PGS
HERITAGE & GRAVE
RELOCATION CONSULTANTS

Environmental Impact Management Services (Pty) Ltd

Lambda 400/765kV Substation and Associated 400kV and 765 kV lines

EIA and EMP

Heritage Impact Assessment

Issue Date: 12 July 2012

Revision No.: 2

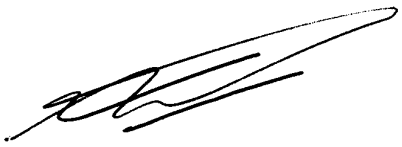
Project No.:

Declaration of Independence

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

HERITAGE CONSULTANT: PGS Heritage & Grave Relocation Consultants

CONTACT PERSON: Wouter Fourie
Tel: +27 (0) 12 332 5305
Email: wouter@gravesolutions.co.za



SIGNATURE: _____

ACKNOWLEDGEMENT OF RECEIPT

CLIENT: Environmental Impact Management Services (Pty) Ltd

CONTACT PERSON: Liam Whitlow.
Tel: (011) 789-7170 Fax: (011) 787- 3059
Email: liam@eims.co.za

SIGNATURE: _____

EXECUTIVE SUMMARY

PGS Heritage & Grave Relocation Consultants was appointed by Environmental Impact Management Services (Pty) Ltd to undertake a Heritage Impact Assessment that forms part of the Environmental Impact Assessment (EIA) and Environmental Management Plan (EMP) for Lambda 400/765kV Substation and Associated 400kV and 765 kV lines EIA and EMP, in Mpumalanga Province.

Heritage resources are unique and non-renewable and as such any impact on such resources must be seen as significant.

During the field work 8 heritage sites were identified that are on or inside the boundary of the proposed alternatives' buffer areas. Along with this the evaluation of the cultural landscape took cognisance of farmsteads and homesteads scattered over the study area.

Impacts and mitigation measures as evaluated for the alternative sites is as follows:

1.1 Cemeteries

Four cemeteries were identified within the alternative alignments and sites surveyed. These cemeteries contained a total of 103 graves.

Mitigation recommendations

- Fence and demarcate as no-go area during construction;
- Fence must be palace with a 10 meter buffer from the closest grave;
- If it is found that the alignment and pylon positions cannot be moved, a full grave relocation process must be followed.

1.2 Homesteads

Three ruined homesteads were identified within the alternative alignments and sites surveyed.

The exact age and time span of occupation of the homesteads are unknown. The architectural design, construction techniques and the artefacts found on the site were used

to assume a relative age for the site. These structures and thus the identified homesteads seem to be from within the last 60 years and are therefore not protected under the National Heritage Act (Act 25 of 1999). The structures themselves have little or no heritage value or significance due to their relevant recent origins from within the last 60 years.

The structures, however, should be avoided, due to the possibility of infant human remains underneath the remains of the structures.

Mitigation recommendations:

- Fence and demarcate as no-go area during construction;
- If it is found that the alignment and pylon positions cannot be moved, a qualified archaeologist must monitor construction activities as stipulated in Section 5.2 must be followed.

1.3 Cultural Landscape

The larger study area is already impacted and sensitised towards transmission lines and power generation structures, notably the Amajuba Power Station as well as the UGG infrastructure close to Alternative 3. However the addition of the new alignments and substation may aggravate the cumulative effect of this infrastructure type on the landscape

The visual impact of the proposed transmission lines and substation will be addressed in the Visual Impact Assessment of the EIA, as well as the possible mitigation measures. These mitigation measures will in most instances also alleviate impacts on the cultural landscape.

1.4 Fatal Flaws

No fatal flaws have been identified during this study.

1.5 Assessment of Alternatives

An assessment of the proposed alternatives with regards to impact on heritage, none of the finds during the field work constitute a non-mitigatable issue.

1.5.1 Substation alternatives

No heritage resources were found within the boundary of any of the proposed substation sites, and as such from a direct impact all four alternative sites score the same.

1.5.2 Transmission line alternatives

These alternative transmission line alignments are foremost influenced by the choice of substation position. As none of the four substation alternatives are excluded from heritage findings, the alignments must all be evaluated by means of their relative positions in relations to heritage structures.

Seven heritage sites have been identified as being very close or under proposed alignments, but even these sites can be avoided by micro adjustment of the pylon positions in the field.

The biggest impact of transmission lines from a heritage perspective is on the cultural landscape and its impact on sense of place. The larger study area is already impacted and sensitised towards transmission lines and power generation structures, notably the Majuba Power Station as well as the UGG infrastructure close to Alternative 3. However the addition of the new alignments and substation may aggravate the cumulative effect of this infrastructure type on the cultural landscape.

Table 1 - Impact Evaluation Scoring of Heritage Resources

Alternative Alignment	**Number of heritage structure under or close by**	**Significance rating of cumulative impact of alignment on structure**	**Significance rating of impact of alignment on cultural landscape**
Alt3: Majuba Lambda1 400kV Loopin	LAM4 (Close vicinity) LAM5 (Close vicinity) LAM6 (Close vicinity) LAM7 (Close vicinity)	-6 -6 -6 -6	-12.375
Alt3: Majuba Lambda2 400kV Loopin	LAM4 (Close vicinity) LAM5 (Close vicinity) LAM6 (Close vicinity) LAM7 (Close vicinity)	-6 -6 -6 -6	-12.375
Alt 4: Lambda Majuba TX 400kV	LAM5 (Close vicinity) LAM6 (Under alignment) LAM7 (Under alignment) LAM8 (Close vicinity)	-6 -6 -6 -6	-13.5

Alt5: Lambda Venus 765kV part 1	LAM2(Under alignment) LAM3 (Close vicinity) LAM7 (Under alignment) LAM8 (Close vicinity)	-6 -6 -6 -6	-14.625
Alt5: Lambda Majuba part 1	LAM6 (Close vicinity) LAM7 (Under alignment) LAM8 (Close vicinity)	-6 -6 -6	
Alt8: Lambda Majuba TX 400kV1 and 2	LAM8 (Under alignment) LAM6 (Under alignment) LAM7 (Close vicinity)	-6 -6 -6	-12.375

Evaluation of the alternative alignments 3 and 8 has shown that although the visual impact on Alternative 3 and 8 may seem high, the existing power and transmission lines and infrastructure has sensitised the area and residents to such infrastructure.

In the case of Alternatives 4 and 5, and specifically Alternative 5, the absence of existing transmission lines and associated infrastructures will lead to a much higher visual impact and impact on the cultural landscape and sense of place.

Taking in to consideration the existing Transmission line corridors and infrastructure associated with power generation in the area, Alternative 8 and its alignments may have a smaller cumulative impact on heritage resources overall, only impacting on two identified heritage points. The close proximity of the Rietpoort farmstead to the Alternative 8 Substation position may be problematic from a cultural landscape perspective and must be addressed in the Visual Assessment.

CONTENTS **Page**

List of Appendices

LIST OF FIGURES

LIST OF TABLES

1 INTRODUCTION

PGS Heritage & Grave Relocation Consultants was appointed by Environmental Impact Management Services (Pty) Ltd to undertake a Heritage Impact Assessment that forms part of the Environmental Impact Assessment (EIA) and Environmental Management Plan (EMP) for Lambda 400/765kV Substation and Associated 400kV and 765 kV lines EIA and EMP, in Mpumalanga Province.

