NBC COLLIERY GLISA AND PAARDEPLAATS MINING PROJECT

Phase 1 – Heritage Impact Assessment

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PGS Project No.: 524HIA
CIGroup project No: 19.0001

Declaration of Independence

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I, Polke Birkholtz, declare that –

- I act as the independent heritage practitioner in this application
- I will perform the work relating to the application in an objective manner, even if this results in views and findings that are not favourable to the applicant
- I declare that there are no circumstances that may compromise my objectivity in performing such work;
- I have expertise in conducting heritage impact assessments, including knowledge of the Act, Regulations and any guidelines that have relevance to the proposed activity;
- I will comply with the Act, Regulations and all other applicable legislation;
- I will take into account, to the extent possible, the matters listed in section 38 of the NHRA when preparing the application and any report relating to the application;
- I have no, and will not engage in, conflicting interests in the undertaking of the activity;
- I undertake to disclose to the applicant and the competent authority all material information in my possession that reasonably has or may have the potential of influencing - any decision to be taken with respect to the application by the competent authority; and - the objectivity of any report, plan or document to be prepared by myself for submission to the competent authority;
- I will ensure that information containing all relevant facts in respect of the application is distributed or made available to interested and affected parties and the public and that participation by interested and affected parties is facilitated in such a manner that all interested and affected parties will be provided with a reasonable opportunity to participate and to provide comments on documents that are produced to support the application;
- I will provide the competent authority with access to all information at my disposal regarding the application, whether such information is favourable to the applicant or not
- All the particulars furnished by me in this form are true and correct;
- I will perform all other obligations as expected from a heritage practitioner in terms of the Act and the constitutions of my affiliated professional bodies; and
- I realise that a false declaration is an offence in terms of regulation 71 of the Regulations and is punishable in terms of section 24F of the NEMA.

Disclosure of Vested Interest

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

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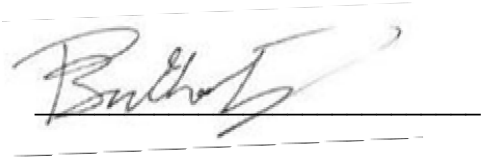
SIGNATURE: 

Report Title	NBC Colliery Glisa and Paardeplaats Mining Project		
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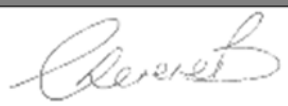
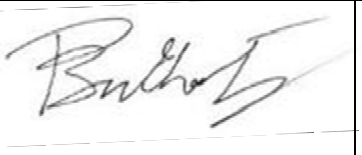
Author	Cherene de Bruyn		Archaeologist – PGS Heritage
Co-Author & Internal Review	Polke Birkholtz		Archaeologist/Heritage Specialist/Project Manager – PGS Heritage

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EXECUTIVE SUMMARY

Introduction

PGS Heritage (Pty) Ltd (PGS) was appointed by CIGroup Environmental (Pty) Ltd (CIGroup) to undertake a Heritage Impact Assessment (HIA) for the Glisa and Paardeplaats Sections of the NBC Colliery (NBC). The project area is located near (eMakhazeni) Belfast and is situated in the eMakhazeni Local Municipality, Nkangala District Municipality, Mpumalanga Province

Project Description

The following information was provided by CIGroup. NBC consists of three (3) mining sections namely the Eerstelingsfontein Section, the Glisa Section, and the Paardeplaats Section. The focus of this assessment will be on the Glisa and Paardeplaats Sections.

The Section 102 Consolidation and IEA application focus on the following:

- Consolidation of the Glisa Section Mining Right (MR) and Environmental Management Plan (EMP) into the Paardeplaats Section (MP 30/5/1/2/2/10090 MR);
- Inclusion of Portion 24 of the farm Paardeplaats 380 JT into the Paardeplaats Section MR; and
- IEA for listed activities triggered in terms of the NEMA and National Environmental Management: Waste Act, 2008 (Act No. 59 of 2008) (NEMA:WA) within the MR areas and Portion 24 of the farm Paardeplaats 380 JT1.

NBC require the following changes to existing infrastructure:

- Expansion of the Crushing, Screening and Washing Plant (CSWP) on Portion 3 and 4 of the farm Paardeplaats 380 JT;
- Expansion of the existing Water Treatment Plant (WTP) pipeline network on all farm portions associated with the Integrated Paardeplaats Section; and
- Widening of haul roads between the mining sections and processing plants

Scope of Work

PGS's scope of work was to undertake intensive walkthroughs of the proposed Discard Management Facility (DMF) coupled with revisits to the heritage sites identified by PGS during a previous study undertaken in 2012. This report and its recommendations are based on only this scope of work.

General Desktop Study

An archaeological and historical desktop study was undertaken of the project area and surrounding landscape (refer to **Chapter 5**). An archaeological and historical overview was compiled, which was augmented by an assessment of previous archaeological and heritage studies completed for the study area and surrounding landscape. Furthermore, an assessment was made of the early editions of the relevant topographic maps.

Associated Reports and Processes

PGS completed a Heritage Impact Assessment for the proposed Exxaro Paardeplaats project in 2012. The current report represents an amendment as well as verification of the sites identified in 2012. During the fieldwork for the 2012 study, a total of 32 heritage sites, including 22 heritage structures, seven cemeteries and three areas with historical mining shafts were identified. Although additional walkthroughs were also undertaken for the proposed DMF area, this report is largely based on the original fieldwork findings.

Fieldwork

The fieldwork comprised a field assessment of the study area undertaken primarily by foot and vehicle over the course of three days by an experienced fieldwork team from PGS consisting of an archaeologist (Cherene de Bruyn) and two field assistants (Michelle Sacshe and Thomas Mulaudzi). The fieldwork was undertaken from Monday, 19 April 2021 to Wednesday 21 April 2021.

As almost the entire project area had been intensively assessed as part of a previous HIA study by PGS, the focus on the current fieldwork was on revisiting all the heritage sites that were identified in the previous report and also undertaking intensive walkthroughs of a small section that is now earmarked for the development of a Discard Management Facility (DMF).

As part of the current fieldwork, revisits and verification of the location and state of the 32 heritage sites that were identified in 2012 were conducted. These previously identified sites are numbered PP 01 to PP 32. As part of the current fieldwork, an additional 13 heritage sites (PP33 to PP45) were identified. The table below provides a summary of all the heritage sites.

Table 1 – Heritage Sites identified within the Study Area

Site Number	Coordinates	Site Type	Significance
PP 1	S 25.725820 E 30.002610	Demolished Historic Farmstead	Low (GP.C)
PP 2	S 25.729890 E 30.002260	Burial Ground	Medium to High (GP.A)

PP 3	S 25.719080 E 30.004140	Burial Ground	Medium to High (GP.A)
PP 4	S 25.744150 E 29.985790	Burial Ground	Medium to High (GP.A)
PP 5	S 25.725210 E 30.015120	Burial Ground	Medium to High (GP.A)
PP 6	S 25.728000 E 30.010130	Historic Homesteads and Structures with the Possible Risk for Unmarked Graves	Medium (GP.B)
PP 7	S 25.743270 E 30.003010	Demolished Historic Structures	Low (GP.C)
PP 8	S 25.743800 E 30.002360	Demolished Historic Farmstead	Low (GP.C)
PP 9	S 25.742100 E 30.004780	Demolished Historic Structure	Low (GP.C)
PP 10	S 25.750780 E 29.989940	Single Grave	Medium to High (GP.A)
PP 11	S 25.751030 E 29.989600	Historic Farmstead and Structures with the Possible Risk for Unmarked Graves	Medium (GP.B)
PP 12	S 25.745950 E 29.974200	Historic Coal Mine Shaft	Medium to High (GP.A)
PP 13	S 25.748830 E 29.974700	Historic Coal Mine Shaft	Medium to High (GP.A)
PP 14	S 25.752210 E 29.978990	Possible Rock Art Site	Medium to High (GP.A)
PP 15	S 25.754350 E 29.983240	Historic Homesteads and Structures with the Possible Risk for Unmarked Graves	Medium (GP.B)
PP 16	S 25.752990 E 29.982910	Historic Homestead with Graves and the Possible Risk for Unmarked Graves	Medium to High (GP.A)
PP 17	S 25.748830 E 29.974700	Historic Coal Mine Shaft	Medium to High (GP.A)
PP 18	S 25.760100 E 29.966720	Animal Drinking Trough	Low (GP.C)
PP 19	S 25.759800 E 29.966230	Demolished Historic Structure	Low (GP.C)
PP 20	S 25.761510 E 29.965360	Reservoir with Associated Structures	Low (GP.C)

PP 21	S 25.761660 E 29.964650	Historic Homesteads and Structures with the Possible Risk for Unmarked Graves	Medium (GP.B)
PP 22	S 25.761690 E 29.963750	Historic Homesteads and Structures with the Possible Risk for Unmarked Graves	Medium (GP.B)
PP 23	S 25.761660 E 29.964650	Demolished Historic Structure (before 2012)	Low (GP.C)
PP 24	S 25.762720 E 29.961770	Sunbury Railway Station	Low (GP.C)
PP 25	S 25.732420 E 29.993510	Historic Homesteads and Structures with the Possible Risk for Unmarked Graves	Medium (GP.B)
PP 26	S 25.734280 E 29.993040	Historic Homesteads and Structures with the Possible Risk for Unmarked Graves	Medium (GP.B)
PP 27	S 25.735080 E 29.993410	Historic Structure	Medium (GP.B)
PP 28	S 25.736050 E 29.993310	Burial Ground	Medium to High (GP.A)
PP 29	S 25.726980 E 29.989670	Historic Homesteads and Structures with the Possible Risk for Unmarked Graves	Medium (GP.B)
PP 30	S 25.718530 E 30.017220	Historic Farmstead	Medium (GP.B)
PP 31	S 25.711330 E 30.016450	Burial Ground	Medium to High (GP.A)
PP 32	S 25.723070 E 30.015850	Historic Homesteads and Structures with the Possible Risk for Unmarked Graves	Medium (GP.B)
PP 33	S 25.748624 E 29.974775	Historic Structure	Medium (GP.B)
PP 34	S 25.742500 E 30.002855	Demolished Structure	Low (GP.C)
PP 35	S 25.743408 E 30.001842	Contemporary Farmstead	Low (GP.C)
PP 36	S 25.754370 E 29.981422	Historic Coal Mine Shaft	Medium to High (GP.A)
PP 37	S 25.750654 E 29.989601	Single Grave	Medium to High (GP.A)
PP 38	S 25.729260 E 30.013751	Reservoir with Associated Structures	Low (GP.C)

PP 39	S 25.726835 E 30.010754	Reservoir with Associated Structures	Low (GP.C)
PP 40	S 25.735453 E 29.995204	Historic Homestead with the Possible Risk for Unmarked Graves	Medium (GP.B)
PP 41	S 25.716593 E 30.014553	Structure	Low (GP.C)
PP 42	S 25.726796 E 30.002923	Animal Drinking Trough	Low (GP.C)
PP 43	S 25.738228 E 30.000564	Demolished Structure	Low (GP.C)
PP 44	S 25.736880 E 30.003181	Reservoirs with Associated Structures	Low (GP.C)
PP 45	S 25.735982 E 30.001980	Demolished Structure	Low (GP.C)

Palaeontology

The palaeontological Desktop Assessment (PDA) was conducted by Banzai Environmental (Butler, 2021). The proposed development is primarily underlain by the Vryheid Formation of the Ecca Group (Karoo Supergroup). According to the South African Heritage Resources Information System the project area is located in an area with Very High sensitivity (red), as such the Palaeontological Sensitivity of project area is Very High.

As such, a full Environmental Impact Assessment (EIA) level Palaeontological Impact Assessment (PIA) report is recommended to assess the value and prominence of fossils in the development area and the effect of the proposed development on the palaeontological heritage.

Impact of Proposed Development and Mitigation

An overlay of the identified archaeological and heritage sites over the proposed development footprint area for the DMF was made. It was established that none of the identified heritage sites are located within 100m of the proposed development of the DMF. As a result, no impact is expected as a result of the proposed development of the DMF. Refer **Chapter 7**.
Please note the following regarding heritage mitigation:

- No mitigation is required for heritage sites assessed to have a low heritage significance. As a result, no mitigation is required for the following sites: PP 01, PP 07, PP 08, PP 09, PP 18, PP 19, PP 20, PP 23, PP 24, PP 34, PP 35, PP 38, PP 39, PP 41, PP 42, PP 43, PP 44 & PP 45;

- No heritage impact is expected as a result of the proposed development of the Discard Management Facility (DMF);

- Site mitigation measures are outlined in **Chapter 8**. These mitigation measures would be required should any development footprints be proposed within 100m of the identified burial grounds and graves or within 50m of the other identified heritage sites that are of Medium Significance and higher. Refer **Section 8.2**; and

- General site mitigation measures are also required for the Possible Rock Art Site and sites comprising Historic Coal Mine Shafts. These general mitigation measures must be implemented as soon as possible and are not dependant on the expansion of development footprint areas. Refer **Section 8.3.**

Conclusions

The unmitigated impact of the proposed development of the DMF is not expected to result in any heritage impacts. As a result, on the condition that the recommendations made in this report are adhered to, no heritage reasons can be given for the development of the DMF not to continue.

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APPENDICES

TERMINOLOGY AND ABBREVIATIONS

Archaeological resources

This includes:

- 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;

- rock art, being any form of painting, engraving or other graphic representation on a fixed rock surface or loose rock or stone, which was executed by human agency and which is older than 100 years, including any area within 10m of such representation;
- 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;
- 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

Cultural Landscapes Terminology

"perceptual qualities" Aspects of a landscape which are perceived through the senses, specifically views and aesthetics.

"cultural landscape" A representation of the combined worlds of nature and of man illustrative of the evolution of human society and settlement over time, under the influence of the physical constraints and/or opportunities presented by their natural environment and of successive social, economic and cultural forces, both external and internal (World Heritage Committee, 1992). Includes and extends beyond the study site boundaries.

"cultural landscape area" These are single unique areas which are the discrete geographical areas of a particular landscape type. Each will have its own individual character and identity, even though it shares the same generic characteristics with other areas of the same type.

"study site" The study site is assumed to include the area within the boundaries of the proposed development

"characteristics" elements, or combination of elements, which make a particular contribution to distinctive character.

"elements" individual components which make up the landscape, such as trees and fences.

"landscape character" A distinct, and consistent pattern of elements in the landscape that makes one landscape different from another, rather than better or worse.

"landscape character assessment" This is the process of identifying and describing variation in the character of the landscape. It seeks to identify and explain the unique combination of elements and features (characteristics) that make landscapes distinctive. This process results in the production of a Landscape Character Assessment.

"sense of place" The unique quality or character of a place, whether natural, rural or urban. It relates to uniqueness, distinctiveness or strong identity.

"scenic route" A linear movement route, usually in the form of a scenic drive, but which could also be a railway, hiking trail, horse-riding trail or 4x4 trail.

Development

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

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

Earlier Stone Age

The archaeology of the Stone Age between ~300 000 and 3 300 000 years ago.

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 and can include (but not limited to) the following (as stated under Section 3 of the NHRA):

- places, buildings, structures and equipment of cultural significance;
- places to which oral traditions are attached or which are associated with living heritage;

- historical settlements and townscapes;
- landscapes and natural features of cultural significance;
- geological sites of scientific or cultural importance;
- archaeological and palaeontological sites;
- graves and burial grounds, and
- sites of significance relating to the history of slavery in South Africa

Holocene

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

Later Stone Age

The archaeology of the last 30 000 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 iron-working and farming activities such as herding and agriculture.

Middle Stone Age

The archaeology of the Stone Age between 30 000-300 000 years ago, associated with early modern humans.

Palaeontology

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

Site

Site in this context refers to an area place where a heritage resource is located and not a proclaimed heritage site as contemplated under s27 of the NHRA.

Table 2 – List of abbreviations used in this report

Abbreviations	Description
AIA	Archaeological Impact Assessment
ASAPA	Association of South African Professional Archaeologists

CRM	Cultural Resource Management
CSWP	Crushing, Screening and Washing Plant
DEA	Department of Environmental Affairs
DMF	Discard Management Facility
DWS	Department of Water and Sanitation
ECO	Environmental Control Officer
EAP	Environmental Assessment Practitioner
EIA	Environmental Impact Assessment
ESA	Early Stone Age
GPS	Global Positioning System
HIA	Heritage Impact Assessment
HMP	Heritage Management Plan
IAP	Interested and Affected Party
IWUL	Integrated Water Use License
LSA	Late Stone Age
LIA	Late Iron Age
LoM	Life of Mine (
MSA	Middle Stone Age
MIA	Middle Iron Age
MR	Mining Right
MPRDA	Mineral and Petroleum Resources Development Act, 2002 (Act No. 28 of 2002)
NEMA	National Environmental Management Act
NEM:WA	National Environmental Management: Waste Act, 2008 (Act No. 59 of 2008)
NHRA	National Heritage Resources Act
PDA	Palaeontological Desktop Assesment
PHRA	Provincial Heritage Resources Authority

PIA	Palaeontological Impact Assesment
PSSA	Palaeontological Society of South Africa
RO	Reverse Osmosis
RoM	Run of Mine
SADC	Southern African Development Community
SAHRA	South African Heritage Resources Agency
UF	Ultrafiltration
WTP	Water Treatment Plant

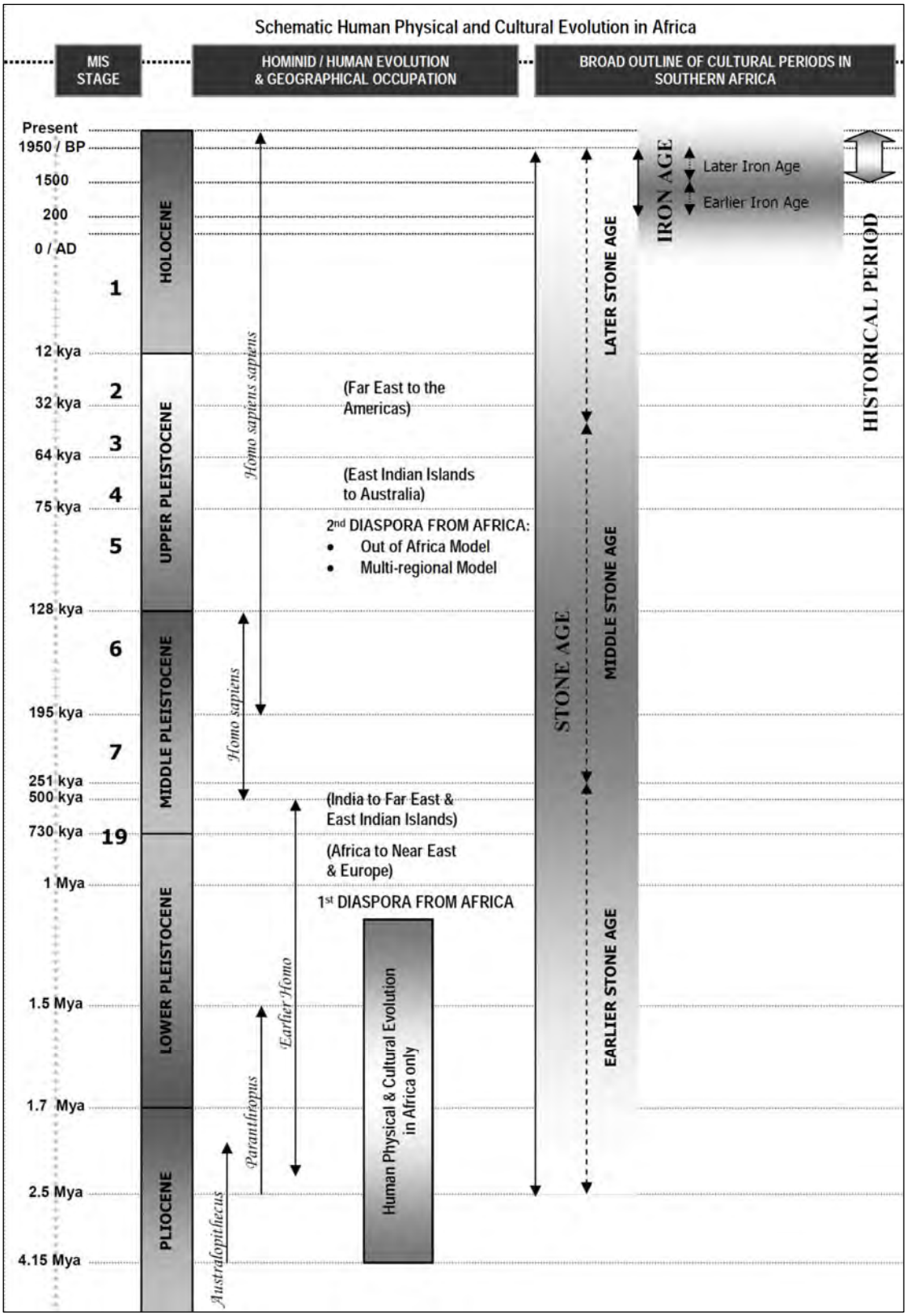

Figure 1 – Human and Cultural Timeline in Africa (Morris, 2008).

1 INTRODUCTION

PGS Heritage (Pty) Ltd was appointed by CIGroup (Pty) Ltd to undertake a Heritage Impact Assessment (HIA) for the Glisa and Paardeplaats Sections of the NBC Colliery (NBC). The project area is located near eMakhazeni (Belfast) and is situated in the eMakhazeni Local Municipality, Nkangala District Municipality, Mpumalanga Province.

The scope of work that PGS was appointed for was to undertake intensive walkthroughs of the DMF area coupled with revisits to the heritage sites identified during the previous hertage study undertaken by PGS in 2012.

1.1 Scope of the Study

This HIA aims to identify possible heritage sites and finds that may occur in the proposed development area and to assess the impact of the proposed development on these identified heritage sites. The study also aims to inform the developers to manage the identified heritage resources responsibly, 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. The staff at PGS has a combined experience of nearly 90 years in the heritage consulting industry and has extensive experience in managing HIA processes. PGS will only undertake heritage assessment work where the staff has the relevant expertise and experience to undertake that work competently.

Polke Birkholtz, the project manager and co-author, is registered with the Association of Southern African Professional Archaeologists (ASAPA) as a Professional Archaeologist and is also accredited with its CRM Section. He has 20 years of experience in the heritage assessment and management field and holds a B.A. (cum laude) from the University of Pretoria specialising in Archaeology, Anthropology and History and a B.A. (Hons.) in Archaeology (cum laude) from the same institution.

Cherene de Bruyn, the author of this report is registered with ASAPA as a Professional Archaeologist and is accredited as a Principal Investigator and Field Director, she is further also a member of the International Association for Impact Assessment South Africa (IAIASA). She holds a MA in Archaeology from University College London, and a BSc (Hons) in Physical Anthropology and a BA (Hons) in Archaeology from the University of Pretoria.

1.3 Assumptions and Limitations

The following assumptions and limitations regarding this study and report exist:

- 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, as well as the density of vegetation cover found in some areas. As such, should any heritage features and/or objects not included in the present study be located or observed, a heritage specialist must immediately be contacted. 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 assess 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 identified or exposed during the development, the procedures and requirements pertaining to graves and burials will apply as set out below (refer **Appendix A**).

- The scope of work that PGS was appointed for, was to undertake intensive walkthroughs of the DMF area coupled with revisits to the heritage sites identified during the previous heritage study by PGS in 2012. This report and its recommendations reflect this scope of work.

- Should any development footprint areas located outside the areas defined by the appointed scope of work by PGS be proposed, such additional footprint areas will have to be assessed in the field and included in a heritage impact assessment.

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:

1.4.1 Statutory Framework: The National Heritage Resources (Act 25 of 1999)

The NHRA has applicability, as the study forms part of an overall HIA in terms of the provisions of Section 34, 35, 36 and 38 of the NHRA and forms part of a heritage scoping study that serves to identify key heritage resources, informants, and issues relating to the palaeontological, archaeological, built environment and cultural landscape, as well as the need to address such issues during the impact assessment phase of the HIA process.

1.4.2 Section 34 – Structures

According to Section 34 of the NHRA, no person may alter, damage or destroy any structure that is older than 60 years, and which forms part of the sites built environment, without the necessary permits from the relevant provincial heritage authority.

1.4.3 Section 35 – Archaeology, Palaeontology and Meteorites

According to Section 35 (Archaeology, Palaeontology and Meteorites) and Section 38 (Heritage Resources Management) of the NHRA, PIAs and AIAs are required by law in the case of developments in areas underlain by potentially fossiliferous (fossil-bearing) rocks, especially where substantial bedrock excavations are envisaged, and where human settlement is known to have occurred during prehistory and the historic period.

1.4.4 Section 36 – Burial Grounds & Graves

A section 36 permit application is made to the SAHRA or the competent provincial heritage authority which protects burial grounds and graves that are older than 60 years and must conserve and generally care for burial grounds and graves protected in terms of this section, and it may make such arrangements for their conservation as it sees fit. SAHRA must also identify and record the graves of victims of conflict and any other graves which it deems to be of cultural significance and may erect memorials associated with these graves and must maintain such memorials. A permit is required under the following conditions:

Permit applications for burial grounds and graves older than 60 years should be submitted to the South African Heritage Resources Agency:

a) destroy, damage, alter, exhume or remove from its original position or otherwise disturb the grave of a victim of the conflict, or any burial ground or part thereof which contains such graves.
b) destroy, damage, alter, exhume, remove from its original position or otherwise disturb any grave or burial ground older than 60 years which is situated outside a formal cemetery administered by a local authority; or
c) bring onto or use at a burial ground or grave referred to in paragraph (a) or (b) any excavation equipment, or any equipment which assists in the detection or recovery of metals.
d) SAHRA or a provincial heritage resources authority may not issue a permit for the destruction or damage of any burial ground or grave referred to in subsection (3)(a) unless it is satisfied that the applicant has made satisfactory arrangements for the exhumation and re-interment of the contents of such graves, at the cost of the applicant.

1.4.5 Section 38 - HIA as a Specialist Study within the EIA in Terms of Section 38(8)

A NHRA Section 38 (Heritage Impact Assessments) application to MP-PHRA is required when the proposed development triggers one or more of the following activities:

a) the construction of a road, wall, power line, pipeline, canal or other similar form of linear development or barrier exceeding 300m in length;
b) the construction of a bridge or similar structure exceeding 50 m in length;
c) any development or other activity which will change the character of a site,
    i. exceeding 5 000 m2 in extent; or
    ii. involving three or more existing erven or subdivisions thereof; or
    iii. involving three or more erven or divisions thereof which have been consolidated within the past five years; or
    iv. the costs of which will exceed a sum set in terms of regulations by SAHRA or a provincial heritage resources authority;
d) the re-zoning of a site exceeding 10 000 m2 in extent; or
e) any other category of development provided for in regulations by SAHRA or a provincial heritage resources authority

In this instance, the heritage assessment for the property is to be undertaken as a component of the EIA for the project. Provision is made for this in terms of Section 38(8) of the NHRA, which states that:

- An HIA report is required to identify, and assess archaeological resources as defined by the NHR Act, assess the impact of the proposal on the said archaeological resources, review alternatives and recommend mitigation (see methodology above).

Section 38 (3) Impact Assessments are required, in terms of the statutory framework, to conform to basic requirements as laid out in Section 38(3) of the NHRA. These are:

- The identification and mapping of heritage resources in the area affected;
- The assessment of the significance of such resources;
- The assessment of the impact of the development on the heritage resources;
- An evaluation of the impact on the heritage resources relative to sustainable socio/economic benefits;
- Consideration of alternatives if heritage resources are adversely impacted by the proposed development;
- Consideration of alternatives; and
- Plans for mitigation.

1.4.6 Notice 648 of the Government Gazette 45421

Although minimum standards for archaeological (2007) and palaeontological (2012) assessments were published by SAHRA (2016), Government Notice (GN) 648 requires sensitivity verification for a site selected on the national web-based environmental screening tool for which no specific assessment protocol related to any theme has been identified. The requirements for this GN are listed in **Table 3** and the applicable section in this report noted.

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Table 3 - Reporting requirements for GN648.

GN 648	Relevant section in report	Where not applicable in this report
2.2 (a) a desktop analysis, using satellite imagery	Section 4 and 5	-
2.2 (b) a preliminary on-site inspection to identify if there are any discrepancies with the current use of land and environmental status quo versus the environmental sensitivity as identified on the national web-based environmental screening tool, such as new developments, infrastructure, indigenous/pristine vegetation, etc.	Section 4 and 5	-
2.3(a) confirms or disputes the current use of the land and environmental sensitivity as identified by the national web-based environmental screening tool	Section 1 and 5	-
2.3(b) contains a motivation and evidence (e.g. photographs) of either the verified or different use of the land and environmental sensitivity	Section 4 provides a description of the current use and confirms the status in the screening report	-

An assessment of the Environmental Screening tool provides the following sensitivity ratings for archaeological resources that fall within the proposed project area rated as Very High to Low (**Figure 2**), while palaeontological resources are rated as Very High (**Figure 3).**

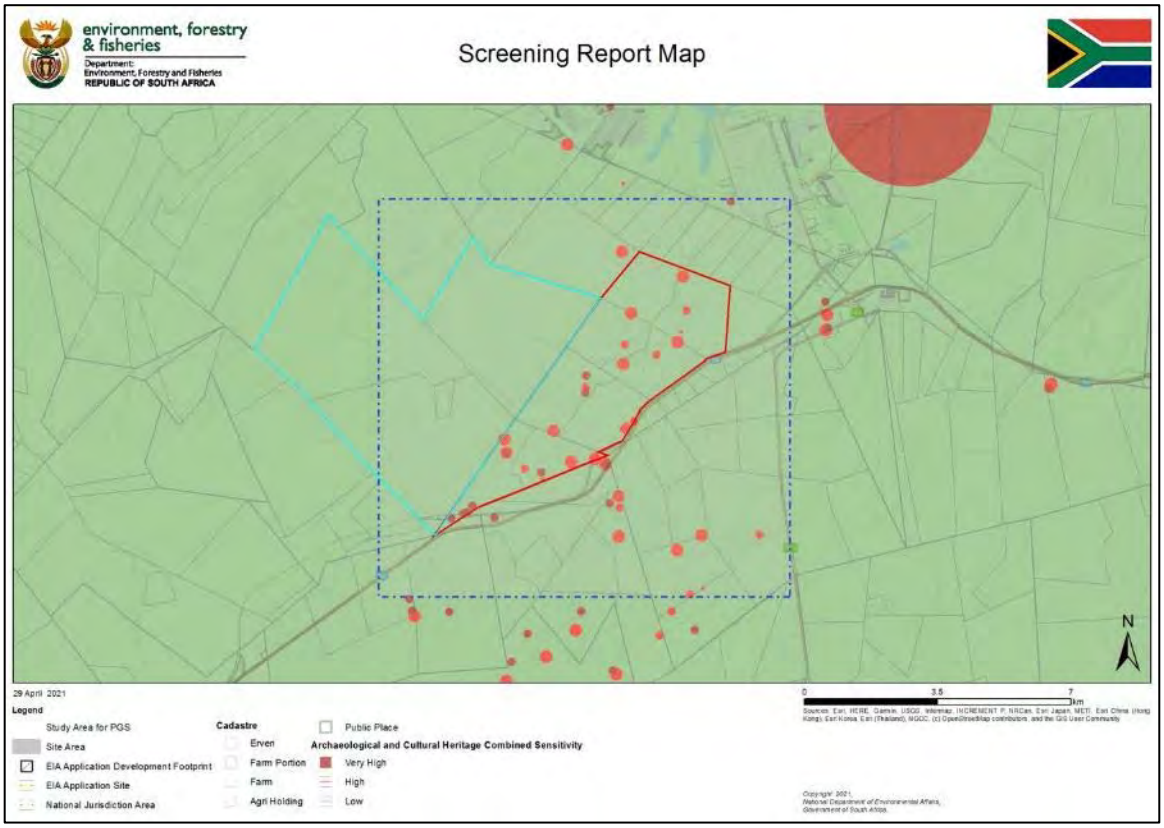

Figure 2 - Environmental screening tool's depiction of the archaeological and heritage sensitivity of the study area and surroundings.

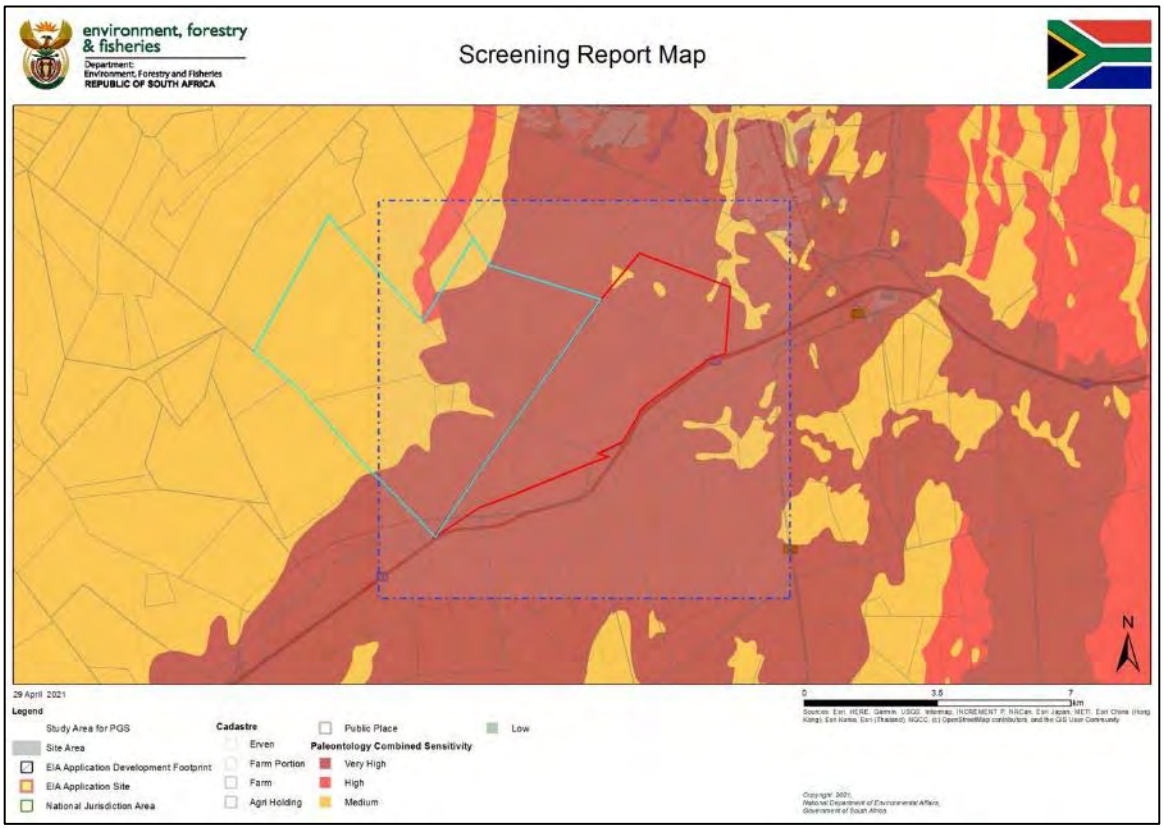

Figure 3 - Environmental screening tool's depiction of the palaeontological sensitivity of the study area and surroundings.

1.4.7 NEMA – Appendix 6 requirements

The HIA report has been compiled considering the National Environmental Management Act (Act No. 107 of 1998) (NEMA) and Environmental Impact Assessment (EIA) Regulations (2014, and as amended in 2017). **Table 4** of this report sets out the relevant sections as listed in Appendix 6 of the EIA Regulations (2017), which describes the requirements for specialist reports. For ease of reference, **Table 4** provides cross-references to the report sections where these requirements have been addressed. It is important to note, that where something is not applicable to this HIA, this has been indicated in the table below.

Table 4 - Reporting requirements as per NEMA, as amended, Appendix 6 for specialist reports.

Requirements of Appendix 6 – GN R326 EIA Regulations of 7 April 2017	**Relevant section in report**	**Comment where not applicable.**
1.(1) (a) (i) Details of the specialist who prepared the report	Page ii of Report – Contact details and company	-
(ii) The expertise of that person to compile a specialist report including a curriculum vita	Section 1 – refer to **Appendix B**	-
(b) A declaration that the person is independent in a form as may be specified by the competent authority	Page ii of the report	-
(c) An indication of the scope of, and the purpose for which, the report was prepared	Section 1 and 2	-
(cA) An indication of the quality and age of base data used for the specialist report	Section 3, 4 and 5	-
(cB) a description of existing impacts on the site, cumulative impacts of the proposed development and levels of acceptable change;	Section 6 and 7	-
(d) The duration, date and season of the site investigation and the relevance of the season to the outcome of the assessment	Section 3 and 4	-
(e) a description of the methodology adopted in preparing the report or carrying out the specialised process inclusive of equipment and modelling used	Section 3 and **Appendix A and B**	-
(f) details of an assessment of the specific identified sensitivity of the site related to the proposed activity or activities and its associated structures and infrastructure, inclusive of a site plan identifying site alternatives;	Sections 5 and 6	-
(g) An identification of any areas to be avoided, including buffers	Sections 6, 8 and 9	-
(h) A map superimposing the activity including the associated structures and infrastructure on the environmental sensitivities of the site including areas to be avoided, including buffers;	Figures 22 and 188	
(i) A description of any assumptions made and any uncertainties or gaps in knowledge;	Section 1	-
(j) A description of the findings and potential implications of such findings on the impact of the proposed activity, including identified alternatives, on the environment	Section 7, 8 and 9	
(k) Any mitigation measures for inclusion in the EMPr	Sections 8 and 9	
(l) Any conditions for inclusion in the environmental authorisation	Sections 8 and 9	
(m) Any monitoring requirements for inclusion in the EMPr or environmental authorisation	Sections 8 and 9	

Requirements of Appendix 6 – GN R326 EIA Regulations of 7 April 2017	Relevant section in report	Comment where not applicable.
(n)(i) A reasoned opinion as to whether the proposed activity, activities or portions thereof should be authorised and	Section 9	
(n)(iA) A reasoned opinion regarding the acceptability of the proposed activity or activities; and		
(n)(ii) If the opinion is that the proposed activity, activities or portions thereof should be authorised, any avoidance, management and mitigation measures that should be included in the EMPr, and where applicable, the closure plan	Sections 8 and 9	-
(o) A description of any consultation process that was undertaken during the course of carrying out the study		Not applicable. A public consultation process was handled as part of the BA and EMPr process.
(p) A summary and copies if any comments that were received during any consultation process		Not applicable. To date no comments regarding heritage resources that require input from a specialist have been raised.
(q) Any other information requested by the competent authority.		Not applicable.
(2) Where a government notice by the Minister provides for any protocol or minimum information requirement to be applied to a specialist report, the requirements as indicated in such notice will apply.	NEMA Appendix 6 and GN648 SAHRA guidelines on HIAs, PIAs and AIAs	

1.4.8 MPRDA 2002 (Act No. 28 OF 2002)

As per the NEMA no 107 of 1998, and the NEMA EIA Regulations, any activity requiring a prospecting right, mining right, mining permit, production right or exploration right, triggers the Mineral and Petroleum Resources Development Act, 28 of 2002 (MPRDA). The MPRDA Act 28 of 2002 intends to makes provision for sustainable development of South Africa's mineral and petroleum resources.

Furthermore, Chapter 8 of the MPRDA, as amended in 2015, states that the principles of the NEMA No. 107 of 1998 apply to all mining-related activities. It also serves as guidelines for the interpretation, administration and implementation of all the needed environmental requirements and authorizations of the MPRDA. In conjunction with the NEMA, the MPRDA makes provision that mining companies need to comply with other South African legislation regulating the impacts of mining-related projects on the natural and cultural environment, including the National Environmental Management Protected Areas Act (No. 57 of 2003) and the NHRA No. 25 of 1999.

Section 86 for EIA of the Regulations for Petroleum Exploration and Production (2015) of the MPRDA states that:

(1) The exploration and production activities related to petroleum are subject to the requirements of the NEMA and any relevant specific environmental management Act.
(2) Before exploration and production activities related to petroleum may commence, the holder must be in possession of an Environmental Authorisation (EA) issued in terms of the EIA Regulations, 2014.
(3) When submitting an application in terms of the EIA Regulations an applicant must comply with the minimum information requirement, guidance document or decision support tool as identified by the competent authority.
(4) The designated agency, the Council of Geosciences and the Council for Scientific Research must be identified as interested and affected parties for the purposes of the public participation to be undertaken as part of the EIA process.

2 PROJECT DESCRIPTION

2.1 Site Location

Study Area Coordinates	Northernmost point: S 25.705783 E 30.005728	Easternmost point: S 25.719525 E 30.026947
	Southernmost point: S 25.766746 E 29.957696	Westernmost point: S 25.731951 E 29.984605
Location	Near the town of eMakhazeni (Belfast) in the Emakhazeni Local Municipality and Nkangala District Municipality, Mpumalanga Province. The proposed project area is located approximately 3km south of eMakhazeni (Belfast), and 33km south-west of Dullstroom. The N4 is situated on the eastern boundary of the proposed project area.	
Property	Portion 1, Portion 2, Portion 3,Portion 4,Portion 5, Portion 13, Portion 24, Portion 28, Portion 29, Portion 30 and Portion 40 of the farm Paardeplaats 380 JT, as well as Remaining Extent and Portion 2 of the farm Paardeplaats 425 JS	
Topographic Map	2529DB, 2529DD, 2530CA and 2530CC	
Application Area	Approximately 2,463.78 hectares	

2.2 Project Description

The following information was provided by CIGroup.

NBC consists of three (3) mining sections namely the Eerstelingsfontein Section, the Glisa Section, and the Paardeplaats Section. The focus of this report will be on the Glisa and Paardeplaats Sections (**Figure 4 - Figure 6).**

A total of thirteen (13) farm portions relate to the Integrated Paardeplaats Section. Portion 1, 2, 3, 4, and 5 of the farm Paardeplaats 380 JT, apply to the Glisa Section MR, whilst the Remaining Extent of Portion 13, Portion 28, 29, 30 and 40 of the farm Paardeplaats 380 JT, and the Remaining Extent (RE) and Portion 2 of the farm Paardeplaats 425 JS, apply to the Paardeplaats Section. Portion 24 of the farm Paardeplaats 380 JT is the additional portion being requested through this process.

