PGS
HERITAGE & GRAVE
RELOCATION CONSULTANTS

Phase 1 Heritage Impact Assessment

Proposed Development of the Kriel Ash Dam Facility
Kriel (Ga-Nala) , Emalahleni Local Municipality, Mpumalanga Province

Project No: HU-2009-P92-1

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DECLARATION OF INDEPENDENCE

The report has been compiled by PGS Heritage & Grave Relocation Consultants, an appointed specialist for Aurecon. The views stipulated in this report are purely objective and no other interests are displayed during the decision making processes discussed in this report.

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EXECUTIVE SUMMARY

PGS Heritage and Grave Relocation Consultants were appointed by Aurecon to undertake a Phase 1 Heritage Impact Assessment for the proposed Kriel Ash Dam Facility in the vicinity of Kriel (Ga-Nala), Mpumalanga Province. The proponent is Eskom.

An archival and historical study was undertaken which has revealed various aspects of the area's history. It also showed a number of possible heritage features (i.e. structures) though the fieldwork indicated that no such features are located within the study area. The desktop study also revealed the existence of a grave site as well as huts within the proposed conveyor and pipeline footprints in one of the two areas which could not be surveyed due to access limitations.

A field survey of the study area identified one site (Rood 1) on the north-western edge of Site 16N. The fieldwork team was made aware of the existence of a grave (or graves) by the landowner of that portion of land, Mr. Dawid de Wet. Mr. De Wet could not identify the exact position of the cemetery, while the dense vegetation associated with the indicated area made it impossible to survey that section of land in detail. As a result the exact position of the cemetery is not presently known, and an area of roughly 100m x 100m was indicated by Mr. De Wet as the area within which the grave is located.

The following mitigation measures are required for Rood 1:

- Social consultation process to identify the family (-ies) associated with the grave.
- Once identified, the associated families will be requested to indicate the exact position of the graves, the number of graves located there as well as the details of the deceased.
- With the position of the grave confirmed it can be assessed whether further mitigation measures would be required. This may include changing the edge of the development slightly to allow for the preservation of the grave, or alternatively the relocation of the affected graves.

The following general recommendations are required:

- The two areas of the conveyor and pipeline footprints which could not be surveyed due to access limitations (refer Section 4.4.2) must be surveyed and the results of those surveys included in the heritage assessment report. This includes the grave

site located within one of these areas which was identified during the desktop study.

- Any changes to the existing layout of any of the proposed development footprints (i.e. study area boundaries and/or footprint areas of the conveyor belt or pipeline) will have to be surveyed by a suitably qualified heritage specialist.

It is the opinion of the author of this report that in terms of the heritage aspects addressed as part of the defined scope of work of this study (see Section 3), and on the condition that the required mitigation measures and recommendations made in this report are undertaken before any development takes place, the development may be allowed to continue.

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ANNEXURES

ABREVIATIONS

Acronyms	*Description*
CRM	Cultural Resource Management
DEA	Department of Environmental Affairs
DWA	Department of Water Affairs
EIA practitioner	Environmental Impact Assessment Practitioner
EIA	Environmental Impact Assessment
ESA	Early Stone Age
GIS	Geographic Information System
GPS	Global Positioning System
HIA	Heritage Impact Assessment
HWC	Heritage Western Cape
I&AP	Interested & Affected Party
LSA	Late Stone Age
LIA	Late Iron Age
MSA	Middle Stone Age
MIA	Middle Iron Age
NEMA	National Environmental Management Act
NHRA	National Heritage Resources Act
PHRA	Provincial Heritage Resources Agency
PSSA	Palaeontological Society of South Africa
ROD	Record of Decision
SADC	Southern African Development Community
SAHRA	South African Heritage Resources Agency

TERMS & DEFINITION

Archaeological resources

This includes:

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

Cultural significance

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

Development

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

i. construction, alteration, demolition, removal or change in use of a place or a structure at a place;
ii. carrying out any works on or over or under a place;
iii. subdivision or consolidation of land comprising a place, including the structures or airspace of a place;

iv. constructing or putting up for display signs or boards;
v. any change to the natural or existing condition or topography of land; and
vi. any removal or destruction of trees, or removal of vegetation or topsoil

Heritage resources

This means any place or object of cultural significance

1. INTRODUCTION

PGS Heritage and Grave Relocation Consultants were appointed by Aurecon to undertake a Phase 1 Heritage Impact Assessment for the proposed Kriel Ash Dam Facility in the vicinity of Kriel (Ga-Nala), Mpumalanga Province. The proponent is Eskom.