1.1 Scope of the Study

The aim of the study is to identify possible heritage sites and finds that may occur in and on the areas where infrastructure will be sited. The Heritage Impact Assessment aims to inform the development of a comprehensive Environmental Impact Assessment (EIA) and consequent Environmental Management Plan (EMP) to assist Eskom in managing the discovered heritage resources in a responsible manner, in order to protect, preserve, and develop them within the framework provided by the National Heritage Resources Act of 1999 (NHRA) (Act 25 of 1999).

1.2 Specialist Qualifications

This Heritage Impact Assessment Report was compiled by PGS Heritage & Grave Relocation Consultants (PGS).

The staff at PGS has a combined experience of nearly 40 years in the heritage consulting industry. PGS and its staff have extensive experience in managing HIA processes. PGS will only undertake heritage assessment work where they have the relevant expertise and experience to undertake that work competently.

Wouter Fourie, Principal Archaeologist for this project, is registered with the Association of Southern African Professional Archaeologists (ASAPA) and has Cultural Resources Management (CRM accreditation within the said organisation.

1.3 Assumptions and Limitations

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 possible heritage resources present within the area. Various factors account for this, including the subterranean nature of some archaeological sites and the current dense vegetation cover. As such, should any heritage

features and/or objects not included in the present inventory be located or observed, a heritage specialist must 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 applies to graves and cemeteries as well. In the event that any graves or burial places are located during the proposed development's activities, the procedures and requirements pertaining to graves and burials will apply as set out in the report.

1.4 Legislative Context

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

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

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

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

The NHRA stipulates that cultural heritage resources may not be disturbed without authorization from the relevant heritage authority. Section 34 (1) of the NHRA states that "no person may alter or demolish any structure or part of a structure which is older than 60 years without a permit issued by the relevant provincial heritage resources authority…". The NEMA (No 107 of 1998) states that an integrated EMP should (23:2 (b)) "…identify, predict and evaluate the actual and potential impact on the environment, socio-economic conditions and cultural heritage". In accordance with legislative requirements and EIA rating criteria, the regulations of SAHRA and ASAPA have also been incorporated to ensure that a comprehensive legally compatible AIA report is compiled.

1.5 Terminology and definitions

Table 2 – Abbreviations used in report

Abbreviations	***Description***
AIA	Archaeological Impact Assessment
ASAPA	Association of South African Professional Archaeologists
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
GPS	Global Positioning System
HIA	Heritage Impact Assessment
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

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; and
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

Early Stone Age

The archaeology of the Stone Age between 400 000 and 2500 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.

Holocene

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

Late 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 30-300 000 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.

Refer to **Appendix A** for further discussions on heritage management and legislative frameworks.

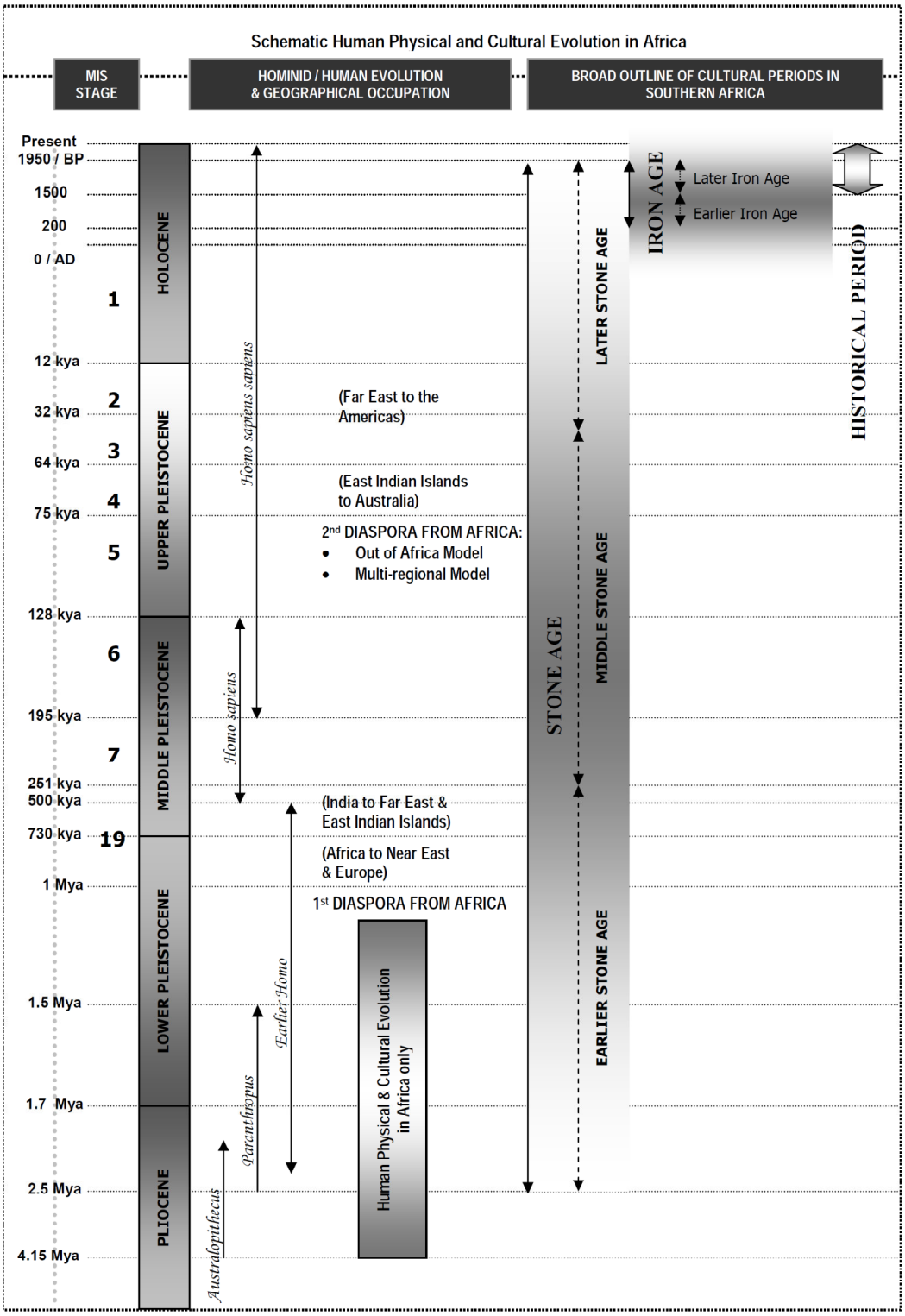


Figure 1 - Human and Cultural Time line in Africa (Morris, 2008)

2 TECHNICAL DETAILS OF THE PROJECT

Eskom has applied for environmental authorisation for the construction of a new Lambda 400/765kV Substation and the associated 400kV and 765kV Transmission lines.

The following specific activities pertain to the application and will be assessed in the EIA:

- Construction of the Eskom Lambda 400/765 kV Substation.
- Construction of 2 X 400kV transmission lines to link the existing Majuba Substation to the proposed new Lambda Substation (each 400kV transmission line will require a servitude of 55m wide).
- Construction of loop-in of the Majuba- Umfolozi 765kV transmission line to the proposed new Lambda Substation (the 765kV transmission line will require a servitude of maximum 80m wide).
- Construction of loop-in of the Majuba-Venus 765kV transmission line to the proposed new Lambda Substation.

In addition to the construction of the substation and the transmission lines the following ancillary activities will be required:

- Telecommunications mast (approximately 40m in height);
- Heavy vehicle access roads to the substation for the construction and operation; and
- Construction camps for the purposes of housing construction workers during the construction process.

3 CURRENT STATUS QUO

The Scoping Report (SR) has been completed and public comment received.