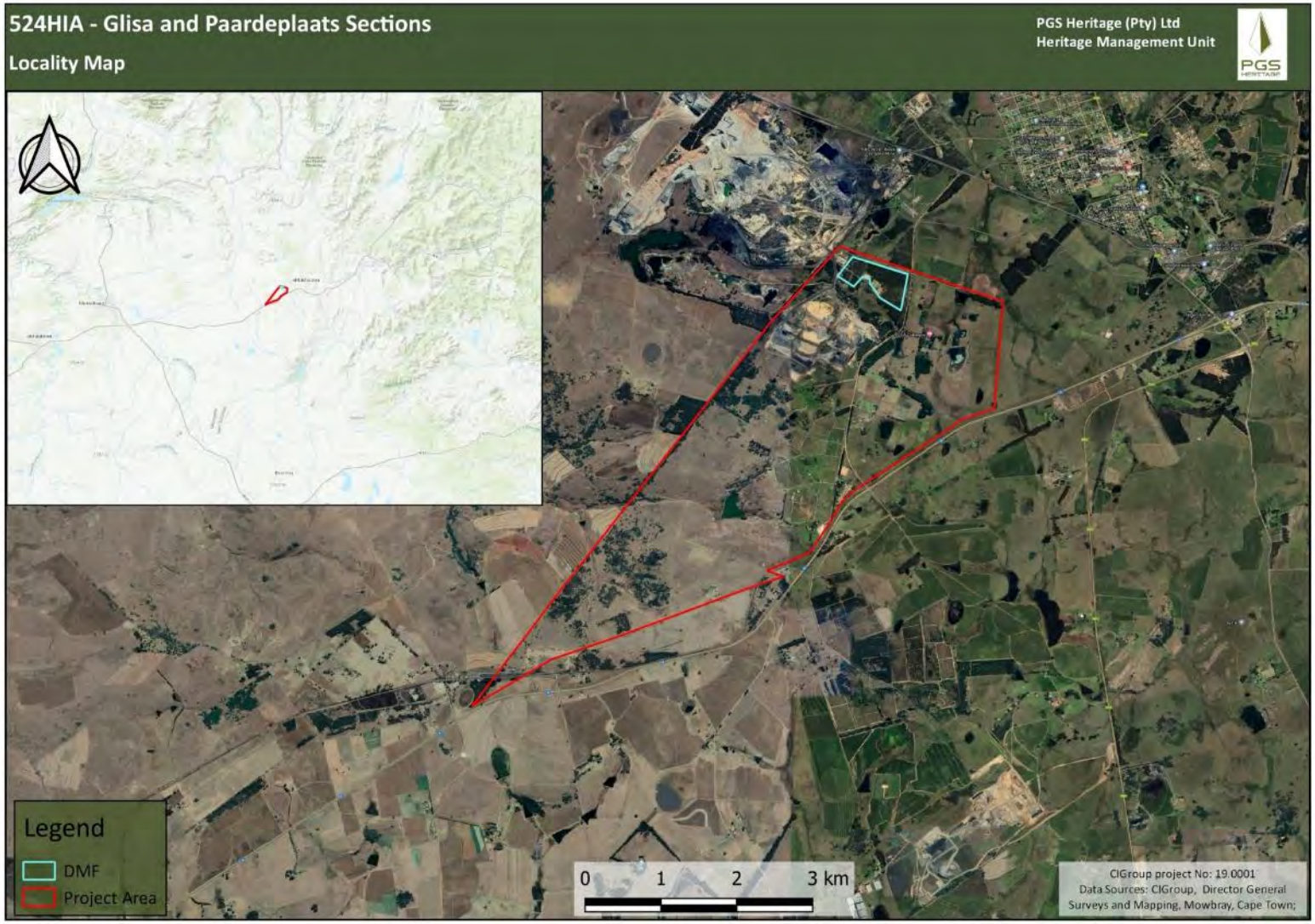

Figure 4 - Locality plan depicting the study area within its surroundings. The position of the proposed DMF area is shown in blue.

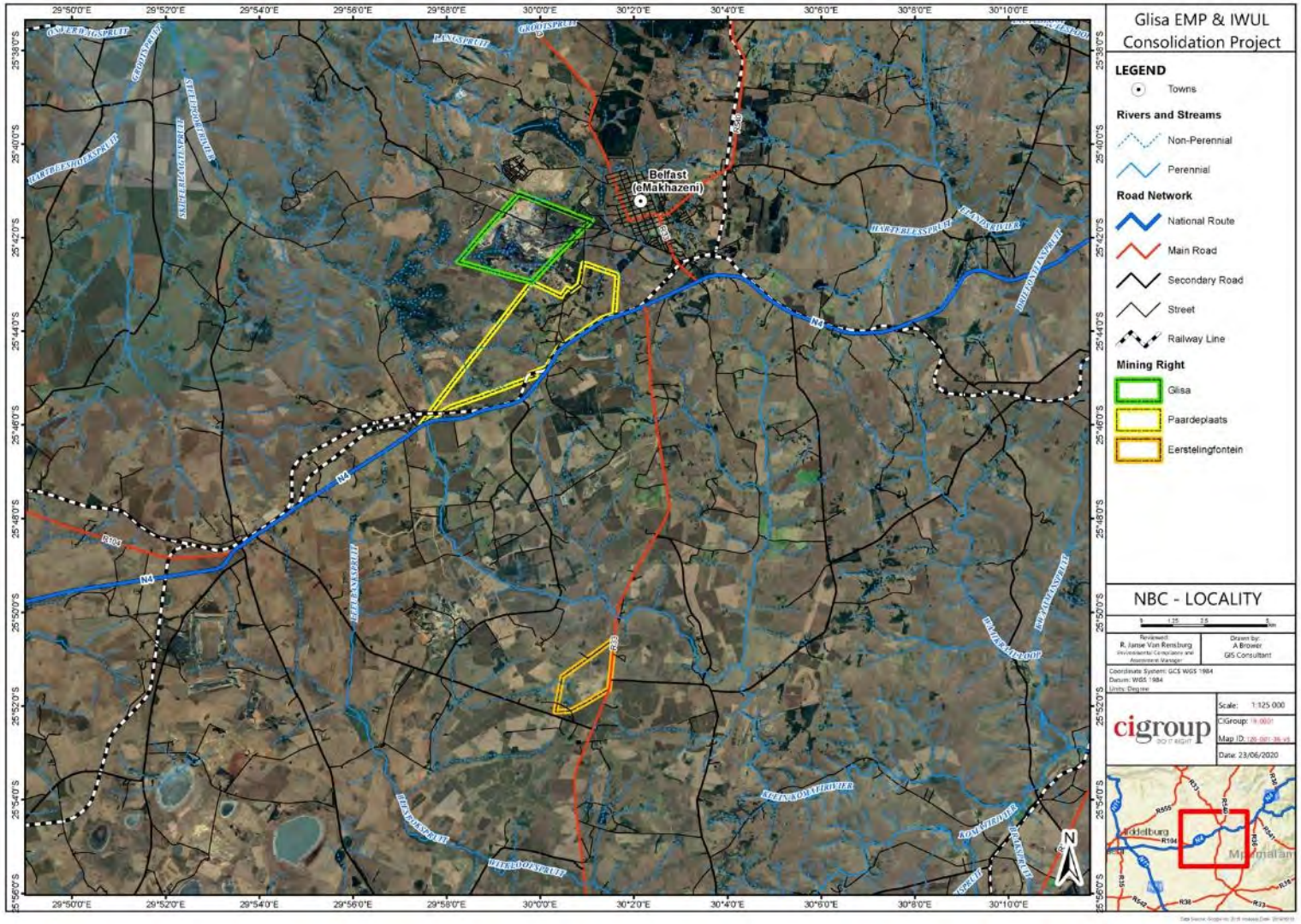

Figure 5 – Location and Farm Portions Applicable to the Glisa and Paardeplaats Sections. Map provided by CIGroup.

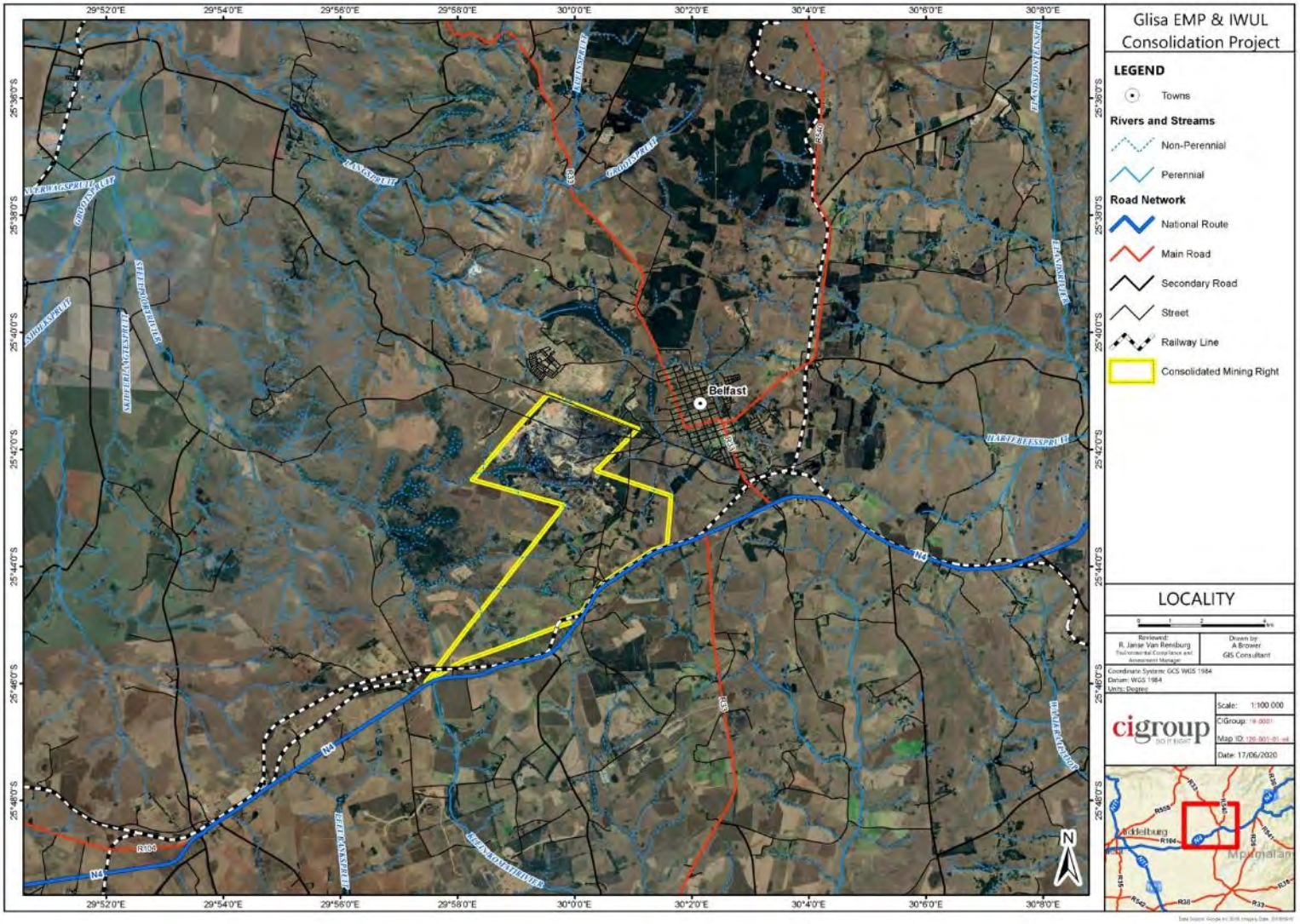

Figure 6 - Location of the Integrated Paardeplaats Section. Map provided by CIGroup.

2.3 Description of the Activities to be Undertaken

2.3.1 Current Activities

2.3.1.1 Glisa Section

Mining started at the Glisa Section in 1890 using underground mining methods. From 2006 mining was undertaken by opencast mining methods with underground pillars being reclaimed. This opencast mining method is still in force at the Glisa Section. Coal is crushed and screened at stationary plants whilst other coal products are processed at the main Crushing, Screening and Washing Plant (CSWP) located in the Glisa Section. In addition to mining and coal processing, the Glisa Section also consists of infrastructures such as roads, offices, workshops, stockpiles, pipelines, and a Water Treatment Plant (WTP).

NBC has an existing supply agreement with Eskom to supply steady and secure coal for selected Eskom coal-fired power stations. The Glisa Section has been the source of this coal for many years; however, the Glisa Section Life of Mine (LoM) is nearing its end and a resultant reduction in Run of Mine (RoM) coal is occurring. In order to meet its contractual obligations to Eskom, NBC intends to supply Eskom with coal from the adjoining Paardeplaats Section.

NBC, through the utilisation of the Glisa Section infrastructure, intends to limit the disturbance of additional natural areas in the Paardeplaats Section. In so doing, the utilisation of the existing infrastructure at the Glisa Section is paramount. Existing infrastructure at the Glisa Section is licensed in terms of the Mineral and Petroleum Resources Development Act, 2002 (Act No. 28 of 2002) (MPRDA) and the NEMA and all of the existing infrastructures at the Section will continue to be used in support of mining activities in the Integrated Paardeplaats Section. The infrastructure that will be continued to be used and which does not require licensing in terms of this application includes, the following:

- RoM stockpile areas at the crushing and screening plants, e.g. Gijima, and the main CSWP;
- Product stockpiles at the crushing and screening plants and main CSWP;
- Haul roads, including existing river diversions, culverts, and drains;
- Stormwater management infrastructure, including existing dams and channels;
- Magazine and explosives area;
- Workshops, administrative offices, mining contractor offices, and security offices, including ablution facilities, septic tanks, and French drains;
- Fuel bays, above and below ground diesel storage tanks, wash bays, and salvage areas; and
- Waste management areas.

2.3.1.1.1 Water Treatment Plant

The WTP for the Glisa Section spans an area of approximately 0.67 ha on Portion 24 of Paardeplaats 380JT and is fully operational. The design treatment capacity of the WTP is 1.5 megalitres per day (Ml/d) on average over a 30-day cycle, equating to an average of 62.5 cubic metres per hour (m^3/h). Proxa designed and constructed the WTP on behalf of the previous mine owner, Exxaro, and have been operating the WTP since 2017. The WTP processes entail chemical precipitation in combination with Ultrafiltration (UF) and Reverse Osmosis (RO) technologies. Additional brine treatment is designed to ensure a zero-brine discharge.

RO is a water treatment process whereby dissolved salts, such as sodium, chloride, calcium carbonate, and calcium sulphate may be separated from water by forcing the water through a semi-permeable membrane under high pressure. The water diffuses through the membrane and the dissolved salts remain behind as the liquid by-product. The liquid by-product generated by the WTP process is routed to a filter press which produces *Gypsum by-product* (25% moisture content) which is stored within a concrete based, bunded storage area on site.

The process water pipelines (dirty water collection and product water pipelines) traverse Portions 2, 3, 4, 5 and 24 of Paardeplaats 380JT. The purpose of the WTP is to treat water within the dams and voids at the Glisa and Paardeplaats Sections which have been impacted on by historical and current mining activities. The WTP is supported by a significant pipeline network to transfer feed water from the collection points to the WTP for treatment, as well as the pipeline routes from the plant to the discharge point and clean water storage locations.

The collection points are located within un-rehabilitated voids from historical opencast mining by previous owners of the mine. These voids contain poor quality water mainly from runoff. The voids are licensed in terms of the current Glisa Integrated Water Use License (IWUL) (License No.: 06/B41A/ABCFGIJ/1002; File No.: 27/2/2/B141/3/9) Water is collected from the collection points by means of sumps within which pumps are located

Existing infrastructure at the WTP in the Glisa Section is licensed in terms of the MPRDA and the NEMA and all of the existing infrastructure for the WTP will continue to be used in support of the Paardeplaats Section mining activities. The infrastructure that will continued to be used and which does not require licensing in terms of this application includes, the following:

- WTP and pipeline reticulation system, including discharge pipeline and electrical supply through a 500 Kilovolt Ampere (kVA) mini-substation;
- Gypsum storage areas at the WTP; and
- Waste management areas.

2.3.1.2 Paardeplaats Section

The Paardeplaats Section is an operational section that adjoins the Glisa Section. Mining is undertaken by opencast mining methods. Mining at the Paardeplaats Section will focus on Portion

30 of the farm Paardeplaats 380 JT for the first ten (10) years of the MR, before expanding to other farm portions.

As RoM reduces at the Glisa Section, the shortfall will be addressed through coal mined at the Paardeplaats Section. The Paardeplaats Section is an open cast mining operation where bench mining techniques are employed to access the coal seams. The 2 Seam Burden is removed with Dozers doing roll-over of the 2 seam burden into the previous 2 seam voids, and the upper burden seams are removed with the truck and shovel mining method. Coal seams 4, 3 and 2 will be mined for processing. Seam 1 appears in certain areas only and is highly weathered and contaminated with inseam shales and is not suitable to mine and will be left in situ in the pit. The Paardeplaats Section has an estimated RoM supply rate of 4.2 – 4.4 mtpa which relate to 2.4 – 2.6 mtpa of product, supplying Eskom's Komati and Arnot power stations, as well as an estimated RoM supply rate of 1.7 mtpa of export coal which equates to 1.0 mtpa of the export product.

2.3.1.2.1 Resource Details

The Integrated Paardeplaats Section falls within the Witbank Coal Field which is close to the north-eastern edge of the Karoo Basin. The Karoo sequence is represented by the Dwyka Formation consisting of diamictite and the overlaying Ecca Group. The coal seams of the Witbank Coal Field are found at the base of the Vryheid Formation of the Ecca Group and the strata in which coal seams occur consist predominantly of fine, medium and coarse-grained sandstone with subordinate mudstone, shale, siltstone, and carbonaceous shale.

All five coal seams of the Witbank Coal Field occur within the Integrated Paardeplaats Section. The number 2 and 4 seams are more extensively developed than seams 1, 3 and 5. In the far northeast portion of the Paardeplaats Section a dolerite sill, likely a post-depositional feature related to the Lesotho Basalts is believed to have completely displaced coal seams (EIMS, 2014). The coal seams are relatively flat-lying, and the average seam thickness is as follows:

- The Number (No.) 1 seam has an average thickness of 0.34 metres (m);
- The No. 2 seam has an average thickness of 5.37 m;
- The No. 3 seam has an average of 0.78 m;
- The No. 4 seam has an average thickness of 3.04 m; and
- The No. 5 seam has an average thickness of 0.62 m.

The No. 1, 2, 4 and 5 seams can be mined whilst the No. 3 seams, although persistent across the entire coal field, has been determined to be too thin to be considered an economically viable resource.

2.3.1.2.2 Mining Method

Mining at the Paardeplaats Section entails opencast mining. The open cast mining method was selected due to the shallowness of the target coal seams present within the MR area. The open cast mining will be undertaken as a hybrid of roll-over and bench/box cut mining techniques. The use of the two respective techniques is dependent on the number of seams present as well as the overburden thickness. The roll-over technique will be utilised where only a single seam is present and where the overburden has a corresponding thickness of less than 20 m. The bench/box-cut technique will be utilised where two or more seams are present, and the overburden has a thickness of greater than 20 m.

The creation of the opencast was initiated through a stripping operation which removes topsoil and exposes the overburden of the first proposed cut. Initial topsoil was hauled to a designated area and stored for use in rehabilitation. When a steady state is reached, topsoil will be replaced in a continuous operation. The overburden is then drilled and blasted. The removal of overburden is undertaken in two phases namely, the top portion will be loaded and hauled, and the lower portion dozed. This will ensure that backfilling is adequately addressed and that concurrent rehabilitation may take place.

Once the overburden has been removed and dozed, the coal seams are drilled and blasted and then transferred to the Glisa Section for mineral processing by means of standard load and haul operations. It is anticipated that after the first four (4) cuts, a steady-state will be reached. The schematics described the mining method in more detail, with the mining direction being from left to right, and depicts the following:

- A section through the general stratigraphic sequence;
- The box cut is excavated after removal of the topsoil and subsoil;
- Coal is removed from the box cut, subsoil from cut 2 and topsoil from cut 3;
- The overburden from cut 2 is drilled and blasted;
- The topmost part of the overburden is loaded and hauled to a stockpile due to insufficient pit room availability;
- The bottom part is dozed over;
- Coal is removed from cut 2 and subsoil from cut 3;
- Cut 3 overburden is blasted;
- The top part of the blasted overburden is hauled and placed at the beginning of the low wall;
- The bottom part of cut 3 is dozed over and the cleaned coal face;
- Coal is removed from cut 3 and subsoil from cut 4; and
- Overburden from cut 4 is blasted.

At this point the pit is now in a ready state and no more material is stockpiled as it can now be accommodated in the pit. Concurrent rehabilitation can now logically follow as soon as the subsoil

gets stripped in the front and replaced in the back. The same is true for the topsoil which gets placed over the subsoil in a continuous process.

Due to the proximity of the Glisa and Paardeplaats Sections, all mineral processing and waste disposal for the Paardeplaats Section is being undertaken at the Glisa Section. For this reason, NBC requires the consolidation of the Sections into the Integrated Paardeplaats Section to align with the Paardeplaats Section LoM which currently extends until 25 September 2038. Coal will be crushed at stationary plants prior to processing being undertaken at the main CSWP located in the Glisa Section. Water treatment will also be undertaken at the WTP in the Glisa Section.

2.3.2 Proposed Activities

2.3.2.1 Existing Infrastructure Changes

NBC require the following changes to existing infrastructure:

- Expansion of the CSWP on Portion 3 and 4 of the farm Paardeplaats 380 JT;
- Expansion of the existing WTP pipeline network on all farm portions associated with the Integrated Paardeplaats Section; and
- Widening of haul roads between the mining sections and processing plants.

2.3.2.2 New Infrastructure Required

To ensure the continuation of mineral processing and water treatment activities for the Integrated Paardeplaats Section in support of the mining activities taking place, NBC requires new infrastructure within the Integrated Paardeplaats Section in support operation activities in the Section. This new infrastructure includes the following:

- A RoM pad on Portion 3 and 4 of the farm Paardeplaats 380 JT;
- A PCD at the CSWP on Portion 3 and 4 of the farm Paardeplaats 380 JT;
- Additional stormwater management infrastructure including diversion channels around the CSWP, and diversion channels around the administrative, contractor, workshop, and security offices on Portion 3 and 4 of the farm Paardeplaats 380 JT;
- Rerouting of a powerline at the CSWP on Portion 3 and 4 of the farm Paardeplaats 380 JT to ensure a clear footprint area for the PCD;
- A RoM pad on Portion 24 of the farm Paardeplaats 380 JT;
- An additional crushing and screening plant on Portion 24 of the farm Paardeplaats 380 JT;
- A mining contractors office, workshop, and conservancy tank on Portion 24 of the farm Paardeplaats 380 JT;
- A PCD on Portion 24 of the farm Paardeplaats 380 JT;

- Stormwater management infrastructure, including diversion channels, for the above-mentioned infrastructure on Portion 24 of the farm Paardeplaats 380 JT;
- A powerline extension from the existing network to supply power to the infrastructure on Portion 24 of the farm Paardeplaats 380 JT;
- Pipelines between the PCD, Plant and the WTP on Portion 24 of the farm Paardeplaats 380 JT;
- A conveyor between the RoM Pad on Portion 24 of the farm Paardeplaats 380 JT and the CSWP on Portion 3 and 4 of the farm Paardeplaats 380 JT;
- An emulsion silo adjacent to the magazine yard on Portion 24 of the farm Paardeplaats 380 JT;
- Haul roads and a dewatering pipeline within the active mining area on Portion 30 of the farm Paardeplaats 380 JT and planned mining areas on Potion 13, 28, 29 and 40 of the the farm Paardeplaats 380 JT and Portion 2 and Remaining Extent of the farm Paardeplaats 425 JS;
- Backfill areas on Portion 1, 3, 4 and 5 of the farm Paardeplaats 380 JT; and
- Discard Management Facility (DMF) on Portion 24 of the farm Paardeplaats 380 JT.

2.4 Scope of Work

For the purposes of this report, only the proposed DMF is considered.

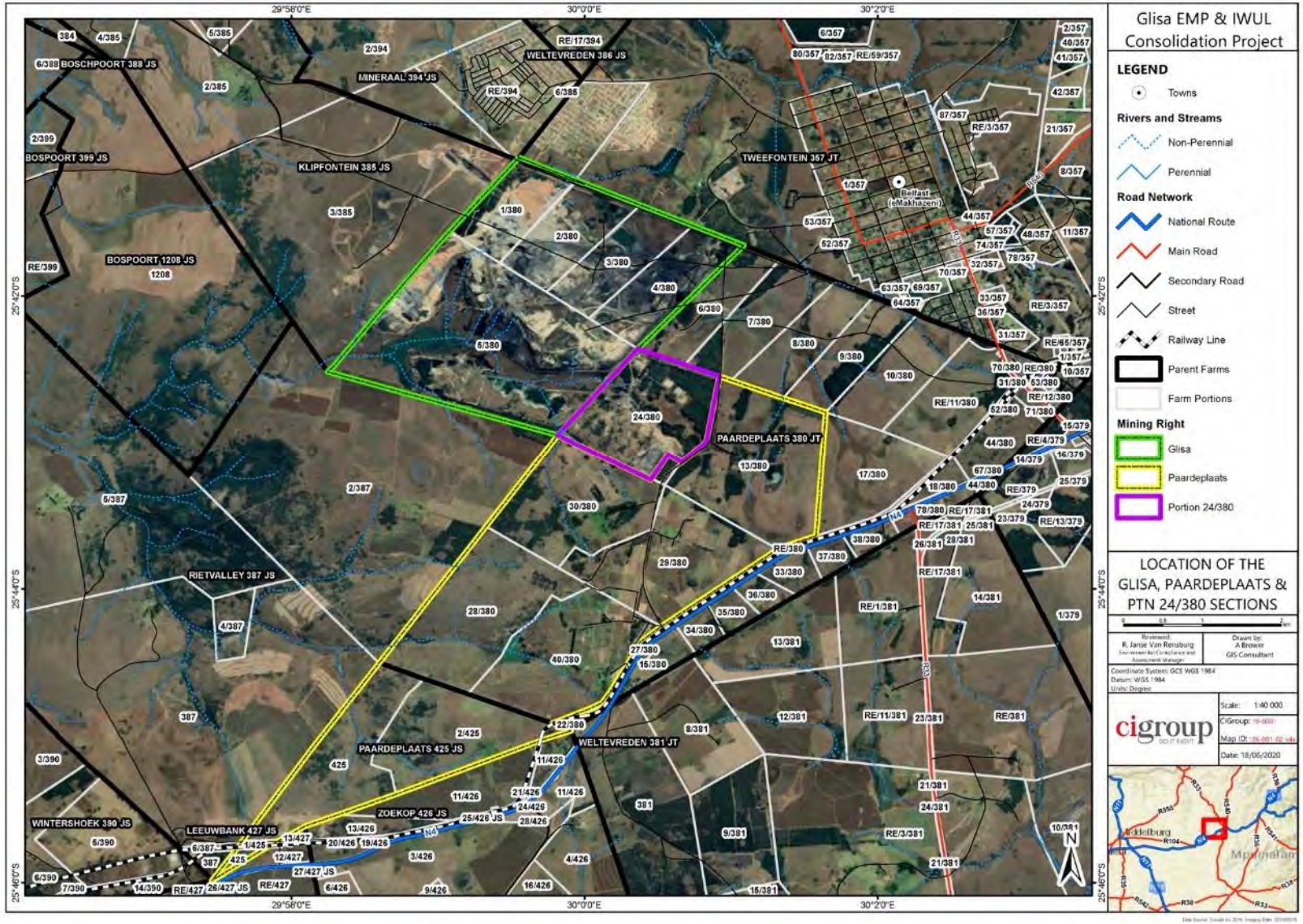

Figure 7 – Location of the Glisa and Paardeplaats Sections. Map provided by CIGroup.

3 METHODOLOGY

3.1 Methodology for Assessing Heritage Site Significance

The HIA process consisted of three steps:

Step I – Desktop Study: An archaeological and historical desktop study was undertaken of the project area and surrounding landscape (refer to **Chapter 5**). An archaeological and historical overview was compiled, which was augmented by an assessment of previous archaeological and heritage studies completed for the study area and surrounding landscape. Furthermore, an assessment was made of the early editions of the relevant topographic maps.

Step II – Physical Survey: The fieldwork comprised a field assessment of the study area undertaken primarily by foot and vehicle over the course of three days by an experienced fieldwork team from PGS consisting of an archaeologist (Cherene de Bruyn) and two field assistants (Michelle Sacshe and Thomas Mulaudzi). The fieldwork was undertaken from Monday, 19 April 2021 to Wednesday 21 April 2021.

As almost the entire project area had been intensively assessed as part of a previous HIA study by PGS, the focus on the current fieldwork was on revisiting all the heritage sites that were identified in the previous report and also undertaking intensive walkthroughs of a small section that is now earmarked for the development of a Discard Management Facility (DMF).

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

The significance of heritage sites was based on five 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 - <10/50m²
    - Medium - 10-50/50m²
    - High - >50/50m²
- uniqueness and
- the 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 position
D - Preserve site, or extensive data collection and mapping of the site; and
E - Preserve site

Site Significance

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

Table 5 - 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	Conservation; Mitigation not advised
Local Significance (LS)	Grade 3B	High	Mitigation (Part of site should be retained)
Generally Protected A (GP.A)	-	High/Medium	Mitigation before destruction
Generally Protected B (GP.B)	-	Medium	Recording before destruction
Generally Protected C (GP.C)	-	Low	Destruction

3.2 Methodology for Impact Assessment

To ensure uniformity, a standard impact assessment methodology has been utilised so that a wide range of impacts can be compared. The impact assessment methodology makes provision for the assessment of impacts against the following criteria:

- Significance;
- Spatial scale;
- Temporal scale;
- Probability; and
- Degree of certainty.

A combined quantitative and qualitative methodology was used to describe impacts for each of the aforementioned assessment criteria.

A summary of each of the qualitative descriptors, along with the equivalent quantitative rating scale for each of the aforementioned criteria, is given in **Table 6** below.

Table 6 – Quantitative rating and equivalent descriptors for the impact assessment criteria

RATING	SIGNIFICANCE	EXTENT SCALE	TEMPORAL SCALE
1	VERY LOW	*Isolated corridor / proposed corridor*	Incidental
2	LOW	*Study area*	Short-term
3	MODERATE	*Local*	Medium-term
4	HIGH	*Regional / Provincial*	Long-term
5	VERY HIGH	*Global / National*	Permanent

A more detailed description of each of the assessment criteria is given in the following sections.

Significance Assessment

The significance rating (importance) of the associated impacts embraces the notion of extent and magnitude but does not always clearly define these since their importance in the rating scale is very relative. For example, 10 structures younger than 60 years might be affected by a proposed development, and if destroyed the impact can be considered as VERY LOW in that the structures are all of Low Heritage Significance. If two of the structures are older than 60 years and of historic significance, and as a result of High Heritage Significance, the impact will be considered to be HIGH to VERY HIGH. A more detailed description of the impact significance rating scale is given in **Table 7** below.

Table 7 – Description of the significance rating scale

RATING		DESCRIPTION
5	VERY HIGH	Of the highest order possible within the bounds of impacts which could occur. In the case of adverse impacts: there is no possible mitigation and/or remedial activity which could offset the impact. In the case of beneficial impacts, there is no real alternative to achieving this benefit.
4	HIGH	The impact is of substantial order within the bounds of impacts which could occur. In the case of adverse impacts: mitigation and/or remedial activity is feasible but difficult, expensive, time-consuming or some combination of these. In the case of beneficial impacts, other means of achieving this benefit are feasible but they are more difficult, expensive, time-consuming or some combination of these.
3	MODERATE	The impact is real but not substantial in relation to other impacts, which might take effect within the bounds of those which could occur. In the case of adverse impacts: mitigation and/or remedial activity are both feasible and fairly easily possible. In the

		case of beneficial impacts: other means of achieving this benefit are about equal in time, cost, effort, etc.
2	LOW	The impact is of a low order and therefore likely to have a little real effect. In the case of adverse impacts: mitigation and/or remedial activity is either easily achieved or little will be required, or both. In the case of beneficial impacts, alternative means for achieving this benefit are likely to be easier, cheaper, more effective, less time consuming, or some combination of these.
1	VERY LOW	The impact is negligible within the bounds of impacts which could occur. In the case of adverse impacts, almost no mitigation and/or remedial activity is needed, and any minor steps which might be needed are easy, cheap, and simple. In the case of beneficial impacts, alternative means are almost all likely to be better, in one or several ways, than this means of achieving the benefit. Three additional categories must also be used where relevant. They are in addition to the category represented on the scale, and if used, will replace the scale.
0	NO IMPACT	There is no impact at all - not even a very low impact on a party or system.

Spatial Scale

The spatial scale refers to the extent of the impact i.e. will the impact be felt at the local, regional, or global scale. The spatial assessment scale is described in more detail in **Table 8** below.

Table 8 – Description of the spatial significance rating scale

RATING		**DESCRIPTION**
5	Global/National	The maximum extent of any impact.
4	Regional/Provincial	The spatial scale is moderate within the bounds of possible impacts and will be felt at a regional scale (District Municipality to Provincial Level). The impact will affect an area up to 50 km from the site.
3	Local	The impact will affect an area up to 5 km from the proposed site.
2	Study Area	The impact will affect an area not exceeding the study area boundary.
1	Isolated Sites / proposed site	The impact will affect an area no bigger than the site.

Temporal/Duration Scale

In order to accurately describe the impact, it is necessary to understand the duration and persistence of an impact on the environment. The temporal or duration scale is rated according to criteria set out in **Table 9** below.

Table 9 – Description of the temporal rating scale

RATING		**DESCRIPTION**
1	Incidental	The impact will be limited to isolated incidences that are expected to occur very sporadically.
2	Short-term	The environmental impact identified will operate for the duration of the construction phase or a period of less than 5 years, whichever is the greater.

3	Medium-term	The environmental impact identified will operate for the duration of life of the project.
4	Long-term	The environmental impact identified will operate beyond the life of operation of the project.
5	Permanent	The environmental impact will be permanent.

Degree of Probability

The probability or likelihood of an impact occurring will be outlined in **Table 10** below.

Table 10 – Description of the degree of probability of an impact occurring

RATING	DESCRIPTION
1	Practically impossible
2	Unlikely
3	Could happen
4	Very likely
5	It's going to happen/has occurred

Degree of Certainty

It is not possible to be 100% certain of all facts, and for this reason, a standard "degree of certainty" scale is used, as discussed in **Table 11**. The level of detail for specialist studies is determined according to the degree of certainty required for decision-making.

Table 11 – Description of the degree of the certainty rating scale

RATING	DESCRIPTION
Definite	More than 90% sure of a particular fact.
Probable	Between 70 and 90% sure of a particular fact, or of the likelihood of that impact occurring.
Possible	Between 40 and 70% sure of a particular fact, or of the likelihood of an impact occurring.
Unsure	Less than 40% sure of a particular fact or the likelihood of an impact occurring.
Can't know	The consultant believes an assessment is not possible even with additional research.

Quantitative Description of Impacts

To allow for impacts to be described quantitatively, in addition to the qualitative description given above, a rating scale of between 1 and 5 was used for each of the assessment criteria. Thus the total value of the impact is described as the function of significance, spatial and temporal scale, as described below:

$$\textbf{\textit{Impact Risk}} = \frac{(\text{Significance} + \text{Spatial} + \text{Temporal})}{3} \times \frac{\text{Probability}}{5}$$

An example of how this rating scale is applied is shown below:

Table 12 – Example of a rating scale

IMPACT	SIGNIFICANCE	SPATIAL SCALE	TEMPORAL SCALE	PROBABILITY	RATING
	Low	Local	Medium Term	Could Happen	**Low**
Impact on heritage structures	2	3	3	3	**1.6**

Note: The significance, spatial and temporal scales are added to give a total of 8, which is divided by 3 to give a criterion rating of 2.67. The probability (3) is divided by 5 to give a probability rating of 0.6. The criteria rating of 2.67 is then multiplied by the probability rating (0,6) to give the final rating of 1,6. The impact risk is classified according to five classes as described in the table below.

Table 13 – Impact Risk Classes

RATING	IMPACT CLASS	DESCRIPTION
0.1 – 1.0	1	Very Low
1.1 – 2.0	2	Low
2.1 – 3.0	3	Moderate
3.1 – 4.0	4	High
4.1 – 5.0	5	Very High

Therefore, with reference to the example used for heritage structures above, an impact rating of 1.6 will fall in Impact Class 2, which will be considered to be a low impact.

4 CURRENT STATUS QUO

The study area is located near the town of eMakhazeni (Belfast) in the eMakhazeni Local Municipality in the Nkangala District Municipality of the Mpumalanga Province. The proposed project area is located 3km south of Belfast, 55km east of Middelburg, approximately 40km northwest of Carolina and 33km south-east of Dullstroom. The N4 is located on the eastern boundary of the proposed project area.

According to the National Vegetation Map of South Africa, the study area is located within the vegetation type known as the Eastern Highveld Grassland. The Eastern Highveld Grassland is characterised by

"*Slightly to moderately undulating plains, including some low hills and pan depressions. The vegetation is short dense grassland dominated by the usual highveld grass composition (Aristida, Digitaria, Eragrostis, Themeda, Tristachya etc.) with small, scattered rocky outcrops with wiry, sour grasses and some woody species" (*Sanbi, 2021).

In terms of geology and soils, the site characterised by *red to yellow sandy soils of the Ba and Bb land types found on shales and sandstones of the Madzaringwe Formation (Karoo Supergroup) "(*Sanbi, 2021).

During the fieldwork, the study area was found to be located in a landscape that consisted of primarily level sections, with some undulating sections also seen. The landscape is characterised by grassy vegetation. Several existing structures (including farmsteads, a substation, railway tracks and powerlines) were observed throughout the area.

Overall, the accessibility of the project footprint area was fairly good. The visibility of the site was limited due to the dense vegetation growth. Several photographs below provide general views of the study area and the landscape within which it is located **(Figure 8** to **Figure 13).**

Figure 8 – General view of the N4. This road provides access to the eastern section of the project area.

Figure 9 - Several sections of the project area can be characterised by grassy vegetation.

Figure 10 – Another general view of the study area showing some of the powerlines observed throughout the project area.

Figure 11 - The explosives magazine of the mine is located in the north-western section of the study area.

Figure 12 - The area surrounding the explosive magazine in the north-western corner of the project area is characterised by a plantation.

Figure 13 - Railway lines are found along the southern and south-eastern boundary of the project area.

5 DESKTOP STUDY FINDINGS

5.1 Archaeological and Historical Overview of the Study Area and Surroundings

DATE	DESCRIPTION
The Study Area and Surroundings during the Stone Age	
The archaeological literature does not contain much information on the Stone Age archaeology of this area, since this period has not been researched extensively in Mpumalanga (Esterhuysen & Smith, 2007). However, it is clear from the general archaeological record that the larger Mpumalanga region has been inhabited by humans since Earlier Stone Age (ESA) times. Although no Stone Age sites are known from the immediate vicinity of the study area, there are some sites recorded in the greater region (Esterhuysen & Smith, 2007). Examples of such sites are noted below.	
2.5 million to 250 000 years ago	The Earlier Stone Age (ESA) is the first and oldest phase identified in South Africa's archaeological history and comprises two technological phases. The earliest of these technological phases is known as Oldowan which is associated with crude flakes and hammerstones and dates to approximately 2 million years ago. The second technological phase in the ESA of Southern Africa is known as the Acheulian and comprises more refined and better-made stone artefacts such as the cleaver and bifacial handaxe. The Acheulian phase dates back to approximately 1.5 million years ago. Concentrations of ESA stone tools were found in erosion gullies along the Rietspruit (Esterhuysen & Smith, 2007).

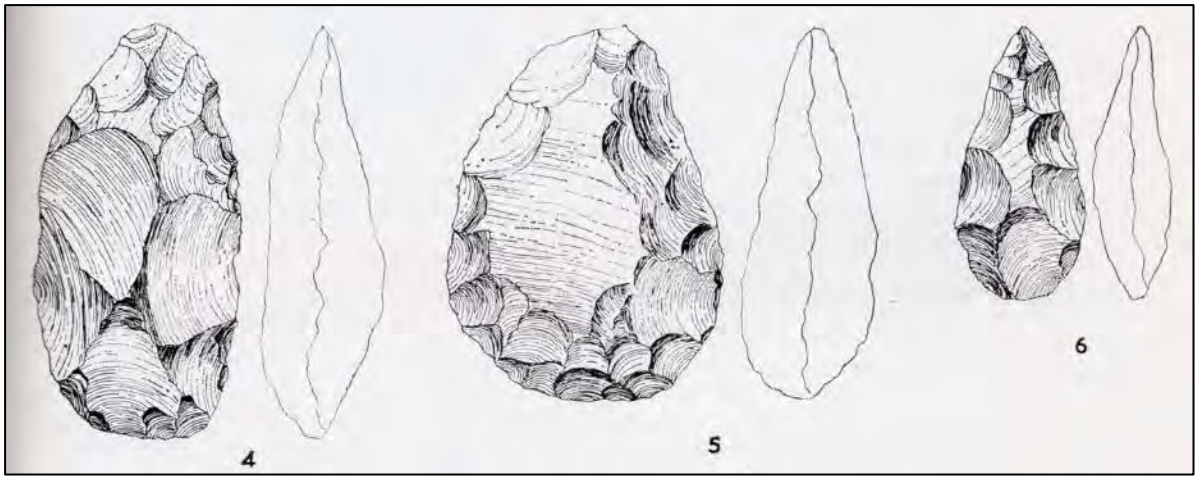

Figure 14 - Example of Early Stone Age Later Acheulian handaxes. These handaxes were identified at Blaaubank near Rooiberg. Cropped section of an illustration published in Mason (1962:199).

