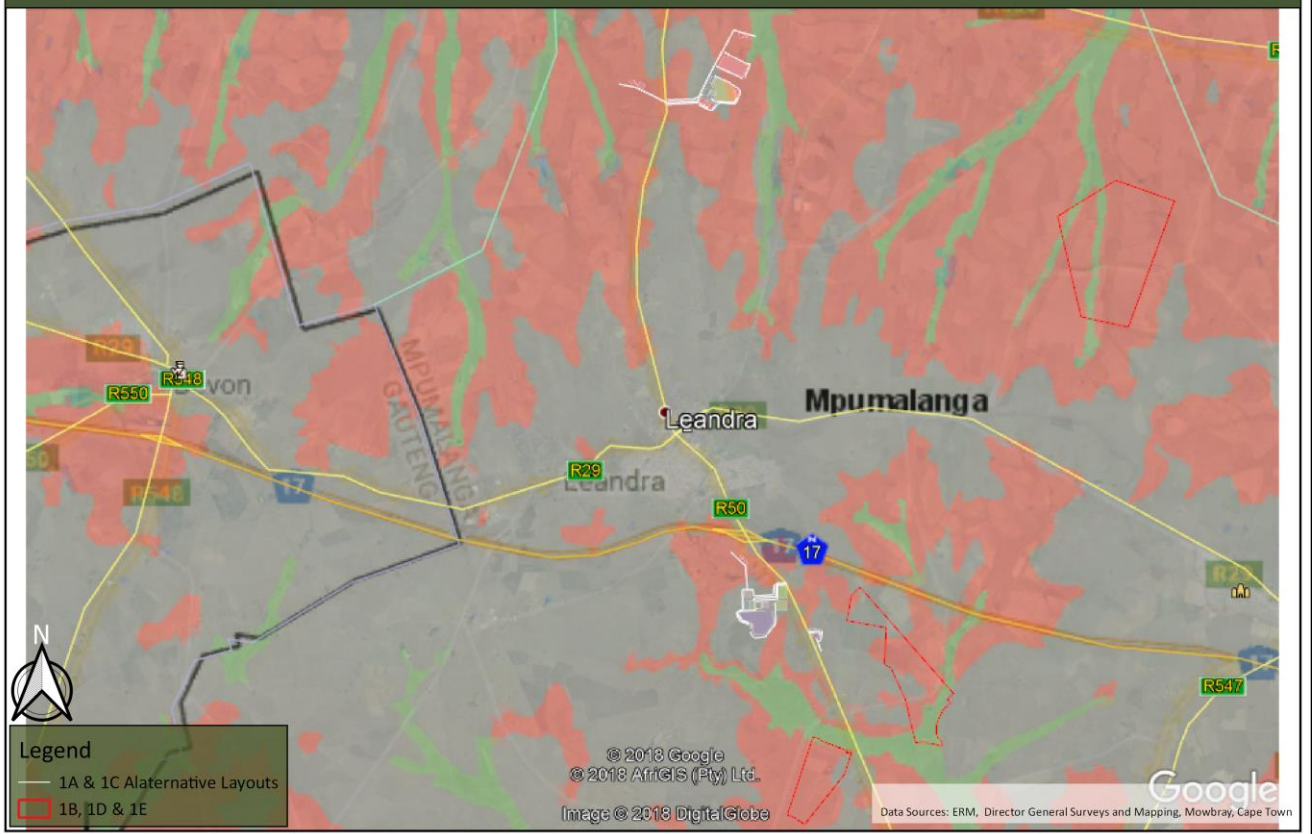


Figure 73 - Palaeontological sensitivity map indicating that the study areas fall within VERY HIGH, MODERATE and INSIGNIFICANT sensitivity zones.