The main outcomes of the SR included the following:

- The identification of three alternative sites for the location of the Substation (Sites 3, 4 and 5 (Refer to **Figure 2**);
- The identification of preliminary transmission line route options for each of the three alternative sites;
- The identification of impacts which require detailed assessment in the EIA Phase (Refer to **Section 3.1.1**); and
- As part of the EIA a fourth alternative site, Site 8 with its proposed alignments was evaluated as a possible position for the proposed Substation.

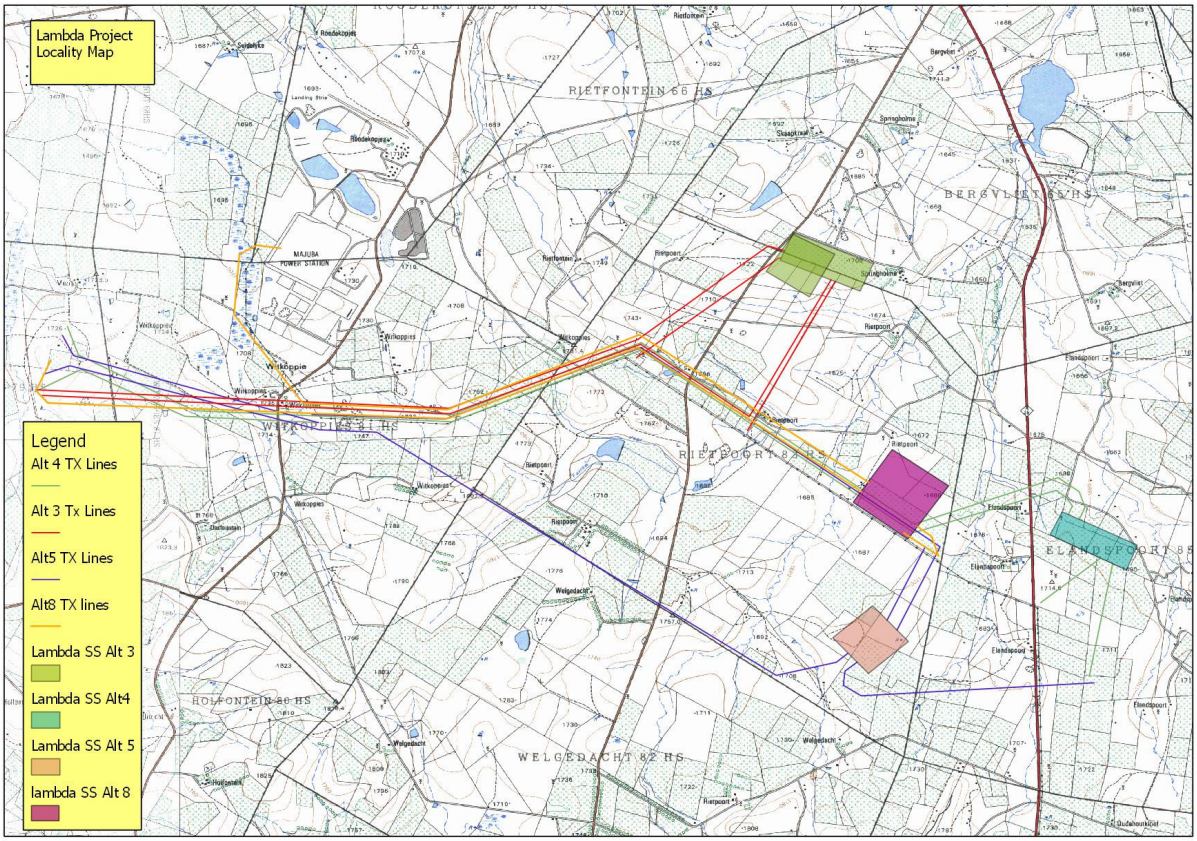


Figure 2 - Locality map of proposed substation alternatives and transmission line route alignments

3.1 Site Description

The alignments and substation alternative sites traverse a landscape that can be classified as rural farming landscape. Most of the landscape is still utilised for farming purposes and is characterised by undulating grasslands.

Figure 3 - View of study area and alignments on Alternative 3

Figure 4 - General conditions in survey areas

Figure 5 - Majuba Power Station in north western corner of study area

Figure 6 - Majuba Power Station in north western corner of study area

3.1.1 Findings of Heritage Scoping Report

From a Fatal Flaw analysis the four alternative sites evaluated during the Heritage Scoping study reflected no Fatal Flaws that could be identified during the archival and desktop evaluation. Some possible sensitive area were identified that required further evaluation in the field.

In the larger study area possible fatal flaws are the existing cemeteries and graves specifically associated with the conflict of the South African War (**Figure 8**). Four specific sites on the farms, Mezigt, Witkoppies and Rietpoort were identified. The farm Palmietspruit also contains cemeteries but the position of the cemeteries is not known.

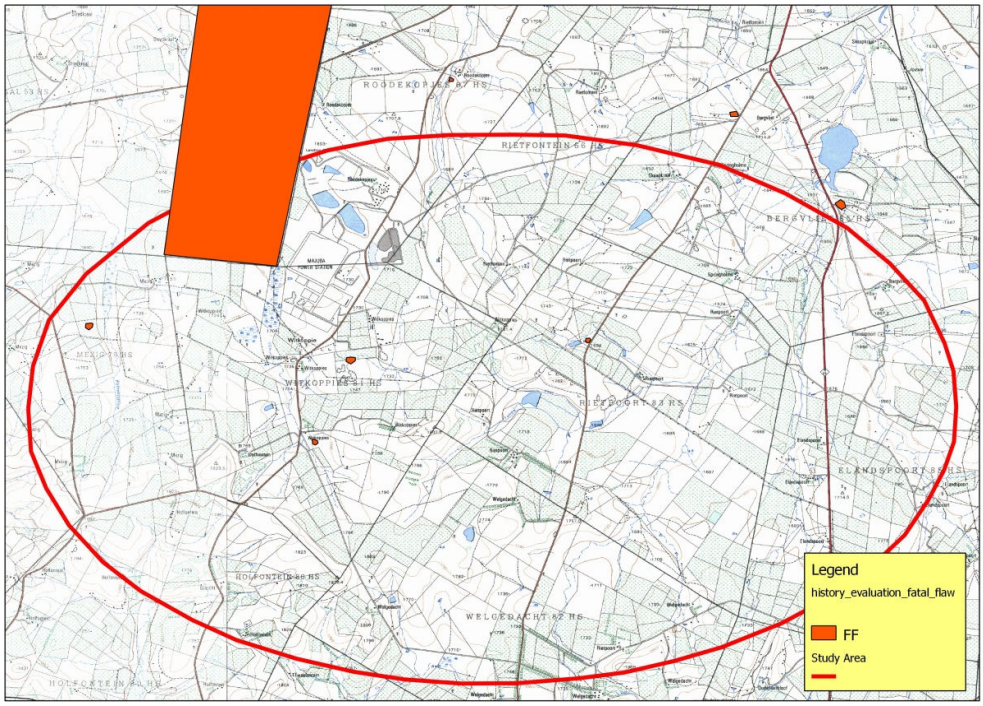


Figure 7 - Position of cemeteries of the South African Conflict – Possible Fatal Flaws

Potential Sensitivities

The same data set developed for the Fatal Flaw analysis was utilised for the sensitivity analysis. This data was then combined to develop a map of possible heritage resources (***Figure 9***) from which a sensitivity map of heritage resources was created (***Figure 10)***. In a few cases where reference was made in archival records of farms with war graves on, the whole farm was marked as sensitive, but more focused with field work during the EIA phase.