>250 000 to 40 000 years ago	The Middle Stone Age (MSA) dates to between 250 000 to 40 000 years BP. MSA dates of around 250 000 BP originate from sites such as Leopards Kopje in Zambia, while the late Pleistocene (125 000 BP) yields several important dated sites associated with modern humans (Deacon & Deacon, 1999). The MSA is characterised by flake and blade industries, the first use of grindstones, wood and bone artefacts, personal ornaments, use of red ochre, circular hearths and hunting and gathering lifestyle. Evidence for the MSA period has been excavated from Bushman Rock Shelter, situated on the farm Klipfonteinhoek in the Ohrigstad District. The MSA layers indicated that the cave was visited repeatedly over a long period, between approximately 40 000 years ago and 27 000 years Before the Present (Esterhuysen & Smith, 2007). Low-density surface scatters of MSA material are known from areas closer to Ogies and Emalahleni (CRM Africa & Matakoma, 2001) (Birkholtz & De Bruyn, 2020).
40 000 years ago to c.AD200	The Later Stone Age (LSA) is the third phase identified in South Africa's archaeological history. It is associated with an abundance of very small stone artefacts known as microliths. Several surface occurrences of LSA materials are likely to be found around the general vicinity of the study area. Unfortunately, these are expected to be in the form of surface material that has been eroded out of dongas and riverbeds. The only possible LSA site known from within the study area is a possible rock art site (see site **PP 14**).

The Study Area and Surroundings during the Iron Age

The arrival of early farming communities during the first Millenium heralded in the start of the Iron Age for South Africa. The Iron Age is that period in South Africa's archaeological history associated with pre-colonial farming communities who practised cultivation and pastoralist farming activities, metalworking, cultural customs such as lobola and whose settlement layouts show the tangible representation of the significance of cattle (known as the Central Cattle Pattern) (Huffman, 2007).

The Southern African Iron Age can be divided into an Early Iron Age (AD 200 – AD 900), Middle Iron Age (AD 900 – AD 1300) and Late Iron Age (AD 1300 – AD 1840) (Huffman, 2007). Maggs (1976) opines that the Highveld areas of Mpumalanga were not occupied by the EIA due to the existing environment. The extensive grassland endemic to this area was of little value to their economy as they were dependent on slash-and-burn (swidden) agriculture. Radiocarbon dating from pottery places the EIA in the first millennium (Evers 1977); however, the land became valuable only when LIA populations had increased livestock numbers to the point that they formed a principal resource. It is during this time

that the LIA populations would have migrated to the high grasslands of the Highveld to take advantage of the open grazing lands (Hall 1987). Delius (2007) mentions that from around the beginning of the sixteenth century, LIA communities would have migrated to Mpumalanga during times of climate shift and political instability. At around 1640, during a warmer phase within the Little Ice Age, the population growth showed a considerable increase. As the population increased, the frequency of interactions dealing with land and resources between various groups also intensified. A screening of the available Google Earth imagery was made. While no LIA stone walled settlements are evident from within the study area and its direct surroundings, large numbers of such settlements are for example evident in areas approximately 3km north-west of the present study area.	
AD 1700 – AD 1840	The Buispoort facies of the Moloko branch of the Urewe Tradition is the first association of the study area's surroundings with the Iron Age. It is most likely dated to between AD 1700 and AD 1840. The key features on the decorated ceramics of this facies include rim notching, broadly incised chevrons and white bands, all with red ochre (Huffman, 2007). Buispoort can be associated with the Western Sotho-Tswana, including the Hurutshe and Kwena, and the settlement layouts of Buispoort sites are known as Molokwane-type walling (Huffman, 2007). According to the map published by Huffman (2007:203), the present study area is located on the far eastern edge of the known distribution of Buispoort facies sites and settlements. The Heritage Impact Assessment undertaken for the proposed 400kV transmission line from Arnot to Gumeni (Pelser, 2012), mentions a number of Late Iron Age stonewalled sites located south, east and south-east of the present study area. It is expected that these sites can likely be associated with the Buispoort facies.
AD 1821 – AD 1823	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 (www.mk.org.za). 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. 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 represent 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.

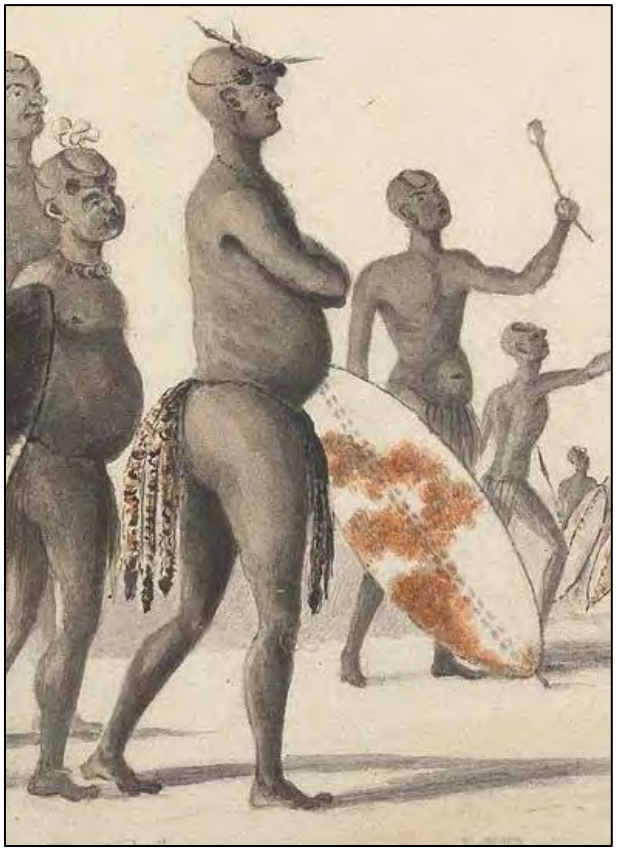

Figure 15 - King Mzilikazi of the Matabele. This depiction was made by Captain Cornwallis Harris in c. 1838 (www.sahistory.org.za).

The Study Area and Surroundings during the Historical Period

The Historical Period within the study area and surroundings commenced with the arrival of newcomers to this area. The first arrivals would almost certainly have been travellers, traders, missionaries, hunters and fortune seekers. However, with time, this initial trickle was replaced by a mass flood of white immigrants during the 1830s, when a mass migration of roughly 2 540 Afrikaner families (comprising approximately 12 000 individuals) from the frontier zone of the Cape Colony to the interior of Southern Africa took place. The people who took part in this Great Trek were later named Voortrekkers (Visagie, 2011).

As this period carried on, the general surroundings of the study area underwent significant changes during the Twentieth Century, including extensive infrastructural and mining development.

1836	The first Voortrekker parties crossed over the Vaal River (Bergh, 1999).
1845	Both the district and town of Lydenburg was established in this year (Bergh, 1999). The study area fell within the Lydenburg district at the time.
1860s	This period saw the early establishment of farms by white farmers in the general vicinity of the study area. Van der Merwe (1952) indicates that the farm Steynsplaats, located 4.5km north-east of the present study area, was awarded to its first owner CH Viljoen in 1862. Additionally, the farm Berg-en-Dal, located 3.5km east of the present study area, was also established in 1862. From these two dates it seems evident that many of the farms from the surroundings of the study area were established during the early 1860s. While these dates indicate when some of these farms were officially proclaimed, these dates do not necessarily mean that none of the farms

	from the surroundings of the study area were already settled and farmed before these dates. The permanent settlement of white farmers in the general vicinity of the study area would have resulted in the proclamation of individual farms and the establishment of permanent farmsteads. Features that can typically be associated with the early farming history of the area include farm dwellings, sheds, rectangular stone kraals and cemeteries. The other sites often associated with these early farms are graves and cemeteries for farmers and farm workers, and their respective families. These sites are often all that remains of the farmsteads of the mid to late nineteenth century. This may be due to their age as well as the destruction of farmsteads by the British forces during the South African War in accordance with the so-called 'scorched earth' policy.
1865	A Berlin Missionary Society station was established at Botshabelo (which means 'Place of Refuge') in 1865 by the Reverend Alexander Merensky (Erasmus, 2014). The mission station is located roughly 51km north-west of the present study area.
1866	Although a village had been established on the farms Klipfontein and Keerom in c. 1859, the site of this village was not popular with the local community. The village was subsequently moved to the adjoining farm Sterkfontein, where a town was formally laid out in 1866. Although the new town was named Nazareth, this name was changed to Middelburg in 1874. The name Middelburg was chosen as the new town was located between Pretoria and Lydenburg (Erasmus, 2014).
1872	The study area now fell within the district of Middelburg (Bergh, 1999). During the same year, the general surroundings of the study area were visited by a geologist from Eastern Europe, Woolf Harris. During his visit, Harris identified coal in the Van Dyksdrift area. He is also believed to have started the Maggie's Mine the following year (Falconer, 1990).

Figure 16 - This engraving by T. Wangeman depicts the mission station at Botshabelo during the early years of its existence (Delius & Hay, 2009:70).

30 June 1890	The town of Belfast (present-day Emakhazeni) was established on 30 June 1890 on the farm Tweefontein. This event followed on the late 1880s, when the numbers of farmers in the area began to increase and the need for a town was felt. During 1889, the community asked Richard Charles O'Neil to request the government of the Z.A.R. to establish a new town on his farm. When asked what the name of the new town should be, Richard Charles O'Neil proposed the name 'Belfast' in honour of his grandfather (also Richard Charles O'Neil) who was born in Belfast, Northern Ireland. According to Van der Merwe (1952), three main reasons can be given why it was decided that the farm Tweefontein would be best suited for a new town. These are: • On 16 December 1886 a monument was officially opened on the farm to commemorate the Battle of Blood River. The monument soon became the place where local farmers could gather during special events or festivals; • A strong need was felt for the establishment of a church roughly in the middle between the towns of Middelburg and Lydenburg. The farm Tweefontein fitted this requirement; and • The discovery of coal and the subsequent establishment of a number of coal mines all around the farm Tweefontein meant that a town on this farm would be centrally located within this wider mining area. The first survey work for the town was undertaken in 1889 by Peter Macdonald, and on the 30 July 1890 the town was officially proclaimed by President Paul Kruger. Of the original 888 surveyed stands, 575 were given to R.C. O'Neil as the owner of the farm (Van der Merwe, 1952).

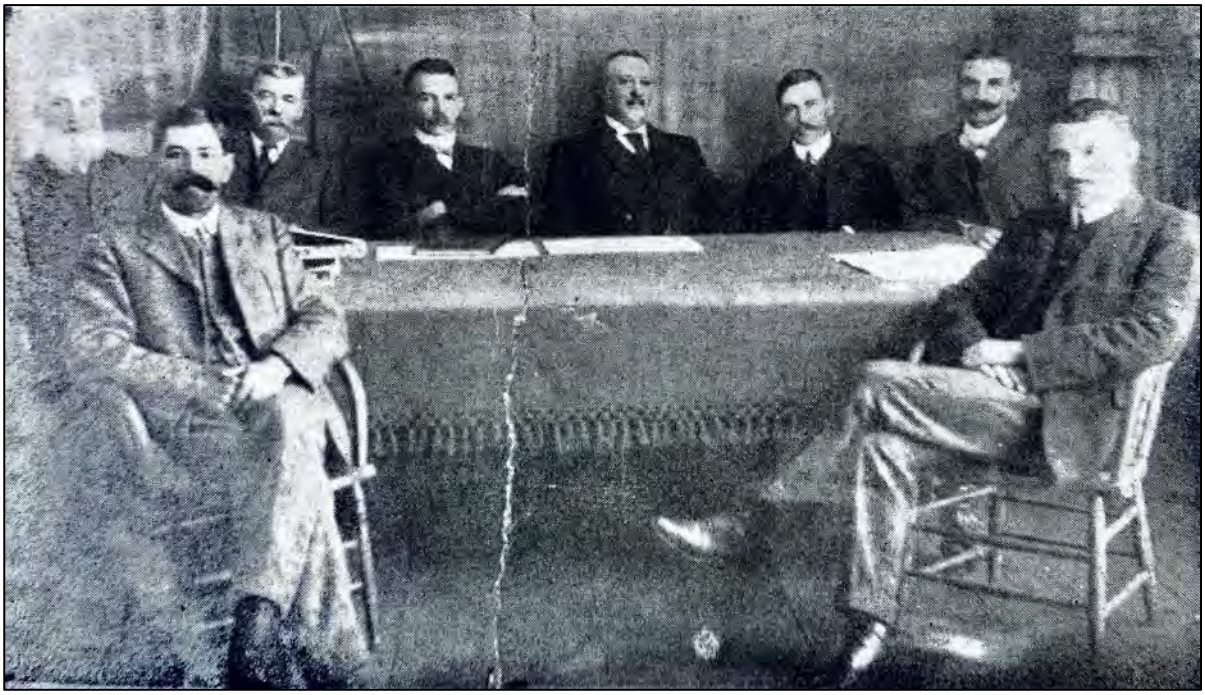

Figure 17

The top image depicts the only photograph of Richard Charles O'Neil that could be located. It was taken in 1911 and shows the Belfast Town Council in sitting. RC O'Neil is the fifth figure from the left. He is also shown in the cropped and enlarged image depicted on the left (Van der Merwe, 1952:55).

20 October 1894 - 2 November 1894	On this day the railway line between Pretoria and Delagoa Bay (present-day Maputo) was completed, with the last work on the line taking place near Balmoral. However, the symbolic completion of the line's construction took place at Brugspruit Station, where the last rail screw was fastened by President Paul Kruger on 2 November 1894 (De Jong, 1996). The completion of the NZASM Eastern Line, as it was known, was very significant for the study area and surroundings. This is due to the fact that the vast deposits of coal known to have existed in this area since the mid 19th century, could now be commercially mined (Bulpin, 1989) and easily transported to the Witwatersrand gold mines and the populated centres of Pretoria and Johannesburg where it was most required. As a result, the completion of the Eastern Line created a massive stimulus not only for the mining of coal but also for the establishment of coal mines. As will be seen below, a number of coal mines were established in the years following on the completion of the Eastern Line.
c. 1894 - 1895	Shortly after the completion of the main line in 1894 a branch line was built to connect it to a coal mine already in existence to the west of the town of

	Belfast (Van der Merwe, 1952). This branch line is depicted on the Middelburg Sheet of the Major Jackson Series depicted in **Figure 19** below. Van der Merwe (1952:31)) adds that this historic coal mine "…*belonged to Sammy Marks who had acquired all the coal rights parallel to the main line…At one stage a certain McLaughlin was the manager when there were about fifty families on the mine living mostly in tin shanties. These people who were mostly English speaking, characteristically had many and varied sporting activities and certainly had their influence on the development of the village.*"
The Study Area and Surroundings during the South African War	
The South African War (also known as the Anglo Boer War) between Great Britain and her allies and the Boer Republics of the Transvaal (known as the *Zuid-Afrikaansche Republiek*) and Free State took place between October 1899 and May 1902. The wider surroundings of the study area experienced skirmishes and battles associated with the war years. However, it is the Battle of Bergendal that is of highest significance for eMakhazeni and surroundings.	
27 August 1900	Pretoria, the capital city of the Transvaal Republic, was occupied by British forces on 5 June 1900. Many believed that the war, which had by now lasted for nearly eight months, was at an end, and that the Boer leaders would sue for peace. However, a couple of days before the occupation of Pretoria, President Paul Kruger and members of the Transvaal Government were rushed out of the capital city on a train and a temporary government was established at Machadodorp (present-day eNtokozweni). After the occupation of Pretoria, General Louis Botha, the Commandant-General of the Transvaal Republic, decided to delay the advance of the British from Pretoria by placing his forces along the far-eastern section of the Magaliesberg Mountain range, located 30km east of the centre of Pretoria. The subsequent battle, known as the Battle of Donkerhoek or Diamond Hill, took place over the course of a number of days, and only ended when the Boer forces slipped slipped unnoticed into the night on the evening of 12 June 1900. The route of retreat chosen by General Botha was to follow the old Eastern Line between Pretoria and Delagoa Bay in an eastern direction, and delay the British advance as much as tactically and logistically possible. On a number of occasions in the following weeks, General Botha used his Long Tom artillery to fire at significant range on advancing British units, thereby delaying the overall advance of the British Army. Eventually, General Botha positioned his 5,000 men north and south of the railway line in a defensive line more than 80km long. The centre of this defensive line was positioned on the farm Berg-en-Dal, a few kilometers south-east of the town of Belfast. This defensive line was placed here to protect the Transvaal Government from the expected British attack (Von der Heyde, 2013). Various British forces started advancing towards the Boer defensive line, with Lord Roberts advancing in an eastern direction along the railway line and General Sir Redvers Buller advancing in a northern direction from present-day Kwazulu-Natal. On 24 August 1900 the town of Belfast (present-day eMakhazeni) was occupied by a British force under General Reginald Pole-Carew (Von der Heyde, 2013). When Lord Roberts eventually decided to go on the offensive on the morning of 27 August 1900, he focused his attack on a rocky outcrop located south of the railway line on the farm Berg-en-Dal. This outcrop was held by the *Zuid Afrikaansche Republiek Politie (*ZARP), a special mounted police corps of the ZAR, under command of Commandant GMJ. van Dam. The offensive started at 11 am with a three-hour bombardment of the hill

	held by the ZARP. The hill was held until the British infantry managed to reach its foot before charging the Boer position with fixed bayonets. This resulted in the retreat of the ZARP. Of the original 74 men who held the hill, only 30 were able to escape the battle unharmed (Von der Heyde, 2013). When the remainder of the Boer front line heard of the breach near its centre, they started melting away. The towns of Machadodorp (eNtokozweni) and Waterval Boven were subsequently occupied by the British Army, which forced the Transvaal Government to continue moving eastwards along the railway line. The map depicted in **Figure 18** below shows the British and Boer positions at the Battle of Bergendal. It also shows the approximate position of the study area. From this map, it is clear that the events of the battle was located some distance east and south-east of the present study area. In fact, the rocky outcrop which represents the main component of the battle, is located approximately 7.7km east by south-east of the present study area.
7 – 8 January 1901	A Boer attack took place on the British positions in an around Belfast (present-day eMakhazeni) on the night of 7 - 8 January 1901. This attack was planned by Generals Louis Botha, Chris Botha and Tobias Smuts, and involved the simultaneous nightly attack on British positions at Pan Station, Wonderfontein Station, Belfast Camp and Station, the Coal Mine near Belfast, Monument Hill outside Belfast, Dalmanutha and Machadodorp (present-day eNtokozweni). Commandant Trichardt with the Middelburg and Germiston Commandos were to attack Pan Station and Wonderfontein Station. The State Artillery was ordered to attack the Coal Mine outside Belfast, whereas the Lydenburg Commando was to attack Dalmanutha and Machadodorp. General Muller with the Johannesburg and Boksburg Commandoes were to attack Monument Hill. If these attacks proved successful, General Viljoen was to attack the town of Belfast (Van der Westhuizen & Van der Westhuizen, 2013). Despite cold and misty conditions, the Boer forces north of the railway line were all in position at midnight when the attack commenced. The situation south of the railway line was less successful, and the attacks on Pan Station, Wonderfontein Station, Dalmanutha and Machadodorp failed. Meanwhile, the attack on Belfast was planned to comprise an initial simultaneous attack on the Coal Mine in the west and Monument Hill to the north-east of Belfast. Once these attacks were successful, the town itself could be attacked. The attack on the town was to be supported by General Chris Botha's attack on the railway station south of Belfast (Meijer, 2000). General Muller with the Johannesburg and Boksburg Commandos attacked Monument Hill and after an intense battle manage to occupy the position. Meanhwile, Major JF Wolmarans with the State Artillery attacked the forts guarding the coal mine west of town. When news of the two successful attacks reached General Viljoen, he proceeded to attack the town of Belfast. However, the British garrison under the command of General HL Smith-Dorrien fought off the Boer attack. When the planned supporting attack of General Chris Botha did not happen, or did not succeed, General Viljoen was forced to call off his attack (Meijer, 2000). The closest component of the events associated with the nightly attacks of 7 – 8 January 1901 to the present study area, appears to be Wolmarans's attack on a number of British forts defending the coal mine located west of Belfast. This coal mine appears to have been located in the north-western section of the farm Paardeplaats 380 JS. As a result, the coal mine and British forts were likely located more than 1.5km north-west of the study area.

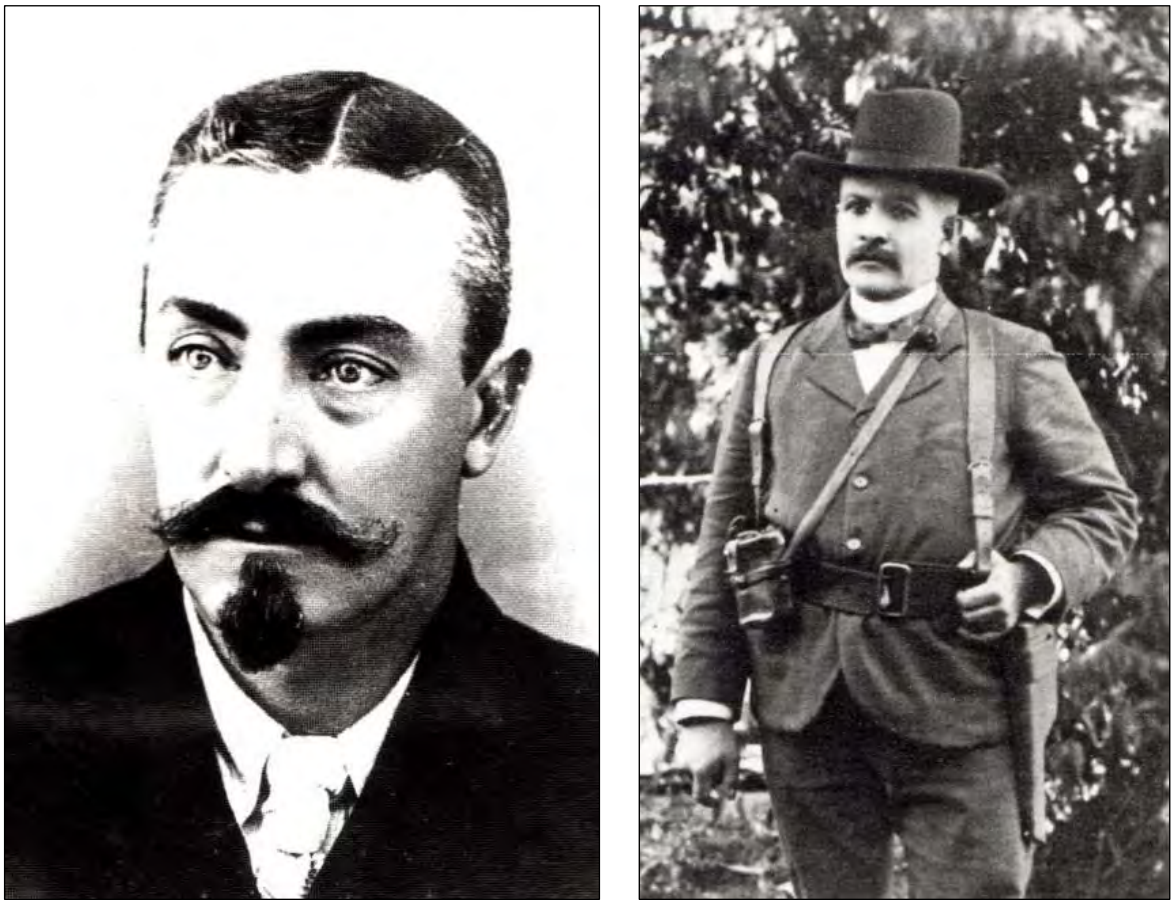

Figure 18 – The of the Boer officers who played crucial roles during the nightly attack of 7 and 8 January 1901 on Belfast (present-day eMakhazeni). From left to right: General Ben Viljoen, the Boer commander responsible for the attack on the town of Belfast itself and General Chris Muller, commandant of the Boksburg Commando, who was responsible for the attack on Monument Hill, north-east of Belfast (Meijer, 2000:149 & 215).

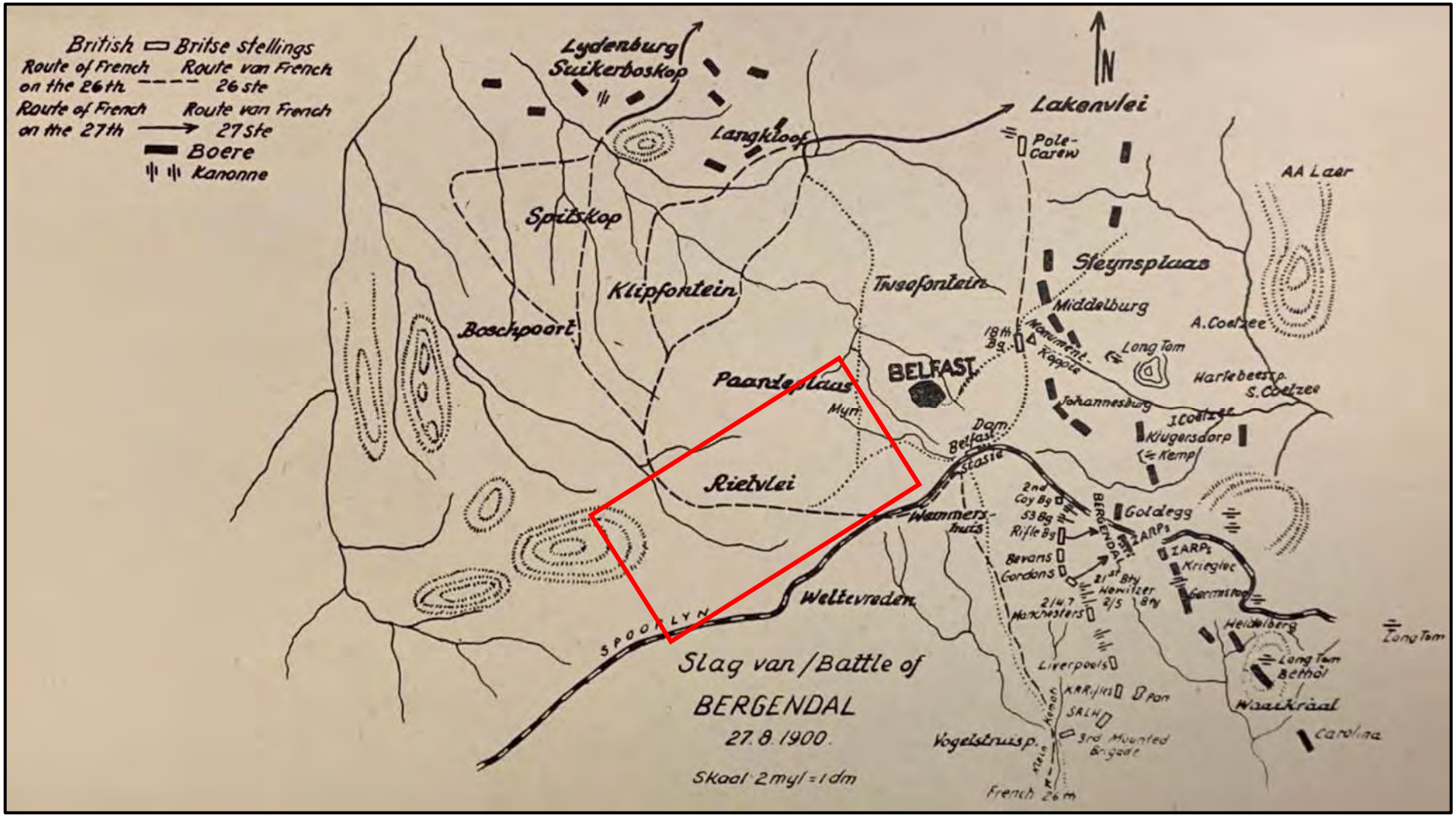

Figure 19 – Map of the Battle of Bergendal published in Van der Merwe (1952:106). The approximate position of the study area is indicated in red.

5.2 Archival and Historical Maps

An assessment of available archival and historical maps was undertaken as a way to establish a historic layering for the study area. These historic maps are also valuable resources in identifying possible heritage sites and features located within the study area. In terms of the topographic maps, overlays were compiled showing the study area boundaries on each of the maps. Any possible heritage sites depicted within the study area on these maps will be marked and discussed. Refer to **Figures 19** - **21**.

5.2.1 Middelburg Sheet of the Major Jackson Map Series dating to 1903

A section of the Middelburg Sheet of the Major Jackson Map Series is depicted below. This map series was compiled from farm surveys of the Transvaal. The sheet was drawn in the Surveyor-General's Office and printed at the Goevernment Printing Works in Pretoria on 1 August 1903.

The map depicts a colliery and explosives magazine in the north by north-western corner of the farm Paardeplaats. A mine-related railway siding can also be seen running across the northern and north-eastern sections of the study area.

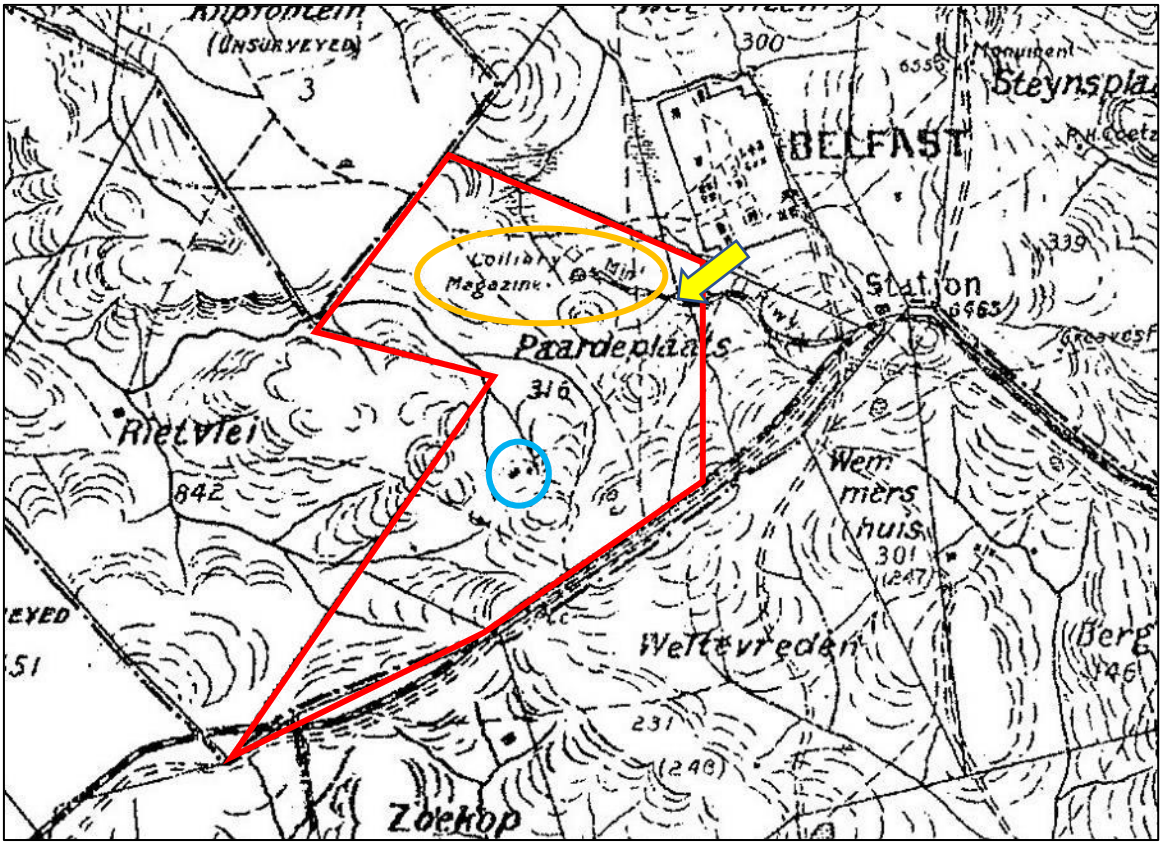

Figure 20 – Section of the Middelburg Sheet of the Major Jackson Map Series that was compiled in 1903. A colliery and magazine (orange oval) can be identified in the north-western corner of the farm. The yellow arrow indicates the position of the mining-related railway siding. Several buildings were identified in the central section of the farm (blue circle).

5.2.2 First Edition of the 2530CA Topographic Map

A section of the First Edition of the 2530CA (Belfast) Topographical Map is depicted below. This map was surveyed in 1969 and drawn by the Trigonometrical Survey Office in 1970. It was printed by the Government Printer in 1980**.** Seven possible heritage features were identified.

Table 14 – Possible Heritage Features depicted on the First Edition of the 2530CA Map

Feature	Coordinates	Description
Feature 1	S 25.712945 E 30.024450	Three huts are depicted here. As can be seen on the different map sections, the symbols used on these maps differed between a stylized image of a hut and a black circle. These symbols were used to indicate the position of homesteads and accommodation associated with black people. The huts shown here were most likely accommodation for farm labour.
Feature 2	S 25.717848 E 30.018611	Several buildings forming part of the Paardeplaats farmstead.
Feature 3	S 25.724216 E 30.013899	Three huts are depicted here. These huts were most likely accommodation for farm labour.
Feature 4	S 25.726005 E 30.003033	Several buildings forming part of the Westergloor farmstead.
Feature 5	S 25.727727 E 30.010433	A livestock enclosure (kraal) is depicted here.
Feature 6	S 25.722205 E 30.006246	A single hut. The hut was most likely accommodation for farm labour.
Feature 7	S 25.718135 E 30.003499	A single hut. The hut was most likely accommodation for farm labour.

5.2.3 First Edition of the 2529DB Topographic Map

A section of the First Edition of the 2529DB Languitsig Topographic Map is depicted below. This map was surveyed in 1967 and drawn by the Trigonometrical Survey Office in 1969. It was printed by the Government Printer in 1969.

One possible heritage feature was identified within the boundaries of the study area on this map section. This heritage feature is shown in **Table 15** below.

Table 15 – Possible Heritage Features depicted on the First Edition of the 2529DB Topographic Map

Feature	Coordinates	Description
Feature 8	S 25.734995 E 29.992645	A single hut. The hut was most likely accommodation for farm labour.

5.2.4 First Edition of the 2529DD Topographic Map

A section of the First Edition of the 2529DD (Wonderfontein) Topographic Map is depicted below. This map was surveyed in 1967 and drawn by the Trigonometrical Survey Office in 1968. It was printed by the Government Printer in 1969.

Five possible heritage features were identified within the boundaries of the study area on this map section. These heritage features are shown in **Table 16** below.

Table 16 – Possible Heritage Features depicted on the First Edition of the 2530DD Topographic Map

Feature	Coordinates	Description
Feature 9	S 25.762830 E 29.963107	Three structures forming part of the Sunbury Train Station are depicted here.
Feature 10	S 25.761615 E 29.964614	Three structures are depicted here.
Feature 11	S 25.753357 E 29.982477	A cluster of three huts is depicted here. The huts were most likely accommodation for farm labour.
Feature 12	S 25.755826 E 29.972066	A single hut is depicted here. The hut was most likely accommodation for farm labour.
Feature 13	S 25.758850 E 29.967931	A single hut is depicted here. The hut was most likely accommodation for farm labour.

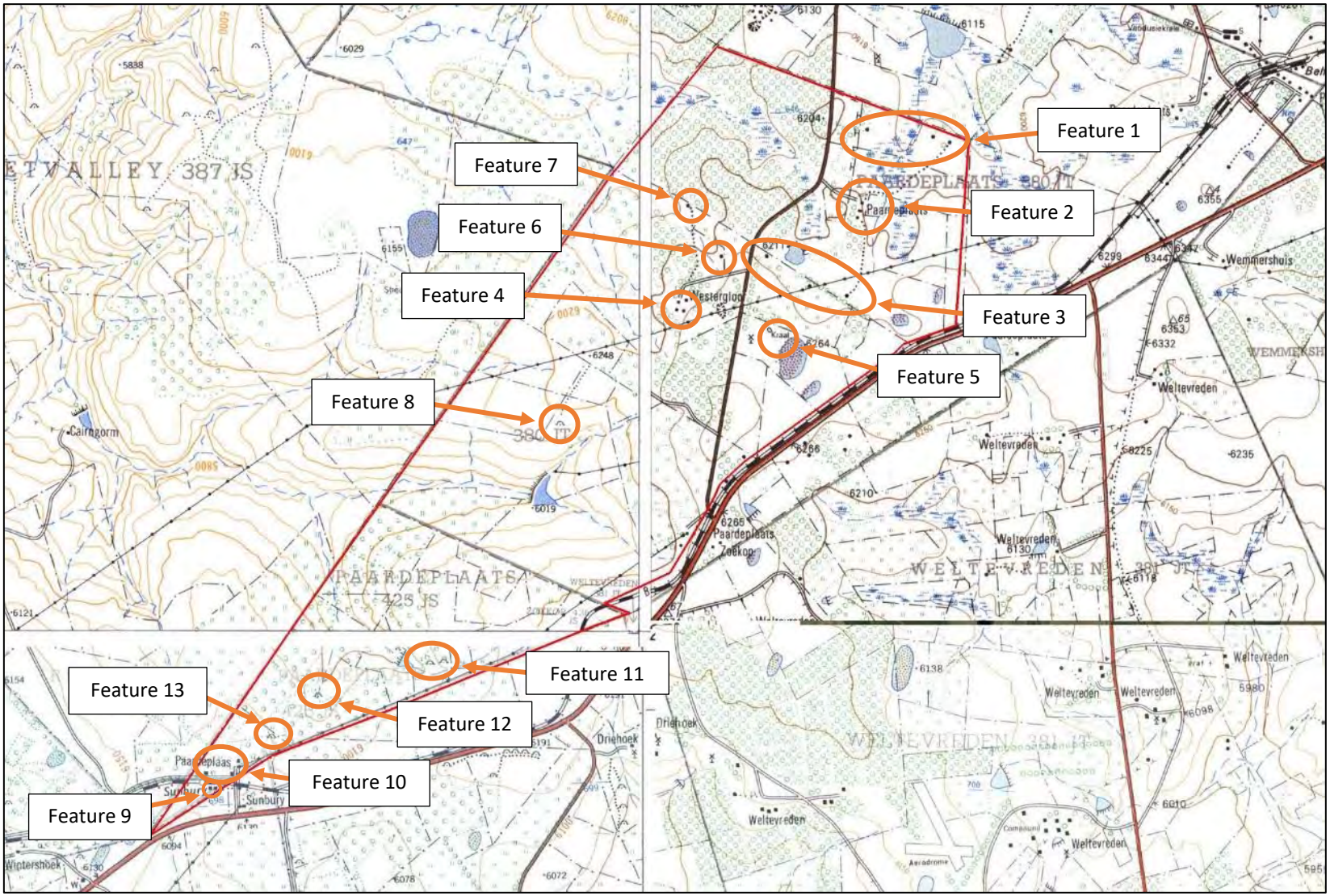

Figure 21 – Composite view of sections of the First Editions of the 2529DB, 2529DD, 2530CA and 2530CC Topographic Sheets. Please note that the study area does not extend into the 2530CC map. The possible heritage features depicted on these maps are indicated and numbered. The study area boundary is in red.

5.2.5 Second Edition of the 2530CA Topographic Map

A section of the Second Edition of the 2530CA (Belfast) Topographic Map is depicted below. The map was compiled by the Chief-Director Surveys and Mapping and printed by the Government Printer in 1989.

Thirteen possible heritage features are depicted within the study area on this map. These heritage features are shown in **Table 17** below.

Table 17 – Possible Heritage Features depicted on the Second Edition of the 2530CA Map

Feature	Coordinates	Description
Feature 1	S 25.712480 E 30.018195	A single hut is depicted here. The hut was most likely accommodation for farm labour.
Feature 2	S 25.712003 E 30.014748	Two structures are depicted here.
Feature 3	S 25.718392 E 30.002804	A single hut is depicted here. The hut was most likely accommodation for farm labour.
Feature 4	S 25.722085 E 30.009687	A single hut is depicted here. The hut was most likely accommodation for farm labour.
Feature 5	S 25.718791 E 30.017526	Several buildings forming part of the Paardeplaats farmstead are depicted here.
Feature 6	S 25.723998 E 30.012818	Several structures are depicted here.
Feature 7	S 25.724921 E 30.016495	A single hut is depicted here. The hut was most likely accommodation for farm labour.
Feature 8	S 25.728660 E 30.008688	Two structures are depicted here.
Feature 9	S 25.725698 E 30.004522	Several buildings forming part of the Westergloor farmstead are depicted.
Feature 10	S 25.737714 E 30.007839	Several structures are depicted here.
Feature 11	S 25.735505 E 30.001845	One structure is depicted here.
Feature 12	S 25.737550 E 30.000528	One structure is depicted here.
Feature 13	S 25.743072 E 30.002753	Several structures are depicted here.

5.2.6 Second Edition of the 2529DB Topographic Map

A section of the Second Edition of the 2529DB (Languitsig) Topographic Map is depicted below. This map was compiled by the Chief-Director Surveys and Mapping and printed by the Government Printer in 1987. No possible heritage features are depicted within the study area on this map.

5.2.7 Second Edition of the 2529DD Topographic Map

A section of the Second Edition of the 2529DD (Arnot) Topographic Map is depicted below. This map was compiled by the Chief-Director Surveys and Mapping and printed by the Government Printer in 1987. Three possible heritage features are depicted within the study area on this map.

Table 18 – Possible Heritage Features depicted on the Second Edition of the 2529DD Map

Feature	Coordinates	Description
Feature 14	S 25.747347 E 29.984125	One structure is depicted here.
Feature 15	S 25.752260 E 29.986820	Two structures are depicted here..
Feature 16	S 25.763457 E 29.962304	Three structures associated with the Sunbury Train Station are depicted here.