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

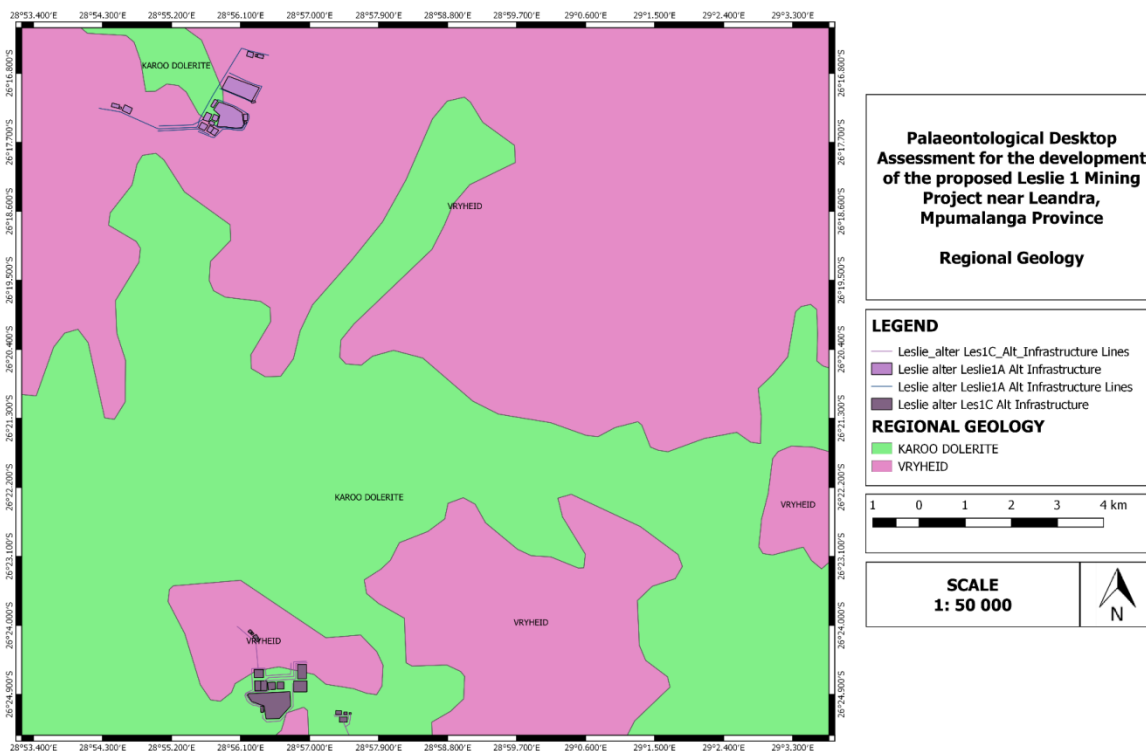


Figure 74 - The surface geology of the proposed Leslie 1 Coal mine near Leandra, Mpumalanga province. The development site is underlain by rocks of the Permian Vryheid Formation (Ecca Group, Karoo Supergroup) and Karoo Dolerite. (Butler 2018).

## 7 IMPACT ASSESSMENT

The aim of the impact evaluation is to determine the extent of the impact of the proposed project on the identified heritage resources and predict possible impacts on unidentified heritage resources.

During the field work, a total of 28 heritage related sites were identified, with three additional sites (LES029, LES030 & LES031) identified during the stakeholder engagement process. The heritage sites can be subdivided into burial grounds and recent historic structures. It must be considered that the heritage significance of the identified sites plays a role in the evaluation of the impact and must influence the magnitude rating of the impact tables. Thus, a heritage resource with a high heritage significance rating will have a higher impact magnitude rating than a heritage resource with a low or no heritage significance rating. Consequently, mitigation measures will be more extensive for a heritage resource with a high heritage significance than those with a low heritage significance.

As of 2<sup>nd</sup> July 2018, the proposed layout plans for Leslie 1A & 1C had been altered in order to mitigate their impact upon surface ecology & soils, as well as the heritage resources uncovered by the fieldwork for the original HIA. However, several portions of the alternative layouts as prescribed in *Option 2* for both Leslie 1A & 1C, falls outside the purview of the original study area.



Figure 75 – Portion of alternative layout for Leslie 1A (Option 2) that has not been surveyed.



Figure 76 - Portion of alternative layout for Leslie 1B (Option 2) that has not been surveyed.