The sensitivity rating utilised for the study area is reflected in *Table 3*.

Table 3 - Sensitivity rating

Category	Description	Rating
Restricted	All confirmed and potential sites of heritage significance together with a 100m buffer.	-1
Negotiable	No confirmed heritage sites. Potential for unidentified sites (e.g. Palaeontological features not currently identified).	0
Preferred	No confirmed heritage sites and little to no potential for heritage sites.	+1

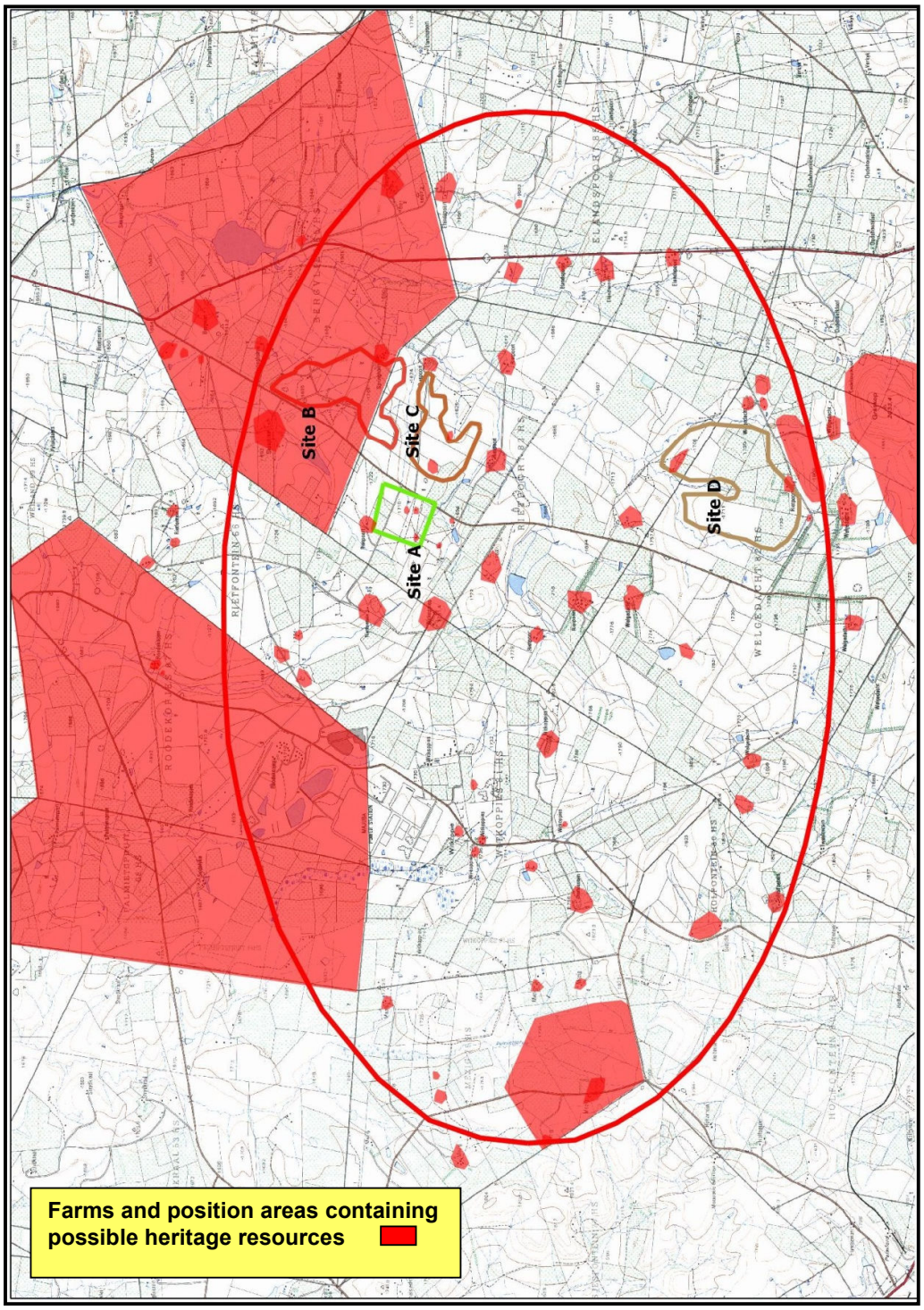


Figure 8– Map developed for possible heritage resources in the study area

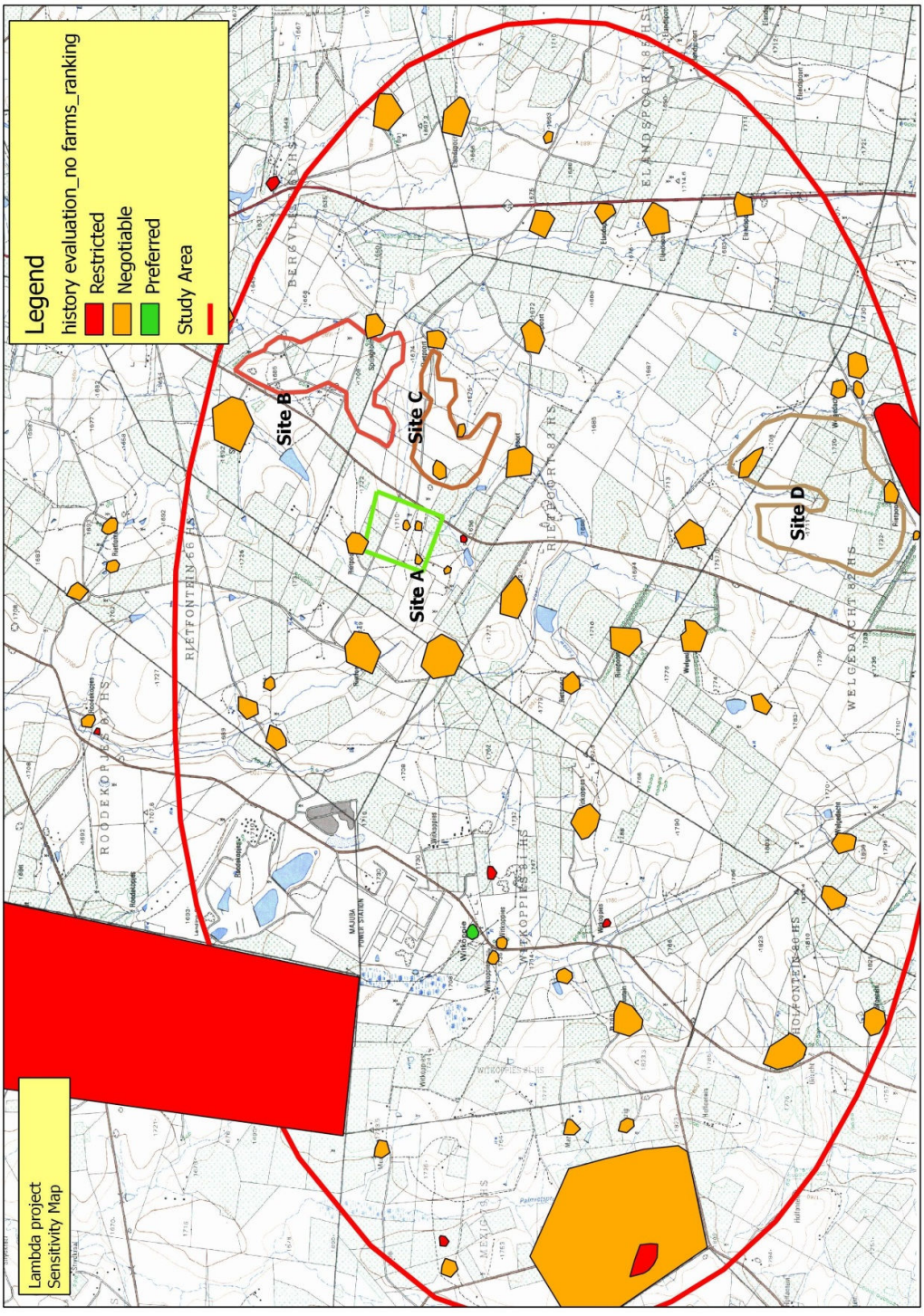


Figure 9 -Sensitivity map developed for possible heritage resources in the study area

Potential Impacts and Further Work for EIA Phase

The site evaluation has shown that the possibility exists of finding heritage resources in the proposed Substation Sites. The Scoping Phase site evaluation did however not exclude the need for proper ground

thruthing during the EIA phase of the project. Table 4 provides a guideline on possible finds that could be made during ground thruthing and the next steps to be taken during the site evaluation in the EIA Phase.