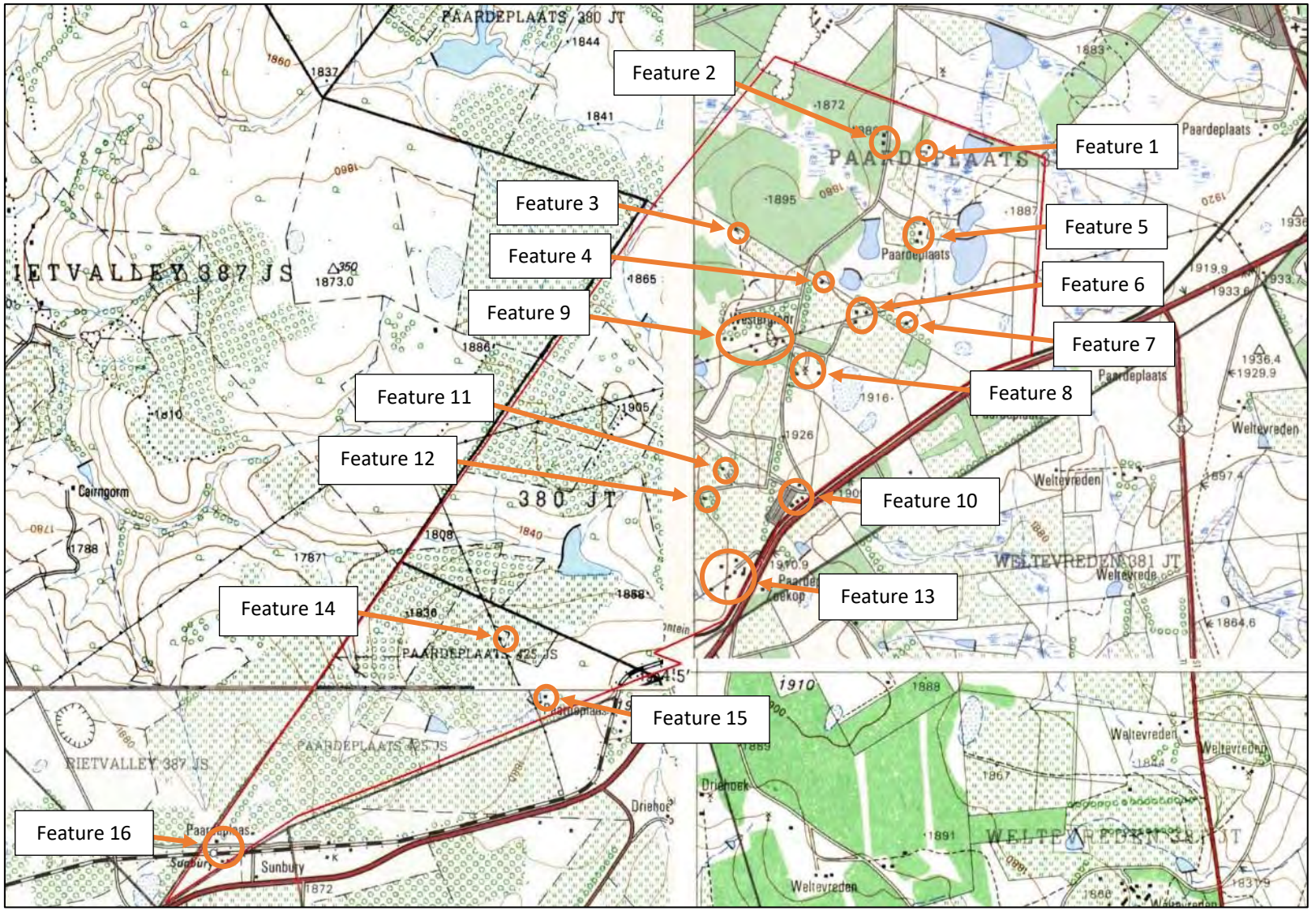

Figure 22 – Composite view of sections of the Second Editions of the 2529DB, 2529DD, 2530CA and 2530CC Sheets. Please note that the study area does not extend into the 2530CC map. The possible heritage features depicted on these map sheets are indicated and numbered. The study area boundary is in red.

5.3 Heritage Screening

5.3.1 Previous Heritage Impact Assessment Reports from the Study Area and Surroundings

An assessment of the South African Heritage Resources Information System (SAHRIS) of SAHRA was undertaken to establish whether any previous archaeological and heritage impact assessments had revealed archaeological and heritage sites within the present study area. This assessment has revealed that a number of previous studies had been undertaken in the surroundings of the study area. However, although a few sites were identified in proximity to the present study area, no sites from these studies were identified within the present study area. The only exception is the heritage impact assessment undertaken by PGS of almost the exact same area as the one assessed for the present study.

All previous studies that were located on the SAHRIS system and/or received from the client, will be briefly discussed in chronological order below. In each case, the results of each study are shown in bold.

- KUSEL, U. 2005. Cultural Heritage Resources Impact Assessment on the Farm De Suikerboschkop 361 JS, Belfast. **The sites identified include several graves and a farmhouse.**

- FOURIE, W. 2008. Archaeological Impact Assessment of Northern Coal's Portion 15 and 16 of the farm Weltevreden 381 JT, Belfast, Mpumalanga. **No sites of heritage significance were found during the survey.**

- COETZEE, F. 2008. Cultural Heritage Survey of the Proposed Eco-Tourism Development on the farm Paardeplaats 512 JT, near Dullstroom, Emakhazeni Municipality, Mpumalanga. **No Stone Age or Iron Age settlements, structures, features or artefacts were recorded during the survey.**

- KITTO, J. & FOURIE, W. 2012. Heritage Impact Assessment Report for the Exxaro Paardeplaats Project. **A total of 32 heritage sites, including 22 heritage structures, 7 cemeteries and 3 areas with historical mining shafts were identified.**

- PELSER, A. 2012. A Report on a Heritage Assessment for the Proposed Arnot-Gumeni 400 Kv Powerline Project, in the Middelburg/Belfast Area, Mpumalanga Province. **The sites identified during the fieldwork include stone-walled Iron Age sites, possible Stone Age sites, historical homesteads/farmsteads, historical Anglo-Boer War (1899-1902) battlefield sites as well as graveyards and cemeteries.**

- PISTORIUS, J. C. C. 2013. A Revised Phase I Heritage Impact Assessment study for the proposed Wonderfontein Colliery near Belfast in the Mpumalanga Province of South Africa**. The sites identified during the fieldwork include formal and informal graveyards, as well as historical houses.**

- HIGGIT, N. 2014. Heritage Impact Assessment for the Weltevreden Open Cast Coal Mine, Weltevreden 381JT, Belfast, Mpumalanga Province. **A total of five heritage resources were identified within the project area including histirical mine shafts, a historical werf, stonewalling and burial grounds.**

- ANGEL, J. 2017. Heritage Impact Assessment Umsimbithi eMakhazeni Mining Project. **The fieldwork for the HIA identified a total of 28 heritage resources consisting of 20 Burial sites (with approximately 200 burials in total), one archaeological site and seven historic structures.**

6 FIELDWORK FINDINGS

6.1 Introduction

PGS Heritage completed a HIA for the proposed Exxaro Paardeplaats project in 2012. During the fieldwork for this previous project a total of 32 heritage sites, including 21 heritage structures, seven cemeteries three areas with historical mining shafts and one possible rock art site.

As almost the entire project area had been intensively assessed as part of a previous HIA study by PGS, the focus on the current fieldwork was on revisiting all the heritage sites that were identified in the previous report and also undertaking intensive walkthroughs of a small section that is now earmarked for the development of a Discard Management Facility (DMF).

As a result, the fieldwork findings included in this report comprise the following:

- The 32 sites that were originally identified during the previous study and that were revisited during the present study (PP 01 – PP32); and
- An additional 13 heritage sites (PP33 – PP45) that were identified during the present fieldwork.

In terms of the heritage sites that were identified in 2012, the aim of the revisit was to establish what the current state and significance of these sites are. This is due to the fact that nearly nine years have passed since the original fieldwork undertaken in 2012.

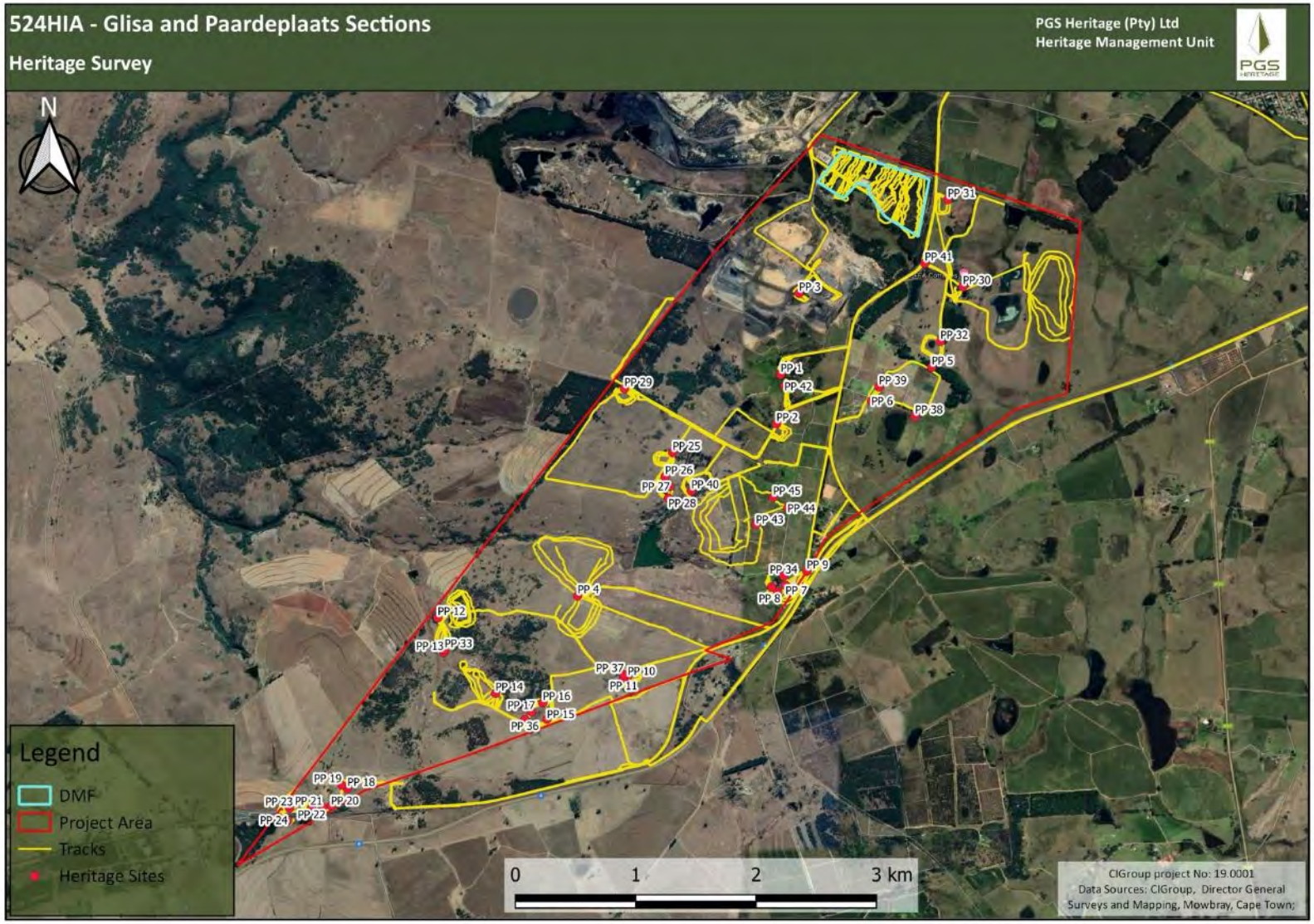

Figure 23 - Google Earth image depicting the study area in red with the recorded tracklogs in yellow. All the identified heritage sites are also depicted. As indicated in the text, the study area was intensively covered during the 2012 fieldwork.

6.2 Heritage Sites identified in 2012

6.2.1 PP 01

GPS Coordinates:

S 25.725820
E 30.002610

Type: Demolished Historic Farmstead

Description:

Description of Site from Kitto & Fourie (2012)

A farmstead with its associated buildings was identified at this location. The main house and other buildings were still intact and were occupied until recently before the property was sold to Exxaro (Pers.com). The main house measures approximately 20m x 20m and has a pitched corrugated iron roof. A kitchen and more rooms were added later to the back of the building. The original building has thick external walls which were plastered and painted. It also has a chimney for a coal stove. The house has wooden and metal door- and window frames. It also has external electricity and water systems on the older parts of the building and internal electricity and water systems on the later additional parts.

A carport combined with a storeroom is situated next to the main house. This structure is brick-built and is constructed in the same architectural style as the main house, but it was evident from the materials used that this structure is of a much more recent origin than the main house. This structure also has a pitched corrugated iron roof, metal window frames and wooden doors and door frames.

A storeroom or shed with farm implements was also identified. This storeroom measures approximately 12m x 8m and has a low pitched corrugated iron roof. The building is brick-built and has metal window frames and wooden door frames with homemade doors. It has an external electrical system.

Another storeroom or shed is situated next to the first shed. It measures approximately 10m x 5m and is brick-built with a low pitched corrugated iron roof. A 5m x 10m extension was added at the back of the original structure and this extension has a sloping corrugated iron roof. The building has metal window frames and wooden doors and door frames. It also has an external electrical system.

A cattle shed or stables for horses is situated next to the two storerooms. The building is also brick-built and measures approximately 15m x 18m. It has a low pitched corrugated iron roof with a sloping corrugated iron roof on the one side, which was a later extension. This extension served as a feed storeroom. The building also has external electrical and water systems. The external water pipes were

insulated to prevent the water from freezing in winter.

A pigsty was situated next to the cattle shed. The original structure is built with stone and mortar, but later extensions to raise the walls and additions are brick-built. The additions were most probably used as stables for horses. The building has a low pitched corrugated iron roof and external electrical and water systems. The building has no window or door frames and cement lintels were used for the window and door openings. The structure has a cement floor.

Figure 24 – The main farmhouse building as recorded in 2012 (Photo: Kitto & Fourie, 2012).

Figure 25 – The main house and storeroom/shed as recorded in 2012 (Photo: Kitto & Fourie, 2012).

Figure 26 - Pigsty and two sheds/storerooms as recorded in 2012 (Photo: Kitto & Fourie, 2012)

Description of Site from the 2021 Fieldwork

Currently, the structures that were identified at site PP 01 in 2012 have been demolished. Only the ruins of the foundations remain. The site is overgrown and abandoned.

Significance:

During the 2012 study, the site was assessed to be of **High Local Significance (Grade 3B).** Due to the fact that the site has now been completely demolished, the current significance of the site is deemed to be of **Low Significance** or **Generally Protected C (GP.C).**

Site Extent:

The site is approximately 200m x 150m in extent.

Impact Assessment and Mitigation*:*

See Chapter 7 for impact assessment calculations and Chapter 8 for required mitigation measures

Figure 27 - General view of site PP 01 as recorded during the 2021 fieldwork.

Figure 28 – Another view of site PP 01 as recorded during the 2021 fieldwork.

Figure 29 - View of building rubble from the demolished remains of structures from site PP 01.

6.2.2 PP 02

GPS Coordinates:

S 25.72989
E 30.00226

Type: Burial Ground

Description:

Description of Site from Kitto & Fourie (2012)

A cluster of four informal graves was identified at this location. The graves are situated in between a gravel road and a fence. The graves are placed next to each other along the fence and are orientated from west to east. One grave has a rectangular-shaped cement outline as a dressing, with an inscribed granite headstone. This seems to be a double child's grave, as the headstone has two inscriptions painted on. Another grave is a double adult grave with a square-shaped cement outline, which is filled with a layer of gravel. It also has an inscribed granite headstone. The fourth grave has an informal, elongated oval-shaped mound of packed rocks as a dressing. It does not have an inscribed headstone. The graves are overgrown with vegetation, but it was evident that the graves had been cleared regularly as the vegetation was not overwhelming. The headstone inscriptions date the graves from the late 1960's and the 1970's and all the names on the graves are of the Mtweni family.

Figure 30 – General view of the cemetery as recorded in 2012 (Photo: Kitto & Fourie, 2012).

Figure 31 - Inscription on the double child's grave as recorded in 2012 (Photo: Kitto & Fourie, 2012).

Description of Site from the 2021 Fieldwork

The cemetery comprising four graves were identified during the current fieldwork. The site was found to be overgrown vegetation. Furthermore, the inscription appearing on the the double child's grave has faded significantly.

Significance:

All graves have high levels of emotional, religious and in some cases historical significance. As such, the site is of **Medium** to **High Significance** or **Generally Protected A (GP. A).** This is the same heritage significance rating that the site received in the 2012 report.

Site Extent:

The site is 10m x 4m.

Impact Assessment and Mitigation*:*

See Chapter 7 for impact assessment calculations and Chapter 8 for required mitigation measures.

Figure 32 - General view of the cemetery at PP 02 as recorded during the 2021 fieldwork.

Figure 33 – Closer view of the headstone on the double grave.

6.2.3 PP 03

GPS Coordinates:

S 25.71908
E 30.00414

Type: Burial Ground

Description:

Description of Site from Kitto & Fourie (2012)

Two informal graves were identified at this location. The graves are crudely fenced and are placed next to each other and orientated from west to east. The graves have large oval-shaped outlines of packed rock as dressings. A flat rock serves as the head stone for one grave. A plastic bottle and ceramic cup were placed on the graves as grave goods. The graves are not maintained and are overgrown with grass and other vegetation. The graves belong to the Maseko family, but their age was not known (local informant - Lina). The Maseko family apparently lives on the farm in the farmworkers houses located behind the farmstead (PP 001). Such graves are treated as being of 60 years or older unless evidence is obtained to the contrary.

Figure 34 – The two Maseko graves as recorded in 2012 (Photo: Kitto & Fourie, 2012).

Description of Site from the 2021 Fieldwork

The site consists of three graves located near the pit of the mine. Two of the graves belong to the Maseko family, while the third grave belongs to an unknown individual. The mine has appointed a

service provider to relocate these graves. This mitigation work is currently in the permit application phase.

Significance:

All graves have high levels of emotional, religious and in some cases historical significance. As such, the site is of **Medium** to **High Significance** or **Generally Protected A (GP. A).** This is the same heritage significance rating that the site received in the 2012 report.

Site Extent:

The site is 5m x 5m.

Impact Assessment and Mitigation*:*

See Chapter 7 for impact assessment calculations and Chapter 8 for required mitigation measures.

Figure 35 - General view of site PP 03 as recorded during the 2021 fieldwork.

Figure 36 - The two Maseko family graves as recorded in 2021. The scale is in 10cm increments.

Figure 37 - The third grave belonging to an unknown individual. The scale is in 10cm increments.

6.2.4 PP 04

GPS Coordinates:

S 25.74415
E 29.98579

Type: Burial Ground

Description:

Description of Site from Kitto & Fourie (2012)

An informal cemetery with approximately 81 graves was identified at this location. The cemetery is not fenced and is located in the open veld. The graves are placed in 5 unequal lines next to each other. The graves are placed along the boundary fence of the property and they are orientated from west to east. Most of the graves have informal oval or rectangular shaped mounds or outlines of packed rocks as dressings. Some of the graves had been cleaned recently, but most of them are overgrown with grass and other vegetation. A number of graves have granite inscribed headstones and one grave has a formal granite dressing with an inscribed granite headstone.

Figure 38 – General view of the cemetery at PP 04 as recorded in 2012 (Photo: Kitto & Fourie, 2012).

Figure 39 - Close-up view of the headstone on one of the graves (Photo: Kitto & Fourie, 2012).

Description of Site from the 2021 Fieldwork

The cemetery was identified during the current fieldwork. Approximately 80 to 90 graves appear to be buried at the site. The cemetery is overgrown with vegetation and is not fenced.

Significance:

All graves have high levels of emotional, religious and in some cases historical significance. As such, the site is of **Medium** to **High Significance** or **Generally Protected A (GP. A).** This is the same heritage significance rating that the site received in the 2012 report.

Site Extent:

The site is approximately 50m x 40m in extent.

Impact Assessment and Mitigation*:*

See Chapter 7 for impact assessment calculations and Chapter 8 for required mitigation measures.

Figure 40 - General view of some of the graves at PP 04 as recorded during the 2021 fieldwork.

Figure 41 - View of one of the graves with a cement headstone from site PP 04. This photograph was also taken during the 2021 fieldwork. The scale is in 10cm increments.

6.2.5 PP 05

GPS Coordinates:

S 25.72521
E 30.01512

Type: Burial Ground

Description:

Description of Site from Kitto & Fourie (2012)

Another informal cemetery with approximately 40 graves was identified at this location. The cemetery is not fenced and is located amongst a plantation of blue-gum trees. The graves are placed in 5 unequal lines next to each other. The graves are also placed along the boundary fence of the property and they are orientated from west to east. Most of the graves have informal oval or rectangular shaped mounds or outlines of packed rocks as dressings. Most of the graves are overgrown with grass and other vegetation. Some graves have inscribed granite headstones and some graves have painted metal markers as headstones. Most of the graves have grave goods placed on the dressings.

Figure 42 - View of some of the graves from PP 05 as recorded in 2012 (Photo: Kitto & Fourie, 2012).

Figure 43 - Grave with marker and grave goods as recorded in 2012 (Photo: Kitto & Fourie, 2012).

Description of Site from the 2021 Fieldwork

The site was revisited during the present fieldwork. It seems possible for more graves to have been buried at the site in the nine years since the previous assessment took place. This is said as approximately 40 to 50 graves appear to be buried at the cemetery today. The site is located next to a bluegum plantation and is overgrown with vegetation.

Significance:

All graves have high levels of emotional, religious and in some cases historical significance. As such, the site is of **Medium** to **High Significance** or **Generally Protected A (GP. A).** This is the same heritage significance rating that the site received in the 2012 report.

Site Extent:

The site is 20m x 50m.

Impact Assessment and Mitigation*:*

See Chapter 7 for impact assessment calculations and Chapter 8 for required mitigation measures

Figure 44 - General view of the cemetery at site PP 05 as recorded during the 2021 fieldwork.

Figure 45 – Another general view of the cemetery at PP 05 as recorded during the 2021 fieldwork.

Figure 46 – Closer view of one of the graves from site PP 05. This is the same grave as the one shown on the photograph that was taken in 2012. The scale is in 10cm increments.

6.2.6 PP 06

GPS Coordinates:

S 25.72800
E 30.01013

Type: Historic Homesteads and Structures with the Possible Risk for Unmarked Graves

Description:

Description of Site from Kitto & Fourie (2012)

The remains of an old cattle kraal were identified at this location. The structure was built with stone and mortar and measures approximately 20m x 25m in size. The walls of the kraal are thick and measure approximately 0.75m thick and 2.2m high. The kraal has a storeroom attached to one side and feeding troughs are placed along another wall. The storeroom is a later addition and is brick-built with a sloping corrugated iron roof. Three families had used parts of the old kraal structure to build their own homesteads. These families were working on the farm. The age of the kraal is not known**.**

Figure 47 - View of the kraal with dwelling additions as recorded in 2012 (Photo: Kitto & Fourie, 2012).

Figure 48 - Close-up view of a dwelling addition as recorded in 2012 (Photo: Kitto & Fourie, 2012).

Description of Site from the 2021 Fieldwork

Although the cattle kraal was still identified during the current fieldwork, sections of its walls have collapsed. A number of dwellings are also still located at the site. The number of dwellings at the site appear to have increased in the nine years since the previous assessment of the site in 2012.

Significance:

The site was stated to be of **Low Significance** or **Generally Protected C (GP.C)** in the 2012 report. However, past experience has shown that in some cases unmarked stillborn babies and infants were buried in close proximity to such homesteads. These babies and infants were frequently buried along the sides, or underneath, the parents' dwelling. No direct information with regards to the presence (or not) of such graves is currently available. To address this potential risk, the site is deemed to be of **Medium Significance** or **Generally Protected B (GP.B).**

Site Extent:

The site is 40m x 40m.

Impact Assessment and Mitigation*:*

See Chapter 7 for impact assessment calculations and Chapter 8 for required mitigation measures

Figure 49 - General view of site PP 06 as recorded during 2021 fieldwork.

Figure 50 – Closer view of a section of walling from the kraal. The scale is in 10cm incremets.

Figure 51 - View of some of the dwellings associated with the kraal.

6.2.7 PP 07

GPS Coordinates:

S 25.74327
E 30.00301

Type: Demolished Historic Structures

Description:

Description of Site from Kitto & Fourie (2012)

A large storeroom or shed was identified at this location. The storeroom measures approximately 20m x 12m in size and has a high pitched corrugated iron roof. It has large metal doors with metal door frames. These are most likely a later addition. The high windows have wooden frames and are open. The building also has an external electrical system. It has a cement floor and the building is still in use. A small, square sandstone-built structure is situated next to the larger storeroom. This structure measures approximately 5m x 5m in size and also has a pitched corrugated iron roof. It is built with sandstone blocks and mortar and is in a rather weathered state. It does not have a door or door frame and a wooden lintel is used in the door opening. It has wooden window frames. The building has a dirt floor and does not have any water or electrical systems. The age of these buildings is not known.

Figure 52 – General view of the large storeroom as recorded in 2012 (Photo: Kitto & Fourie, 2012).

Figure 53 – The dilapidated square structure as recorded in 2012. This building was constructed of sandstone (Photo: Kitto & Fourie, 2012).

Description of Site from the 2021 Fieldwork

All the structures and buildings that were located at site PP 07 have been demolished. Only the remains of the foundations are visible on site.

Significance:

During the 2012 study, the site was assessed to be of **Medium Significance** or **Generally Protected B (GP.B).** Due to the fact that the site has now been completely demolished, the current significance of the site is deemed to be of **Low Significance** or **Generally Protected C (GP.C).**

Site Extent:

The site is 30m x 25m.

Impact Assessment and Mitigation*:*

See Chapter 7 for impact assessment calculations and Chapter 8 for required mitigation measures

Figure 54 - General view of site PP 07 as recorded during the 2021 fieldwork.

Figure 55 - General view of the demolished remains observed at site PP 07.

Figure 56 – Another view of the state of site PP 07 as recorded during the 2021 fieldwork. The scale is in 10cm increments.

Figure 57 - Remains of the sandstone-built structure as recorded during the 2021 fieldwork at site PP 07. The scale is in 10cm increments.

6.2.8 PP 08

GPS Coordinates:

S 25.74380
E 30.00236

Type: Demolished Historic Farmstead

Description:

Description of Site from Kitto & Fourie (2012)

The remains of a farmhouse and its associated buildings were identified at this location. The remains of the multi-roomed farm house measure approximately 20m x 20m in size. The building was constructed with sandstone blocks and mortar and later additions are brick-built. The walls of the building are thick and are mostly constructed with sandstone blocks and mortar. Some other sections had been constructed or repaired with mud-bricks. Most of the building is plastered with cement and is painted over. A wrought iron fireplace with red tile surround was still in situ, which could date the building to approximately the 1910s to 1930s [Edwardian period, http://www.c20fireplaces.co.uk/information/history-twentieth-century-fireplaces-1905-1939].

The building has no roof and all windows, doors and window and door frames had been removed. It has a sandstone chimney and some of the floors are tiled. The house had an internal electrical system which was a later addition.

A water reservoir is situated approximately 30m from the main house. Another sandstone building is situated approximately 40m on the other side of the farmhouse. This building was constructed with sandstone blocks and mortar and has a pitched corrugated iron roof. This structure measures approximately 5m x 10m in size and is in a semi-dilapidated state. This structure probably served as a storeroom or garage for the main building.

The age of this farmstead and its associated buildings is not known, however, it is highly likely that they are 60 years or older and they could be the original buildings for the Hadeco company.

Figure 58 – General view of the farmhouse as recorded in 2012 (Photo: Kitto & Fourie, 2012).

Figure 59 – The sandstone storeroom as recorded during 2012 (Photo: Kitto & Fourie, 2012).

Description of Site from the 2021 Fieldwork

The structures that were identified in 2012 have all been demolished. Only the remains of the structures and foundations were found during the 2021 fieldwork.

Significance:

During the 2012 study, the site was assessed to be of **Medium Significance** or **Generally Protected B (GP. B)**. Due to the fact that the site has now been completely demolished, the current significance of the site is deemed to be of **Low Significance** or **Generally Protected C (GP.C).**

Site Extent:

The site is 30m x 25m.

Impact Assessment and Mitigation*:*

See Chapter 7 for impact assessment calculations and Chapter 8 for required mitigation measures

Figure 60 - View of the foundation of a structure as seen during 2021. The scale is in 10cm increments.

Figure 61 – Building rubble from a demolished structure at site PP 08. The scale is in 10cm increments.

Figure 62 – More structural remains observed at site PP 08. The scale is in 10cm increments.

6.2.9 PP 09

GPS Coordinates:

S 25.74210
E 30.00478

Type: Demolished Historic Structure

Description:

Description of Site from Kitto & Fourie (2012)

The remains of a small, square structure were identified at this location. The structure is built with sandstone blocks and cement and measures approximately 4m x 4m in size. The structure has no roof and has only one entrance with no windows. It also has a gravel floor. The function and age of this structure is unknown.

Figure 63 - Square sandstone structure as recorded in 2012 (Photo: Kitto & Fourie, 2012).

Description of Site from the 2021 Fieldwork

The remains of the same square structure were identified during the 2021 fieldwork. However, the condition of the structure has deteriorated significantly in the nine years since the previous assessment

was undertaken.

Significance:

During the 2012 study, the site was assessed to be of **Medium Significance** or **Generally Protected B (GP. B)**. Due to the fact that the site has now deteriorated significantly, the current significance of the site is deemed to be of **Low Significance** or **Generally Protected C (GP.C).**

Site Extent:

The site is 10m x 10m.

Impact Assessment and Mitigation*:*

See Chapter 7 for impact assessment calculations and Chapter 8 for required mitigation measures

Figure 64 - View of the front of the structure as recorded in 2021. This view of the structure shows the same façade as the one that was taken in 2012 above. A comparison of the two photographs clearly show the level of deterioration at the site. The scale is in 10cm increments.

Figure 65 – Another view of the structure as recorded in 2021. The scale is in 10cm increments.

Figure 66 – Another view of the structure as recorded in 2021. The scale is in 10cm increments.

6.2.10 PP 10

GPS Coordinates:

S 25.75078
E 29.98994

Type: Grave

Description:

Description of Site from Kitto & Fourie (2012)

A single, informal grave was identified at this location. The grave is situated approximately 40m from a farmstead, which has been identified as site PP 011 (below). The grave has an oval-shaped outline of packed rocks as dressing and is orientated from west to east. A single rock is placed upright at the western end to serve as a headstone. The grave is not maintained and is overgrown with grass and other vegetation. The age of the grave is not known.

Figure 67 – General view of the grave at site PP 010 as recorded during the fieldwork undertaken in 2012 (Photo: Kitto & Fourie, 2012).

Description of Site from the 2021 Fieldwork

The general area of where the grave was identified in 2012 was walked through by the fieldwork team from PGS. Despite the intensive walkthrough undertaken, no surface features as those observed during the 2012 fieldwork could be found. Several single stones, that could possibly be grave markers, were

however found.

Significance:

All graves have high levels of emotional, religious and in some cases historical significance. As such, the site is of **Medium** to **High Significance** or **Generally Protected A (GP. A).** This is the same heritage significance rating that the site received in the 2012 report.

Site Extent:

The site is 15m x 15m.

Impact Assessment and Mitigation*:*

See Chapter 7 for impact assessment calculations and Chapter 8 for required mitigation measures

Figure 68 - General view of the area where the grave was recorded during the 2012 fieldwork. The scale is in 10cm increments.

6.2.11 PP 11

GPS Coordinates:

S 25.75103
E 29.98960

Type: Historic Farmstead and Structures with the Possible Risk for Unmarked Graves

Description:

Description of Site from Kitto & Fourie (2012)

A farmstead with its associated buildings was identified at this location. The farmstead consists of two brick-built houses, located next to each other inside a fenced area. Both houses have pitched corrugated iron roofs with metal window and door frames. Both houses also have internal electrical and plumbing systems. Both houses are still occupied.

A large brick-built storeroom or shed is situated approximately 70m from the two houses. It has a pitched corrugated iron roof and wooden door and window frames. Large metal doors are used to close the door openings.

Another brick-built house is situated on the other side of the storeroom. This house is occupied by the farm labourers and their families. It also has a pitched corrugated iron roof and metal door and window frames. Several brick-built extensions have been added to the original structure. It also has external electrical and plumbing systems.

Two cement and mud-brick silos are situated next to the storeroom. The silos measure approximately 4m in diameter and approximately 5m high. The silos are in a ruined state and are not in use.

The remains of a cattle kraal were also identified near the houses. The kraal was built with sandstone blocks and mortar and measures approximately 25m x 8m in size. The kraal is in a ruined state and the walls had been replaced by fencing.

The remains of a double-rondawel workers' dwelling was also identified near the houses. The two rondawels were built of cement bricks and plastered. A brick curtain wall was added to join the two rondawels at a later date. The rondawel may be associated with the single grave (PP010). The age of this farmstead and its associated buildings was not known.

Figure 69 – The farmstead at site PP 10 as recorded in 2012 (Photo: Kitto & Fourie, 2012).

Figure 70 - Brick shed as recorded in 2012 (Photo: Kitto & Fourie, 2012).

Figure 71 – Farm worker houses as recorded in 2012 (Photo: Kitto & Fourie, 2012).

Figure 72 – The two silos from site PP 10 as recorded in 2012 (Photo: Kitto & Fourie, 2012).

Figure 73 - Remains of the cattle kraal as recorded in 2012 (Photo: Kitto & Fourie, 2012).

Description of Site from the 2021 Fieldwork

The farmstead was visited during the current fieldwork. The main farmhouse appears to be a bit dilapidated from the building that was recorded in 2012. However, all the other structures are still intact and appear to be in a similar condition as when they where identified in 2012. The site is currenlty occupied by the Joubert family.

Significance:

The site was stated to be of **Medium Significance** or **Generally Protected B (GP.B)** in the 2012 report. As the site has not significantly deteriorated over the last nine years, the same significance level can still be attributed to it. It is however important to note that past experience has shown that in some cases unmarked stillborn babies and infants were buried in close proximity to such homesteads. These babies and infants were frequently buried along the sides, or underneath, the parents' dwelling. No direct information with regards to the presence (or not) of such graves at the site is currently available.

Site Extent:

The site is 300m x 250m.

Impact Assessment and Mitigation*:*

See Chapter 7 for impact assessment calculations and Chapter 8 for required mitigation measures

Figure 74 - View of the main farm house as recorded during the recent fieldwork.

Figure 75 - View of the silo, storeroom and farm labourer houses.

Figure 76 - General view of the stone kraal. The scale is in 10 cm increments.

6.2.12 PP 12

GPS Coordinates:

S 25.74595
E 29.97420

Type: Historic Coal Mine Shaft

Description:

Description of Site from Kitto & Fourie (2012)

An abandoned coal mine shaft was identified at this location. The shaft measures approximately 2m x 5m and extends approximately 25m into the side of the hill. A second tunnel/shaft extended from the main shaft and its roof had collapsed at the end of this shaft/tunnel. Most of the shaft is flooded with water. Wooden supports to keep the roof of the shaft from collapsing are still in place. A ventilation hole had been dug in the roof which is visible on the surface of the rock outcrop. The age of this abandoned mine is not known. However, it is likely that it dates to over 100 years. Van der Merwe's book on the town of Belfast states that coal mining occurred in this area in historical times and was associated with Sammy Marks (1952).

Figure 77 – The entrance to the old mine shaft as recorded in 2012 (Photo: Kitto & Fourie, 2012).

Figure 78 - Interior view of mine shaft as recorded in 2012 (Photo: Kitto & Fourie, 2012).

Description of Site from the 2021 Fieldwork

The entrance to the shaft is currently covered by dense vegetation. As a result, it was not possible to access the shaft and assess its interior.

Significance:

The site is a relatively unique tangible reminder of the history of coal mining in the surroundings of eMakhazeni (Belfast). As such, the site is of **Medium** to **High Significance** or **Generally Protected A (GP. A).** This is the same heritage significance rating that the site received in the 2012 report.

Site Extent:

The site is 5m x 30m.

Impact Assessment and Mitigation*:*

See Chapter 7 for impact assessment calculations and Chapter 8 for required mitigation measures

Figure 79 – General view of the site and shaft entrance as recorded in 2012.

Figure 80 – Closer view of the entrance to the shaft as recorded during the recent fieldwork. As can be seen, the shaft entrance is completely overgrown. The scale is in 10cm increments.

6.2.13 PP 13

GPS Coordinates:

S 25.74883
E 29.97470

Type: Historic Coal Mine Shaft

Description:

Description of Site from Kitto & Fourie (2012)

Another abandoned mine shaft was identified at this location. The shaft also measures approximately 2m x 5m and extends approximately 25m into the side of the hill. Most of the shaft is flooded with water. Wooden supports to keep the roof of the shaft from collapsing are still in place. The age of this abandoned mine was not known. However, as noted above, it probably dates to the historical period. The coal spoil heap is also still present close to the entrance of the shaft

Figure 81 - General view of mine shaft at site PP 13 as recorded in 2012 (Photo: Kitto & Fourie, 2012).

Figure 82 - Close-up view oof the shaft entrance as recorded in 2012 (Photo: Kitto & Fourie, 2012).

Description of Site from the 2021 Fieldwork

The shaft appears to be in the same condition as when it was identified in 2012.

Significance:

The site is a relatively unique tangible reminder of the history of coal mining in the surroundings of eMakhazeni (Belfast). As such, the site is of **Medium** to **High Significance** or **Generally Protected A (GP. A).** This is the same heritage significance rating that the site received in the 2012 report.

Site Extent:

The site is 30m x 25m.

Impact Assessment and Mitigation*:*

See Chapter 7 for impact assessment calculations and Chapter 8 for required mitigation measures

Figure 83 – General view of the shaft entrance at PP 13 as recorded during the recent fieldwork. The scale is in 10cm increments.

Figure 84 – Closer view of the shaft entrance at PP 13 as recorded during the recent fieldwork.

6.2.14 PP 14

GPS Coordinates:

S 25.75221
E 29.97899

Type: Possible Rock Art Site

Description:

Description of Site from Kitto & Fourie (2012)

A possible rock art site was identified at this location. The position of the panel is situated on the southern side of an exposed rock bank which formed a slight overhang. Two extremely faded figures were identified. These figures were red in colour, but could not be identified clearly. The figures measure approximately 20cm in size. The rock face is also deteriorating. No archaeological deposit was identified at the foot of the rock face.

Figure 85 – General view of the rock outcrop with possible rock art as recorded in 2012 (Photo: Kitto & Fourie, 2012).

Figure 86 – Closer view of the possible rock art as recorded in 2012 (Photo: Kitto & Fourie, 2012).

Description of Site from the 2021 Fieldwork

The site was visited during the recent fieldwork. During the site visit, the southern panel was studied. No evidence for rock art can currently be seen with the naked eye at the site.

Significance:

During the 2012 study, the site was assessed to be of **Provincial Significance (Grade 2).** Due to the deterioration that has evidentl occurred over the last nine years, the the current significance of the site is deemed to be of **Medium** to **High Significance (GP. A).**

Site Extent:

The site is 10m x 3m.

Impact Assessment and Mitigation*:*

See Chapter 7 for impact assessment calculations and Chapter 8 for required mitigation measures

Figure 87 - General view of the exposed rock at site PP 14 as recorded during the recent fieldwork.

Figure 88 - Closer view of the side of the boulder shows no distinctive or visible rock art

6.2.15 PP 15

GPS Coordinates:

S 25.75435
E 29.98324

Type: Historic Homestead and Structures with the Possible Risk for Unmarked Graves

Description:

Description of Site from Kitto & Fourie (2012)

The remains of a mud-brick homestead together with a stone-walled cattle kraal were identified at this location. The remains of the mud-brick homestead consist of the foundations of two rectangular structures, which each measure approximately 5m x 5m in size. Another circular structure measures approximately 4m in diameter. This structure was most probably the cooking hut. Rocks were used in the foundations to support the mud-brick walls. Two lower grinding stones were also identified with the remains of the structures.

The ruined stone walled cattle kraal was situated approximately 35m to the west of the homestead. The kraal measures approximately 10m x 10m in size and the walls measure approximately 0.5m wide and 0.75m high.

Figure 89 - Remains of the cattle kraal as recorded in 2012 (Photo: Kitto & Fourie, 2012).

Figure 90 – Close-up view along a section of the wall of the cattle kraal (Photo: Kitto & Fourie, 2012).

Description of Site from the 2021 Fieldwork

The site was visited during the recent fieldwork. Sections of the stone-packed kraal were identified. It would appear that sections of the kraal's walls have collapsed in the nine years since the 2012 site visit. The remains of the mudbrick homestead could not be seen.

Significance:

The site was stated to be of **Low Significance** or **Generally Protected C (GP.C)** in the 2012 report. However, past experience has shown that in some cases unmarked stillborn babies and infants were buried in close proximity to such homesteads. These babies and infants were frequently buried along the sides, or underneath, the parents' dwelling. No direct information with regards to the presence (or not) of such graves is currently available. To address this potential risk, the site is deemed to be of **Medium Significance** or **Generally Protected B (GP.B).**

Site Extent:

The site is 30m x 25m.

Impact Assessment and Mitigation*:*

See Chapter 7 for impact assessment calculations and Chapter 8 for required mitigation measures

Figure 91 - View of the stone kraal as recorded during the 2021 fieldwork. The site is currently overgrown and it appears as if sections of its walls have collapsed since the 2012 fieldwork. The scale is in 10cm increments.

Figure 92 - Closer view of a section of walling from the kraal. The scale is in 10cm increments.

6.2.16 PP 16

GPS Coordinates:

S 25.75299
E 29.98291

Type: Historic Homestead with Graves and the Possible Risk for Unmarked Graves

Description:

Description of Site from Kitto & Fourie (2012)

The remains of a mud-brick homestead with a stone-walled cattle kraal were identified at this location. The remains of the mud-brick homestead consist of the foundations of one rectangular structure, which measures approximately 7m x 4m in size, and a multi-roomed rectangular structure, which measured 8m x 10m each. Another circular structure measures approximately 4m in diameter. This structure was most probably the cooking hut. Rocks were used in the foundations to support the mud-brick walls of the structures. A lower grinding stone was also identified with the remains of the structures. Several modern metal artefacts such as wire, corrugated iron and cans were found scattered around the site.

The ruin of a stone-walled cattle kraal is situated approximately 30m to the east of the homestead. The kraal measures approximately 10m x 12m in size but the walls had been robbed and the size of the walls could not be determined. Two informal graves were also identified next to the kraal. They are placed next to each other and are orientated from west to east. The graves have oval-shaped mounds of packed rocks as dressing. The graves have no headstones and their age could not be determined.

Figure 93 – The remains of kraal walling as recorded in 2012 (Photo: Kitto & Fourie, 2012).

Figure 94 – General view of the two graves as recorded in 2012 (Photo: Kitto & Fourie, 2012).

Description of Site from the 2021 Fieldwork

The site was visited during the recent fieldwork. Sections of the stone-packed kraal were identified. It would appear that sections of the kraal's walls have collapsed in the nine years since the 2012 site visit. The remains of the mudbrick homestead could not be seen. The two stone packed graves were identified on-site.

Significance:

All graves have high levels of emotional, religious and in some cases historical significance. As such, the site is of **Medium** to **High Significance** or **Generally Protected A (GP. A).** This is the same heritage significance rating that the site received in the 2012 report.

Past experience has shown that in some cases unmarked stillborn babies and infants were buried in close proximity to such homesteads. These babies and infants were frequently buried along the sides, or underneath, the parents' dwelling. No direct information with regards to the presence (or not) of such graves is currently available.