The present report was preceded by two heritage desktop studies also undertaken by PGS Heritage and Grave Relocation Consultants. In the first of these reports (reference number AUR-KAD-HDS-1 and dated 13 August 2010) three possible sites (Site 10, Site 16C and Site 16N) for the proposed Ash Dam Facility were investigated through available heritage desktop data. In the second report (reference number AUR-KAD-HDS-3 and dated 10 September 2010) five possible sites (Site 10, Site 16C and Site 16N, Site 15 and the New Site) for the proposed Ash Dam Facility were investigated through available heritage desktop data.

These reports formed part of Aurecon's options analysis aimed identifying the most suitable site for the proposed Ash Dam Facility, both in terms of its associated environmental and heritage impacts as well as it suitability for the proposed development.

In the end two sites were identified for the heritage assessment phase. These two sites are Site 10 and Site 16N.

2. DESCRIPTION OF STUDY AREA AND PROPOSED DEVELOPMENT

2.1 Study Area

2.1.1 Site 10

Site 10 is located directly south of the Kriel Power Station and can be described as largely disturbed. It is located on the farms Driefontein 69 IS, Kriel Power Station 65 IS and Onverwacht 70 IS and is situated 3.4 km south-west of the town of Kriel (Ga-Nala). The approximate boundaries of Site 10 are defined by the following coordinates:

- S26.27681 E29.18707
- S26.28032 E29.18980
- S26.28359 E29.20101
- S26.28167 E29.21333

- S26.27990 E29.21626
- S26.27637 E29.21626
- S26.27033 E29.20378
- S26.26436 E29.20387
- S26.26302 E29.20053
- S26.26496 E29.19467
- S26.26958 E29.19756
- S26.27160 E29.19426

Plate 1 General view of a section of Site 10. It is quite evident from this photograph that this site is not pristine.

2.1.2 Site 16N

Site 16 N is located for the most part on the farm Roodepoort 40 IS with a small section located on the farm Roodebloem 58 IS. It is situated approximately 2.3 km north of the town of Kriel (Ga-Nala). The study area comprises large sections of agricultural fields, with a section of it containing a vlei as well. The approximate boundaries of Site 16 N are defined by the following coordinates:

- S26.22515 E29.24320
- S26.22368 E29.25270
- S26.20145 E29.25003
- S26.19980 E29.24535

- S26.20676 E29.23626

Plate 2 View of a section of Site 16N.

2.1.3 Conveyor belts

The approximate boundaries of the conveyor belt associated with Site 10 are defined by the following coordinates:

- S26.25316 E29.17944
- S26.26491 E29.18675
- S26.26461 E29.19442
- S26.27284 E29.19969

The approximate boundaries of the conveyor belt associated with Site 16N are defined by the following coordinates:

- S26.25316 E29.17944
- S26.25727 E29.19356
- S26.24502 E29.21476
- S26.21300 E29.22016
- S26.20022 E29.24324

Plate 3 View of a section of the conveyor belt area in the vicinity of Site 16 N.

Plate 4 View of a section of the conveyor belt area in the vicinity of Site 10.

2.1.4 Pipelines

The approximate boundaries of the pipelines associated with Site 10 are defined by the following coordinates:

- S26.24851 E29.18018
- S26.25253 E29.17042
- S26.26713 E29.17782
- S26.27272 E29.17802
- S26.28402 E29.20167
- S26.28437 E29.20469

The approximate boundaries of the pipelines associated with Site 16N are defined by the following coordinates:

- S26.24851 E29.18018
- S26.24559 E29.18559
- S26.24065 E29.21592
- S26.21321 E29.22049
- S26.20280 E29.23911
- S26.20175 E29.25206
- S26.19114 E29.25163

2.2 Proposed Development

The Kriel Power Station is a coal fired power station owned by Eskom and makes use of a wet ashing process to dispose of its ash. The power station produces coarse and fine ash through burning coal for the generation of electricity. Coarse ash is crushed at the Power Station and transferred to sumps from where it is pumped to the ash dams together with the fine ash (fly ash). The fine ash is also transported separately to the existing ash dams via a conveyor belt, while the coarse fly-ash ash mixture is pumped as slurry through a pipeline to the ash dams. Recently two of the three ash dams have reached their capacity, whereas the third ash dam would be reaching its capacity by 2016. Eskom is thus proposing to construct an additional ash dam that would fulfil ash disposal requirements for the remainder of the power station's operational life, i.e. 2043 plus a five year contingency, during which approximately 111.18 million m^3 of ash will be produced.