As portions of the updated infrastructure layouts have fallen outside of the purview of the original HIA study area, the potential of heritage resources in those portions that have not been surveyed have to be acknowledged. Therefore, until such time as those portions are surveyed, the impact significance on potential heritage resources in those areas have to be set at HIGH negative.

Refer to **Table 6** for the impact assessment tables as described in the following subsections.

All the impacts are envisaged to happen during construction activities. Where there is an impact during Operations/Mining this is mentioned where relevant in the following section.

### 7.1 Impact on recent or historical structures

A total of eight (8) historical structure sites were identified all of which (**LES004, LES011, LES012, LES017, LES018, LES020, LES023, LES026**) have low heritage significance.

Only sites **LES013** will be directly affected by the mining activity footprint (inclusive of the buffer zone) in Areas 1A and 1C of the proposed layout. The impact significance for these sites rated as



MEDIUM negative before mitigation and with the implementation of the mitigation measures the impact significance is reduced to LOW negative.

## **7.2 Impact on burial grounds**

Nineteen burial grounds have been identified during the field work, with two burial sites identified during the stakeholder engagement process (**LES029, LES030**). Due to the social and cultural significance of burial grounds and graves, a high heritage significance is given to all these sites.

### *7.2.1 Area 1A*

Before the alterations to the infrastructure layout of area 1A, the impact of the proposed project on the burial grounds located at sites **LES002, LES003, and LES007** was rated as having a HIGH negative significance before mitigation and with the implementation of mitigation measures as having a LOW negative significance. However, if *Option 2* is chosen for the layout of area 1A, all the grave sites in proximity to 1A, **LES001, LES002, LES003, LES005, LES006, LES007, LES008, LES009, LES010, LES029, LES030** should not be impacted on by mining activity as they occur outside the footprint area, however, caution is still advised as some of the sites (**LES002 & LES007**) are situated particularly close to the edge of the proposed layout.

### *7.2.2 Area 1B*

The impact of the proposed project on the burial ground at site **LES015** is rated as having a HIGH negative significance before mitigation and with the implementation of mitigation measures as having a LOW negative significance. It is difficult to tell if this site is situated directly on the proposed layout for the 1B shaft entrance due to the resolution of the layout, but it is close enough to the shaft entrance and any probable access roads to the shaft entrance that a high impact rating is warranted.

### *7.2.3 Area 1C*

Before the alterations to the infrastructure layout of area 1C, the impact of the proposed project on the burial grounds at sites **LES019, LES022 and LES025** was rated as having a HIGH negative significance before mitigation and with the implementation of mitigation measures as having a LOW negative significance. However, if *Option 2* is chosen for the layout of area 1C, all the remaining sites **LES014, LES016, LES019, LES021, LES022, LES024, LES025 and LES028** should not be impacted on by mining activity as they occur outside the footprint area, however, caution is

still advised as some of the sites (**LES019**) is situated particularly close to the edge of the proposed layout.

### **7.3 Impact on living heritage resources**

The only living heritage site identified is site **LES031** located near area 1A. This site is an Ndebele Initiation ceremony site and is rated as having a high significance. Depending on the local community, relocation /destruction of the site may be possible with stakeholder engagement and consent. The recommendation would be to allow the site to be retained *in situ* and avoided if possible, but mitigation or destruction may be possible (with stakeholder engagement). However, even though the site is located outside the proposed layout, the resulting mining activities might make access to this site difficult, thus a proper stakeholder engagement process will be necessary.

### **7.4 Impact on Palaeontological Resources**

According to the palaeontological sensitivity map accessed via the SAHRIS database, the study areas fall within 'VERY HIGH', 'MODERATE' and 'INSIGNIFICANT' rated sensitivity zones. Even though there are 'MODERATE' and 'INSIGNIFICANT' ratings, the highest rating being 'VERY HIGH' will have to be adhered to and therefore a palaeontological field assessment during the construction phase will be required (**Figure 73**).