Table 4 – Possible heritage resources to be identified during ground thruthing

ISSUE	**Impact on archaeological sites**
DISCUSSION	As seen from the archival work and discussion the possibility of archaeological finds have been identified and thus further fieldwork is required to develop a comprehensive Heritage Management Plan for the construction activities.
EXISTING IMPACT	None known.
PREDICTED IMPACT	Unidentified archaeological sites. Fieldwork can thus provide valuable information on in the study area and provide timeous management of such through the realignment of the construction activities.
EIA INVESTIGATION REQUIRED	Archaeological field survey of selected sites.
CUMULATIVE EFFECT	None foreseen at this stage.

ISSUE	**Impact on historical sites**
DISCUSSION	As seen from the archival work and discussion the possibility of historical finds have been identified as being high and thus further fieldwork is required to develop a comprehensive Heritage Management Plan for the construction.
EXISTING IMPACT	None known.
PREDICTED IMPACT	Unidentified historical structures. Fieldwork can thus provide valuable information on the study area and provide timeous management of such through the realignment of the proposed construction.
EIA INVESTIGATION REQUIRED	Archaeological field survey of selected sites will identify possible impacted sites.
CUMULATIVE EFFECT	None foreseen at this stage.

ISSUE	Impact on graves and cemeteries site
DISCUSSION	The existence of graves and cemeteries has not been verified during the archival research. It has however been found that such structures are rarely noted in maps and documents and can only be identified during field work.
EXISTING IMPACT	None known.
PREDICTED IMPACT	Unidentified graves and cemeteries and the discovery of such structures during prospecting can seriously hamper construction timelines. In the event that graves and cemeteries could not be avoided a grave relocation process needs to be initiated bearing in mind that such a process impacts on the spiritual and social fabric of the next of kin and associated communities. Fieldwork can thus provide valuable information on the study area and provide timeous management of such through the realignment of the proposed construction.
EIA INVESTIGATION REQUIRED	Archaeological field survey of selected areas will identify possible impacted sites.
CUMULATIVE EFFECT	None foreseen at this stage.

3.1.2 Findings of the Heritage Field work

The field work was based on the guidelines provided in the Heritage Scoping document dated 25 November 2010. The guideline stipulated that when the alignments and positions of the proposed alternative sites have been determined a survey of each alignment and substation position will be required to identify possible heritage sensitive areas.

To comply with this requirement, a field survey of the preferred Sites 3, 4 and 5 as well as the transmission route alignments was done in the week of the 30th of November 2011. While field work on Site 8 and its alignments was completed on the 9th of July 2012.

The substation positions and route alignments were surveyed by an archaeologist and field assistant from PGS over 4 days by foot and vehicle with the aim of identifying all heritage resources on or close to the substation and route alignments.

Site LAM 2

GPS: 27° 09' 50,1" S 29° 50' 21,5" E

A small informal cemetery with 26 graves was identified at this location. The cemetery was demarcated with a low stone packed wall. The cemetery was situated right on the proposed transmission line route. The graves were placed in one line next to each other and all were orientated from west to east. A few small (children) graves were placed at the feet of some of the larger (adult) graves. Two of the graves had formal granite dressings which were filled with soil and gravel. These graves also had inscribed granite headstones, but they had fallen over. The one grave dated from 1959. The rest of the graves had informal oval shaped or rectangular shaped mounds of packed rocks as dressings. The cemetery seemed to be maintained by the family as the grass cover on the graves was only from the last season.

Site size: Approximately 30m x 15m.

Figure 10–View of cemetery (Low stone walling on both sides clearly visible)

Heritage Significance: GP.A – High Significance

Table 5 - Impact Evaluation: Cemetery LAM 2 – Alternative 5

Impact name:	*Destruction of cemeteries*				
Alternative:	*Transmission Alignments - Alternatives 5*				
Description of impact:	*Destruction of cemeteries during construction*				
Environmental Risk					
Attribute	**Pre-mitigation**	**Post-mitigation**	**Attribute**	**Pre-mitigation**	**Post-mitigation**
Nature of Impact	-1	-1	Magnitude of Impact	5	2
Extent of Impact	2	2	Reversibility of Impact	3	2
Duration of Impact	5	2	Probability	2	2
Environmental Risk (Pre-mitigation)					**-7.5**
Environmental Risk (Post-mitigation)					**-4**
Degree of confidence in impact prediction:					Medium
Impact Prioritisation					
Public Response					1
Cumulative Impacts					2
Destruction of graves sites and removal of these site can cause social discourse and negativity toward the project					
Degree of potential irreplaceable loss of resources					3
Cultural resources are irreplaceable					
Prioritisation Factor					1.5
Final Significance					**-6**

Recommendations:

- Fence and demarcate as no-go area during construction;
- Fence must be palace with a 10 meter buffer from the closest grave;d
- If it is found that the alignment and pylon positions cannot be moved, a full grave relocation process must be followed.

Site LAM 3

GPS: 27° 09’ 48,0” S 29° 50’ 23,0” E

The remains and the foundations of a cluster of dilapidated structures were identified at this location. These dilapidated structures formed part of an abandoned homestead which was most probably occupied within the last 60 years. The remains consisted basically of packed lines of rocks which were used in the foundations of these structures on which mud-brick walls were built. These structures were predominantly square or rectangular in shape and the rooms measured approximately 5m x 5m. Two of the structures were round (rondawels) and were most probably used as a kitchen and/or storeroom. A few metal artefacts such as wire and cans were observed amongst the remains of the structures.

A stone walled cattle kraal was also identified approximately 25m further north of the abandoned homestead. The kraal measured approximately 15m x 15m and had an entrance on the northern side. The walls were in a dilapidated state, but measured approximately 0,5m high and 0,5m wide. Branches were most probably used to create a higher enclosure.

The homestead and associated kraal structure were situated approximately 50m to the south of the cemetery identified at site LAM 2.

The exact age and time span of occupation of the above mentioned site are not known. The architectural design, construction techniques and the artefacts found on the site were used to assume a relative age for the site. These structures and thus the identified homestead seem to be from within the last 60 years and are therefore not protected under the National Heritage Act (Act 25 of 1999). The structures themselves have little or no heritage value or significance due to their relevant recent origins from within the last 60 years.

The identified settlement and structures falls within the proposed area for Alignment 5.

The structures, however, should be avoided, due to the possibility of infant human remains underneath the remains of the structures.