The Kriel Power Station proposes to expand the existing ash dam complex to include a fourth ash disposal facility. The project requires the following components:

- An ash disposal facility that would have sufficient capacity to store approximately 111.18 million m3 of ash;
- Return water dams from where decant and drained water could be pumped back to the power station for re-use;
- Delivery and return infrastructure, including conveyor belts and/ or pipelines, transfer houses, pump stations, powerlines, access roads;
- A liner system and/or water treatment facility; and
- Seepage and surface runoff collection trenches.

It will also be necessary to have roads to and at the ash facility for maintenance / operational purposes, as well as power supply lines to operate the various infrastructures.

Once the need for the proposed ash disposal facility had been established, an extensive site screening process was initiated to identify potential sites within a 12 km radius of the Kriel Power. Based on this exercise, the following two sites were identified as being potentially suitable for the proposed ash disposal facility, viz.:

- Site 10 adjacent to the existing ash dam complex; and
- Site 16N to the northeast of the power station.

It was recommended that these two site location alternatives be assessed in the EIA phase. As a result these two alternatives (with their respective associated conveyor belts and pipeline routes) are assessed as part of the present Heritage Assessment as well.

Refer Figure 1 below for the layout of the two alternatives.

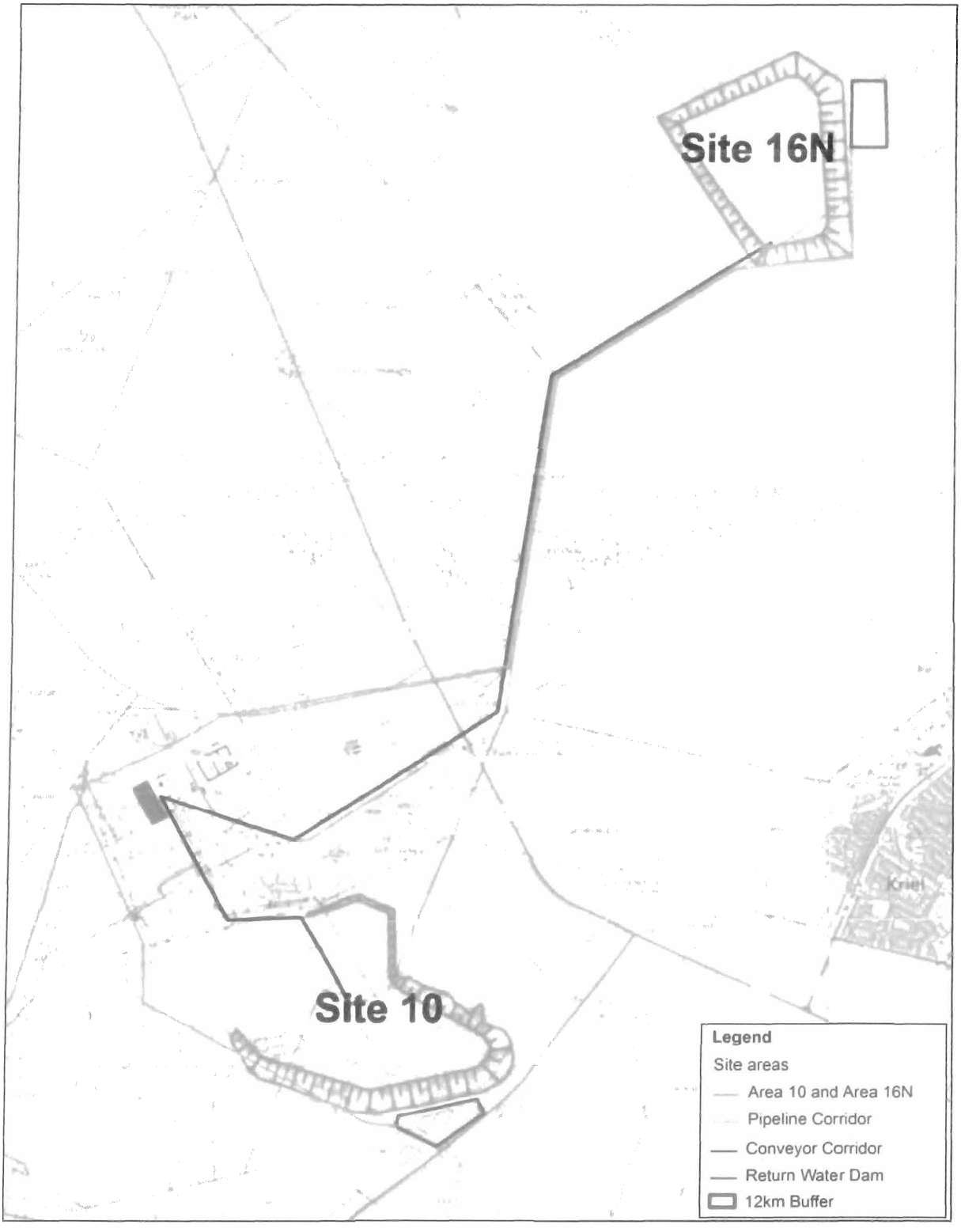

Figure 1 This image depicts a modified version of a plan supplied by the client. The development footprint depicted here is from the plan supplied by the client.