## 7.5 Impact assessment table for heritage resources

Table 6: Heritage Impact Table

No.	Affected Environment	Activity	Impact Description	BEFORE MITIGATION						Cumulative Impact	Mitigation measures / Recommendations	AFTER MITIGATION					
				Magnitude	Duration	Spatial Scale	Consequence	Probability	SIGNIFICANCE			Magnitude	Duration	Spatial Scale	Consequence	Probability	SIGNIFICANCE
<b>Construction</b>																	
1	Heritage	1B - Mining Activities	Endangerment of graves at LES015	Major -	Long Term > 5 years	Site or Local	High	Possible	High	No	Demarcate sites with a 50-meter buffer and avoid them. If this is not possible a detailed grave relocation process must be implemented as required under the NHRA and National Health Act regulations	Minor -	Long Term > 5 years	Site or Local	Medium	Unlikely	Low
2	Heritage	1A & 1C - Mining Activities	Unknown nature of heritage resources on un-surveyed portions of updated layout footprint	Major -	Long Term > 5 years	Site or Local	High	Possible	High	No	Assess un-surveyed portion of footprint through field-based assessment.	Minor -	Long Term > 5 years	Site or Local	Medium	Possible	Low
3	Heritage	1C - Mining Activities	Destruction of historical structures LES013	Moderate -	Long Term > 5 years	Site or Local	Medium	Definite	Medium	No	Demarcate sites with a 50-meter buffer and avoid them if possible. If this is not possible, the sites may be destroyed following a destruction permit from SAHRA.	Minor -	Long Term > 5 years	Site or Local	Medium	Unlikely	Low
<b>Operation</b>																	
11	Heritage	Overall	Impact on palaeontology	Major -	Long Term > 5 years	Site or Local	High	Definite	High	No	The EAP and ECO must be informed that a Very High Palaeontological Sensitivity is	Minor +	Long Term > 5 years	Site or Local	Medium	Possible	Medium

No.	Affected Environment	Activity	Impact Description	BEFORE MITIGATION					Cumulative Impact	Mitigation measures / Recommendations	AFTER MITIGATION					
				Magnitude	Duration	Spatial Scale	Consequence	Probability			SIGNIFICANCE	Magnitude	Duration	Spatial Scale	Consequence	Probability
										allocated to the whole study area. A Phase 1 PIA document and "Chance Find Protocol" must be completed during the first month of excavation. These recommendations must be incorporated in the EMPr of this project.						

## 7.6 Management recommendations and guidelines

### 7.6.1 Construction phase

The project will encompass a range of activities during the construction phase, including ground clearance, establishment of construction camp areas and small-scale infrastructure development associated with the project.

It is possible that cultural material will be exposed during construction and may be recoverable, keeping in mind delays can be costly during construction and as such must be minimised. Development surrounding infrastructure and construction of facilities results in significant disturbance, however foundation holes do offer a window into the past and it thus may be possible to rescue some of the data and materials. It is also possible that substantial alterations will be implemented during this phase of the project and these must be catered for. Temporary infrastructure, such as construction camps and laydown areas, is often changed or added to the project as required. In general, these are low impact developments as they are superficial, resulting in little alteration of the land surface, but still need to be catered for.

During the construction phase, it is important to recognize any significant material being unearthed, making the correct judgment on which actions should be taken. It is recommended that the following chance find procedure should be implemented.

### 7.6.2 Chance find procedure

- A heritage practitioner / archaeologist should be appointed to develop a heritage induction program and conduct training for the ECO as well as team leaders in the identification of heritage resources and artefacts.
- An appropriately qualified heritage practitioner / archaeologist must be identified to be called upon in the event that any possible heritage resources or artefacts are identified.
- Should an archaeological site or cultural material be discovered during construction (or operation), the area should be demarcated and construction activities halted.
- The qualified heritage practitioner / archaeologist will then need to come out to the site and evaluate the extent and importance of the heritage resources and make the necessary recommendations for mitigating the find and the impact on the heritage resource.

- The contractor therefore should have some sort of contingency plan so that operations could move elsewhere temporarily while the materials and data are recovered.
- Construction can commence as soon as the site has been cleared and signed off by the heritage practitioner / archaeologist.