To address this potential risk, the site, without the above-mentioned presence of two graves, is deemed to be of **Medium Significance** or **Generally Protected B (GP.B).**

Site Extent:

The site is 60m x 60m.

Impact Assessment and Mitigation:

See Chapter 7 for impact assessment calculations and Chapter 8 for required mitigation measures.

Figure 95 - General view of the site as recorded in 2021. The scale is in 10cm increments.

Figure 96 - View of the stone wall observed at the site during the 2021 fieldwork. The scale is in 10cm increments.

Figure 97 - View of the two graves as recorded during the 2021 fieldwork. The scale is in 10cm increments.

6.2.17 PP 17

GPS Coordinates:

S 25.74883
E 29.97470

Type: Historic Coal Mine Shaft

Description:

Description of Site from Kitto & Fourie (2012)

An abandoned coal mine shaft was identified at this location. The shaft measures approximately 2m x 4m and extends approximately 15m into the side of the hill. Most of the shaft is flooded with water. The age of this abandoned mine is not known but it is likely to be of historical date (as discussed above).

Figure 98 – Entrance to the mine shaft at site PP17 as recorded in 2012 (Photo: Kitto & Fourie, 2012).

Description of Site from the 2021 Fieldwork

The site was visited during the recent fieldwork. The mine shaft appears to be relatively intact and in a similar condition as when it was recorded in 2012. The shaft is still flooded with water.

Significance:

The site is a relatively unique tangible reminder of the history of coal mining in the surroundings of eMakhazeni (Belfast). As such, the site is of **Medium** to **High Significance** or **Generally Protected A (GP. A).** This is the same heritage significance rating that the site received in the 2012 report.

Site Extent:

The site is 5m x 15m.

Impact Assessment and Mitigation*:*

See Chapter 7 for impact assessment calculations and Chapter 8 for required mitigation measures

Figure 99 – General view of site PP 17 as recorded during the recent fieldwork. The entrance to the mine shaft can be seen below the weaver-nests hanging from the tree.

Figure 100 – General view of the entrance to the shaft at site PP 17 as recorded during the recent fieldwork. The scale is in 10cm increments.

Figure 101 - Interior view of the shaft as recorded during the recent fieldwork.

6.2.18 PP 18

GPS Coordinates:

S 25.76010
E 29.96672

Type: Animal Drinking Trough

Description:

Description of Site from Kitto & Fourie (2012)

An old animal drinking trough was identified at this location. The trough is constructed with sandstone blocks and cement and is plastered. The trough measures approximately 5m x 1m and is approximately 0.75m high. No other structures or features are associated with the trough. The age of the trough is not known.

Description of Site from the 2021 Fieldwork

The site was visited during the recent fieldwork.The trough appears to be in the same condition as when it was recorded in 2012. The site is overgrown with vegetation and it would appear that the trough is not currently used.

Significance:

The site is of **Low Significance** and is rated as **Generally Protected C (GP.C)**. This is the same heritage significance rating that the site received in the 2012 report.

Site Extent:

The site is 1m x 5m.

Impact Assessment and Mitigation:

See Chapter 7 for impact assessment calculations and Chapter 8 for required mitigation measures

Figure 102 - General view of the animal drinking trough at site PP 18 as recorded during the recent fieldwork. The scale is in 10cm increments.

6.2.19 PP 19

GPS Coordinates:

S 25.75980
E 29.96623

Type: Demolished Historic Structure

Description:

Description of Site from Kitto & Fourie (2012)

A ruined stone-walled cattle kraal was identified at this location. The kraal measures approximately 20m x 10m in size and the walls measure approximately 0.5m wide and 1m high. Most of the sandstone blocks used in the walls of the kraal have been robbed (used somewhere else) and the original kraal is in a very dilapidated state.

Figure 103 - Remains of stone kraal as recorded in 2012 (Photo: Kitto & Fourie, 2012).

Figure 104 - Close-up view of a section of walling from the kraal (Photo: Kitto & Fourie, 2012).

Description of Site from the 2021 Fieldwork

During the recent site visit undertaken in 2021, the kraal could not be identified. This was due to the fact that the site, and its surroundings, was used for the construction of the Phumulani village. The kraal was most likely demolished during the construction.

A sign placed near the site reads as follows: “PHUMULANI AGRI-VILLAGE BELFAST COAL MINE RELOCATED COMMUNITY”

Significance:

The site is of **Low Significance** and is rated as **Generally Protected C (GP.C)**. This is the same heritage significance rating that the site received in the 2012 report.

Site Extent:

The site is 20m x 10m

Impact Assessment and Mitigation*:*

See Chapter 7 for impact assessment calculations and Chapter 8 for required mitigation measures

Figure 105 - General view of PP 19 as recording during the recent fieldwork. The kraal is no longer located on-site, as the area has since been used for the site of the Phumulani Agri-Village.

Figure 106 - Information board at the entrance to the Phumulani Agri-Village.

6.2.20 PP 20

GPS Coordinates:

S 25.76151
E 29.96536

Type: Reservoir with Associated Structures

Description:

Description of Site from Kitto & Fourie (2012)

A brick and cement dam was identified at this location. The circular dam is brick-built and is plastered with cement. The dam measures approximately 10m in diameter and the dam wall is approximately 1.6m high.

A 6m x 6m square brick-built building is situated next to the cement dam. The building is plastered and has a wooden door frame. The building's roof, windows and doors had been removed.
The age of this building is not known.

Figure 107 – General view of the brick and cement dam as recorded during the fieldwork undertaken in 2012 (Photo: Kitto & Fourie, 2012).

Figure 108 - Brick structure as recorded during the fieldwork undertaken in 2012 (Photo: Kitto & Fourie, 2012).

Description of Site from the 2021 Fieldwork

During the recent fieldwork undertaken in 2021, the site was also visited. No evidence for the structures that were recorded in 2012 could be observed during the recent fieldwork. It would appear that the structures were most likely demolished during the construction of the Phumulani Agri-village. A newer steel reservoir is located close to the original position of the cement dam.

Significance:

The site is of **Low Significance** and is rated as **Generally Protected C (GP.C)**. This is the same heritage significance rating that the site received in the 2012 report.

Site Extent:

The site is 30m x 30m.

Impact Assessment and Mitigation*:*

See Chapter 7 for impact assessment calculations and Chapter 8 for required mitigation measures

Figure 109 - General view of the site as recorded in 2021. As can be seen from this image, no evidence for the dam or associated structure could be found. The scale is in 10cm increments

Figure 110 – The new steel reservoir that was built near site PP 20. This steel reservoir is associated with the Phumulani Agri-Village.

6.2.21 PP 21

GPS Coordinates:

S 25.76166
E 29.96465

Type: Historic Homesteads and Structures with the Possible Risk for Unmarked Graves

Description:

Description of Site from Kitto & Fourie (2012)

The remains of a mud-brick homestead were identified at this location. The remains of the mud-brick homestead consist of the foundations of one rectangular structure, which measure approximately 7m x 4m in size, and a multi-roomed l-shaped structure, which measures 8m x 12. A further circular structure measures approximately 4m in diameter. This structure was most probably the cooking hut. Rocks were used in the foundations to support the mud-brick walls of the structures. A lower grinding stone was also identified with the remains of the structures. Several modern metal artefacts such as wire, corrugated iron and cans were found scattered around the site.

Figure 111 - Foundations of rectangular structure as recorded in 2012 (Photo: Kitto & Fourie, 2012).

Figure 112 - Remains of circular structure as recorded in 2012 (Photo: Kitto & Fourie, 2012).

Figure 113 - Lower grinding stone as recorded in 2012 (Photo: Kitto & Fourie, 2012).

Description of Site from the 2021 Fieldwork

During the recent fieldwork undertaken in 2021, the site was also visited. No remains of a mud-brick homestead were identified at this location. The site is overgrown with grassy vegetation. No other cultural material including remains of foundations of a grinding stone was observed at the site. The site has been disturbed by illegal dumping activities.

Significance:

The site was stated to be of **Low Significance** or **Generally Protected C (GP. C)** in the 2012 report. However, past experience has shown that in some cases unmarked stillborn babies and infants were buried in close proximity to such homesteads. These babies and infants were frequently buried along the sides, or underneath, the parents' dwelling. No direct information with regards to the presence (or not) of such graves is currently available. To address this potential risk, the site is deemed to be of **Medium Significance** or **Generally Protected B (GP. B).**

Site Extent:

The site is 30m x 30m.

Impact Assessment and Mitigation*:*

See Chapter 7 for impact assessment calculations and Chapter 8 for required mitigation measures

Figure 114 - General view of the site as recorded during the recent site visit. Note the dense vegetation found across the surface of the site, which may explain why the remains of the structures could not be found.

Figure 115 – Evidence for illegal dumping activities was noticed around the site.

6.2.22 PP 22

GPS Coordinates:

S 25.76169
E 29.96375

Type: Historic Homesteads and Structures with the Possible Risk for Unmarked Graves

Description:

Description of Site from Kitto & Fourie (2012)

The remains of a mud-brick homestead were identified at this location. The remains of the mud-brick homestead consist of the foundations of one rectangular multi-roomed structure, which measures approximately 10m x 15m in size; two rectangular-shaped structures, which measure 4m x 6m each; and a square room, which measures 4m x 4m. There was also a circular structure, which measures approximately 4m in diameter. This structure was most probably the cooking hut. The structures are arranged in an open square which formed a central Lapa area. Rocks were used in the foundations to support the mud-brick walls of the structures. Several modern metal artefacts such as wire, corrugated iron and cans were found scattered around the site.

Figure 116 - Foundations of a multi-roomed structure recorded in 2012 (Photo: Kitto & Fourie, 2012).

Description of Site from the 2021 Fieldwork

The site was visited during the recent fieldwork. A small section of the remains of the foundation of the mud-brick homestead could be identified. The outlines of the structure were barely visible underneath the grassy vegetation. No other cultural material including remains were observed at the site.

Significance:

The site was stated to be of **Low Significance** or **Generally Protected C (GP. C)** in the 2012 report. However, past experience has shown that in some cases unmarked stillborn babies and infants were buried in close proximity to such homesteads. These babies and infants were frequently buried along the sides, or underneath, the parents' dwelling. No direct information with regards to the presence (or not) of such graves is currently available. To address this potential risk, the site is deemed to be of **Medium Significance** or **Generally Protected B (GP. B).**

Site Extent:

The site is 30m x 30m.

Impact Assessment and Mitigation*:*

See Chapter 7 for impact assessment calculations and Chapter 8 for required mitigation measures

Figure 117 - General view of site PP 22 as recorded during the recent site visit. The remains of the mudbrick homestead could barely be seen in the dense vegetation. The scale is in 10cm increments.

6.2.23 PP 23

GPS Coordinates:

S 25.76166
E 29.96465

Type: Demolished Historic Structure (before 2012)

Description:

Description of Site from Kitto & Fourie (2012)

The remains of an old sandstone building were identified at this location. Most of the remains of the building had been removed and only the sandstone blocks which formed the foundations of the building are left. Several bricks were also found scattered across the site. There were no other features such as windows, doors or any floors to identify the structure with. These remains are most probably parts of an old farmhouse, which were broken down and removed from this site in the past. The structure measures approximately 18m x 20m in size. The exact function and age of this structure are not known.

Figure 118 – General view of the site as recorded in 2012. The poorly preserved state of the structure can be seen (Photo: Kitto & Fourie, 2012).

Figure 119 – Another photograph of the site that was taken in 2012. A few of the sandstone blocks can be seen (Photo: Kitto & Fourie, 2012).

Description of Site from the 2021 Fieldwork

The site was visited during the recent fieldwork. The scattered remains of an old sandstone building were identified at this location. Most of the remains of the building had been removed and only the sandstone blocks which formed the foundations of the building were left. The site is overgrown.

Significance:

The site is of **Low Significance** and is rated as **Generally Protected C (GP.C)**. This is the same heritage significance rating that the site received in the 2012 report.

Site Extent:

The site is 30m x 30m.

Impact Assessment and Mitigation:

See Chapter 7 for impact assessment calculations and Chapter 8 for required mitigation measures.

Figure 120 - General view of site PP 23 as recorded during the recent fieldwork. The dense vegetation covering the surface of the site can be seen.

Figure 121 - Only the scattered remains of the sandstone blocks of the structure were observed on site. The site is poorly preserved and overgrown. The scale is in 10cm increments.

6.2.24 PP 24

GPS Coordinates:

S 25.76272
E 29.96177

Type: Sunbury Railway Station

Description:

Description of Site from Kitto & Fourie (2012)

The ruined remains of the Sunbury Railway Station were identified at this location. The structure is constructed of red brick that was plastered and painted. The structure has been stripped of its roof, doors, windows and all other features. Only a few of its walls remain. The structure is in ruins and is overgrown with vegetation. The age of the station is not known.

Figure 122 - Remains of the building at the Sunbury Railway Station as recorded in 2012 (Photo: Kitto & Fourie, 2012).

Description of Site from the 2021 Fieldwork

During the site visit undertaken recently the collapsed remains of the building associated with the Sunbury Railway Station building were identified. A newer brick structure, the Sunbury Substation, was also identified at the site.

Significance:

The site is of **Low Significance** and is rated as **Generally Protected C (GP.C)**. This is the same heritage significance rating that the site received in the 2012 report.

Site Extent:

The site is 30m x 25m.

Impact Assessment and Mitigation*:*

See Chapter 7 for impact assessment calculations and Chapter 8 for required mitigation measures

Figure 123 - The collapsed remains of the building associated with the Sunbury Railway Station as recorded during the recent fieldwork.

6.2.25 PP 25

GPS Coordinates:

S 25.73242
E 29.99351

Type: Historic Homesteads and Structures with the Possible Risk for Unmarked Graves

Description:

Description of Site from Kitto & Fourie (2012)

The remains of farm labourer quarters were identified at this location. The structure is brick-built and plastered and measures approximately 10m x 5m in size. The roof, doors, windows and frames have been removed from the building. The building consisted of two rooms and a bathroom. A warm water system (donkey) is situated next to the bathroom of the building. A midden was also identified approximately 20m from the structure.

The remains of a cattle or pig shed were also identified approximately 50m to the west of the labourer quarters. A brick and cement drinking trough was identified near the remains of the cattle/pig shed.

Figure 124 - Ruins of farmworker dwelling and "donkey" structure as recorded during the fieldwork undertaken in 2012 (Photo: Kitto & Fourie, 2012).

Figure 125 - Remains of shed as recorded in 2012 (Photo: Kitto & Fourie, 2012).

Figure 126 - Close-up view of a section of walling from the shed. This photograph was also taken during the site visit of 2012 (Photo: Kitto & Fourie, 2012).

Description of Site from the 2021 Fieldwork

During the site visit undertaken recently, the remains of collapsed dwellings were observed. A single animal drinking trough was also found near the houses.

The site is overgrown and no remains of the shed were identified.

Significance:

The site was stated to be of **Low Significance** or **Generally Protected C (GP. C)** in the 2012 report.

However, past experience has shown that in some cases unmarked stillborn babies and infants were buried in close proximity to such homesteads. These babies and infants were frequently buried along the sides, or underneath, the parents' dwelling. No direct information with regards to the presence (or not) of such graves is currently available.

To address this potential risk, the site is deemed to be of **Medium Significance** or **Generally Protected B (GP. B).**

Site Extent:

The site is 30m x 25m.

Impact Assessment and Mitigation*:*

See Chapter 7 for impact assessment calculations and Chapter 8 for required mitigation measures

Figure 127 - General view of site PP 25 as recorded during the recent site visit.

Figure 128 - The drinking trough was also observed during the recent fieldwork.

6.2.26 PP 26

GPS Coordinates:

S 25.73428
E 29.99304

Type: Historic Homesteads and Structures with the Possible Risk for Unmarked Graves

Description:

Description of Site from Kitto & Fourie (2012)

The remains of a mud-brick homestead were identified at this location. The mud-brick homestead consists of the foundations of two square structures, which measure approximately 4m x 4m in size each, and a multi-roomed rectangular structure, which measures 8m x 15m. Another circular structure measures approximately 4m in diameter. This structure was most probably the cooking hut. Rocks were used in the foundations to support the mud-brick walls of the structures. Several modern metal artefacts such as wire, corrugated iron and cans were found scattered around the site.

Figure 129 - Foundation of the homestead as recorded in 2012 (Photo: Kitto & Fourie, 2012).

Figure 130 - Remains of a circular structure recorded in 2012 (Photo: Kitto & Fourie, 2012).

Description of Site from the 2021 Fieldwork

During the site visit undertaken recently, the site was found to consist of the remains of a barely visible foundation of a mudbrick house. The site was found to be very overgrown.

Significance:

The site was stated to be of **Low Significance** or **Generally Protected C (GP. C)** in the 2012 report. However, past experience has shown that in some cases unmarked stillborn babies and infants were buried in close proximity to such homesteads. These babies and infants were frequently buried along the sides, or underneath, the parents' dwelling. No direct information with regards to the presence (or not) of such graves is currently available. To address this potential risk, the site is deemed to be of **Medium Significance** or **Generally Protected B (GP. B).**

Site Extent:

The site is 30m x 30m.

Impact Assessment and Mitigation*:*

See Chapter 7 for impact assessment calculations and Chapter 8 for required mitigation measures

Figure 131 - General view of the site as recorded during the recent fieldwork.

Figure 132 – Another view of the site that was recorded during the recent visit. This image depicts an elevated soil heap containing scattered bricks and stones. The scale is in 10cm increments.

6.2.27 PP 27

GPS Coordinates:

S 25.73508
E 29.99341

Type: Historic Structure

Description:

Description of Site from Kitto & Fourie (2012)

The remains of a sandstone building were identified at this location. The structure measures approximately 12m x 5m and is constructed with sandstone blocks without mortar or cement. The original entrance to the structure has been filled up with other sandstone blocks. The walls of this structure measure approximately 0.5m wide and approximately 2m high. The structure was most probably a shed or a storeroom.

The remains of a stone-walled kraal were identified next to the sandstone structure. Most of the walling for the kraal has been removed and only some sandstone blocks from the foundations are left. The kraal measures approximately 10m x 25m.

Figure 133 - Ruin of the sandstone building as recorded during the fieldwork undertaken in 2012 (Photo: Kitto & Fourie, 2012).

Figure 134 – Another view of the site as recorded in 2012. This image depicts the remains of walls associated with the building (Photo: Kitto & Fourie, 2012).

Description of Site from the 2021 Fieldwork

During the site visit undertaken recently, the site was found to consist of a collapsed sandstone building and wall. The site is abandoned and poorly preserved. This said, the site appears to be in a similar condition as what was recorded in 2012.

Significance:

During the 2012 study, the site was assessed to be of **Medium Significance** or **Generally Protected B (GP. B)**. Due to the fact that the site has not deteriorated significantly, the current significance of the site would be the same.

Site Extent:

The site is 30m x 40m.

Impact Assessment and Mitigation*:*

See Chapter 7 for impact assessment calculations and Chapter 8 for required mitigation measures

Figure 135 - General view of the site as recorded during the recent fieldwork. The sandstone building can clearly be seen.

Figure 136 – Closer view of the sandstone building as recorded during the recent fieldwork.

Figure 137 – Side view of a section of walling from the building. The scale is in 10cm increments.

Figure 138 – A section of the stone wall associated with the sandstone building (visible in the back) can be seen in the foreground.

6.2.28 PP 28

GPS Coordinates:

S 25.73605
E 29.99331

Type: Burial Ground

Description:

Description of Site from Kitto & Fourie (2012)

A small informal cemetery with eight graves was identified at this location. The cemetery is fenced and is situated in the open veld. The graves are placed in one line next to each other and all are orientated from west to east. Seven of the graves have informal, oval-shaped outlines of packed rocks which are filled with soil. Rocks are placed upright at the western ends to serve as headstones. One grave has a formal granite dressing and an inscribed granite headstone. This grave dates from the early 1960's and belongs to the Skhosana family. Most of the graves are overgrown with grass and other vegetation. No grave goods were found with these graves.

Figure 139 – General view of the cemetery as recorded in 2012 (Photo: Kitto & Fourie, 2012).

Figure 140 - Close-up view of one of the graves from site PP 28 as recorded in 2012 (Photo: Kitto & Fourie, 2012).

Description of Site from the 2021 Fieldwork

All eight graves were observed during the site visit undertaken recently. One of the graves contained a headstone, which is in a poor state of preservation and has fallen over. The graves are overgrown but clearly visible.

Significance:

All graves have high levels of emotional, religious and in some cases historical significance. As such, the site is of **Medium** to **High Significance** or **Generally Protected A (GP. A).** This is the same heritage significance rating that the site received in the 2012 report.

Site Extent:

The site is 30m x 25m.

Impact Assessment and Mitigation*:*

See Chapter 7 for impact assessment calculations and Chapter 8 for required mitigation measures

Figure 141 - General view of the site as recorded during the recent site visit. The dense vegetation can still be seen.

Figure 142 - View of the headstone on the grave of Magwegwe Skhosana, which has fallen over. The scale is in 10cm increments.

6.2.29 PP 29

GPS Coordinates:

S 25.72698
E 29.98967

Type: Historic Homesteads and Structures with the Possible Risk for Unmarked Graves

Description:

Description of Site from Kitto & Fourie (2012)

The remains of an extended mud-brick settlement were identified at this location. The remains of this mud-brick settlement cover an area of approximately 200m x 200 and consist of at least nine different homesteads or structures that formed part of the larger settlement. Most of the structures are ruined and were very difficult to identify. The numbers, sizes and shapes of these structures of this settlement are not clearly identifiable. Rocks were used in the foundations to support the mud-brick walls of the structures. Several modern metal artefacts such as wire, corrugated iron and cans were found scattered around the site.

Figure 143 - General view of some of the foundation remains as recorded in 2012 (Photo: Kitto & Fourie, 2012).

Description of Site from the 2021 Fieldwork

The site was visited during the recent fieldwork. It was found to consist of the foundation remains of several mudbrick homesteads spread across the site. Only the raised foundations are visible on the surface. The site is overgrown. No other cultural remains were found.

Significance:

The site was stated to be of **Low Significance** or **Generally Protected C (GP. C)** in the 2012 report. However, past experience has shown that in some cases unmarked stillborn babies and infants were buried in close proximity to such homesteads. These babies and infants were frequently buried along the sides, or underneath, the parents' dwelling. No direct information with regards to the presence (or not) of such graves is currently available. To address this potential risk, the site is deemed to be of **Medium Significance** or **Generally Protected B (GP. B).**

Site Extent:

The site is 30m x 25m.

Impact Assessment and Mitigation*:*

See Chapter 7 for impact assessment calculations and Chapter 8 for required mitigation measures

Figure 144 - General view of site PP 29 as recorded during the recent fieldwork.

Figure 145 - View of the remains of the foundations of two mudbrick homesteads. The scale is not visible due to the dense grass covering the surface of the site.

6.2.30 PP 30

GPS Coordinates:

S 25.71853
E 30.01722

Type: Historic Farmstead

Description:

Description of Site from Kitto & Fourie (2012)

A farmstead with its associated buildings was identified at this location. The main house and other buildings are still intact and are still being occupied. The main house has been extended over the years and several extensions are visible. These additions are all done in the same architectural style as the original building. The original house has a pitched thatched roof and wooden door and window frames. It has thick walls which are plastered and whitewashed or painted white According to the owner, Mr. Wilkie, the house is more than a hundred years old. The house has many different features and a detailed study by a heritage architect would be necessary to document them all.

A second, more modern, house is situated opposite the original old house . This house is brick-built and has a pitched corrugated iron roof. It measures approximately 25 m x 30m in size and actually consists of two separate buildings which have been joined. According to the owner, Mr.Wilkie, this house is more than 60 years old. The house has metal window frames and wooden door frames and doors. It also has internal electrical and plumbing systems.

A storeroom or shed with farm implements was also identified. This storeroom measures approximately 12m x 8m and has a low pitched corrugated iron roof. The building is built with sandstone blocks and mortar and has wooden window frames and wooden door frames with homemade doors. It has an external electrical system.

Another storeroom or shed is situated next to the first shed. It measures approximately 10m x 5m and is also constructed with sandstone blocks and mortar, with a low pitched corrugated iron roof. This building is in a rather poor state and more recent brick and cement supports had been placed there to extend the life of the building. The building has wooden window frames and wooden doors and door frames.

Figure 146 – General view of the farmhouse as recorded in 2012 (Photo: Kitto & Fourie, 2012).

Figure 147 – Another view of the farmhouse as recorded in 2012 (Photo: Kitto & Fourie, 2012).

Figure 148 - View of rear of the main farmhouse (Photo: Kitto & Fourie, 2012).

Figure 149 - Two sandstone sheds (Photo: Kitto & Fourie, 2012).

Figure 150 - Second farmhouse, the original building (Photo: Kitto & Fourie, 2012).

Figure 151 - Modern addition to the rear of the second farmhouse (Photo: Kitto & Fourie, 2012).

Description of Site from the 2021 Fieldwork

The site was visited during the recent fieldwork. It was found to consist of the remains of an abandoned farmstead with several buildings and a stone kraal. It appears as if the site has been abandoned for some period as the site is overgrown with vegetation.

The main house and other buildings are intact and are currently unoccupied. The main house has been extended over the years and several extensions are visible. Two storerooms or sheds were also identified. The buildings are built with sandstone blocks and mortar and are located next to each other. The roof of one of the sandstone buildings has collapsed. Since the farmstead appears to be unoccupied, access could not be gained through the locked gate and electric fence.

Significance:

During the 2012 study, the site was assessed to be of **Medium Significance** or **Generally Protected B (GP. B)**. Although the site has deteriorated, the current significance would remain the same.

Site Extent:

The site is 50m x 50m.

Impact Assessment and Mitigation*:*

See Chapter 7 for impact assessment calculations and Chapter 8 for required mitigation measures.

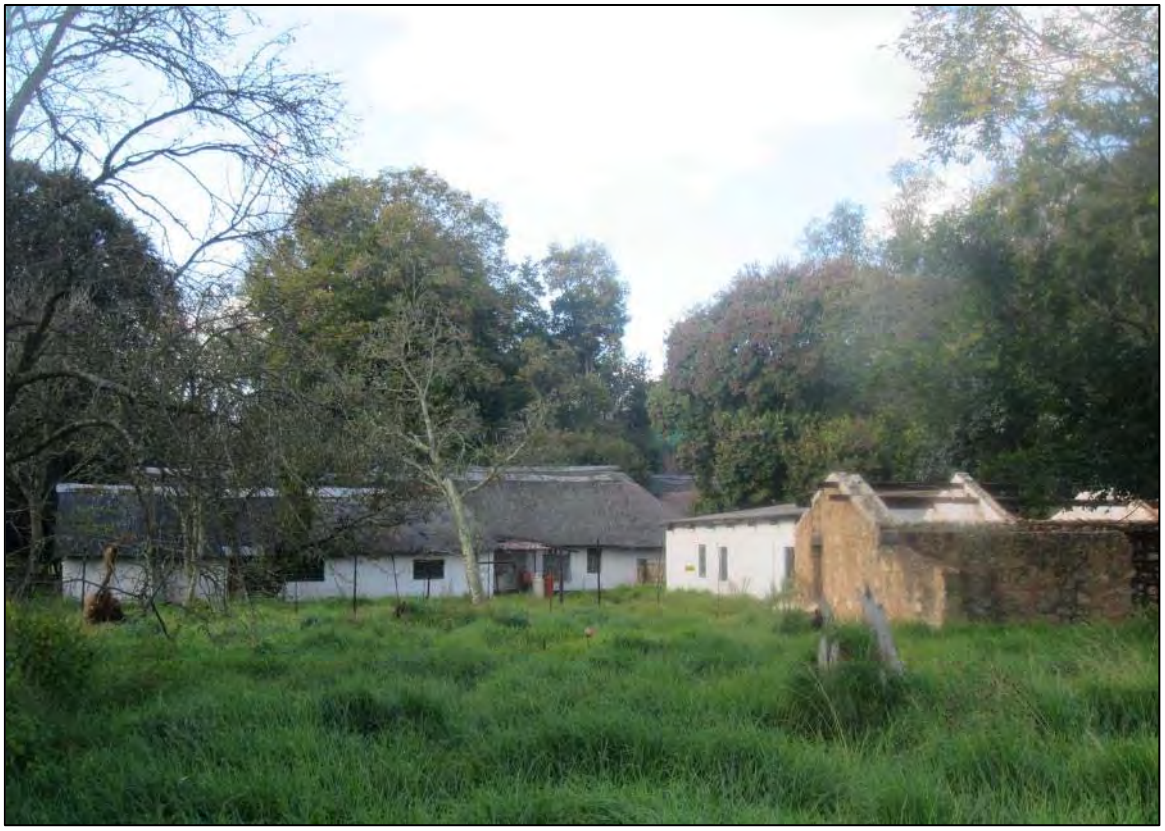

Figure 152 - General view of the farmstead at site PP 30 as recorded during the recent visit to the site. The thatched-roof farmhouse can be seen in the background on the left.

Figure 153 - View of the stone building with collapsed roof. The scale is in 10cm increments.

6.2.31 PP 31

GPS Coordinates:

S 25.71133
E 30.01645

Type: Burial Ground

Description:

Description of Site from Kitto & Fourie (2012)

An informal cemetery with approximately 39 graves was identified at this location. The cemetery is not fenced and is located in a ploughed and planted field. The graves are placed in 3 unequal lines next to each other aligned east-west. Most of the graves have informal oval or rectangular shaped mounds or outlines of packed rocks as dressings. One grave has a formal granite dressing and an inscribed granite headstone. Some of the graves had been cleaned recently, but most of them are overgrown with grass and other vegetation. Some graves have granite inscribed headstones. According to local residents, the graves are farmworker graves. Some families still live on the farm and others live in the settlement of Siyathuthuka.

Figure 154 - View of the cemetery at site PP 31 as recorded in 2012 (Photo: Kitto & Fourie, 2012).

Figure 155 – Another view of the cemetery as recorded in 2012 (Photo: Kitto & Fourie, 2012).

Description of Site from the 2021 Fieldwork

The site was visited during the recent fieldwork. It was found to consist of a cemetery containing a total of approximately 40 graves located in an agricultural field. Many of the graves have stone-lined dressings whereas some graves have formal dressings and inscribed headstones. The graves are clearly visibly. The cemetery is not fenced.

Significance:

All graves have high levels of emotional, religious and in some cases historical significance. As such, the site is of **Medium** to **High Significance** or **Generally Protected A (GP. A).** This is the same heritage significance rating that the site received in the 2012 report.

Site Extent:

The site is 50m x 50m.

Impact Assessment and Mitigation*:*

See Chapter 7 for impact assessment calculations and Chapter 8 for required mitigation measures

Figure 156 - General view of the cemetery at site PP 31 as recorded during the recent site visit.

Figure 157 - View of some of the graves consisting of formal dressings, headstones and packed graves. Not the small fence surrounds three stone-lined graves.

6.2.32 PP 32

GPS Coordinates:

S 25.72307
E 30.01585

Type: Historic Homesteads and Structures with the Possible Risk for Unmarked Graves

Description:

Description of Site from Kitto & Fourie (2012)

The remains of another mud-brick homestead were identified at this location. The remains of the mud-brick homestead consist of the foundations of four square structures, which each measure approximately 4m x 4m in size, and a circular structure that measured approximately 4m in diameter. This structure was most probably the cooking hut. The structures are all placed around a central Lapa area. Rocks were used in the foundations to support the mud-brick walls of the structures. Several modern metal artefacts such as wire, corrugated iron and cans were found scattered around the site.

Figure 158 – General view of site PP 32 as recorded during the fieldwork undertaken in 2012. The foundation remains of the homestead can be seen on this photograph (Photo: Kitto & Fourie, 2012).

Figure 159 - Close-up view of one of the wall foundations. This photograph was also taken during the 2012 fieldwork (Photo: Kitto & Fourie, 2012).

Description of Site from the 2021 Fieldwork

The site was visited during the recent fieldwork. It was found to consist of the remains of a mudbrick homestead, with only some of the foundations visible on site. The site is overgrown with vegetation.

Significance:

The site was stated to be of **Low Significance** or **Generally Protected C (GP. C)** in the 2012 report. However, past experience has shown that in some cases unmarked stillborn babies and infants were buried in close proximity to such homesteads. These babies and infants were frequently buried along the sides, or underneath, the parents' dwelling. No direct information with regards to the presence (or not) of such graves is currently available. To address this potential risk, the site is deemed to be of **Medium Significance** or **Generally Protected B (GP. B).**

Site Extent:

The site is 30m x 30m.

Impact Assessment and Mitigation*:*

See Chapter 7 for impact assessment calculations and Chapter 8 for required mitigation measures

Figure 160 - General view of site PP 32 as recorded during the recent fieldwork. Note the dense vegetation found at the site.

Figure 161 - View of some of the stone foundations observed at the site.

6.3 Heritage Sites identified in 2021

6.3.1 PP 33

GPS Coordinates:

S 25.748624
E 29.974775

Type: Historic Structure associated with Historic Coal Mine Shaft

Description:

The site consists of the stone foundation of a structure located approximately 25m north of the old mine shaft at site PP 13. This suggests that the structure can in all likelihood be associated with the old mine shaft.

The structure is rectangular in shape and consists of low stone foundations. No other cultural material was identified on-site.

Significance:

The structure is possibly associated with PP 13, and most likely older than 60 years. As such the site is of **Medium Significance** and is rated as **Generally Protected B (GP.B)**.

Site Extent:

The site is 10m x 10m.

Impact Assessment and Mitigation*:*

See Chapter 7 for impact assessment calculations and Chapter 8 for required mitigation measures

Figure 162 - General view of the stone foundations of a ming structure found at site PP 33. The scale is in 10cm increments.

6.2.34 PP 34

GPS Coordinates:

S 25.742500
E 30.002855

Type: Demolished Structure

Description:

The site consists of the demolished ruins of a multi-roomed brick house. The site is located approximately 100m north of PP 07.

A building is depicted in proximity to this site on the Second Edition of the 2530CA (Belfast) Topographical Map that was compiled in 1989. This building is not depicted on the First Edition of this sheet that was surveyed in 1969. From this information it seems evident that the building at site PP 34 was built between 1969 and 1989. The building at site PP 34 is therefore younger than 60 years.

Significance:

The building at the site is completely demolished. It is also younger than 60 years. As a result, the site is of **Low Significance** and is rated as **Generally Protected C (GP.C)**.

Site Extent:

The site is 30m x 30m.

Impact Assessment and Mitigation*:*

See Chapter 7 for impact assessment calculations and Chapter 8 for required mitigation measures

Figure 163 - General view of the demolished structure at PP 34.

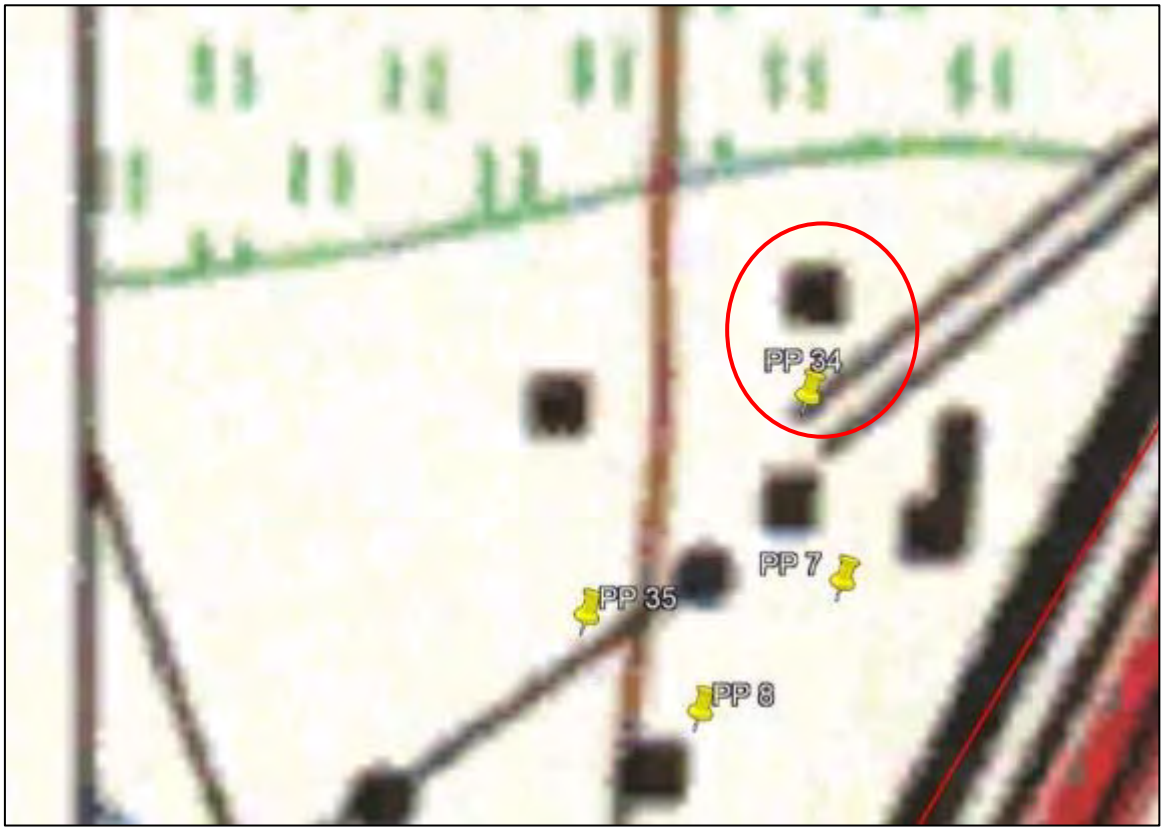

Figure 164 - View of the building (red polygon) depicted on the Second Edition of the 2530CA (Belfast) Topographical Map in proximity to the position of the demolished structure at site PP 34. This map was compiled in 1989.

6.2.35 PP 35

GPS Coordinates:

S 25.743408
E 30.001842

Type: Contemporary Farmstead

Description:

The site consists of two brick buildings with tiled roofs. structures, A third smaller brick building is located in the western corner of the property. A fourth building with a collapsed roof, most likely used as an outside storeroom, is located in the southern corner of the property. The property is surrounded by a fence and is currently occupied. The site is located approximately 90m north-west of PP 08.

A building is depicted in proximity to this site on the Second Edition of the 2530CA (Belfast) Topographical Map that was compiled in 1989. This building is not depicted on the First Edition of this sheet that was surveyed in 1969. From this information it seems evident that the buildings at site PP 35 were built between 1969 and 1989. These buildings are therefore younger than 60 years.

Significance:

The buildings at the site are all younger than 60 years. As a result, the site is of **Low Significance** and is rated as **Generally Protected C (GP.C)**.

Site Extent:

The site is 30m x 30m.

Impact Assessment and Mitigation*:*

See Chapter 7 for impact assessment calculations and Chapter 8 for required mitigation measures

Figure 165 - General view of the two brick houses (visible in the background) with an associated smaller brick building in the foreground.

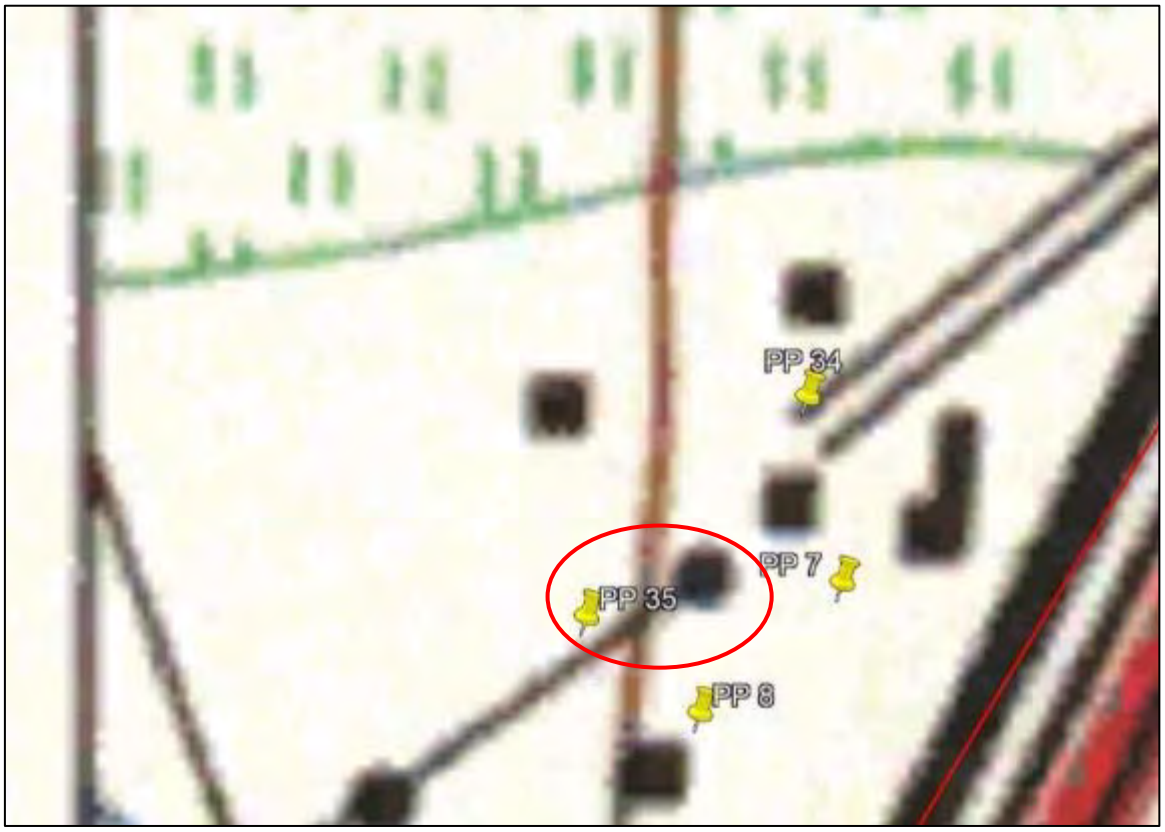

Figure 166 - View of the building (red polygon) depicted on the Second Edition of the 2530CA (Belfast) Topographical Map in proximity to the position of site PP 35. This map was compiled in 1989.

6.2.36 PP 36

GPS Coordinates:

S 25.754370
E 29.981422

Type: Historic Coal Mine Shaft

Description:

An abandoned coal mine shaft was identified here. The shaft measures approximately 2m x 2m. It is located approximately 90m south-west of the shaft at site PP 17. Because of the smaller shaft entrance, it was not possible to get a clear view of the interior of the shaft. The age of this abandoned mine is not known but it is likely quite old.