3. SCOPE OF WORK

The aim of the Heritage Impact Assessment is to locate any heritage resources situated within the study area, assess their respective levels of significance, evaluate the impact of the proposed development on these sites and provide mitigation measures should these sites be negatively impacted upon. The National Heritage Resources Act (25 of 1999) provides a very comprehensive list of what the national estate may consist of. This list includes:

1. Places, buildings, structures and equipment of cultural significance
2. Places to which oral traditions are attached or which are associated with living heritage
3. Historical settlements and townscapes
4. Landscapes and natural features of cultural significance
5. Geological sites of scientific or cultural importance
6. Archaeological and palaeontological sites
7. Graves and burial grounds
8. Sites of significance relating to the history of slavery in South Africa
9. Movable objects such as military objects and ethnographic art.

From the items listed here, numbers 1, 3, 6 (excluding 'palaeontological sites'), 7, 8 and 9 were addressed in this report. Furthermore, it must be noted as well that this study focussed on the identification of tangible heritage resources. As a result very little work was undertaken in terms of intangible heritage (i.e. ritual or spiritual aspects of the area, indigenous knowledge systems and living heritage).

4. METHODOLOGY

4.1 Desktop Study

The desktop study's aim is to compile as much available information as possible on the heritage resources of the area and thereby also providing historical context for any located sites. The focus in the study was placed on archival and historical maps.

4.2 Field Surveys

The field surveys were undertaken from Tuesday, 5 July 2011 to Thursday, 7 July 2011. Location data was captured with a Garmin MAP60CS handheld GPS receiver, loaded with

a Garmap South Africa Topographic & Recreation v1.00 base map. Photographs were taken with a Canon Powershot A550 digital camera.

4.3 Consulting with Local Interested and/or Affected Parties

A public participation process was undertaken by Aurecon. Informal discussions took place with members of the public encountered during the fieldwork undertaken by PGS Heritage & Grave Relocation Consultants. These individuals were asked whether they knew of any graves, old buildings or other heritage sites in the area.

4.4 Aspects regarding Visibility and Constraints

1. Not subtracting 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 heritage resources located there. This may be due to various reasons, including the subterranean nature of some archaeological sites and dense vegetation cover. As such, should any heritage features and/or objects not included in the present inventory be located or observed, a heritage specialist must 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 make an assessment as to the significance of the site (or material) in question. This is true for graves and cemeteries as well.

2. The entire study area was covered during the field surveys with the exception of the following:

    - No access was possible in terms of a section of the conveyor belt and water pipeline route from the Kriel Power Station to Area 16 N. This section was situated between Transfer House 3 (T3) at chainage 3995m to Transfer House 4 (T4) at chainage 7619m.
    - Another section of water pipeline situated at the western and south-western side of Kriel Power Station, which crossed the property of AngloCoal was not accessible. The exact length of this section could not be determined.

3. Only the proposed development components as depicted in Figure 1 were assessed as part of this study. Any additional developments such as roads and power lines were not assessed.

5. LEGISLATIVE REQUIREMENTS AND TERMINOLOGY

5.1 Legislation

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:

- National Environmental Management Act (NEMA) Act 107 of 1998
- National Heritage Resources Act (NHRA) Act 25 of 1999
- Minerals and Petroleum Resources Development Act (MPRDA) Act 28 of 2002
- Development Facilitation Act (DFA) Act 67 of 1995

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

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

5.2 Terminology

Archaeological resources

- 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;

- 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

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 change to the nature, appearance or physical nature of a place or influence 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;
- any removal or destruction of trees, or removal of vegetation or topsoil

Heritage resources

This means any place or object of cultural significance

6. ASSESSMENT CRITERIA

This chapter describes the evaluation criteria used for the sites listed below. The four main criteria used in the evaluation of archaeological sites are:

- **site integrity** (i.e. primary vs. secondary context),

- **amount of deposit, range of features** (e.g. stonewalling and stone tools),
- **uniqueness** and
- **potential** to answer present research questions.