### 7.7 Possible finds during construction

The study area contains numerous old homesteads as identified during the fieldwork. Excavations of foundations and soil clearance could uncover the following:

- Stone foundations;
- Ash middens associated with the farmsteads and homesteads that can contain bone, glass and clay ceramics, ash, metal objects such as spoons, knives, and knives;
- Possible infant burials.

### 7.8 Timeframes

It must be kept in mind that mitigation and monitoring of heritage resources discovered during construction activity will require permitting for collection or excavation of heritage resources and lead times must be worked into the construction time frames. **Table 7** gives guidelines for lead times on permitting.

*Table 7: Lead times for permitting and mobilisation*

ACTION	RESPONSIBILITY	TIMEFRAME
Preparation for field monitoring and finalisation of contracts	The contractor and service provider	1 month
Application for permits to do necessary mitigation work	Service provider – Archaeologist and SAHRA	2 month
Documentation, excavation and archaeological report on the relevant site	Service provider – Archaeologist	3 months
Handling of chance finds – Graves/Human Remains	Service provider – Archaeologist and SAHRA	2 weeks
Relocation of burial grounds or graves in the way of construction	Service provider – Archaeologist, SAHRA, local government and provincial government	6 months

## 7.9 Heritage Management Plan for EMPr implementation

Table 8: Heritage Management Plan for EMPr implementation

AREA AND SITE NO.	MITIGATION MEASURES	PHASE	TIMEFRAME	RESPONSIBLE PARTY FOR IMPLEMENTATION	MONITORING PARTY (FREQUENCY)	TARGET	PERFORMANCE INDICATORS (MONITORING TOOL)	COST
<b>Possible finds</b>								
A	Implement chance find procedures in case where possible heritage finds are uncovered	Construction	During construction	Applicant ECO Heritage Specialist	ECO (weekly)	Ensure compliance with relevant legislation and recommendations from SAHRA under Section 36 and 38 of NHRA	ECO Monthly Checklist/Report	<b>R20 000</b>
A & B	Survey portions of updated alternative layouts not covered by previous survey.	Planning	Before construction	Applicant ECO Heritage Specialist		Ensure compliance with relevant legislation and recommendations from SAHRA under Section 36 and 38 of NHRA		
<b>Known sites</b>								
<b>LES015</b>	<ul style="list-style-type: none"> <li>Implement design elements to exclude the burial grounds with a 50-metre buffer. If this is not possible, a detailed grave relocation process must be implemented as required under the NHRA and National Health Act regulations.</li> </ul>	Construction	During construction	Applicant ECO	Applicant ECO	Ensure compliance with relevant legislation and recommendations from SAHRA under Section 36 and 38 of NHRA	ECO Monthly Checklist/Report	<b>R1 000 000</b>



AREA AND SITE NO.	MITIGATION MEASURES	PHASE	TIMEFRAME	RESPONSIBLE PARTY FOR IMPLEMENTATION	MONITORING PARTY (FREQUENCY)	TARGET	PERFORMANCE INDICATORS (MONITORING TOOL)	COST
LES013	<ul style="list-style-type: none"> <li>Application for relevant destruction permits from SAHRA including the possibility of compulsory destruction monitoring.</li> <li>Basic archival research on LES004 before destruction</li> </ul>	Construction	During construction	Applicant ECO	Applicant ECO	Ensure compliance with relevant legislation and recommendations from SAHRA under Section 36 and 38 of NHRA	ECO Monthly Checklist/Report	<b>R50 000</b>
Palaeontology	<ul style="list-style-type: none"> <li>The EAP and ECO must be informed that a Very High Palaeontological Sensitivity is allocated to the whole study area. A Phase 1 PIA document and "Chance Find Protocol" must be completed during the first month of excavation.</li> <li>These recommendations must be incorporated in the EMPr of this project.</li> </ul>	Construction through to Operational	Construction Operational	Applicant ECO Palaeontologist	Applicant ECO	Ensure compliance with relevant legislation and recommendations from SAHRA under Section 35 and 38 of NHRA	ECO Monthly Checklist/Report	<b>R100 000</b>