Through experience of similar sites and the knowledge of cultural customs and traditions it is known that stillborn babies and deceased infants occasionally were being buried within the occupational settlement. These children were sometimes buried underneath the floors and walls of houses and huts. These burials were not marked, but were known to the immediate family.

Customs and traditions like these were common in the rural African communities during the earlier parts of the 20th century. It is therefore not only possible, but rather likely that some of these structures may be on top of some of these infant remains.

Site size: Approximately 60m x 30m.

Figure 11–Foundation of hut

Figure 12– Kraal wall foundation

Heritage Significance: GP.B - Low/medium significance.

Table 6 - Impact Evaluation: Structures and possible infant burials LAM 3 – Alternative 5

Impact name:	*Destruction of historical structures with possible infant burials*				
Alternative:	*Alternative Transmission Alignments 5*				
Description of impact:	*Destruction of structures at homesteads where possible infant burials can occur*				
Environmental Risk					
Attribute	**Pre-mitigation**	**Post-mitigation**	**Attribute**	**Pre-mitigation**	**Post-mitigation**
Nature of Impact	-1	-1	Magnitude of Impact	5	2
Extent of Impact	2	2	Reversibility of Impact	3	2
Duration of Impact	5	2	Probability	2	2
Environmental Risk (Pre-mitigation)					**-7.5**
Environmental Risk (Post-mitigation)					**-4**
Degree of confidence in impact prediction:					Medium
Impact Prioritisation					
Public Response					1
Cumulative Impacts					2
Destruction of homesteads and associated structures where infant burials could be present can cause social discourse and negativity toward the project					
Degree of potential irreplaceable loss of resources					3
Cultural resources are irreplaceable					
Prioritisation Factor					1.5
Final Significance					**-6**

Recommendations:

- Fence and demarcate as no-go area during construction; and
- If it is found that the alignment and pylon positions cannot be moved, a qualified archaeologist must monitor construction activities as stipulated in Section 4.2 must be followed.

Site LAM 4

GPS: 27° 06’ 37,6” S 29° 49’ 41,9” E

A small informal cemetery with 31 graves was identified at this location. The cemetery was not fenced, but was demarcated with a low stone packed wall. The cemetery was situated near or possibly inside the reserve of the proposed power line route. The graves were placed in 6 unequal lines next to each other and all were orientated from west to east. One of the graves had a large rectangular shaped brick and cement outline which was filled with gravel. An inscribed cement headstone was placed at the western end. The rest of the graves had informal oval shaped or rectangular shaped mounds of packed rocks as dressings. The cemetery was not well maintained as the graves were covered with grass and other vegetation.

The identified cemetery falls within the proposed area for Alignment 3.

Site size: Approximately 20m x 30m.

Figure 13– View of cemetery

Heritage Significance: GP.A - High significance.

Table 7 - Impact Evaluation: Cemetery LAM 4 – Alternative 3

Impact name:	*Destruction of cemeteries*				
Alternative:	*Transmission Alignments - Alternative 3*				
Description of impact:	*Destruction of cemeteries during construction*				
Environmental Risk					
Attribute	Pre-mitigation	Post-mitigation	Attribute	Pre-mitigation	Post-mitigation
Nature of Impact	-1	-1	Magnitude of Impact	5	2
Extent of Impact	2	2	Reversibility of Impact	3	2
Duration of Impact	5	2	Probability	2	2
Environmental Risk (Pre-mitigation)					**-7.5**
Environmental Risk (Post-mitigation)					**-4**
Degree of confidence in impact prediction:					Medium
Impact Prioritisation					
Public Response					1
Cumulative Impacts					2
Destruction of graves sites and removal of these site can cause social discourse and negativity toward the project					
Degree of potential irreplaceable loss of resources					3
Cultural resources are irreplaceable					
Prioritisation Factor					1.5
Final Significance					**-6**

Recommendations:

- Fence and demarcate as no-go area during construction;
- Fence must be palace with a 10 meter buffer from the closest grave; and
- If it is found that the alignment and pylon positions cannot be moved, a full grave relocation process must be followed.

Site LAM 5

GPS: 27° 06’ 40,8” S 29° 49’ 21,2” E

A small informal cemetery with 33 graves was identified at this location. The cemetery was situated next the homestead of some of the farm labourers. The cemetery was not fenced, but was demarcated with a low stone packed wall. The cemetery was situated near or possibly inside the reserve of the proposed power line route. The graves were placed in 4 unequal lines next to each other and all were orientated from west to east. Most of the graves had informal oval shaped or rectangular shaped mounds of packed rocks as dressings. One of the structures was round (rondawel) and was most probably used as a kitchen and/or storeroom

The identified cemetery within the proposed area for Alignment 3.

Site size: Approximately 15m x 25m.

Figure 14– Cemetery with surrounding wall

Figure 15– Well maintained graves

Heritage Significance: GP.A - High significance.

Table 8 - Impact Evaluation: Cemetery LAM 5 – Alternative 3

Impact name:	*Destruction of cemeteries*				
Alternative:	*Transmission Alignments - Alternatives 3*				
Description of impact:	*Destruction of cemeteries during construction*				
Environmental Risk					
Attribute	**Pre-mitigation**	**Post-mitigation**	**Attribute**	**Pre-mitigation**	**Post-mitigation**
Nature of Impact	-1	-1	Magnitude of Impact	5	2
Extent of Impact	2	2	Reversibility of Impact	3	2
Duration of Impact	5	2	Probability	2	2
Environmental Risk (Pre-mitigation)					**-7.5**
Environmental Risk (Post-mitigation)					**-4**
Degree of confidence in impact prediction:					Medium
Impact Prioritisation					
Public Response					1
Cumulative Impacts					2
Destruction of graves sites and removal of these site can cause social discourse and negativity toward the project					
Degree of potential irreplaceable loss of resources					3
Cultural resources are irreplaceable					
Prioritisation Factor					1.5
Final Significance					**-6**

Recommendations:

- Fence and demarcate as no-go area during construction;
- Fence must be placed with a 10 meter buffer from the closest grave; and
- If it is found that the alignment and pylon positions cannot be moved, a full grave relocation process must be followed.

Site LAM 6

GPS: 27° 06’ 53,0” S 29° 49’ 17,7” E

A small informal cemetery with 13 graves was identified at this location. The cemetery was situated near the homestead of some of the farm labourers. The cemetery was not fenced, but was demarcated with a low stone packed wall. The cemetery was situated near or possibly inside the reserve of the proposed power line route alignment. The graves were placed in 2 unequal lines next to each other and all were orientated from west to east. All of the graves had informal oval shaped or rectangular shaped mounds of packed rocks as dressings. The cemetery seemed to be well maintained as the grass cover on the graves was only from the last season.

The identified cemetery falls within the proposed area for Alignment 3 and 4.

Site size: Approximately 20m x 10m.

Figure 16– Cemetery close to homestead

Significance: GP.A - High significance.

Table 9 - Impact Evaluation: Cemetery LAM 6– Alternative 3 and 4

Impact name:	*Destruction of cemeteries*				
Alternative:	*Transmission Alignments - Alternatives 3 and 4*				
Description of impact:	*Destruction of cemeteries during construction*				
Environmental Risk					
Attribute	**Pre-mitigation**	**Post-mitigation**	**Attribute**	**Pre-mitigation**	**Post-mitigation**
Nature of Impact	-1	-1	Magnitude of Impact	5	2
Extent of Impact	2	2	Reversibility of Impact	3	2
Duration of Impact	5	2	Probability	2	2
Environmental Risk (Pre-mitigation)					**-7.5**
Environmental Risk (Post-mitigation)					**-4**
Degree of confidence in impact prediction:					Medium
Impact Prioritisation					
Public Response					1
Cumulative Impacts					2
Destruction of graves sites and removal of these site can cause social discourse and negativity toward the project					
Degree of potential irreplaceable loss of resources					3
Cultural resources are irreplaceable					
Prioritisation Factor					1.5
Final Significance					**-6**

Recommendations:

- Fence and demarcate as no-go area during construction;
- Fence must be palace with a 10 meter buffer from the closest grave; and
- If it is found that the alignment and pylon positions cannot be moved, a full grave relocation process must be followed.