Significance:

The site is a relatively unique tangible reminder of the history of coal mining in the surroundings of eMakhazeni (Belfast). As such, the site is of **Medium** to **High Significance** or **Generally Protected A (GP. A).**

Site Extent:

The site is 10m x 10m.

Impact Assessment and Mitigation*:*

See Chapter 7 for impact assessment calculations and Chapter 8 for required mitigation measures

Figure 167 - View of the entrance to the abandoned coal mine shaft at PP 36. The scale is in 10cm increments.

6.2.37 PP 37

GPS Coordinates:

S 25.750654
E 29.989601

Type: Single Grave

Description:

A single grave was identified near the recorded positions of the farmhouse at PP 11 and the grave identified at site PP 10. The grave is located approximately 35m northwest of PP 10.

The grave at site PP 37 was pointed out by the farmworkers. Its surface is marked with an iron rod that was placed at the head of the grave. No other cultural remains were identified at the grave site.

Significance:

All graves have high levels of emotional, religious and in some cases historical significance. As such, the site is of **Medium** to **High Significance** and is rated as **Generally Protected A (GP. A).**

Site Extent:

The site is 10m x 10m.

Impact Assessment and Mitigation*:*

See Chapter 7 for impact assessment calculations and Chapter 8 for required mitigation measures.

Figure 168 - General view of the single grave at site PP 37. The metal rod marking the position of the grave can be seen. The scale is in 10cm increments.

Figure 169 - Another view of the single grave at site PP 37. The metal rod marking the position of the grave can again be seen. The scale is in 10cm increments.

6.2.38 PP 38

GPS Coordinates:

S 25.729260
E 30.013751

Type: Reservoir with Associated Structures

Description:

The site consist of a collapsed reservoir associated with a single brick building. Both the reservoir and brick building are younger than 60 years.

Significance:

The buildings from the site are both younger than 60 years. As such, the site is of **Low Significance** and is rated as **Generally Protected C (GP.C)**.

Site Extent:

The site is 30m x 30m.

Impact Assessment and Mitigation:

See Chapter 7 for impact assessment calculations and Chapter 8 for required mitigation measures.

Figure 170 - General view of site PP 38.

Figure 171 – Another view of the site showing a section of the reservoir in the foreground with the brick building in the back.

6.2.39 PP 39

GPS Coordinates:

S 25.726835
E 30.010754

Type: Reservoir with Associated Structures

Description:

The site consists of a circular reservoir associated with two brick buildings. Both the reservoir and brick buildings are younger than 60 years.

Significance:

The buildings from the site are younger than 60 years. As such, the site is of **Low Significance** and is rated as **Generally Protected C (GP.C)**.

Site Extent:

The site is 30m x 30m.

Impact Assessment and Mitigation:

See Chapter 7 for impact assessment calculations and Chapter 8 for required mitigation measures

Figure 172 - General view of the reservoir and buildings at site PP 39.

Figure 173 – A section of the reservoir is visible on the left, with the two associated brick structures located in the back.

6.2.40 PP 40

GPS Coordinates:

S 25.735453
E 29.995204

Type: Historic Homestead with the Possible Risk for Unmarked Graves

Description:

The site consists of the stone foundations of a rectangular structure. The structure is located approximately 252m north-west of the mudbrick homestead at site PP 26 and approximately 180m west of the stone structure at site PP27. It is most likely that the structure was a dwelling and can likely be associated with sites PP 26 and PP 27.

Significance:

The structure itself is deemed to be of **Low Significance** and is rated as **Generally Protected C (GP. C)**. However, past experience has shown that in some cases unmarked stillborn babies and infants were buried in close proximity to such homesteads. These babies and infants were frequently buried along the sides, or underneath, the parents' dwelling. No direct information with regards to the presence (or not) of such graves is currently available. To address this potential risk, the site is deemed to be of **Medium Significance** or **Generally Protected B (GP. B).**

Site Extent:

The site is 30m x 30m.

Impact Assessment and Mitigation*:*

See Chapter 7 for impact assessment calculations and Chapter 8 for required mitigation measures

Figure 174 – General view of the stone foundations of a rectangular structure. The scale is in 10cm increments.

Figure 175 - Closer view of a section of the foundations at site PP 40.

6.2.41 PP 41

GPS Coordinates:

S 25.716593
E 30.014553

Type: Structure

Description:

The remains of a small, square structure were identified at this location. The structure was built with stone and cement and measures approximately 4m x 4m in size. It has has no roof and has only one entrance with no windows. The function and age of this structure are unknown. A section of one wall has broken away.

Significance:

The site is of **Low Significance** and is rated as **Generally Protected C (GP.C)**.

Site Extent:

The site is 30m x 30m.

Impact Assessment and Mitigation*:*

See Chapter 7 for impact assessment calculations and Chapter 8 for required mitigation measures

Figure 176 – General view of the stone structure at site PP 41.

6.2.42 PP 42

GPS Coordinates:

S 25.726796
E 30.002923

Type: Animal Drinking Trough

Description:

An old animal drinking trough was identified at this location. The trough is constructed with blocks and cement and is plastered. The trough measures approximately 5m x 1m and is approximately 0.75m high. No other structures or features are associated with the trough. The age of the trough is not known.

Significance:

The site is of **Low Significance** and is rated as **Generally Protected C (GP.C)**.

Site Extent:

The site is 30m x 30m.

Impact Assessment and Mitigation*:*

See Chapter 7 for impact assessment calculations and Chapter 8 for required mitigation measures

Figure 177 - View of the animal drinking trough. The scale is in 10cm increments.

6.2.43 PP 43

GPS Coordinates:

S 25.738228
E 30.000564

Type: Demolished Structure

Description:

The site consists of the remains of a demolished brick and plaster structure. The collapsed walls and foundations of the structure were found on site.

A building is depicted in proximity to this site on the Second Edition of the 2530CA (Belfast) Topographical Map that was compiled in 1989. This building is not depicted on the First Edition of this sheet that was surveyed in 1969. From this information it seems evident that the building at site PP 43 was built between 1969 and 1989. The building at site PP 43 is therefore younger than 60 years.

Significance:

The building at the site is completely demolished. It is also younger than 60 years. As a result, the site is of **Low Significance** and is rated as **Generally Protected C (GP.C)**.

Site Extent:

The site is 30m x 30m.

Impact Assessment and Mitigation*:*

See Chapter 7 for impact assessment calculations and Chapter 8 for required mitigation measures

Figure 178 - General view of the demolished structure at site PP 43.

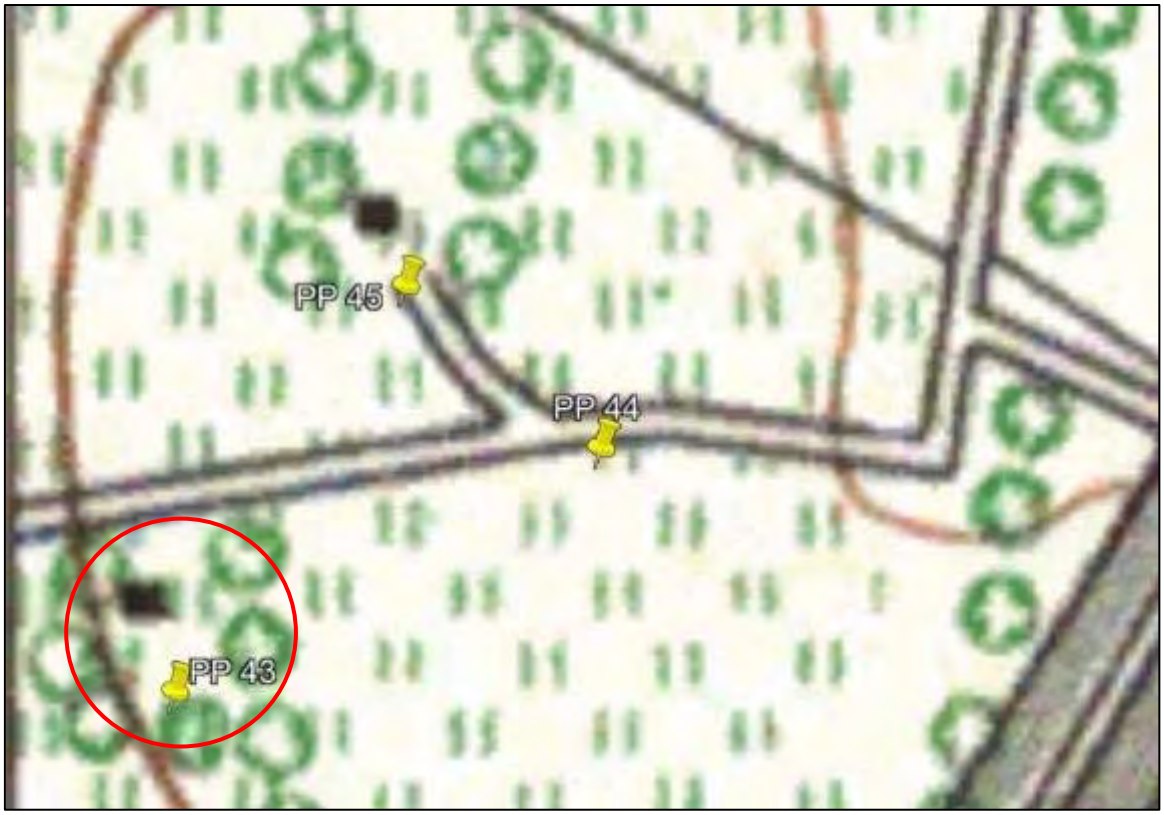

Figure 179 - View of the building (red polygon) depicted on the Second Edition of the 2530CA (Belfast) Topographical Map in proximity to the position of the demolished structure at site PP 43. This map was compiled in 1989.

6.2.44 PP 44

GPS Coordinates:

S 25.736880
E 30.003181

Type: Reservoirs with Associated Structures

Description:

The site consists of two circular cement reservoirs. Three delipidated brick buildings, with no roofs or windows, were also identified at the site. The site is believed to be younger than 60 years.

Significance:

The site is believed to be younger than 60 years. As a result, it is of **Low Significance** and is rated as **Generally Protected C (GP.C)**.

Site Extent:

The site is 30m x 30m.

Impact Assessment and Mitigation*:*

See Chapter 7 for impact assessment calculations and Chapter 8 for required mitigation measures

Figure 180 - General view of the site showing sections of the two reservoirs in the back with one of the associated brick buildings visible in the foreground.

Figure 181 – Anohter view of the site showing a reservoir and its associated buildings and structures.

6.2.45 PP 45

GPS Coordinates:

S 25.735982
E 30.001980

Type: Demolished Structure

Description:

The site consists of the remains of a demolished multi-roomed structure.

A building is depicted in proximity to this site on the Second Edition of the 2530CA (Belfast) Topographical Map that was compiled in 1989. This building is not depicted on the First Edition of this sheet that was surveyed in 1969. From this information it seems evident that the building at site PP 45 was built between 1969 and 1989. The building at site PP 45 is therefore younger than 60 years.

Significance:

The building at the site is completely demolished. It is also younger than 60 years. As a result, the site is of **Low Significance** and is rated as **Generally Protected C (GP.C)**.

Site Extent:

The site is 30m x 30m.

Impact Assessment and Mitigation*:*

See Chapter 7 for impact assessment calculations and Chapter 8 for required mitigation measures

Figure 182 - General view of the demolished structure at site PP 45.

Figure 183 - View of the building (red polygon) depicted on the Second Edition of the 2530CA (Belfast) Topographical Map in proximity to the position of the demolished structure at site PP 45. This map was compiled in 1989.

6.4 Palaeontology

The palaeontological Desktop Assessment (PDA) was compiled by Banzai Environmental (Butler, 2021). The text and figures provided in this chapter are derived from this specialist report. Refer **Appendix C**.

The proposed development is primarily underlain by the Vryheid Formation of the Ecca Group (Karoo Supergroup). According to the South African Heritage, Resources Information System the project area is located in an area with Very High sensitivity (red), as such the Palaeontological Sensitivity of these rocks is Very High.

The geology of the proposed Glisa EMP and IWUL Consolidated Project is depicted on the 1: 250 000 2528 Pretoria (1978) and 2530 Baberton (1986) Geological Map (Council for Geosciences, Pretoria. The area is underlain by rocks of the Transvaal Supergroup (Rooiberg and Pretoria Groups) that is overlain by the Vryheid Formation (Ecca Group, Karoo Supergroup). Isolated areas are mantled by Quaternary alluvium.

Quaternary superficial deposits are the youngest geological deposits formed during the most recent period of geological time (approximately 2.6 million years ago to the present). Most of the superficial deposits are unconsolidated sediments and consist of gravel, sand, silt and clay, and they form relatively thin, often discontinuous patches of sediments or larger spreads onshore. These sediments may include stream, channel and floodplain deposits, beach sand, talus gravels and glacial drift sediments (Partridge et al, 2006). Quaternary fossil assemblages are generally rare and low in diversity and occur over a wide-ranging geographic area. In the past palaeontologists did not focus on Caenozoic superficial deposits although they sometimes comprise of significant fossil deposits. These fossil assemblages resemble modern animals and may comprise of mammalian teeth, bones and horn corns, reptile skeletons and fragments of ostrich eggs. Microfossils, non-marine mollusc shells are also known as Quaternary deposits. Plant material such as foliage, wood, pollens and peats are recovered as well as trace fossils like vertebrate tracks, burrows, termitaria (termite heaps/ mounds) and rhizoliths (root casts).

As such it is recommended that an EIA level palaeontology report be conducted to assess the value and prominence of fossils in the development area and the effect of the proposed development on the palaeontological heritage. The purpose of the EIA Report is to elaborate on the issues and potential impacts identified during the scoping phase. A Phase 1 field-based assessment would be conducted with research in the site-specific study area, as well as a comprehensive assessment of the impacts identified during the scoping phase.

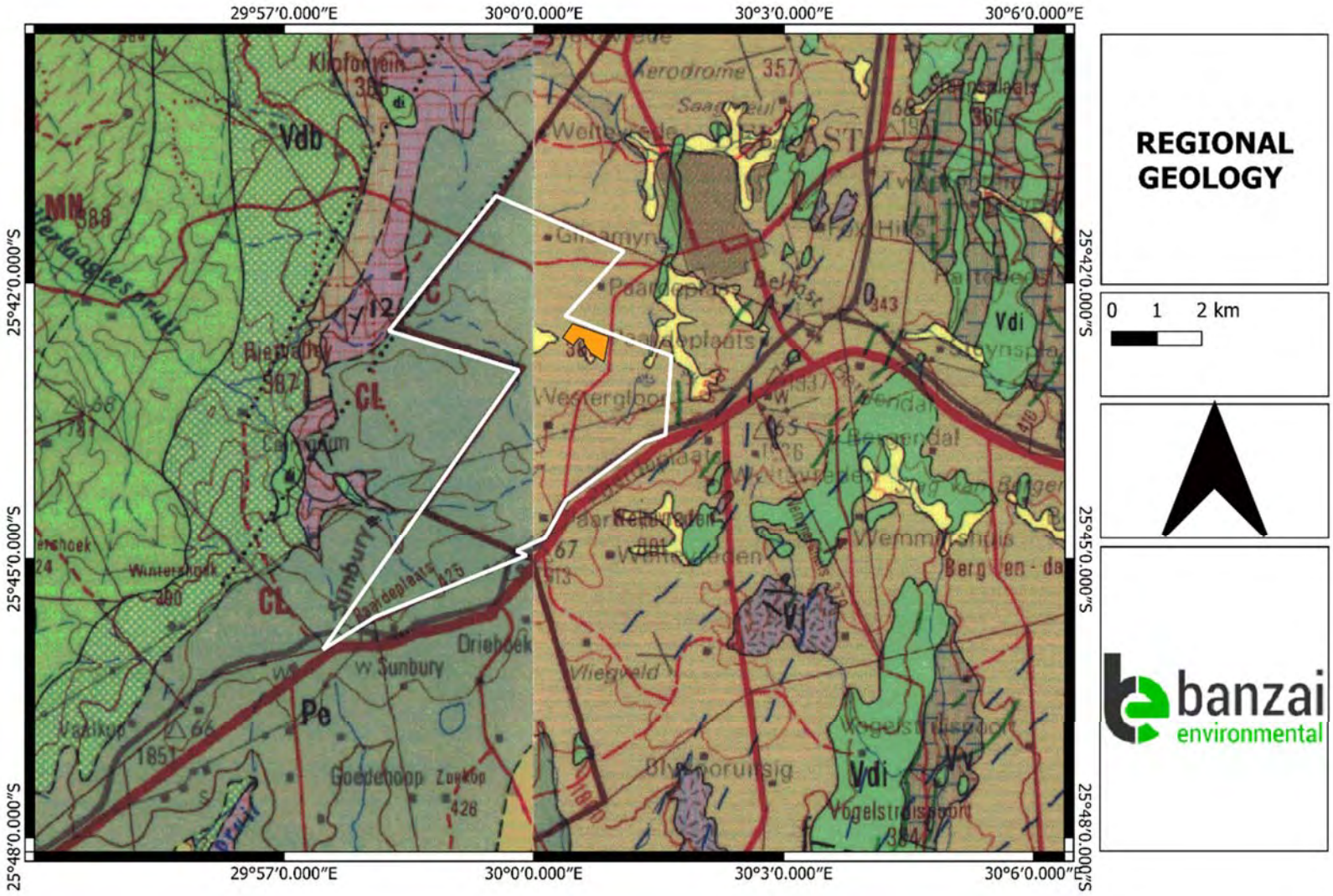

Figure 184 - Extract of the 2528 (Pretoria) and 2530 (Baberton) Geological Map (Council of Geoscience) indicating the surface geology of the proposed development in white and orange (Butler, 2021:12).

Table 19 - Legend to Map and short explanation (Modified from the 1:250 000 2528 Pretoria (1978) and 2530 Baberton (1986) Geological Map (Council for Geosciences, Pretoria)

Symbol	Lithology	Stratigraphy	Age
	Surface deposit, alluvium		Quaternary
	Shale, Shaley sandstone, grit, sandstone, conglomerate, coal in places near top and bottom	Vryheid Formation, Ecca Group, Karoo Supergroup	Permian
	Diabase		Vaalian to post Mogolian Age
	Volcanic rocks, pyroxene hornfels	Dullstroom Formation, Pretoria Group, Transvaal Supergroup	Vaalian
	Quartzite, subordinate shale	Steenkampsberg Formation, Pretoria Group, Transvaal Supergroup	

Vryheid Formation

The coalfields of South African occur in the Main Karoo Basin or its associated sub-basins. The Main Karoo Basin forms part of a series of Gondwanan basins that was established along the southern boundary of Gondwana (Cole, 1992; De Wit and Ransome 1992; Veevers *et al*. 1994; Catuneanu *et al*. 1998). These basins include Beacon Basin in Antarctica, Bowen Basin in Australia as well as the Paraná Basin in South America. The Basins were formed between the Late Carboniferous and Middle Jurassic and their joint stratigraphies portray the best non-marine sedimentation record globally.

Most of the coal mined in South Africa originates in the Permian Vryheid Formation (refer **Figure 184** below).

The **Vryheid Formation** comprises mudrock, rhythmite, siltstone and fine- to coarse-grained sandstone (pebbly in places). The Formation contains up to five (mineable) coal seams. The different lithofacies are mainly arranged in upward-coarsening deltaic cycles (up to 80m thick in the southeast). Fining-upward fluvial cycles, of which up to six are present in the east, are typically sheet-like in geometry, although some form valley-fill deposits. They comprise coarse-grained to pebbly, immature sandstones - with an abrupt upward transition into fine-grained sediments and coal seams.

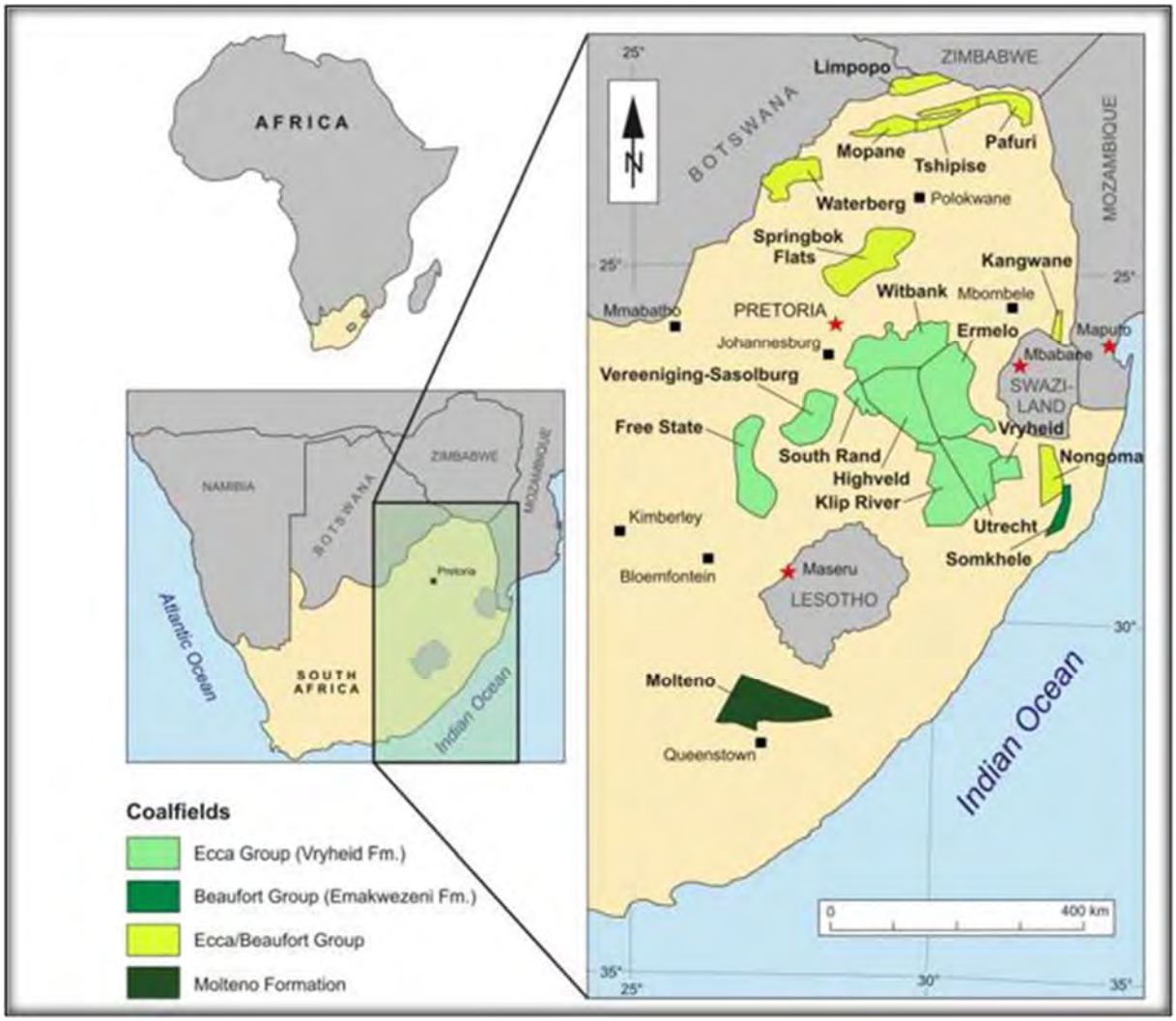

Figure 185 - Coalfields of Southern Africa, taken from Hancox and Götz (2014).

The Vryheid Formation comprise of a rich assemblage of Glossopteris flora. After continental deglaciation took place Gymnospermous glossopterids (Figure 6) dominated the peat and non-peat accumulating Permian wetlands (Falcon, 1986, Greb *et al*., 2006).

Recent paleobotanical studies in the Vryburg Formation include that of Bordy and Prevec (2008) and Prevec *et al.* (2008, 2009, 2010) and Prevec, (2011). Bamford (2011) described numerous plant fossils from this formation (e.g. *Azaniodendron fertile*, *Cyclodendron leslii, Sphenophyllum hammanskraalensis, Annularia sp., Raniganjia sp., Asterotheca spp., Liknopetalon enigmata, Hirsutum* sp., *Scutum* sp., *Ottokaria* sp., *Estcourtia* sp., *Arberia* sp., *Lidgetonnia* sp., *Noeggerathiopsis* sp., *Podocarpidites* sp as well as more than 20 Glossopteris species.

In the past, palynological studies have focused on the coal-bearing successions of the Vryheid Formation and include articles by Aitken (1994, 1998), and Millsteed (1994, 1999), while recent studies focussed on the Witbank Coalfield were conducted by Götz and Ruckwied (2014).

Table 20 - Ecca Group and Formations. (Modified from Johnson et al, 2006).

Period	Supergroup	Group	Formation West of 24º E	Formation East of 24º E	Formation Free State / KwaZulu Natal
Permian	Karoo Supergroup	Ecca Group	Waterford Formation	Waterford Formation	Volksrust Formation
			Tierberg / Fort Brown Formation	Fort Brown Formation	
			Laingsburg / Rippon Formation	Rippon Formation	Vryheid Formation
			Collingham Formation	Collingham Formation	Pietermaritzburg Formation
			Whitehill Formation	Whitehill Formation	
			Prince Albert Formation	Prince Albert Formation	Mbizane Formation

Bamford (2011) is of the opinion that only a small amount of data has been published on these potentially fossiliferous deposits and that most likely good material is present around coal mines and in other areas the exposures are poor and of little interest. When plant fossils do occur, they are usually abundant. According to Bamford, it is not feasible to preserve all the sites but in the interests of science these sites ought to be well documented, researched and the collected fossils must be housed in an accredited institution.

To date no fossil vertebrates have been collected from the Vryheid formation. The occurrence of fossil insects is rare, while palynomorphs are diverse. Fish scales and non-marine bivalves have been reported. Trace fossils are found abundantly but the diversity is low. The mesosaurid reptile, *Mesosaurus* (Figure 7) has been found in the southern parts of the basin but may also be present in other areas of the Vryheid formation. Regardless of the rare and irregular occurrence of fossils in this biozone, a single fossil may be of scientific value as many fossil taxa are known from a single fossil.

Figure 186 - Glossopteris leaf.

Figure 187 - Mesosaurus sp. (National Museum, Bloemfontein specimen NMQR 3536)

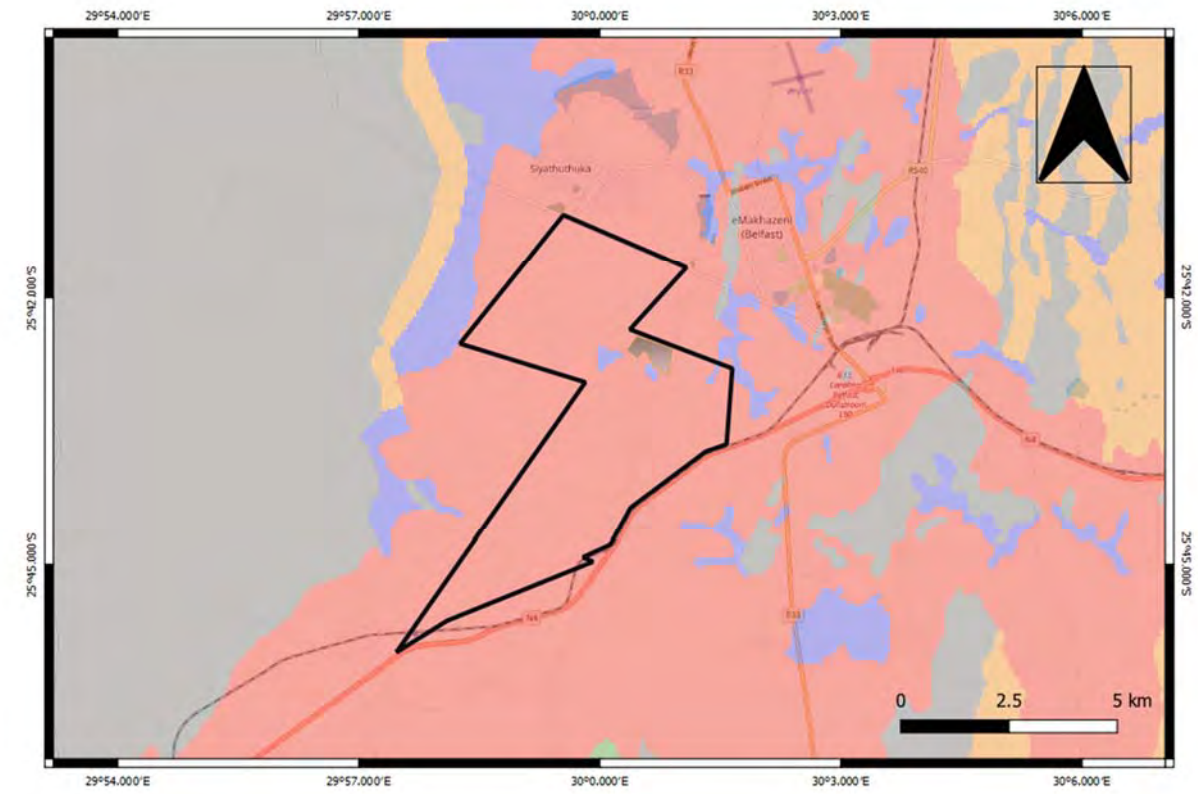

Figure 188 - Extract of the 1:250 000 SAHRIS PalaeoMap (Council of Geosciences) indicating the proposed development in graded colours (Butler, 2021:19).

Table 21 - SAHRIS Palaeosensitivity ratings table.

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.

7 ASSESSMENT OF IMPACT OF PROPOSED DEVELOPMENT

7.1 Introduction

In this section, an assessment will be made of the impact of the proposed development on the identified heritage sites. The following general observations will apply for the impact assessment undertaken in this report:

- Heritage sites assessed to have a low heritage significance are not included in these impact risk assessment calculations. The reason for this is that sites of low significance will not require mitigation. These sites are PP 01, PP 07, PP 08, PP 09, PP 18, PP 19, PP 20, PP 23, PP 24, PP 34, PP 35, PP 38, PP 39, PP 41, PP 42, PP 43, PP 44 & PP 45; and

- The only development footprint area that was assessed for the purposes of this study, is the proposed Discard Management Facility (DMF).

7.2 Assessment of Pre-Mitigation Impact of DMF on the Identified Heritage Sites

As indicated elsewhere, only the heritage impact of the proposed Discard Management Facility (DMF) is included in this assessment.

No heritage sites were identified within the proposed DMF area. Of the 45 heritage sites included in this report, only five are located within 1,000 meters of this proposed proposed development area. These five sites, with their respective distances from this proposed development area, are provided below.

- Site PP 31 (Burial Ground) – 158m east of the proposed development;
- Site PP 41 (Structure) – 199m south by south-east of the proposed development;
- Site PP 30 (Historic Farmstead) – 549m south-east of the proposed development;
- Site PP 3 (Burial Ground) – 930m south-west of the proposed development; and
- Site PP 32 (Historic Homestead with Possible Risk for Unmarked Graves) – 937m south-east of the proposed development.

From these distances it is evident that the construction of the proposed DMF will have no impact on any of the identified heritage sites.

Figure 189 – This image provides an overlay of the identified heritage sites over the proposed development footprint area of the DMF. As can be seen, none of the identified heritage sites are located within, or in close proximity to, this development footprint.

8 REQUIRED MITIGATION MEASURES

8.1 Introduction

In this chapter, required mitigation measures for each of the sites affected by the proposed development will be outlined. Please note the following:

- No mitigation is required for heritage sites assessed to have a low heritage significance. As a result, no mitigation is required for the following sites: PP 01, PP 07, PP 08, PP 09, PP 18, PP 19, PP 20, PP 23, PP 24, PP 34, PP 35, PP 38, PP 39, PP 41, PP 42, PP 43, PP 44 & PP 45;

- No heritage impact is expected as a result of the proposed development of the Discard Management Facility (DMF). As such, no mitigation is required for the construction of this DMF to continue;

- Site mitigation measures are outlined in this chapter. These mitigation measures would be required should any development footprints be proposed within 100m of the identified burial grounds and graves or within 50m of any other identified heritage sites that are of Medium Significance and higher. Refer **Section 8.2**; and

- General site mitigation measures are also required for the Possible Rock Art Site and sites comprising Historic Coal Mine Shafts. These general mitigation measures must be implemented as soon as possible and are not dependent on the expansion of development footprint areas. Refer **Section 8.3.**

8.2 Site Mitigation Measures

8.2.1 Graves and Burial Grounds

These sites are sites PP 2, PP 3, PP 4, PP 5, PP 10, PP 16, PP 28, PP 31 and PP 37.

As cemeteries and graves have Medium to High Heritage Significance, the best option is to change the development footprint to allow for the i*n situ* preservation of these sites. However, should it not be possible to preserve these sites in situ, the required mitigation measures are outlined below.

- A grave relocation process must be undertaken.
- A detailed social consultation process, at least 60 days in length, comprising the attempted identification of the next-of-kin in order to obtain their consent for the relocation.
- Bilingual site and newspaper notices indicating the intent of the relocation.
- Permits from all the relevant and legally required authorities.
- An exhumation process that keeps the dignity of the remains and family intact.

- An exhumation process that safeguards the legal rights of the families as well as that of the mining company.
- The process must be done by a reputable company well versed in the mitigation of graves.

8.2.2 Historic Homesteads and Structures with the Possible Risk for Unmarked Graves

These sites are PP 6, PP 11, PP 15, PP 16, PP 21, PP 22, PP 25, PP 26, PP 29, PP 32 and PP 40.

The following initial mitigation measure is required:

- A social consultation process to assess whether any local residents or the wider public is aware of the presence of graves at these sites.

Depending on the outcome of the social consultation process, three different outcomes would be the result, namely:

- Outcome 1: The social consultation absolutely confirms that no graves are located here.
- Outcome 2: The social consultation absolutely confirms that graves are located here.
- Outcome 3: The social consultation does not yield any confident results.

The following mitigation measures would be required for sites falling under Outcome 1:

- No further grave-related mitigation would be required.

The following mitigation measures would be required for sites falling under Outcome 2:

- A grave relocation process must be undertaken.
- A detailed social consultation process, at least 60 days in length, comprising the attempted identification of the next-of-kin in order to obtain their consent for the relocation.
- Bilingual site and newspaper notices indicating the intent of the relocation.
- Permits from all the relevant and legally required authorities.
- An exhumation process that keeps the dignity of the remains and family intact.
- An exhumation process that safeguards the legal rights of the families as well as that of the mining company.
- The process must be done by a reputable company well versed in the mitigation of graves.

The following mitigation measures would be required for sites falling under Outcome 3:

- Test excavations to physically confirm the presence or absence graves.
- If no evidence for graves is found, the site will fall within Outcome 1 as outlined above. This

means that no further mitigation measures would be required.

- If evidence for graves is found, the site will fall within Outcome 2 as outlined above. This means that a full grave relocation process must be implemented.

Additionally, the following mitigation measures must be undertaken for all these sites:

- All structures and site layouts from each site must be recorded using standard survey methods. The end result would be site layout plans for all these sites.
- A mitigation report must be compiled for these sites within which all the mitigation measures and its findings will be outlined. The recorded drawings from the previous item must also be included in this mitigation report.
- The completed mitigation report must be submitted to the relevant heritage authorities.

8.2.3 Historic Farmsteads and Historic Structures

The sites are PP 27 and PP 30.

The following mitigation measure are required:

- An architectural historical specialist must be appointed to undertake a specialist assessment of these sites.
- The recommendations made by the specialist must be implemented.

8.3 General Mitigation Measures

8.3.1 Possible Rock Art Site

The site is PP 4.

The following mitigation measures are required:

- A suitably qualified rock art specialist must be appointed to undertake a specialist assessment of the site.
- The recommendations made by the specialist must be implemented.

8.3.2 Historic Coal Mine Shafts and Associated Structures

The sites are PP 12, PP 13, PP 17, PP 33 and PP 36.

The following mitigation measures are required for these sites:

- Due to the uniqueness of these historic coal mine shafts, every attempt must be made to preserve them *in situ*.

The following general mitigation measures, which forms part of the *in situ* management measures of these sites, must be undertaken:

- These mine shafts must be recorded by way of site plans and photographs.
- Archival and historical research must be undertaken on the history of these very old mine shafts.
- A mitigation report must be compiled for these sites within which the recorded drawings, photographs and history of these shafts must be compiled.
- The completed mitigation report must be submitted to the relevant heritage authorities (SAHRA).

9 CONCLUSIONS AND RECOMMENDATIONS

9.1 Introduction

PGS Heritage (Pty) Ltd (PGS) was appointed by CIGroup Environmental (Pty) Ltd (CIGroup) to undertake a Heritage Impact Assessment (HIA) for the Glisa and Paardeplaats Sections of the NBC Colliery (NBC). The project area is located near (eMakhazeni) Belfast and is situated in the eMakhazeni Local Municipality, Nkangala District Municipality, Mpumalanga Province

9.2 Project Description

The following information was provided by CIGroup. NBC consists of three (3) mining sections namely the Eerstelingsfontein Section, the Glisa Section, and the Paardeplaats Section. The focus of this assessment will be on the Glisa and Paardeplaats Sections.

The Section 102 Consolidation and IEA application focus on the following:

- Consolidation of the Glisa Section Mining Right (MR) and Environmental Management Plan (EMP) into the Paardeplaats Section (MP 30/5/1/2/2/10090 MR);
- Inclusion of Portion 24 of the farm Paardeplaats 380 JT into the Paardeplaats Section MR; and
- IEA for listed activities triggered in terms of the NEMA and National Environmental Management: Waste Act, 2008 (Act No. 59 of 2008) (NEMA:WA) within the MR areas and Portion 24 of the farm Paardeplaats 380 JT1.

NBC require the following changes to existing infrastructure:

- Expansion of the Crushing, Screening and Washing Plant (CSWP) on Portion 3 and 4 of the farm Paardeplaats 380 JT;
- Expansion of the existing Water Treatment Plant (WTP) pipeline network on all farm portions associated with the Integrated Paardeplaats Section; and
- Widening of haul roads between the mining sections and processing plants

9.3 Scope of Work

PGS's scope of work was to undertake intensive walkthroughs of the proposed Discard Management Facility (DMF) coupled with revisits to the heritage sites identified by PGS during a previous study undertaken in 2012. This report and its recommendations are based on only this scope of work.

9.4 General Desktop Study

An archaeological and historical desktop study was undertaken of the project area and surrounding landscape (refer to **Chapter 5**). An archaeological and historical overview was compiled, which was augmented by an assessment of previous archaeological and heritage studies completed for the study area and surrounding landscape. Furthermore, an assessment was made of the early editions of the relevant topographic maps.

9.5 Associated Reports and Processes

PGS completed a Heritage Impact Assessment for the proposed Exxaro Paardeplaats project in 2012. The current report represents an amendment as well as verification of the sites identified in 2012. During the fieldwork for the 2012 study, a total of 32 heritage sites, including 22 heritage structures, seven cemeteries and three areas with historical mining shafts were identified. Although additional walkthroughs were also undertaken for the proposed DMF area, this report is largely based on the original fieldwork findings.

9.6 Fieldwork

The fieldwork comprised a field assessment of the study area undertaken primarily by foot and vehicle over the course of three days by an experienced fieldwork team from PGS consisting of an archaeologist (Cherene de Bruyn) and two field assistants (Michelle Sacshe and Thomas Mulaudzi). The fieldwork was undertaken from Monday, 19 April 2021 to Wednesday 21 April 2021.

As almost the entire project area had been intensively assessed as part of a previous HIA study by PGS, the focus on the current fieldwork was on revisiting all the heritage sites that were identified in the previous report and also undertaking intensive walkthroughs of a small section that is now earmarked for the development of a Discard Management Facility (DMF).

As part of the current fieldwork, revisits and verification of the location and state of the 32 heritage sites that were identified in 2012 were conducted. These previously identified sites are numbered PP 01 to PP 32. As part of the current fieldwork, an additional 13 heritage sites (PP33 to PP45) were identified. The table below provides a summary of all the heritage sites.