## 7.10 Stakeholder engagement comments

Table 9: Stakeholder engagement comments and response

Name of Affected/Interested Party		Date	Issue Raised	Specialist Response to Issues	Section and paragraph reference in the report where the issues and or response were incorporated	Category
Name Of Individual	Consultation Method					
Mahlangu Royal Family	One on one meeting	18/04/2018	The family indicated about six unmarked graves between portion 13 and 18 near the farmers house and marked graves on Goedehoop 308 IR. They also indicated that the area in portion 12 has been utilised for the Ndebele initiation ceremonies since the 1970's and these ceremonies are administered by the Mahlangu Royal family. This Initiation school has certain	The six unmarked graves (LES008 & LES009) had been located during the heritage survey while the other sets of graves and initiation site are situated outside the proposed development footprint. However, even though these sites are located outside the proposed layout, the resulting mining	Section 5.2, pages 32 – 33 & 55 – 56. Sites <b>LES008, LES009, LES029, LES030 &amp; LES031.</b>	Heritage Impact Assessment

Name of Affected/Interested Party		Date	Issue Raised	Specialist Response to Issues	Section and paragraph reference in the report where the issues and or response were incorporated	Category
Name Of Individual	Consultation Method					
			customary rules and regulations associated with the site that is utilised.	activities might make access to the sites difficult, thus a proper stakeholder engagement process will be necessary		
Mr Danie Bezuidenhout Weltwreden 307 IR Ptn 4/Re, Springboklaagte 306 IR Ptn 8	One on one meeting	15/03/2018	There are two grave sites on this property	Mentioned graves have been identified during the fieldwork portion of the HIA ( <b>LES006 &amp; LES007</b> ). None of which will be affected by <i>Option 2 of</i> the proposed development and has been accounted for in the relevant impact tables. However, there	Section 5.2, pages 30-31. Sites <b>LES006 &amp; LES007</b> .	Heritage Impact Assessment

Name of Affected/Interested Party		Date	Issue Raised	Specialist Response to Issues	Section and paragraph reference in the report where the issues and or response were incorporated	Category
Name Of Individual	Consultation Method					
				are other grave sites on Mr Bezuidenhout's property but they have also been accounted for.		
Mr Doug Kelly Waternalshoek 350 IR Ptn Re/11	One on one meeting	27/03/2018	There are also some graves.	Mentioned graves sites have been identified during the fieldwork portion of the HIA ( <b>LES019 &amp; LES025</b> ). None of which will be affected by <i>Option 2 of</i> the proposed development and has been accounted for in the relevant impact tables.	Section 5.2, pages 45 & 52. Sites <b>LES019 &amp; LES025</b> .	Heritage Impact Assessment

Name of Affected/Interested Party		Date	Issue Raised	Specialist Response to Issues	Section and paragraph reference in the report where the issues and or response were incorporated	Category
Name Of Individual	Consultation Method					
Mr Bart Harmse Barlou Boerdery Goedehoop 305 Ptn 6	Registration/Comment Sheet	10/04/2018	This project will affect our ground water and grave sites.	Graves mentioned were not detected during fieldwork portion of HIA as the aforementioned property was out of the scope of the proposed development and therefore the HIA. Thus the graves should not be affected by the proposed development.	n/a	Heritage Impact Assessment

## 8 CONCLUSIONS

PGS Heritage was appointed by Kongiwe to undertake an HIA as part of the EIA for the proposed Leslie Coal Mine Project near Leandra, Mpumalanga Province.

The presence of heritage resources has been confirmed through archival research and the evaluation of aerial photography and topographical maps of the sites, as well as the fieldwork findings.

Evaluation of satellite imagery has indicated various areas that may be sensitive from a heritage perspective. The analysis of previous heritage studies conducted in the area assisted in the development of the following landform type to heritage find matrix in **Table 1**.