Site LAM 7

GPS: 27° 07’ 08,2” S 29° 44’ 25,2” E

The remains and the foundations of a cluster of dilapidated structures were identified at this location. These dilapidated structures formed part of an abandoned homestead which was most probably occupied within the last 60 years. This abandoned homestead was situated near or possibly inside of the indicated reserve for the proposed Alignment 5. The remains consisted basically of packed lines of rocks which were used in the foundations of these structures on which mud-brick walls were built. These structures were predominantly square or rectangular in shape and the rooms measured approximately 5m x 5m. A few metal artefacts such as wire and cans were observed amongst the remains of the structures.

The exact age and time span of occupation of the above mentioned site are not known. The architectural design, construction techniques and the artefacts found on the site were used to assume a relative age for the site. These structures and thus the identified homestead seem to be from within the last 60 years and are therefore not protected under the National Heritage Act (Act 25 of 1999). The structures themselves have little or no heritage value or significance due to their relevant recent origins from within the last 60 years.

The structures, however, should be avoided, due to the possibility of infant human remains underneath the remains of the structures.

Through experience of similar sites and the knowledge of cultural customs and traditions it is known that stillborn babies and deceased infants occasionally were being buried within the occupational settlement. These children were sometimes buried underneath the floors and walls of houses and huts. These burials were not marked, but were known to the immediate family.

Customs and traditions like these were common in the rural African communities during the earlier parts of the 20th century. It is therefore not only possible, but rather likely that some of these structures may be on top of some of these infant remains.

Site size: Approximately 50m x 30m.

Figure 17– View of site

Heritage Significance: GP.B - Low/medium significance.

Table 10 - Impact Evaluation: Structures and possible infant burials LAM 7 – Alternatives 3, 4, 5, and 8

Impact name:	*Destruction of historical structures with possible infant burials*				
Alternative:	*Alternative Transmission Alignments 3, 4, 5, and 8*				
Description of impact:	*Destruction of structures at homesteads where possible infant burials can occur*				
Environmental Risk					
Attribute	**Pre-mitigation**	**Post-mitigation**	**Attribute**	**Pre-mitigation**	**Post-mitigation**
Nature of Impact	-1	-1	Magnitude of Impact	5	2
Extent of Impact	2	2	Reversibility of Impact	3	2
Duration of Impact	5	2	Probability	2	2
Environmental Risk (Pre-mitigation)					**-7.5**
Environmental Risk (Post-mitigation)					**-4**
Degree of confidence in impact prediction:					Medium
Impact Prioritisation					
Public Response					1
Cumulative Impacts					2
Destruction of homesteads and associated structures where infant burials could be present can cause social discourse and negativity toward the project					
Degree of potential irreplaceable loss of resources					3
Cultural resources are irreplaceable					
Prioritisation Factor					1.5
Final Significance					**-6**

Recommendations:

- Fence and demarcate as no-go area during construction;
- If it is found that the alignment and pylon positions cannot be moved, a qualified archaeologist must monitor construction activities as stipulated in Section 4.2 must be followed.

Site LAM 8

GPS: 27° 08’ 06.6” S 29° 51’ 10.0” E

The remains and the foundations of two dilapidated structures were identified at this location. These dilapidated structures formed part of an abandoned homestead which was most probably occupied within the last 60 years. This abandoned homestead was situated near, but most probably outside of the indicated area for the proposed sub-station. The remains consisted basically of packed lines of rocks which were used in the foundations of these structures on which mud-brick walls were built.

The larger structure was a circular stone walled kraal which measured approximately 8m in diameter. The walls measured approximately 0.5m wide and 0.75m high when they were intact.

The second structure was the remains of a circular hut. It measured approximately 3m in diameter. Mud brick walls were placed on top of a stone lined foundation. An ash midden with glass fragments, ceramic pot shards and various metal artefacts was situated approximately 20m to the north of the hut structure.

The exact age and time span of occupation of the above mentioned site are not known. The architectural design, construction techniques and the artefacts found on the site were used to assume a relative age for the site. These structures and thus the identified homestead seem to be from within the last 60 years and are therefore not protected under the National Heritage Act (Act 25 of 1999). The structures themselves have little or no heritage value or significance due to their relevant recent origins from within the last 60 years.

The structures, however, should be avoided, due to the possibility of infant human remains underneath the remains of the structures.

Through experience of similar sites and the knowledge of cultural customs and traditions it is known that stillborn babies and deceased infants occasionally were being buried within the occupational settlement. These children were sometimes buried underneath the floors and walls of houses and huts. These burials were not marked, but were known to the immediate family.

Customs and traditions like these were common in the rural African communities during the earlier parts of the 20th century. It is therefore not only possible, but rather likely that some of these structures may be on top of some of these infant remains.

Site size: Approximately 50m x 30m.

Figure 18 – View of site

Heritage Significance: GP.B - Low/medium significance.

Table 11 - Impact Evaluation: Structures and possible infant burials LAM 8– Alternative 4 and 8 Alignment

Impact name:	*Destruction of historical structures with possible infant burials*				
Alternative:	*Alternative Transmission Alignments 4 and 8*				
Description of impact:	*Destruction of structures at homesteads where possible infant burials can occur*				
Environmental Risk					
Attribute	**Pre-mitigation**	**Post-mitigation**	**Attribute**	**Pre-mitigation**	**Post-mitigation**
Nature of Impact	-1	-1	Magnitude of Impact	5	2
Extent of Impact	2	2	Reversibility of Impact	3	2
Duration of Impact	5	2	Probability	2	2
Environmental Risk (Pre-mitigation)					**-7.5**
Environmental Risk (Post-mitigation)					**-4**
Degree of confidence in impact prediction:					Medium
Impact Prioritisation					
Public Response					1
Cumulative Impacts					2
Destruction of homesteads and associated structures where infant burials could be present can cause social discourse and negativity toward the project					
Degree of potential irreplaceable loss of resources					3
Cultural resources are irreplaceable					
Prioritisation Factor					1.5
Final Significance					**-6**

Recommendations:

- Fence and demarcate as no-go area during construction; and
- If it is found that the alignment and pylon positions cannot be moved, a qualified archaeologist must monitor construction activities as stipulated in Section 4.2 must be followed.

Impact on Cultural Landscape

Heritage significance of the cultural landscape is derived from the interaction between the natural landscape, such as valleys, undulating plains and river courses usually framed by mountain ranges or accentuated by ridges and koppies, and access routes, human settlements and farmsteads. Also interacting with these physical entities are intangible and historic landscapes and events that are known to have added to the cultural fabric of a place or area.

The evaluation of the study area as demarcated during the Scoping phase of the project (**Figure 8**) has shown the area to be rich informal farmsteads, informal farm worker farmsteads, historical ruins, cemeteries and military movements during the South African War (1899-1902). These cultural points of settlement represent a historic time span from the early black farming communities (mid 1800's), early white settlers (late 1800's) through to the military activities at the turn of the 20th century and the advent of mechanised farming activities in the mid-1900's.