Table 22 – Heritage Sites identified within the Study Area

Site Number	Coordinates	Site Type	Significance
PP 1	S 25.725820 E 30.002610	Demolished Historic Farmstead	Low (GP.C)
PP 2	S 25.729890 E 30.002260	Burial Ground	Medium to High (GP.A)

PP 3	S 25.719080 E 30.004140	Burial Ground	Medium to High (GP.A)
PP 4	S 25.744150 E 29.985790	Burial Ground	Medium to High (GP.A)
PP 5	S 25.725210 E 30.015120	Burial Ground	Medium to High (GP.A)
PP 6	S 25.728000 E 30.010130	Historic Homesteads and Structures with the Possible Risk for Unmarked Graves	Medium (GP.B)
PP 7	S 25.743270 E 30.003010	Demolished Historic Structures	Low (GP.C)
PP 8	S 25.743800 E 30.002360	Demolished Historic Farmstead	Low (GP.C)
PP 9	S 25.742100 E 30.004780	Demolished Historic Structure	Low (GP.C)
PP 10	S 25.750780 E 29.989940	Single Grave	Medium to High (GP.A)
PP 11	S 25.751030 E 29.989600	Historic Farmstead and Structures with the Possible Risk for Unmarked Graves	Medium (GP.B)
PP 12	S 25.745950 E 29.974200	Historic Coal Mine Shaft	Medium to High (GP.A)
PP 13	S 25.748830 E 29.974700	Historic Coal Mine Shaft	Medium to High (GP.A)
PP 14	S 25.752210 E 29.978990	Possible Rock Art Site	Medium to High (GP.A)
PP 15	S 25.754350 E 29.983240	Historic Homesteads and Structures with the Possible Risk for Unmarked Graves	Medium (GP.B)
PP 16	S 25.752990 E 29.982910	Historic Homestead with Graves and the Possible Risk for Unmarked Graves	Medium to High (GP.A)
PP 17	S 25.748830 E 29.974700	Historic Coal Mine Shaft	Medium to High (GP.A)
PP 18	S 25.760100 E 29.966720	Animal Drinking Trough	Low (GP.C)
PP 19	S 25.759800 E 29.966230	Demolished Historic Structure	Low (GP.C)
PP 20	S 25.761510 E 29.965360	Reservoir with Associated Structures	Low (GP.C)

PP 21	S 25.761660 E 29.964650	Historic Homesteads and Structures with the Possible Risk for Unmarked Graves	Medium (GP.B)
PP 22	S 25.761690 E 29.963750	Historic Homesteads and Structures with the Possible Risk for Unmarked Graves	Medium (GP.B)
PP 23	S 25.761660 E 29.964650	Demolished Historic Structure (before 2012)	Low (GP.C)
PP 24	S 25.762720 E 29.961770	Sunbury Railway Station	Low (GP.C)
PP 25	S 25.732420 E 29.993510	Historic Homesteads and Structures with the Possible Risk for Unmarked Graves	Medium (GP.B)
PP 26	S 25.734280 E 29.993040	Historic Homesteads and Structures with the Possible Risk for Unmarked Graves	Medium (GP.B)
PP 27	S 25.735080 E 29.993410	Historic Structure	Medium (GP.B)
PP 28	S 25.736050 E 29.993310	Burial Ground	Medium to High (GP.A)
PP 29	S 25.726980 E 29.989670	Historic Homesteads and Structures with the Possible Risk for Unmarked Graves	Medium (GP.B)
PP 30	S 25.718530 E 30.017220	Historic Farmstead	Medium (GP.B)
PP 31	S 25.711330 E 30.016450	Burial Ground	Medium to High (GP.A)
PP 32	S 25.723070 E 30.015850	Historic Homesteads and Structures with the Possible Risk for Unmarked Graves	Medium (GP.B)
PP 33	S 25.748624 E 29.974775	Historic Structure	Medium (GP.B)
PP 34	S 25.742500 E 30.002855	Demolished Structure	Low (GP.C)
PP 35	S 25.743408 E 30.001842	Contemporary Farmstead	Low (GP.C)
PP 36	S 25.754370 E 29.981422	Historic Coal Mine Shaft	Medium to High (GP.A)
PP 37	S 25.750654 E 29.989601	Single Grave	Medium to High (GP.A)
PP 38	S 25.729260 E 30.013751	Reservoir with Associated Structures	Low (GP.C)

PP 39	S 25.726835 E 30.010754	Reservoir with Associated Structures	Low (GP.C)
PP 40	S 25.735453 E 29.995204	Historic Homestead with the Possible Risk for Unmarked Graves	Medium (GP.B)
PP 41	S 25.716593 E 30.014553	Structure	Low (GP.C)
PP 42	S 25.726796 E 30.002923	Animal Drinking Trough	Low (GP.C)
PP 43	S 25.738228 E 30.000564	Demolished Structure	Low (GP.C)
PP 44	S 25.736880 E 30.003181	Reservoirs with Associated Structures	Low (GP.C)
PP 45	S 25.735982 E 30.001980	Demolished Structure	Low (GP.C)

9.7 Palaeontology

The palaeontological Desktop Assessment (PDA) was conducted by Banzai Environmental (Butler, 2021). The proposed development is primarily underlain by the Vryheid Formation of the Ecca Group (Karoo Supergroup). According to the South African Heritage Resources Information System the project area is located in an area with Very High sensitivity (red), as such the Palaeontological Sensitivity of project area is Very High.

As such, a full Environmental Impact Assessment (EIA) level Palaeontological Impact Assessment (PIA) report is recommended to assess the value and prominence of fossils in the development area and the effect of the proposed development on the palaeontological heritage.

9.8 Impact of Proposed Development and Mitigation

An overlay of the identified archaeological and heritage sites over the proposed development footprint area for the DMF was made. It was established that none of the identified heritage sites are located within 100m of the proposed development of the DMF. As a result, no impact is expected as a result of the proposed development of the DMF. Refer **Chapter 7**.

Please note the following regarding heritage mitigation:

- No mitigation is required for heritage sites assessed to have a low heritage significance. As a result, no mitigation is required for the following sites: PP 01, PP 07, PP 08, PP 09,

PP 18, PP 19, PP 20, PP 23, PP 24, PP 34, PP 35, PP 38, PP 39, PP 41, PP 42, PP 43, PP 44 & PP 45;

- No heritage impact is expected as a result of the proposed development of the Discard Management Facility (DMF);

- Site mitigation measures are outlined in **Chapter 8**. These mitigation measures would be required should any development footprints be proposed within 100m of the identified burial grounds and graves or within 50m of the other identified heritage sites that are of Medium Significance and higher. Refer **Section 8.2**; and

- General site mitigation measures are also required for the Possible Rock Art Site and sites comprising Historic Coal Mine Shafts. These general mitigation measures must be implemented as soon as possible and are not dependant on the expansion of development footprint areas. Refer **Section 8.3.**

9.9 Conclusions

The unmitigated impact of the proposed development of the DMF is not expected to result in any heritage impacts. As a result, on the condition that the recommendations made in this report are adhered to, no heritage reasons can be given for the development of the DMF not to continue.

10 PREPARERS

This Heritage Impact Assessment was written by the following preparers:

- Polke Birkholtz – Project Manager / Archaeologist - Co-Author
- Cherene de Bruyn – Archaeologist – Author

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11.3 Old Topographic Maps

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

11.4 Internet

www.sanbi.org

https://screening.environment.gov.za/screeningtool/#/pages/welcome

http://www.c20fireplaces.co.uk/information/history-twentieth-century-fireplaces-1905-1939
www.sahistory.org.za

11.5 Google Earth

At least some of the aerial depictions of the study área were obtained using Google Earth.

Appendix A

HERITAGE MANAGEMENT GUIDELINES

1. General Management Guidelines

1. The National Heritage Resources Act (Act 25 of 1999) states that, any person who intends to undertake a development categorised as-

   (a) the construction of a road, wall, transmission line, pipeline, canal or other similar form of linear development or barrier exceeding 300m in length;
   (b) the construction of a bridge or similar structure exceeding 50m in length;
   (c) any development or other activity which will change the character of a site-

      (i) exceeding 5 000 m^2 in extent; or
      (ii) involving three or more existing erven or subdivisions thereof; or
      (iii) involving three or more erven or divisions thereof which have been consolidated within the past five years; or
      (iv) the costs of which will exceed a sum set in terms of regulations by SAHRA or a provincial heritage resources authority;

   (d) the re-zoning of a site exceeding 10 000 m^2 in extent; or
   (e) any other category of development provided for in regulations by SAHRA or a provincial heritage resources authority, must at the very earliest stages of initiating such a development, notify the responsible heritage resources authority and furnish it with details regarding the location, nature and extent of the proposed development.

In the event that an area previously not included in an archaeological or cultural resources survey is to be disturbed, the SAHRA needs to be contacted. An enquiry must be lodged with them into the necessity for a Heritage Impact Assessment.

2. In the event that an additional heritage assessment is required, it is advisable to utilise a qualified heritage practitioner, preferably registered with the Cultural Resources Management Section (CRM) of the Association of Southern African Professional Archaeologists (ASAPA). This survey and evaluation must include:

   (a) The identification and mapping of all heritage resources in the area affected;
   (b) An assessment of the significance of such resources in terms of the heritage assessment criteria set out in section 6 (2) or prescribed under section 7 of the National Heritage Resources Act;
   (c) An assessment of the impact of the development on such heritage resources;
   (d) An evaluation of the impact of the development on heritage resources relative to the sustainable social and economic benefits to be derived from the development;
   (e) The results of consultation with communities affected by the proposed development and other interested parties regarding the impact of the development on heritage resources;

(f) If heritage resources will be adversely affected by the proposed development, the consideration of alternatives; and
(g) Plans for mitigation of any adverse effects during and after the completion of the proposed development.

1. In the event that a possible find is discovered during construction, the following steps must be taken:

   (a) All activities must be halted in the area of the discovery and a qualified archaeologist contacted;
   (b) The archaeologist needs to evaluate the finds on site and make recommendations towards possible mitigation measures;
   (c) If mitigation is necessary, an application for a rescue permit must be lodged with SAHRA; and
   (d) After mitigation, an application must be lodged with SAHRA for a destruction permit. This application must be supported by the mitigation report generated during the rescue excavation. Only after the permit is issued may such a site be destroyed.

2. In the case where a grave is identified during construction, the following measures must be taken:

   (a) Upon the accidental discovery of graves, a buffer of at least 20 meters should be implemented;
   (b) If graves are accidentally discovered during construction, activities must cease in the area and a qualified archaeologist be contacted to evaluate the find;
   (c) To remove the remains, a permit must be applied for from SAHRA and other relevant authorities. The local South African Police Services must immediately be notified of the find; and
   (d) Where it is recommended that the graves be relocated, a full grave relocation process that includes a comprehensive social consultation must be followed. Such a grave relocation process must include the following:

      (i) A detailed social consultation process that aims to trace the next-of-kin and obtain their consent for the relocation of the graves, that will be at least 60 days in length;
      (ii) Site notices indicating the intent of the relocation;
      (iii) Newspaper notices indicating the intent of the relocation;
      (iv) Permits from the relevant permitting authorities, including the local authority; the Provincial Department of Health; the South African Heritage Resources Agency (SAHRA) (if the graves are older than 60 years or unidentified and thus presumed older than 60 years) etc.

(vii) An exhumation process that keeps the dignity of the remains intact;

(viii) The whole process must be done by a reputable company that is well versed in relocations; and

(ix) The exhumation process must be conducted in such a manner as to safeguard the legal rights of the families as well as that of the mining company.

PGS Heritage can be contacted on the way forward in this regard.

Table 23: Roles and responsibilities of archaeological and heritage management

ROLE	RESPONSIBILITY	IMPLEMENTATION
A responsible specialist needs to be allocated and should attend all relevant meetings, especially when changes in design are discussed, and liaise with SAHRA.	The client	Archaeologist and a competent archaeological support team
If chance finds and/or graves or burial grounds are identified during construction or operational phases, a specialist must be contacted for evaluation.	The client	Archaeologist and a competent archaeological support team
Comply with defined national and local cultural heritage regulations on management plans for identified sites.	The client	Environmental Consultancy and the Archaeologist
Consult the managers, local communities and other key stakeholders on mitigation of archaeological sites.	The client	Environmental Consultancy and the Archaeologist
Implement additional programs, as appropriate, to promote the safeguarding of our cultural heritage.	The client	Environmental Consultancy and the Archaeologist
If required, conservation or relocation of burial grounds and/or graves according to the applicable regulations and legislation.	The client	Archaeologist, and/or competent authority for relocation services
Ensure that recommendations made in the Heritage Report are adhered to.	The client	The client
Provision of services and activities related to the management and monitoring of significant archaeological sites.	The client	Environmental Consultancy and the Archaeologist

After the specialist/archaeologist has been appointed, comprehensive feedback reports should be submitted to relevant authorities during each phase of development.	Client and Archaeologist	Archaeologist

Appendix B

PROFESSIONAL CURRICULUM
FOR POLKE DOUSSY BIRKHOLTZ

Name: *Polke Doussy Birkholtz*

Date & Place of Birth: *9 February 1975 – Klerksdorp, North West Province, South Africa*

Place of Tertiary Education & Dates Associated:

Institution: University of Pretoria
Qualification: BA (Cum Laude) - Bachelor of Arts Specializing in Archaeology, History & Anthropology
Date: 1996

Institution: University of Pretoria
Qualification: BA Hons (Cum Laude) - Bachelor of Arts with Honours Degree Specializing in Archaeology
Date: 1997

Qualifications:

BA	-	Degree specialising in Archaeology, History and Anthropology
BA Hons	-	Professional Archaeologist

Memberships:

Association of Southern African Professional Archaeologists (ASAPA)
Professional Member of the CRM Section of ASAPA

Overview of Post Graduate Experience:

1997 – 2000 – Member/Archaeologist – Archaeo-Info
2001 – 2003 – Archaeologist/Heritage Specialist – Helio Alliance
2000 – 2008 – Member/Archaeologist/Heritage Specialist – Archaeology Africa
2003 - Present – Director / Archaeologist / Heritage Specialist – PGS Heritage

Languages: English: Speak, Read & Write & Afrikaans: Speak, Read & Write

Total Years' Experience: 19 Years

Experience Related to the Scope of Work:

- Polke has worked as a **HERITAGE SPECIALIST / ARCHAEOLOGIST / HISTORIAN** on more than 300 projects and acted as **PROJECT MANAGER** on almost all of these projects. His experience includes the following:

    - Development of New Sedimentation and Flocculation Tanks at Rand Water's Vereeniging Pumping Station, Vereeniging, Gauteng Province. Heritage Impact Assessment for *Greenline*.
    - EThekwini Northern Aqueduct Project, Durban, KwaZulu-Natal. Heritage Impact Assessment for *Strategic Environmental Focus*.
    - Johannesburg Union Observatory, Johannesburg, Gauteng Province. Heritage Inventory for *Holm Jordaan*.
    - Development at Rand Water's Vereeniging Pumping Station, Vereeniging, Gauteng Province. Heritage Impact Assessment for *Aurecon*.
    - Comet Ext. 8 Development, Boksburg, Gauteng Province. Phase 2 Heritage Impact Assessment for *Urban Dynamics*.
    - Randjesfontein Homestead, Midrand, Gauteng Province. Baseline Heritage Assessment with Nkosinathi Tomose for Johannesburg City Parks.
    - Rand Leases Ext. 13 Development, Roodepoort, Gauteng Province. Heritage Impact Assessment for *Marsh*.
    - Proposed Relocation of the Hillendale Heavy Minerals Plant (HHMP) from Hillendale to Fairbreeze, KwaZulu-Natal. Heritage Impact Assessment for *Goslar Environmental*.
    - Portion 80 of the farm Eikenhof 323 IQ, Johannesburg, Gauteng Province. Heritage Inventory for *Khare Incorporated*.
    - Comet Ext. 14 Development, Boksburg, Gauteng Province. Heritage Impact Assessment for *Marsh*.
    - Rand Steam Laundries, Johannesburg, Gauteng Province. Archival and Historical Study for *Impendulo* and *Imperial Properties*.
    - Mine Waste Solutions, near Klerksdorp, North West Province. Heritage Inventory for *AngloGold Ashanti*.
    - Consolidated EIA and EMP for the Kroondal and Marikana Mining Right Areas, North West Province. Heritage Impact Assessment for *Aquarius Platinum*.
    - Wilkoppies Shopping Mall, Klerksdorp, North West Province. Heritage Impact Assessment for the *Center for Environmental Management*.
    - Proposed Vosloorus Ext. 24, Vosloorus Ext. 41 and Vosloorus Ext. 43 Developments, Ekurhuleni District Municipality, Gauteng Province. Heritage Impact Assessment for *Enkanyini Projects*.
    - Proposed Development of Portions 3, 6, 7 and 9 of the farm Olievenhoutbosch 389 JR, City of Tshwane Metropolitan Municipality, Gauteng Province. Heritage Impact Assessment for *Marsh*.

- Proposed Development of Lotus Gardens Ext. 18 to 27, City of Tshwane Metropolitan Municipality, Gauteng Province. Heritage Impact Assessment for *Pierre Joubert*.
- Proposed Development of the site of the old Vereeniging Hospital, Vereeniging, Gauteng Province. Heritage Scoping Assessment for *Lekwa*.
- Proposed Demolition of an Old Building, Kroonstad, Free State Province. Phase 2 Heritage Impact Assessment for *De Beers Consolidated Mines*.
- Proposed Development at Westdene Dam, Johannesburg, Gauteng Province. Heritage Impact Assessment for *Newtown*.
- West End, Central Johannesburg, Gauteng Province. Phase 1 Heritage Impact Assessment for the *Johannesburg Land Company*.
- Kathu Supplier Park, Kathu, Northern Cape Province. Heritage Impact Assessment for *Synergistics*.
- Matlosana 132 kV Line and Substation, Stilfontein, North West Province. Heritage Impact Assessment for *Anglo Saxon Group* and *Eskom*.
- Marakele National Park, Thabazimbi, Limpopo Province. Cultural Resources Management Plan for *SANParks*.
- Cullinan Diamond Mine, Cullinan, Gauteng Province. Heritage Inventory for *Petra Diamonds*.
- Highveld Mushrooms Project, Pretoria, Gauteng Province. Heritage Impact Assessment for *Mills & Otten*.
- Development at the Reserve Bank Governor's Residence, Pretoria, Gauteng Province. Archaeological Excavations and Mitigation for the *South African Reserve Bank*.
- Proposed Stones & Stones Recycling Plant, Johannesburg, Gauteng Province. Heritage Scoping Report for *KV3*.
- South East Vertical Shaft Section of ERPM, Boksburg, Gauteng Province. Heritage Scoping Report for *East Rand Proprietary Mines*.
- Proposed Development of the Top Star Mine Dump, Johannesburg, Gauteng Province. Detailed Archival and Historical Study for *Matakoma.*
- Soshanguve Bulk Water Replacement Project, Soshanguve, Gauteng Province. Heritage Impact Assessment for *KWP*.
- Biodiversity, Conservation and Participatory Development Project, Swaziland. Archaeological Component for *Africon*.
- Camdeboo National Park, Graaff-Reinet, Eastern Cape Province. Cultural Resources Management Plan for *SANParks*.
- Main Place, Central Johannesburg, Gauteng Province. Phase 1 Heritage Impact Assessment for the *Johannesburg Land Company*.
- Modderfontein Mine, Springs, Gauteng Province. Detailed Archival and Historical Study for *Consolidated Modderfontein Mines.*
- Proposed New Head Office for the Department of Foreign Affairs, Pretoria, Gauteng Province. Heritage Impact Assessment for *Holm Jordaan Group*.

- Proposed Modification of the Lukasrand Tower, Pretoria, Gauteng Province. Heritage Assessment for IEPM.
- Proposed Road between the Noupoort CBD and Kwazamukolo, Northern Cape Province. Heritage Impact Assessment for *Gill & Associates*.
- Proposed Development at the Johannesburg Zoological Gardens, Johannesburg, Gauteng Province. Detailed Archival and Historical Study for *Matakoma.*

- Polke's **KEY QUALIFICATIONS:**

  - Project Management
  - Archaeological and Heritage Management
  - Archaeological and Heritage Impact Assessment
  - Archaeological and Heritage Fieldwork
  - Archival and Historical Research
  - Report Writing

- Polke's **INFORMATION TECHNOLOGY EXPERIENCE:**

  - *MS Office – Word, Excel, & Powerpoint*
  - *Google Earth*
  - *Garmin Mapsource*
  - *Adobe Photoshop*
  - *Corel Draw*

PROFESSIONAL CURRICULUM FOR CHERENE DE BRUYN

Professional Archaeologist for PGS Heritage

2016-2017	MA in Archaeology University College London, United Kingdom
2015	BSC Honours in Physical Anthropology, University of Pretoria, South Africa
2013	BA Honours in Archaeology University of Pretoria, South Africa
2010-2012	BA (General) University of Pretoria, South Africa Major subjects: Archaeology and Anthropology

PROFESSIONAL QUALIFICATIONS:

- Association of Southern African Professional Archaeologists - Professional Member (#432)
- International Association for Impact Assessment South Africa - Member (#6082)
- Association of Southern African Professional Archaeologists - CRM Accreditation
    - Principal Investigator: Grave relocation
    - Field Director: Colonial period archaeology, Iron Age archaeology
    - Field Supervisor: Rock art, Stone Age archaeology
    - Laboratory Specialist: Human Skeletal Remains
- KZN Amafa and Research Institute - Accredited Professional Heritage Practitioner

Languages:
Afrikaans & English

SUMMARY OF EXPERIENCE
Expertise in Heritage Impact Assessment Management, Historical and Archival Research, Archaeology, Physical Anthropology, Grave Relocations, Fieldwork, Geographic Information Systems and Project Management including *inter alia* -

Involvement in various grave relocation projects

- Grave exhumation, test excavations and grave “rescue” excavations in the various provinces of South Africa.
- Permit applications with SAHRA BGG and AMAFA, including relevant Munciplaities and Authorities for grave relocation projects.

Involvement with various Heritage Impact Assessments,

- Heritage Impact Assessments and Management for various projects within Eastern Cape, Free State, Gauteng, KwaZulu-Natal, Limpopo, Mpumalanga, Northern Cape, North West and Western Cape Province.
- Archaeological Walkdowns for various projects.
- Instrument Survey and recording for various projects.
- Desktop, archival and heritage screening for projects.

INFORMATION TECHNOLOGY EXPERIENCE:

- MS Office – Word, Excel, Publisher & Powerpoint
- Google Earth
- QGIS, ArcGIS Online, ArcGIS Collector
- Inkscape

Heritage Assessment Projects
Below a selected list of Heritage Impact Assessments (HIA) Projects involvement:

- Heritage Management Plan for the proposed development of the 305MW Oya solar photovoltaic (PV) facility and associated infrastructure near Matjiesfontein, Western Cape.
- Heritage Impact Assessment for the Proposed Township Establishment on the Remainder of Portion 8 of the Farm Boschoek 103 JQ, near Boschoek, North West Province.
- The Proposed Irenedale Water Pipeline Between Bosjesspruit Colliery And A Local Reservoir, Located In The Lekwa Local Municipality And The Govan Mbeki Local Municipality, Gert Sibande District Municipality, Mpumalanga Province.
- Heritage Impact Assessment for the proposed development of the Msobo Coal Tselentis Colliery: Albion Opencast project, Near Breyten, Mpumalanga Province.
- Heritage Impact Assessment for the proposed development of an Airport For Kolomela Mine In Postmasburg, Northern Cape.
- Heritage Impact Assessment for the Proposed South African Coal Estates (SACE) Clydesdale Pit Project, near Emalahleni, Mpumalanga Province.
- Heritage Impact Assessment for the Amendment of the Mogalakwena Mine Expansion Project, near Mokopane, Limpopo Province.
- Heritage Impact Assessment for the Mogalakwena Mine Integrated Permitting Project near Mokopane, Limpopo Province.
- Heritage Impact Assessment for the Proposed Solar PV Plant at Armoede, near Mokopane, Limpopo Province.
- Heritage Impact Assessment for the Proposed New Cargo Precinct For The O.R. Tambo International Airport On The Farm Witkoppie 64, Gauteng Province.
- Heritage Impact Assessment for the upgrade of road d4407 between Hluvukani and Timbavati, road d4409 at Welverdiend and road d4416/2 between Welverdiend and road P194/1 in the Bohlabela region of the Mpumalanga Province.
- Heritage Impact Assessment for the proposed Piggery on Portion 46 of the farm Brakkefontien 416, within the Nelson Mandela Bay Municipality, Eastern Cape.
- Heritage Impact Assessment for proposed development On Erf 30, Letamo Town, Farm Honingklip 178 Iq, Mogale Local Municipality, Gauteng Province.
- Heritage Impact Assessment for the proposed Prospecting Right Application on the Farm Reserve No 4 15823 And 7638/1, near St Lucia, within the jurisdiction of the Mfolozi Local Municipality in the King Cetshwayo District Municipality, KwaZulu-Natal Province.

Grave Relocation Projects

Below, a selection of grave relocation projects involvement:

- Report On Test Excavations. Ivn_078 Maruma Graves, Farm Turfspruit 241 Kr, Mokopane, Limpopo Province. Test Excavation Of Possible Burial Ground As Identified By The Maruma Family.
- Relocation Of Two Infant Graves From The Farm Wonderfontein 428 Js, Belfast, Mpumalanga Province.
- Relocation Of Approximately 4 Stillborn Graves From Farm Wonderfontein 428 Js, Umsimbithi Mining (Pty) Ltd, Belfast, Chief Albert Luthuli Local Municipality, Mpumalanga Province.

EMPLOYMENT SUMMARY:

Positions Held

- 2020 – to date: Archaeologist - PGS Heritage (Pty) Ltd
- 2018 – 2019: Manager of the NGT ESHS Heritage Department – NGT Holdings (Pty) Ltd
  Archaeologist and Heritage Consultant – NGT Holdings (Pty) Ltd
- 2015-2016: Archaeological Contractor - BA3G, University of Pretoria
- 2014 – 2015: DST-NRF Archaeological Intern, Forensic Anthropological Research Centre

Appendix C

PALAEONTOLOGICAL REPORT

PALAEONTOLOGICAL DESKTOP ASSESSMENT FOR THE PROPOSED GLISA EMP AND IWUL CONSOLIDATED PROJECT NEAR EMAKHAZENI (BELFAST), IN MPUMALANGA

Issue Date: **30 April 2021**
Revision No.: v0.1
Client:
PGS Project No: 524HIA - Paardeplaats

PGS HERITAGE
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Head Office:
906 Bergarend Streets
Waverley, Pretoria,
South Africa
Offices in South Africa, Kingdom of Lesotho and Mozambique
Directors: HS Steyn, PD Birkholtz, W Fourie

Declaration of Independence

I, Elize Butler, declare that –

General declaration:

- I act as the independent palaeontological specialist in this application
- I will perform the work relating to the application in an objective manner, even if this results in views and findings that are not favorable to the applicant
- I declare that there are no circumstances that may compromise my objectivity in performing such work;
- I have expertise in conducting palaeontological impact assessments, including knowledge of the Act, Regulations and any guidelines that have relevance to the proposed activity;
- I will comply with the Act, Regulations and all other applicable legislation;
- I will take into account, to the extent possible, the matters listed in section 38 of the NHRA when preparing the application and any report relating to the application;
- I have no, and will not engage in, conflicting interests in the undertaking of the activity;
- I undertake to disclose to the applicant and the competent authority all material information in my possession that reasonably has or may have the potential of influencing - any decision to be taken with respect to the application by the competent authority; and - the objectivity of any report, plan or document to be prepared by myself for submission to the competent authority;
- I will ensure that information containing all relevant facts in respect of the application is distributed or made available to interested and affected parties and the public and that participation by interested and affected parties is facilitated in such a manner that all interested and affected parties will be provided with a reasonable opportunity to participate and to provide comments on documents that are produced to support the application;
- I will provide the competent authority with access to all information at my disposal regarding the application, whether such information is favorable to the applicant or not
- All the particulars furnished by me in this form are true and correct;
- I will perform all other obligations as expected a palaeontological specialist in terms of the Act and the constitutions of my affiliated professional bodies; and
- I realize that a false declaration is an offense in terms of regulation 71 of the Regulations and is punishable in terms of section 24F of the NEMA.

Disclosure of Vested Interest

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

PALAEONTOLOGICAL CONSULTANT: Banzai Environmental (Pty) Ltd

CONTACT PERSON: Elize Butler

Tel: +27 844478759

Email: elizebutler002@gmail.com

SIGNATURE:  _____

ACKNOWLEDGEMENT OF RECEIPT

Report Title	Palaeontological Desktop Assessment for the proposed Glisa EMP and IWUL Consolidated Project near Emakhazeni (Belfast), in Mpumalanga		
Control	**Name**	**Signature**	**Designation**
Author	**Elize Butler**		**Palaeontologist**
Reviewed			**Principal Heritage Specialist**

CLIENT:

CONTACT PERSON:

SIGNATURE: _____

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

Table 1 - NEMA Table

Requirements of Appendix 6 – GN R326 EIA Regulations of 7 April 2017	**Relevant section in report**	**Comment where not applicable.**
1.(1) (a) (i) Details of the specialist who prepared the report	Page ii and Section 2 of Report – Contact details and company and Appendix A	-
(ii) The expertise of that person to compile a specialist report including a curriculum vitae	Section 2 – refer to **Appendix A**	-
(b) A declaration that the person is independent in a form as may be specified by the competent authority	Page ii of the report	-
(c) An indication of the scope of, and the purpose for which, the report was prepared	Section 4 – Objective	-
(cA) An indication of the quality and age of base data used for the specialist report	Section 5 – Geological and Palaeontological history	-
(cB) a description of existing impacts on the site, cumulative impacts of the proposed development and levels of acceptable change;	Section 9	-
(d) The duration, date and season of the site investigation and the relevance of the season to the outcome of the assessment	Section 1 and 10	
(e) a description of the methodology adopted in preparing the report or carrying out the specialised process inclusive of equipment and modelling used	Section 7 Approach and Methodology	-
(f) details of an assessment of the specific identified sensitivity of the site related to the proposed activity or activities and its associated	Section 1 and 10	

Requirements of Appendix 6 – GN R326 EIA Regulations of 7 April 2017	Relevant section in report	Comment where not applicable.
structures and infrastructure, inclusive of a site plan identifying site alternatives;		
(g) An identification of any areas to be avoided, including buffers	Section 5	No buffers or areas of sensitivity identified
(h) A map superimposing the activity including the associated structures and infrastructure on the environmental sensitivities of the site including areas to be avoided, including buffers;	Section 5 – Geological and Palaeontological history	
(i) A description of any assumptions made and any uncertainties or gaps in knowledge;	Section 7.1 – Assumptions and Limitation	-
(j) A description of the findings and potential implications of such findings on the impact of the proposed activity, including identified alternatives, on the environment	Section 1 and 10	
(k) Any mitigation measures for inclusion in the EMPr	Desktop	
(l) Any conditions for inclusion in the environmental authorisation	Desktop	
(m) Any monitoring requirements for inclusion in the EMPr or environmental authorisation	Desktop	
(n)(i) A reasoned opinion as to whether the proposed activity, activities or portions thereof should be authorised and	Section 1 and 10	
(n)(iA) A reasoned opinion regarding the acceptability of the proposed activity or activities; and		
(n)(ii) If the opinion is that the proposed activity, activities or portions thereof should be authorised, any avoidance, management and mitigation measures that should	Section 1 and 10	-

Requirements of Appendix 6 – GN R326 EIA Regulations of 7 April 2017	Relevant section in report	Comment where not applicable.
be included in the EMPr, and where applicable, the closure plan		
(o) A description of any consultation process that was undertaken during the course of carrying out the study	N/A	Not applicable. A public consultation process will be conducted as part of the EIA and EMPr process.
(p) A summary and copies if any comments that were received during any consultation process	N/A	
(q) Any other information requested by the competent authority.	N/A	Not applicable.
(2) Where a government notice by the Minister provides for any protocol or minimum information requirement to be applied to a specialist report, the requirements as indicated in such notice will apply.	Section 3 compliance with SAHRA guidelines	

EXECUTIVE SUMMARY

Banzai Environmental was appointed by PGS Heritage (Pty) Ltd to conduct the Palaeontological Desktop Assessment for the proposed Glisa EMP and IWUL Consolidated Project near Emakhazeni (Belfast), in Mpumalanga. This Palaeontological Assessment forms part of a Heritage Assessment and complies with the National Heritage Resources Act (No 25 of 1999, section 38) (NHRA), stating that a Palaeontological Impact Assessment is required to determine the presence of fossil material within the planned development. This study is thus necessary to evaluate the effect of the construction on the palaeontological resources.

The proposed development is primarily underlain by the Vryheid Formation of the Ecca Group (Karoo Supergroup). According to the South African Heritage Resources Information System, the Palaeontological Sensitivity of these rocks are Very High.

It is recommended that an EIA level palaeontology report be conducted to assess the value and prominence of fossils in the development area and the effect of the proposed development on the palaeontological heritage. The purpose of the EIA Report is to elaborate on the issues and potential impacts identified during the scoping phase. A Phase 1 field-based assessment would be conducted with research in the site-specific study area, as well as a comprehensive assessment of the impacts identified during the scoping phase.

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Appendix A: CV

TERMINOLOGY AND ABBREVIATIONS

Cultural significance

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

Development

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

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

Fossil

Mineralized 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 and can include (but not limited to) as stated under Section 3 of the NHRA,

- places, buildings, structures, and equipment of cultural significance.
- places to which oral traditions are attached or which are associated with living heritage.
- historical settlements and townscapes.
- landscapes and natural features of cultural significance.
- geological sites of scientific or cultural importance.
- archaeological and palaeontological sites.
- graves and burial grounds, and
- sites of significance relating to the history of slavery in South Africa.

Palaeontology

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

Table 2: Abbreviations

Abbreviations	**Description**
ASAP	Association of South African Professional Archaeologists
CRM	Cultural Resource Management
DEFF	Department of Environmental Department of Environment, Forestry and Fisheries
EA	Environmental Authorisation
ECO	Environmental Control Officer
EIA practitioner	Environmental Impact Assessment Practitioner
EIA	Environmental Impact Assessment
ESA	Early Stone Age
GPS	Global Positioning System
HIA	Heritage Impact Assessment
I&AP	Interested & Affected Party
IWUL	Integrated Water Use License
LSA	Late Stone Age
LIA	Late Iron Age
MSA	Middle Stone Age
MIA	Middle Iron Age
MPRDA	Mineral and Petroleum Resources Development Act
MR	Mining Right
NEMA	National Environmental Management Act
NEM: WA	National Environmental Management: Waste Act
NWA	National Water Act
NHRA	National Heritage Resources Act
PDA	Palaeontological Desktop Assessment
PIA	Palaeontological Impact Assessment
PHRA	Provincial Heritage Resources Authority
PSSA	Palaeontological Society of South Africa
SADC	Southern African Development Community
SAHRA	South African Heritage Resources Agency
SAHRIS	South African Heritage Resources Information System

1 INTRODUCTION

PGS Heritage (Pty) Ltd to was commissioned to conduct the Heritage Assessment for the proposed Glisa EMP and IWUL Consolidated Project near Emakhazeni (Belfast), in Mpumalanga. Banzai Environmental was in turn appointed to conduct the Palaeontological Desktop Assessment.

NBC consists of three (3) mining sections namely the Eerstelingsfontein Section, the Glisa Section, and the Paardeplaats Section (Figure 1). The focus of this process will be on the Glisa and Paardeplaats Sections. **Error! Reference source not found.** presents the Glisa and Paardeplaats Sections Mining Right (MR), Environmental Authorisation (EA), and Integrated Water Use License (IWUL) reference numbers as issued in terms of the Mineral and Petroleum Resources Development Act, 2002 (Act No. 28 of 2002) (MPRDA), the National Environmental Management Act, 1998 (Act No. 107 of 1998), and where applicable, the National Environmental Management: Waste Act, 2008 (Act No. 59 of 2008) (NEM:WA), and the National Water Act, 1998 (Act No. 36 of 1998) (NWA) respectively[1].

Table 3: Glisa and Paardeplaats Mining Sections.

REFERENCE	GLISA SECTION	PAARDEPLAATS SECTION
MR:	MP 30/5/1/2/1/236 MR	MP 30/5/1/2/2/10090 MR
EA:	17/2/3N-4, 17/2/3N-235, & 17/2/3GNK13	-
IWUL:	License No.: 06/B41A/ABCFGIJ/1002 File No.: 27/2/2/B141/3/9	06/B41A/CGIJ/8880

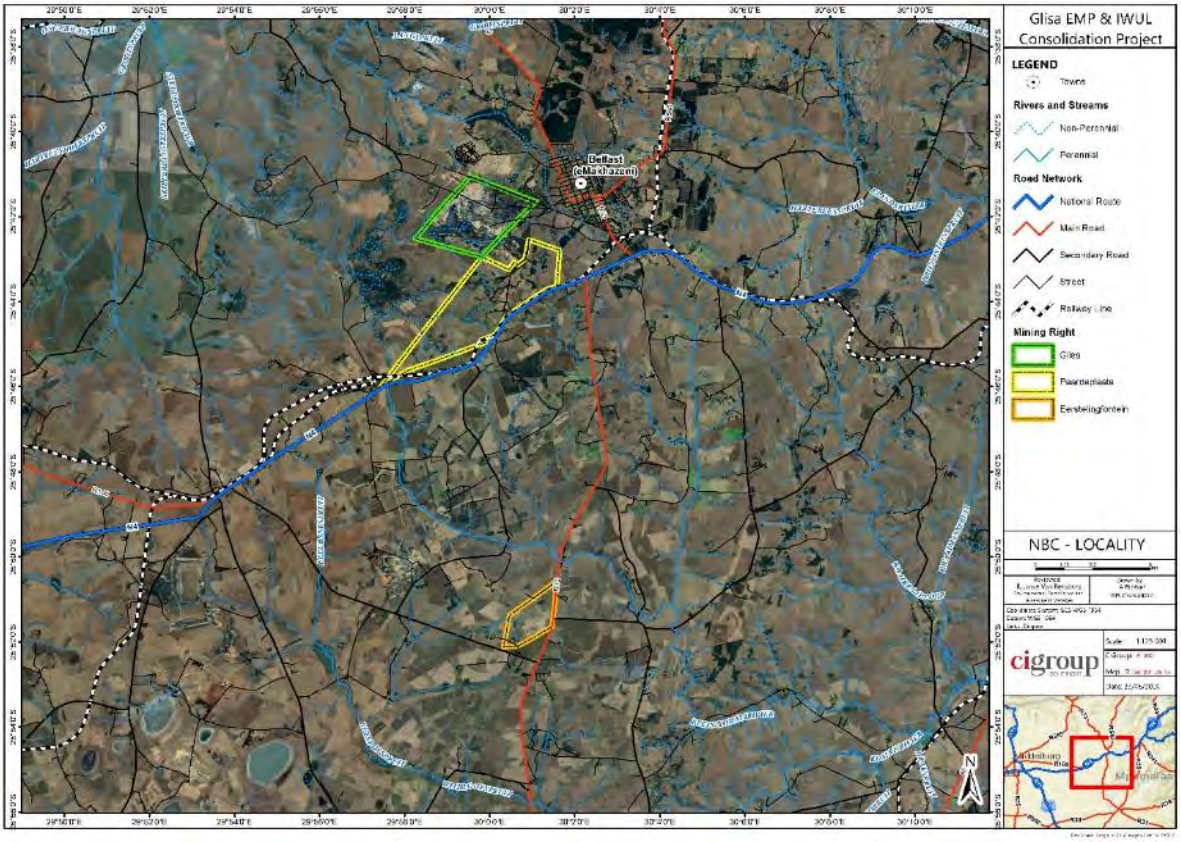


Figure 1: Location of the NBC Glisa, Paardeplaats and Eerstelingsfontein Sections.

The Section 102 Consolidation and IEA application focus on the following:

1. **Consolidation of the Glisa Section MR and Environmental Management Plan (EMP) into the Paardeplaats Section (MP 30/5/1/2/2/10090 MR);**
2. **Inclusion of Portion 24 of the farm Paardeplaats 380 JT into the Paardeplaats Section MR; and**
3. **IEA for listed activities triggered in terms of the NEMA and NEM: WA within the MR areas and Portion 24 of the farm Paardeplaats 380 JT[1].**

Figure 2 presents the individual areas associated with the consolidation and IEA application process, namely the Glisa Section MR area, the Paardeplaats Section MR area and Portion 24 of the farm Paardeplaats 380 JT. For the purposes of distinction, the current mining Sections will be referred to in this report as the Glisa Section and Paardeplaats Section, Portion 24 of the farm Paardeplaats 380 JT will be referred to in this report as Portion 24, and the area applicable to the Section 102 Consolidation and IEA application (i.e. both Sections and Portion 24) will be referred to as the **Integrated Paardeplaats Section (MP 30/5/1/2/2/10090 MR)** (Figure 3).

[1]Information provided by cigroup

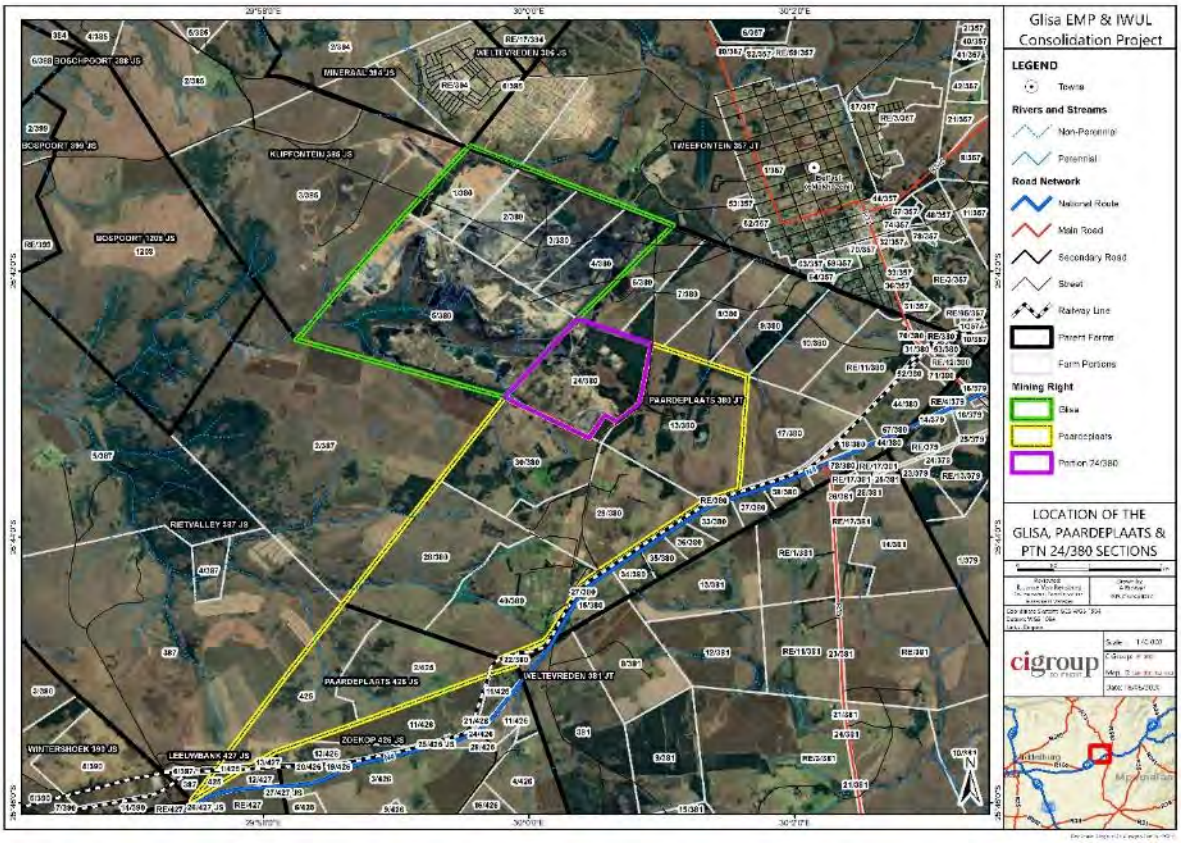


Figure 2: Location of the Glisa Section, Paardeplaats Section and Portion 24.