In terms of heritage sites, Section 3 (3) of the National Heritage Resources Act 25 of 1999 states that a place or object is considered part of the national estate if it has cultural significance or other special value because of:

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

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

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

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

(e) its importance in exhibiting particular aesthetic characteristics valued by a community or cultural group;

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

(g) its strong or special association with a particular community or cultural group for social, cultural or spiritual reasons;

(h) its strong or special association with the life or work of a person, group or organisation of importance in the history of South Africa; and

(i) sites of significance relating to the history of slavery in South Africa.

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

6.1 Impact

The potential environmental impacts that may result from the proposed development.

6.1.1 Nature and existing mitigation

Natural conditions and conditions inherent in the project design that alleviate (control, moderate, curb) impacts. All management actions, which are presently implemented, are considered part of the project design and therefore mitigate against impacts.

6.2 Evaluation

6.2.1 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.

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

6.2.2 Impact rating

VERY HIGH

These impacts would be considered by society as constituting a major and usually permanent change to the (natural and/or social) environment, and usually result in **severe** or **very severe** effects, or **beneficial** or **very beneficial** effects.

Example: The loss of the last known example of an archaeological site.

HIGH

These impacts will usually result in long term effects on the social and/or natural environment. Impacts rated as HIGH will need to be considered by society as constituting an important and usually long term change to the (natural and/or social) environment. Society would probably view these impacts in a serious light.

Example: The loss of a significant archaeological site located within the development area, but which is also known from other areas outside of the study area.

MODERATE

These impacts will usually result in medium- to long-term effects on the social and/or natural environment. Impacts rated as MODERATE will need to be considered by society as constituting a fairly important and usually medium term change to the (natural and/or social) environment. These impacts are real but not substantial.

Example: The loss of a medium significant archaeological site located within the development area, but which is also known from other areas outside of the study area.

LOW

These impacts will usually result in medium to short term effects on the social and/or natural environment. Impacts rated as LOW will need to be considered by the public and/or the specialist as constituting a fairly unimportant and usually short term change to the (natural and/or social) environment. These impacts are not substantial and are likely to have little real effect.

Example: The loss of a low significant archaeological site located within the development area, but which is also known from other areas outside of the study area.

NO SIGNIFICANCE

No primary or secondary effects at all that are important to scientists or the public.

Example: The loss of an archaeological site which has no significance and for which numerous other exactly similar examples exist outside of the study area.

6.2.3 Certainty

DEFINITE: More than 90% sure of a particular fact. Substantial supportive data exist to verify the assessment.
PROBABLE: Over 70% sure of a particular fact, or of the likelihood of impact occurring.
POSSIBLE: Only over 40% sure of a particular fact or of the likelihood of an impact.
UNSURE: Less than 40% sure of a particular fact or likelihood of an impact occurring.

6.2.4 Duration

SHORT TERM: 0 to 5 years
MEDIUM: 6 to 20 years
LONG TERM: more than 20 years
DEMOLISHED: site will be demolished or is already demolished

Evaluation Example

Impact	Impact Significance	Heritage Significance	Certainty	Duration	Mitigation
Negative	Moderate	Grade GP.B	Possible	Short term	B

7. CARTOGRAPHIC FINDINGS

7.1 Site 16 N

7.1.1 Google Earth

The following observations can be made from the Google Earth Image (see **Figure 2**):

- Large sections of the study area can be described as disturbed in that they have been ploughed and cultivated over the years.
- A pan is located directly north-west (but outside) of the study area. As mentioned before freshwater pans have always been a focal point for human settlement, and especially so during the Stone Age. However, no Stone Age material or sites were observed during the field survey.
- A section of a small plantation is located on the northern end of the study area.
- One possible heritage site was observed on the image. It (S26.187824 E29.233863) comprises the remains of a building or structure. As can be seen below, it is likely depicted on the First Edition of the 2629AA Topographical Sheet which was based on aerial photography undertaken in 1954 and surveys undertaken in 1962. Although its age is unknown, the possible heritage site appears to be older than at least 48 years. It was not located during the field survey.

7.1.2 Major Jackson Series Map

Figure 3 depicts an enlarged section of the Bethal Sheet of the Major Jackson Series (National Archives, Maps, 3/559). This series was produced during the South African War (1899-1902) by the Mapping Section of the Field Intelligence Department under the supervision of Major R.M. Jackson. The sheet is a revised edition dated to April 1901.

The following observations can be made from the map:

- No heritage sites are depicted within or in close proximity to Site 16 N.
- The only features depicted within the farm Roodepoort is a farmstead comprised of a farm dwelling and two associated buildings. These are located some distance north-west (and outside) of the boundaries of Site 16 N.
- A number of roads are also shown crossing over the farm. However, none of these roads pass anywhere close to the present study area.