These findings provided the basis for the further field truthing through both a heritage field study and a palaeontological field study covering the site. The aim of this was to compile a comprehensive database of heritage sites in the study areas, with the aim of developing a heritage management plan for inclusion in the EMP as derived from the EIA.

As of 2<sup>nd</sup> July 2018, the proposed layout plans for Leslie 1A & 1C had been altered in order to mitigate their impact upon surface ecology & soils, as well as the heritage resources uncovered by the fieldwork for the original HIA.

### 8.1 Heritage

The fieldwork for the HIA identified 28 heritage resources with different heritage significance ratings. The public participation process further identified two graves sites (**LES029 & LES030**) and an Ndebele initiation ceremony site (**LES031**). These sites consist of 22 Burial sites (consisting of approximately 315 burials), one (1) living heritage (initiation) site and eight (8) historic structures. Of these 31 resources, only 10 with heritage significance (**LES002, LES003, LES004, LES007, LES012, LES015, LES017, LES019, LES022 & LES025**) would have been directly impacted by the project activities.

Prior to the introduction of the updated infrastructure layouts, the impact significance before mitigation of the heritage resources varied between HIGH negative (**All sites except LES004, LES012 & LES017**) and MEDIUM negative (**LES004, LES012, & LES017**). Implementation of the recommended mitigation measures would have reduced this impact rating to MEDIUM

negative. Since the proposed layout changes seem to avoid most of the heritage features within the original study area, except for a high significance feature (**LES015**) and a low significance feature (**LES013**), the impact significance before mitigation of the heritage resources would be HIGH negative. Implementation of the mitigation measures will maintain this impact at MEDIUM negative.

However, as portions of the updated infrastructure layouts have fallen outside of the purview of the original HIA study area, the potential of heritage resources in those portions that have not been surveyed have to be acknowledged. Therefore, until such time as those portions are surveyed, the impact significance on potential heritage resources in those areas have to be set at HIGH negative.

## **8.2 Palaeontology**

According to the palaeontological sensitivity map accessed via the SAHRIS database, the study areas fall within 'VERY HIGH', 'MODERATE' and 'INSIGNIFICANT' rated sensitivity zones. Even though there are 'MODERATE' and 'INSIGNIFICANT' ratings, the highest rating being 'VERY HIGH' will have to be adhered to (**Figure 73**).

Alternatives have been suggested for this project but they all fall in the same geology and thus not one is a preferred alternative in palaeontological terms (Butler 2018).

No significant fossils are expected to be found before deep excavation (>1.5m) are completed. Though, it is possible that significant fossils will be documented during excavations. The recording of fossils will enhance our knowledge of the Palaeontological Heritage of the development area (Butler 2018).

It is thus recommended that an EIA level palaeontology report will be conducted during deep excavation to assess the value and importance of fossils in the development area and the effect of the proposed development on the palaeontological heritage. This involves a Phase 1 field-based assessment by a professional palaeontologist. The purpose of the EIA Report is to elaborate on the concerns and potential impacts identified during the scoping phase. This is accomplished by site visits and research in the site-specific study area as well as a comprehensive assessment of the impacts identified during the scoping phase (Butler 2018).



It is recommended that:

- The EAP and ECO must be informed that a Very High Palaeontological Sensitivity is allocated to the whole study area. A Phase 1 PIA document and “Chance Find Protocol” must be completed during the first month of excavation.
- The developer must apply for a collection and destruction permit for plant fossils encountered during the mining operation.
- A qualified palaeontologist must be employed to visit the present mining operations to record any fossils where the palaeontologist will look out for extraordinarily well preserved fossils and collect representative samples of these fossils for further study at an appropriate institution.
- *These recommendations must be incorporated in the EMPr of this project.*

The management and mitigation measures as described in Section 7 of this report have been developed to minimise the project impact on heritage resources.

It is the author’s considered opinion that the overall impact on heritage resources **after** the implementation of the recommended mitigation measures is acceptably low and that the project can be approved from a heritage perspective.

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## **9.1 Historic Topographic Maps**

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

## **9.2 Google Earth**

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