[1]Information provided by cigroup

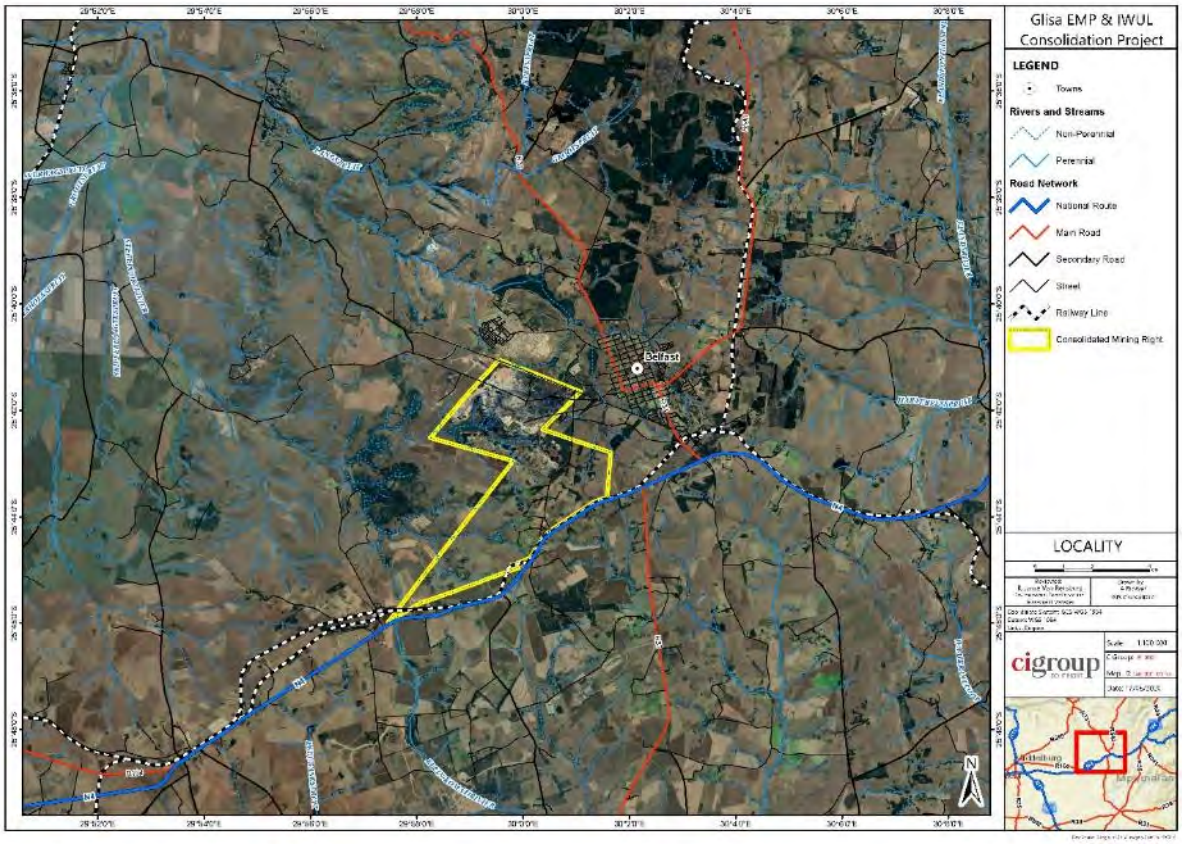


Figure 3:Location of the Integrated Paardeplaats Section.

[1]Information provided by NBS Colliery (Universal Coal)

2 QUALIFICATIONS AND EXPERIENCE OF THE AUTHOR

This present study has been conducted by Mrs Elize Butler. She has conducted approximately 300 palaeontological impact assessments for developments in the Free State, KwaZulu-Natal, Eastern, Central, and Northern Cape, Northwest, Gauteng, Limpopo, and Mpumalanga. She has an MSc (*cum laude*) in Zoology (specializing in Palaeontology) from the University of the Free State, South Africa and has been working in Palaeontology for more than twenty-five years. She has experience in locating, collecting, and curating fossils, including exploration field trips in search of new localities in the Karoo Basin. She has been a member of the Palaeontological Society of South Africa (PSSA) since 2006 and has been conducting PIAs since 2014.

3 LEGISLATION

3.1 National Heritage Resources Act (25 of 1999)

Cultural Heritage in South Africa, includes all heritage resources, is protected by the National Heritage Resources Act (Act 25 of 1999) (NHRA). Heritage resources as defined in Section 3 of the Act include **"all objects recovered from the soil or waters of South Africa, including archaeological and palaeontological objects and material, meteorites and rare geological specimens**".

Palaeontological heritage is exceptional and non-renewable and is protected by the NHRA. Palaeontological resources and may not be unearthed, broken moved, or destroyed by any development without prior assessment and without a permit from the relevant heritage resources authority as per section 35 of the NHRA.

This Palaeontological Impact assessment forms part of the Heritage Impact Assessment (HIA) and adhere to the conditions of the Act. According to **Section 38 (1)**, an HIA is required to assess any potential impacts to palaeontological heritage within the development footprint where:

- the construction of a road, wall, power line, pipeline, canal or other similar form of linear development or barrier exceeding 300 m in length;
- the construction of a bridge or similar structure exceeding 50 m in length;
- any development or other activity which will change the character of a site—
- (exceeding 5 000 m^2 in extent; or
- involving three or more existing erven or subdivisions thereof; or
- involving three or more erven or divisions thereof which have been consolidated within the past five years; or

- the costs of which will exceed a sum set in terms of regulations by SAHRA or a provincial heritage resources authority
- the re-zoning of a site exceeding 10 000 m² in extent;
- or any other category of development provided for in regulations by SAHRA or a Provincial heritage resources authority.

4 OBJECTIVE

The aim of a Palaeontological Impact Assessment (PIA) is to decrease the effect of the development on potential fossils at the development site.

According to the "SAHRA APM Guidelines: Minimum Standards for the Archaeological and Palaeontological Components of Impact Assessment Reports" the purpose of the PIA are: 1) to **identify** the palaeontological importance of the rock formations in the footprint; 2) to evaluate the palaeontological magnitude of the formations; 3) to determine the **impact** on fossil heritage; and 4) to **recommend** how the property developer should guard against and lessen damage to fossil heritage.

The terms of reference of a PIA are as follows:

General Requirements:

- Adherence to the content requirements for specialist reports in accordance with Appendix 6 of the EIA Regulations 2014, as amended.
- Adherence to all applicable best practice recommendations, appropriate legislation and authority requirements.
- Submit a comprehensive overview of all appropriate legislation, guidelines.
- Description of the proposed project and provide information regarding the developer and consultant who commissioned the study.
- Description and location of the proposed development and provide geological and topographical maps.
- Provide Palaeontological and geological history of the affected area.
- Identification sensitive areas to be avoided (providing shapefiles/kml's) in the proposed development.
- Evaluation of the significance of the planned development during the Pre-construction, Construction, Operation, Decommissioning Phases and Cumulative impacts. Potential impacts should be rated in terms of the direct, indirect and cumulative:
    a. **Direct impacts** are impacts that are caused directly by the activity and generally occur at the same time and at the place of the activity.

b. **Indirect impacts** of an activity are indirect or induced changes that may occur as a result of the activity.

c. Cumulative impacts result from the incremental impact of the proposed activity on a common resource when added to the impacts of other past, present or reasonably foreseeable future activities.

- Fair assessment of alternatives (infrastructure alternatives have been provided):
- Recommend mitigation measures to minimise the impact of the proposed development; and

Implications of specialist findings for the proposed development (such as permits, licenses etc).

5 GEOLOGICAL AND PALAEONTOLOGICAL HISTORY

The proposed Glisa EMP and IWUL Consolidated Project near Emakhazeni, in Mpumalanga is depicted on the 1: 250 000 2528 Pretoria (1978) and 2530 Baberton (1986) Geological Map (Council for Geosciences, Pretoria) (Figure 4). The area is underlain by rocks of the Transvaal Supergroup (Rooiberg and Pretoria Groups) that is overlain by the Vryheid Formation (Ecca Group, Karoo Supergroup). Isolated areas are mantled by Quaternary alluvium (Figure 4).

The proposed development is close to the north-eastern margin of the main Karoo basin and located in the Witbank Coalfield. This Coalfield supplies more than 50% of South Africa's saleable coal. The Witbank Coalfield extends 190 km west-east between Brakpan and Belfast an approximately 60km north-south between Middelburg and Ermelo. In the Witbank Coalfield the coal-bearing Vryheid Formation reaches a thickness of between 70m to 200m.

Quaternary superficial deposits are the youngest geological deposits formed during the most recent period of geological time (approximately 2.6 million years ago to present). Most of the superficial deposits are unconsolidated sediments and consist of gravel, sand, silt and clay, and they form relatively thin, often discontinuous patches of sediments or larger spreads onshore. These sediments may include stream, channel and floodplain deposits, beach sand, talus gravels and glacial drift sediments (Partridge *et al*, 2006). Quaternary fossil assemblages are generally rare and low in diversity and occur over a wide-ranging geographic area. In the past palaeontologists did not focus on Caenozoic superficial deposits although they sometimes comprise of significant fossil deposits. These fossil assemblages resemble modern animals and may comprise of mammalian teeth, bones and horn corns, reptile skeletons and fragments of ostrich eggs. Microfossils, non-marine mollusc shells are also known from Quaternary deposits. Plant material such as foliage, wood, pollens and peats are recovered as well as trace fossils like vertebrate tracks, burrows, termitaria (termite heaps/ mounds) and rhizoliths (root casts).

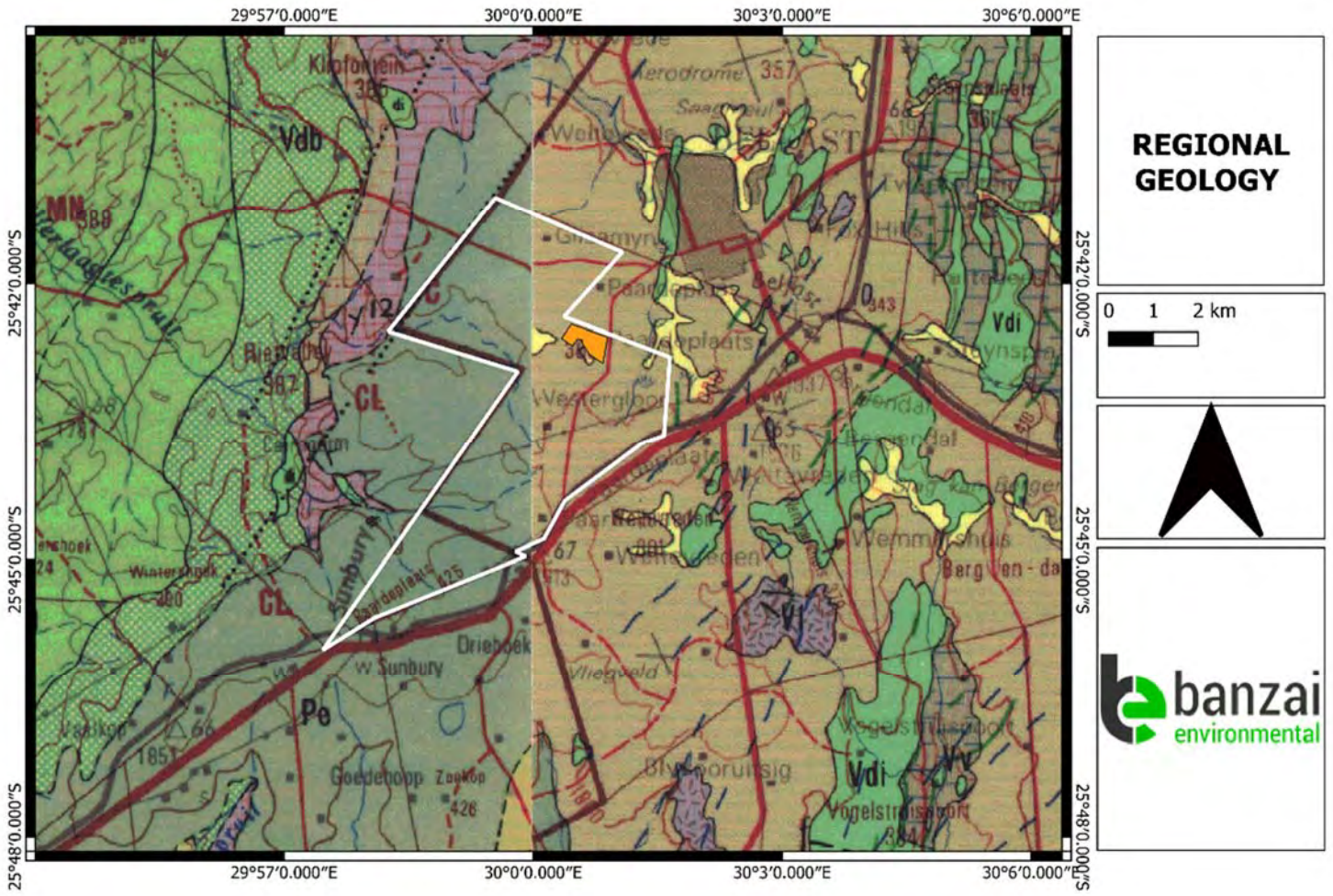


Figure 4: Extract of the 2528 (Pretoria) and 2530 (Baberton) Geological Map (Council of Geoscience) indicating the surface geology of the proposed development in white and orange.

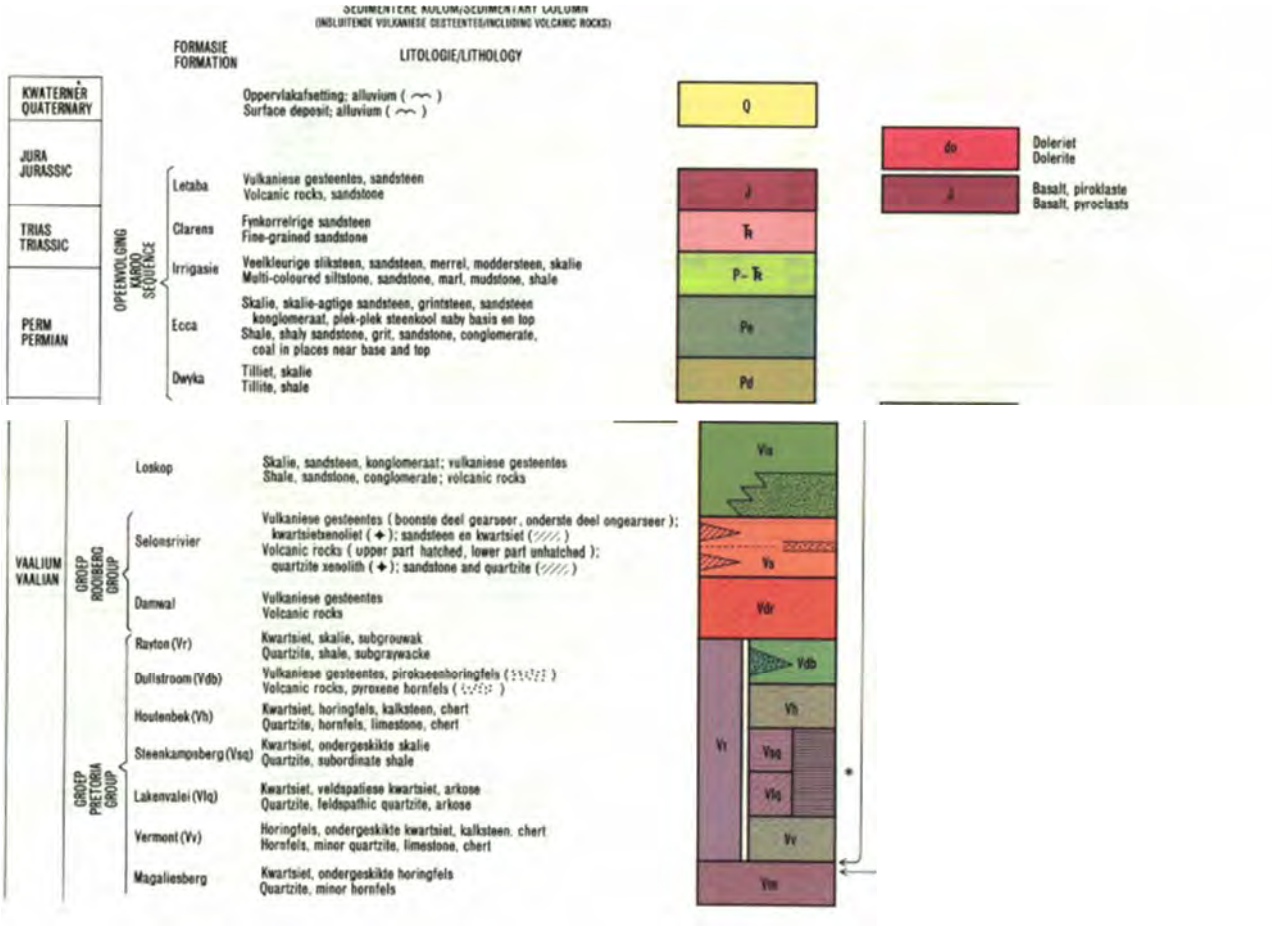
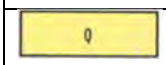
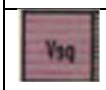

SEDIMENTÊRE REEKS/SEDIMENTARY COLUMN
(INSLUITENDE VULKANIESE GESTEENTES/INCLUDING VOLCANIC ROCKS)
FORMASIE
FORMATION
LITOLOGIE/LITHOLOGY
KWATERNÊR
QUATERNARY
JURA
JURASSIC
TRIAS
TRIASSIC
PERM
PERMIAN
OPEENVOLGING KAROO SEQUENCE
Oppervlakafsetting: alluvium (~)
Surface deposit: alluvium (~)
Letaba
Vulkaniese gesteentes, sandsteen
Volcanic rocks, sandstone
Clarens
Fynkorrelrige sandsteen
Fine-grained sandstone
Irrigasie
Veelkleurige slieksteen, sandsteen, merrel, moddersteen, skalie
Multi-coloured siltstone, sandstone, marl, mudstone, shale
Ecca
Skalie, skalie-agtige sandsteen, grintsteen, sandsteen
konglomeraat, plek-plek steenkool naby basis en top
Shale, shaly sandstone, grit, sandstone, conglomerate,
coal in places near base and top
Dwyka
Tilliet, skalie
Tillite, shale
Q
J
Tr
P-Tr
Pe
Pd
do
Doleriet
Dolerite
Ja
Basalt, piroklaste
Basalt, pyroclasts
VAALIUM
VAALIAN
GROEP
RODEBERG
GROUP
GROEP
PRETORIA
GROUP
Loskop
Skalie, sandsteen, konglomeraat; vulkaniese gesteentes
Shale, sandstone, conglomerate; volcanic rocks
Selonsrivier
Vulkaniese gesteentes (boonste deel gearseer, onderste deel ongearseer);
kwartsietxenoliet (✦); sandsteen en kwartsiet (▨)
Volcanic rocks (upper part hatched, lower part unhatched):
quartzite xenolith (✦); sandstone and quartzite (▨)
Damwal
Vulkaniese gesteentes
Volcanic rocks
Rayton (Vr)
Kwartsiet, skalie, subgrouwak
Quartzite, shale, subgraywacke
Dullstroom (Vdb)
Vulkaniese gesteentes, pirokseenhoringfels (▨)
Volcanic rocks, pyroxene hornfels (▨)
Houtenbek (Vh)
Kwartsiet, horingfels, kalksteen, chert
Quartzite, hornfels, limestone, chert
Steenkampsberg (Vsq)
Kwartsiet, ondergeskikte skalie
Quartzite, subordinate shale
Lakenvalei (Vlq)
Kwartsiet, veldspatiese kwartsiet, arkose
Quartzite, feldspathic quartzite, arkose
Vermont (Vv)
Horingfels, ondergeskikte kwartsiet, kalksteen, chert
Hornfels, minor quartzite, limestone, chert
Magaliesberg
Kwartsiet, ondergeskikte horingfels
Quartzite, minor hornfels
Vla
Vs
Vdr
Vdb
Vh
Vr
Vsq
Vlq
Vv
Vm

Table 4: Legend to Map and short explanation (Modified from the *1:250 000 2528 Pretoria (1978) and 2530 Baberton (1986) Geological Map (Council for Geosciences, Pretoria))*.

Symbol	Lithology	Stratigraphy	Age
	Surface deposit, alluvium		Quaternary
	Shale, Shaley sandstone, grit, sandstone, conglomerate, coal in places near top and bottom	Vryheid Formation, Ecca Group, Karoo Supergroup	Permian
	Diabase		Vaalian to post Mogolian Age
	Volcanic rocks, pyroxene hornfels	Dullstroom Formation, Pretoria Group, Transvaal Supergroup	Vaalian
	Quartzite, subordinate shale	Steenkampsberg Formation, Pretoria Group, Transvaal Supergroup	

Vryheid Formation

The coalfields of South African occur in the Main Karoo Basin or its associated sub-basins. The Main Karoo Basin forms part of a series of Gondwanan basins that was established along the southern boundary of Gondwana (Cole, 1992; De Wit and Ransome 1992; Veevers *et al*. 1994; Catuneanu *et al*. 1998). These basins include Beacon Basin in Antarctica, Bowen Basin in Australia as well as the Paraná Basin in South America. The Basins were formed between the Late Carboniferous and Middle Jurassic and their joint stratigraphies portray the best non-marine sedimentation record globally.

Most of the coal mined in South Africa originates in the Permian Vryheid Formation (Figure 5).

The **Vryheid Formation** comprises mudrock, rhythmite, siltstone and fine- to coarse-grained sandstone (pebbly in places). The Formation contains up to five (mineable) coal seams. The different lithofacies are mainly arranged in upward-coarsening deltaic cycles (up to 80m thick in the southeast). Fining-upward fluvial cycles, of which up to six are present in the east, are typically sheet-like in geometry, although some form valley-fill deposits. They comprise coarse-grained to pebbly, immature sandstones - with an abrupt upward transition into fine-grained sediments and coal seams.

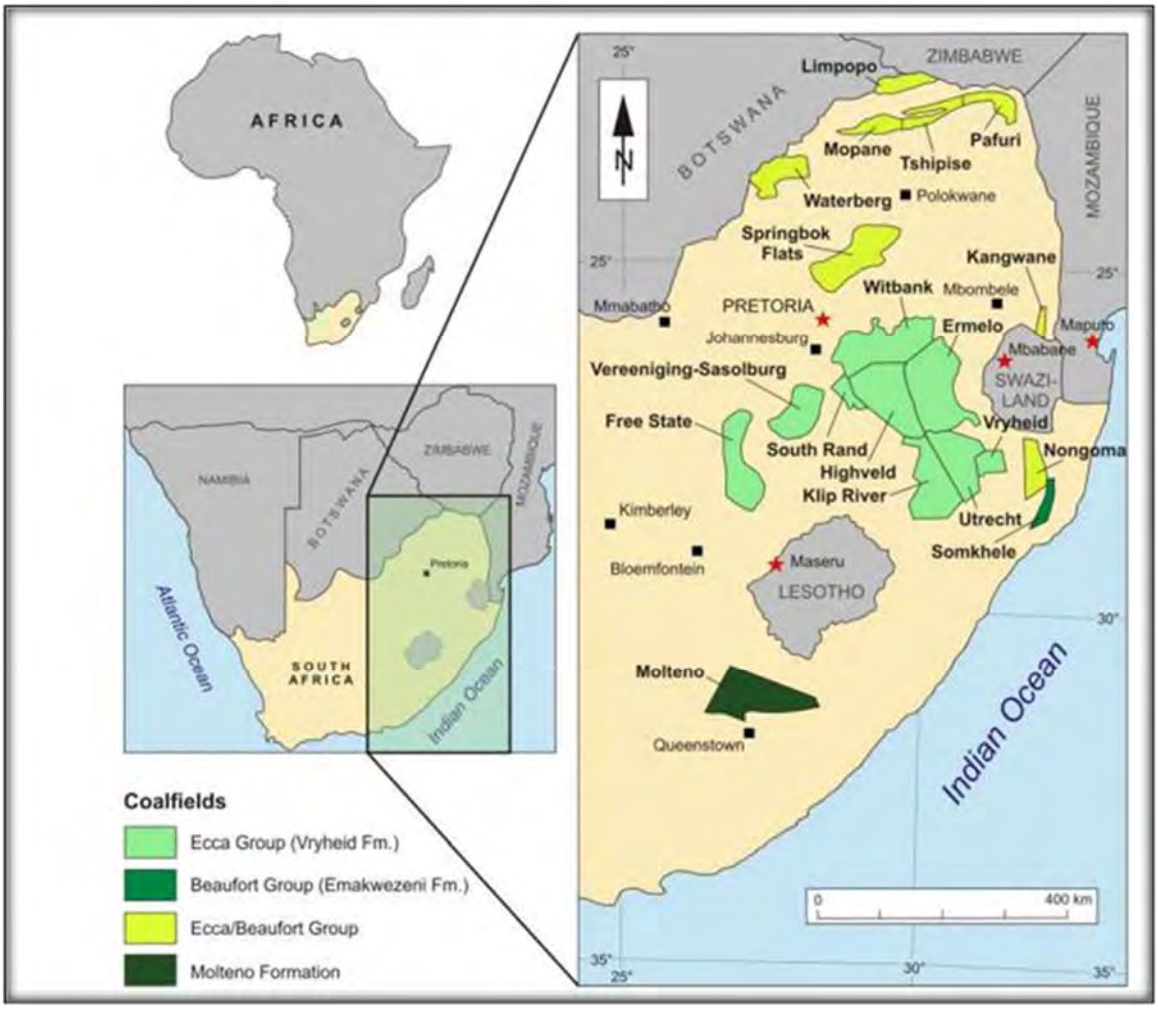


Figure 5: Coalfields of Southern Africa, taken from Hancox and Götz (2014).

The Vryheid Formation comprise of a rich assemblage of Glossopteris flora. After continental deglaciation took place Gymnospermous glossopterids (Figure 6) dominated the peat and non-peat accumulating Permian wetlands (Falcon, 1986, Greb *et al*., 2006).

Table 5: Ecca Group and Formations. (Modified from Johnson et al, 2006).

<table>
<tr><th>Period</th><th>Supergroup</th><th>Group</th><th>Formation West of 24º E</th><th>Formation East of 24º E</th><th>Formation Free State / KwaZulu Natal</th></tr>
<tr><td rowspan="8">Permian</td><td rowspan="8">Karoo Supergroup</td><td rowspan="8">Ecca Group</td><td>Waterford Formation</td><td>Waterford Formation</td><td rowspan="2">Volksrust Formation</td></tr>
<tr><td>Tierberg / Fort Brown Formation</td><td>Fort Brown Formation</td></tr>
<tr><td>Laingsburg / Rippon Formation</td><td>Rippon Formation</td><td>Vryheid Formation</td></tr>
<tr><td>Collingham Formation</td><td>Collingham Formation</td><td rowspan="3">Pietermaritzburg Formation</td></tr>
<tr><td>Whitehill Formation</td><td>Whitehill Formation</td></tr>
<tr><td rowspan="2">Prince Albert Formation</td><td rowspan="2">Prince Albert Formation</td></tr>
<tr><td>Mbizane Formation</td></tr>
<tr><td></td></tr>
</table>

Recent paleobotanical studies in the Vryburg Formation include that of Bordy and Prevec (2008) and Prevec *et al.* (2008, 2009, 2010) and Prevec, (2011). Bamford (2011) described numerous plant fossils from this formation (e.g. *Azaniodendron fertile*, *Cyclodendron leslii, Sphenophyllum hammanskraalensis, Annularia sp., Raniganjia sp., Asterotheca spp., Liknopetalon enigmata, Hirsutum* sp., *Scutum* sp., *Ottokaria* sp., *Estcourtia* sp., *Arberia* sp., *Lidgetonnia* sp., *Noeggerathiopsis* sp., *Podocarpidites* sp as well as more than 20 Glossopteris species.

In the past, palynological studies have focused on the coal-bearing successions of the Vryheid Formation and include articles by Aitken (1994, 1998), and Millsteed (1994, 1999), while recent studies focussed on the Witbank Coalfield were conducted by Götz and Ruckwied (2014).

Bamford (2011) is of the opinion that only a small amount of data has been published on these potentially fossiliferous deposits and that most likely good material is present around coal mines and in other areas the exposures are poor and of little interest. When plant fossils do occur, they are usually abundant. According to Bamford, it is not feasible to preserve all the sites but in the

interests of science these sites ought to be well documented, researched and the collected fossils must be housed in an accredited institution.

To date no fossil vertebrates have been collected from the Vryheid formation. The occurrence of fossil insects is rare, while palynomorphs are diverse. Fish scales and non-marine bivalves have been reported. Trace fossils are found abundantly but the diversity is low. The mesosaurid reptile, *Mesosaurus* (Figure 7) has been found in the southern parts of the basin but may also be present in other areas of the Vryheid formation. Regardless of the rare and irregular occurrence of fossils in this biozone, a single fossil may be of scientific value as many fossil taxa are known from a single fossil.

Figure 6: Glossopteris leaf.

Figure 7: Mesosaurus sp. (National Museum, Bloemfontein specimen NMQR 3536)

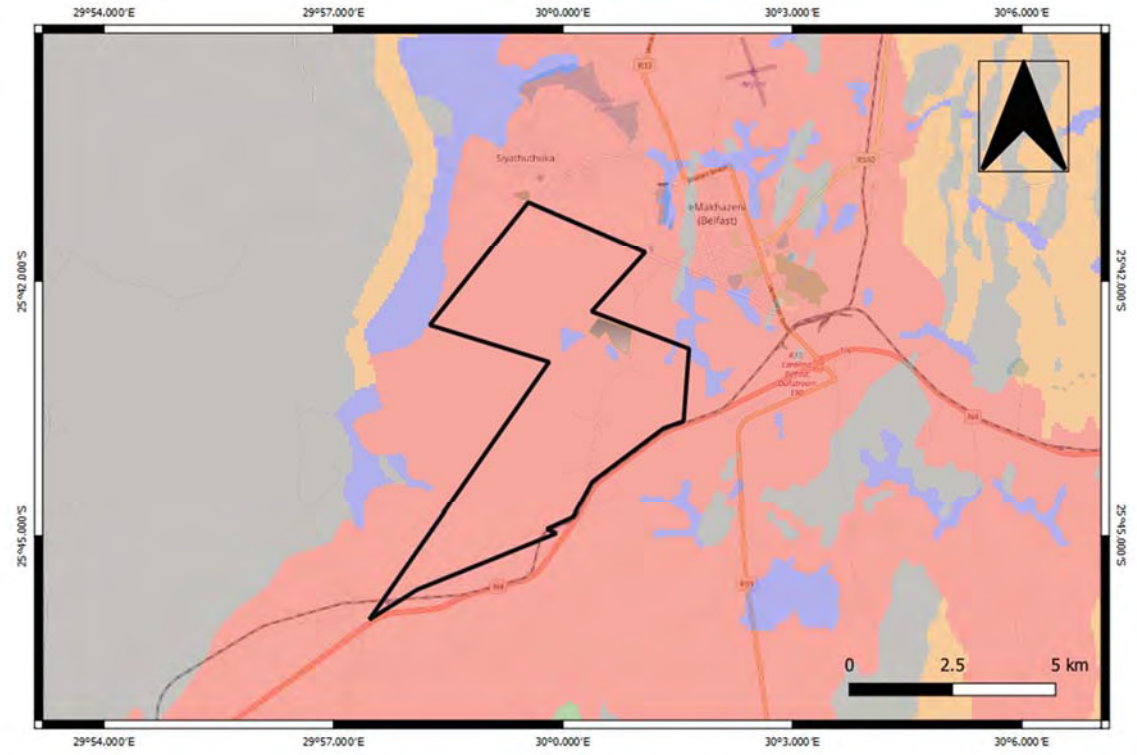


Figure 8: Extract of the 1 in 250 000 SAHRIS PalaeoMap map (Council of Geosciences) indicating the proposed development in graded colours.

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.

According to the SAHRIS Palaeo Sensitivity map (Figure 8) there is a very high chance of finding fossils in the red area.

6 GEOGRAPHICAL LOCATION OF THE SITE

The proposed development is located approximately 5 kilometres South of the town of eMakhazeni (Belfast) and about 1 km South of the Siyathuthuka Township (closest formal settlement).

7 METHODS

The aim of a desktop study is to evaluate the risk to palaeontological heritage in the proposed development. This includes all trace fossils and fossils. All available information is consulted to compile a desktop study and includes: Palaeontological impact assessment reports in the same area; aerial photos and Google Earth images, topographical as well as geological maps.

7.1 Assumptions and Limitations

When conducting a PIA several factors can affect the accuracy of the assessment. The focal point of geological maps is the geology of the area and the sheet explanations were not meant to focus on palaeontological heritage. Many inaccessible regions of South Africa have not been reviewed by palaeontologists and data is generally based on aerial photographs. Locality and geological information of museums and universities databases have not been kept up to date or data collected in the past have not always been accurately documented.

Comparable Assemblage Zones in other areas is used to provide information on the existence of fossils in an area which was not yet been documented. When similar Assemblage Zones and geological formations for Desktop studies is used it is generally **assumed** that exposed fossil heritage is present within the footprint.

8 ADDITIONAL INFORMATION CONSULTED

In compiling this report the following sources were consulted:

- Geological map 1:100 000, Geology of the Republic of South Africa (Visser 1984)
- 1: 250 000 2530 Baberton Geological Map (1986) (Council of Geoscience)
- 1: 250 000 2528 Pretoria Geological Map (1978) (Council of Geoscience)
- A Google Earth map with polygons of the proposed development was obtained from PGS Consultants.
- Information provided by NBS Colliery (Universal Coal).

9 IMPACT ASSESSMENT METHODOLOGY

9.1 Introduction

PLEASE NOTE:

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 impacts will be ranked according to the methodology described below. Where possible, mitigation measures will be provided to manage impacts. In order to ensure uniformity, a standard impact assessment methodology will be utilised so that a wide range of impacts can be compared with each other. The impact assessment methodology makes provision for the assessment of impacts against the following criteria:

- Significance;
- Spatial scale;
- Temporal scale;
- Probability; and
- Degree of certainty.

A combined quantitative and qualitative methodology was used to describe impacts for each of the assessment criteria. A summary of each of the qualitative descriptors along with the equivalent quantitative rating scale for each of the aforementioned criteria is given in **Table 6**.

Table 6: Quantitative rating and equivalent descriptors for the impact assessment criteria

RATING	SIGNIFICANCE	EXTENT SCALE	TEMPORAL SCALE
1	VERY LOW	Proposed site	Incidental
2	LOW	Study area	Short-term
3	MODERATE	Local	Medium/High-term
4	HIGH	Regional / Provincial	Long-term
5	VERY HIGH	Global / National	Permanent

A more detailed description of each of the assessment criteria is given in the following sections.

9.2 Significance Assessment

Significance rating (importance) of the associated impacts embraces the notion of extent and magnitude but does not always clearly define these since their importance in the rating scale is very relative. For example, the magnitude (i.e. the size) of area affected by atmospheric pollution may be extremely large (1 000 km2) but the significance of this effect is dependent on the concentration or level of pollution. If the concentration is great, the significance of the impact would be HIGH or VERY HIGH, but if it is diluted it would be VERY LOW or LOW. Similarly, if 60 ha of a

grassland type are destroyed the impact would be VERY HIGH if only 100 ha of that grassland type were known. The impact would be VERY LOW if the grassland type was common. A more detailed description of the impact significance rating scale is given below.

Table 7: Description of the significance rating scale

RATING		DESCRIPTION
5	Very high	Of the highest order possible within the bounds of impacts which could occur. In the case of adverse impacts: there is no possible mitigation and/or remedial activity which could offset the impact. In the case of beneficial impacts, there is no real alternative to achieving this benefit.
4	High	Impact is of substantial order within the bounds of impacts, which could occur. In the case of adverse impacts: mitigation and/or remedial activity is feasible but difficult, expensive, time-consuming or some combination of these. In the case of beneficial impacts, other means of achieving this benefit are feasible but they are more difficult, expensive, time-consuming or some combination of these.
3	Moderate	Impact is real but not substantial in relation to other impacts, which might take effect within the bounds of those which could occur. In the case of adverse impacts: mitigation and/or remedial activity are both feasible and fairly easily possible. In the case of beneficial impacts: other means of achieving this benefit are about equal in time, cost, effort, etc.
2	Low	Impact is of a low order and therefore likely to have little real effect. In the case of adverse impacts: mitigation and/or remedial activity is either easily achieved or little will be required, or both. In the case of beneficial impacts, alternative means for achieving this benefit are likely to be easier, cheaper, more effective, less time consuming, or some combination of these.
1	Very low	Impact is negligible within the bounds of impacts which could occur. In the case of adverse impacts, almost no mitigation and/or remedial activity are needed, and any minor steps which might be needed are easy, cheap, and simple. In the case of beneficial impacts, alternative means are almost all likely to be better, in one or a number of ways, than this means of achieving the benefit. Three additional categories must also be used where relevant. They are in addition to the category represented on the scale, and if used, will replace the scale.
0	No impact	There is no impact at all - not even a very low impact on a party or system.

9.3 Spatial Scale

The spatial scale refers to the extent of the impact i.e. will the impact be felt at the local, regional, or global scale. The spatial assessment scale is described in more detail below**.**

Table 8: Description of the significance rating scale

RATING		DESCRIPTION
5	Global/National	The maximum extent of any impact.
4	Regional/Provincial	The spatial scale is moderate within the bounds of impacts possible and will be felt at a regional scale (District Municipality to Provincial Level).
3	Local	The impact will affect an area up to 10 km from the proposed site.
2	Study Site	The impact will affect an area not exceeding the Eskom property.
1	Proposed site	The impact will affect an area no bigger than the ash disposal site.

9.4 Duration Scale

In order to accurately describe the impact, it is necessary to understand the duration and persistence of an impact in the environment. The temporal scale is rated according to criteria set out in **Table 9**.

Table 9: Description of the temporal rating scale

RATING		DESCRIPTION
1	Incidental	The impact will be limited to isolated incidences that are expected to occur very sporadically.
2	Short-term	The environmental impact identified will operate for the duration of the construction phase or a period of less than 5 years, whichever is the greater.
3	Medium/High term	The environmental impact identified will operate for the duration of life of facility.
4	Long term	The environmental impact identified will operate beyond the life of operation.
5	Permanent	The environmental impact will be permanent.

9.5 Degree of Probability

Probability or likelihood of an impact occurring will be described as shown in **Table 10** below.

Table 10: Description of the degree of probability of an impact occurring.

RATING	DESCRIPTION
1	Practically impossible
2	Unlikely
3	Could happen
4	Very Likely
5	It's going to happen / has occurred

9.6 Degree of Certainty

As with all studies it is not possible to be 100% certain of all facts, and for this reason a standard "degree of certainty" scale is used as discussed in **Table 11**. The level of detail for specialist studies is determined according to the degree of certainty required for decision-making. The impacts are discussed in terms of affected parties or environmental components.

Table 11: Description of the degree of certainty rating scale

RATING	DESCRIPTION
Definite	More than 90% sure of a particular fact.
Probable	Between 70 and 90% sure of a particular fact, or of the likelihood of that impact occurring.
Possible	Between 40 and 70% sure of a particular fact or of the likelihood of an impact occurring.
Unsure	Less than 40% sure of a particular fact or the likelihood of an impact occurring.
Can't know	The consultant believes an assessment is not possible even with additional research.
Don't know	The consultant cannot, or is unwilling, to make an assessment given available information.

9.7 Quantitative Description of Impacts

To allow for impacts to be described in a quantitative manner in addition to the qualitative description given above, a rating scale of between 1 and 5 was used for each of the assessment criteria. Thus, the total value of the impact is described as the function of significance, spatial and temporal scale as described below:

Impact Risk = (SIGNIFICANCE (5)**+** *Spatial* (2)**+** Temporal(5)) X Probability4)

3 **5**

An example of how this rating scale is applied is shown in **Table 12**.

Table 12: Rating Ratings of the proposed development

Impact	Significance	Spatial Scale	Temporal Scale	Probability	Rating
	Very High	Study site	Permanent	Very Likely	
Impact	5	2	5	4	3.2

Note: The significance, spatial and temporal scales are added to give a total of 12, that is divided by 3 to give a criteria rating of 4. The probability (4) is divided by 5 to give a probability rating of 0,8. The criteria rating of 4 is then multiplied by the probability rating (0,8) to give the final rating of 3.2.

The impact risk is classified according to five classes as described in the **Table 13** below.

Table 13: Impact Risk Classes

RATING	IMPACT CLASS	DESCRIPTION
0.1 – 1.0	1	**Very Low**
1.1 – 2.0	2	**Low**
2.1 – 3.0	3	**Moderate**
3.1 – 4.0	4	**High**
4.1 – 5.0	5	**Very High**

Therefore, with reference to the example above, an impact rating of 3.2 will fall in the **Impact Class 4,** which will be considered to be a **High impact**.

9.8 SUMMARY OF IMPACT TABLES

Only the site will be affected by the proposed development. The proposed development will have a negative impact on Fossil Heritage. The expected duration of the impact is assessed as potentially permanent to long term. It is Very Likely that the impact could occur. The significance of the impact occurring will be High.

10 FINDINGS AND RECOMMENDATIONS

The proposed development is primarily underlain by the Vryheid Formation of the Ecca Group (Karoo Supergroup). According to the South African Heritage Resources Information System, the Palaeontological Sensitivity of these rocks are Very High.

It is thus recommended that an EIA level palaeontology report be conducted to assess the value and prominence of fossils in the development area and the effect of the proposed development on the palaeontological heritage. The purpose of the EIA Report is to elaborate on the issues and potential impacts identified during the scoping phase. A Phase 1 field-based assessment would be conducted with research in the site-specific study area, as well as a comprehensive assessment of the impacts identified during the scoping phase.

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APPENDIX A – ELIZE BUTLER CV

ELIZE BUTLER

PROFESSION:	Palaeontologist
YEARS' EXPERIENCE:	26 years in Palaeontology

EDUCATION:	B.Sc Botany and Zoology, 1988 University of the Orange Free State
	B.Sc (Hons) Zoology, 1991 University of the Orange Free State
	Management Course, 1991 University of the Orange Free State
	M. Sc. *Cum laude* (Zoology), 2009 University of the Free State

Dissertation title: The postcranial skeleton of the Early Triassic non-mammalian Cynodont *Galesaurus planiceps*: implications for biology and lifestyle

MEMBERSHIP

Palaeontological Society of South Africa (PSSA)	2006-currently

EMPLOYMENT HISTORY

Part time Laboratory assistant	Department of Zoology & Entomology University of the Free State Zoology 1989-1992
Part time laboratory assistant	Department of Virology University of the Free State Zoology 1992
Research Assistant	National Museum, Bloemfontein 1993 – 1997
Principal Research Assistant and Collection Manager	National Museum, Bloemfontein 1998–currently

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