The cultural landscape of the study area has an agricultural rural appearance, with industrial activities associated with electrical energy generation in the form of Power Stations and power lines crossing the landscape. Although the new transmission lines and substation will be in contrast to the rural farming landscape, it will by no means be the first such construction in the area.

The larger study area is already impacted and sensitised towards power lines and power generation structures, notably the Majuba Power Station as well as the UGG infrastructure close to Alternative 3 (**Figure 19**), however the addition of the new alignments and substation may aggravate the cumulative effect of this infrastructure type on the cultural landscape.

The visual impact of the proposed transmission lines and substation on the cultural landscape will be addressed in the Visual Impact Assessment of the EIA, as well as the possible mitigation measures. These mitigation measures will in most instances also alleviate impacts on the cultural landscape.

Heritage Significance: GP.B - Medium/High significance.

Table 12 - Impact Evaluation: Cultural Landscape– Alternative 3

Impact name:	*Impact on cultural landscape*				
Alternative:	*Alternative 3*				
Description of impact:	*Placement of new substation and transmission lines can have an impact on cultural landscape and its views from vantage points*				
Environmental Risk					
Attribute	**Pre-mitigation**	**Post-mitigation**	**Attribute**	**Pre-mitigation**	**Post-mitigation**
Nature of Impact	-1	-1	Magnitude of Impact	3	2
Extent of Impact	3	3	Reversibility of Impact	3	2
Duration of Impact	4	4	Probability	4	3
Environmental Risk (Pre-mitigation)					**-13**
Environmental Risk (Post-mitigation)					**-8.25**
Degree of confidence in impact prediction:					Medium
Impact Prioritisation					
Public Response					1
Cumulative Impacts					3
The larger study area is already impacted and sensitised towards transmission lines and power generation structures, notably the Amajuba Power Station as well as the UGG infrastructure close to Alternative 3 However the addition of the new alignments and substation may aggravate the cumulative effect of this infrastructure type on the landscape					
Degree of potential irreplaceable loss of resources					2
If the additional infrastructure is planned to be grouped with current transmission lines and other infrastructure the impact on the cultural landscape will not be as high					
Prioritisation Factor					1.5
Final Significance					**-12.375**

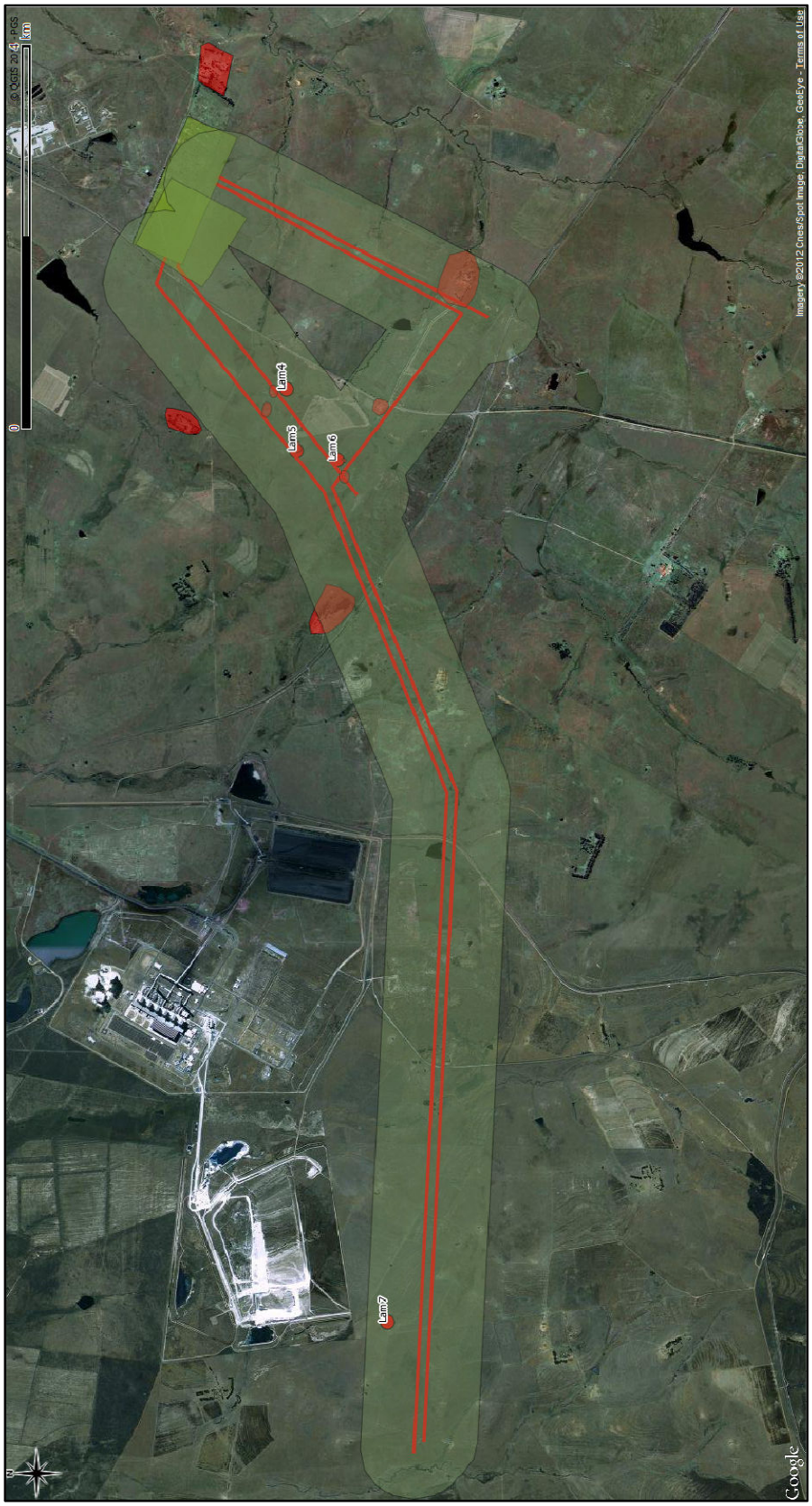


Figure 19– Alignment 3 with 500m buffer and farmsteads/homesteads and other heritage sensitive area indicated in red

Table 13 - Impact Evaluation: Cultural Landscape – Alternative 4

Impact name:	*Impact on cultural landscape*				
Alternative:	*Alternative 4*				
Description of impact:	*Placement of new substation and transmission lines can have an impact on cultural landscape and its views from vantage points*				
Environmental Risk					
Attribute	**Pre-mitigation**	**Post-mitigation**	**Attribute**	**Pre-mitigation**	**Post-mitigation**
Nature of Impact	-1	-1	Magnitude of Impact	3	3
Extent of Impact	3	3	Reversibility of Impact	3	2
Duration of Impact	4	4	Probability	3	3
Environmental Risk (Pre-mitigation)					**-9.75**
Environmental Risk (Post-mitigation)					**-9**
Degree of confidence in impact prediction:					Medium
Impact Prioritisation					
Public Response					1
Cumulative Impacts					3
The larger study area is already impacted and sensitised towards transmission lines and power generation structures, notably the Amajuba Power Station as well as the UGG infrastructure close to Alternative 3 However the addition of the new alignments and substation may aggravate the cumulative effect of this infrastructure type on the landscape					
Degree of potential irreplaceable loss of resources					3
If the additional infrastructure is planned to be grouped with current transmission lines and other infrastructure the impact on the cultural landscape will not be as high					
Prioritisation Factor					1.5
Final Significance					**-13.5**

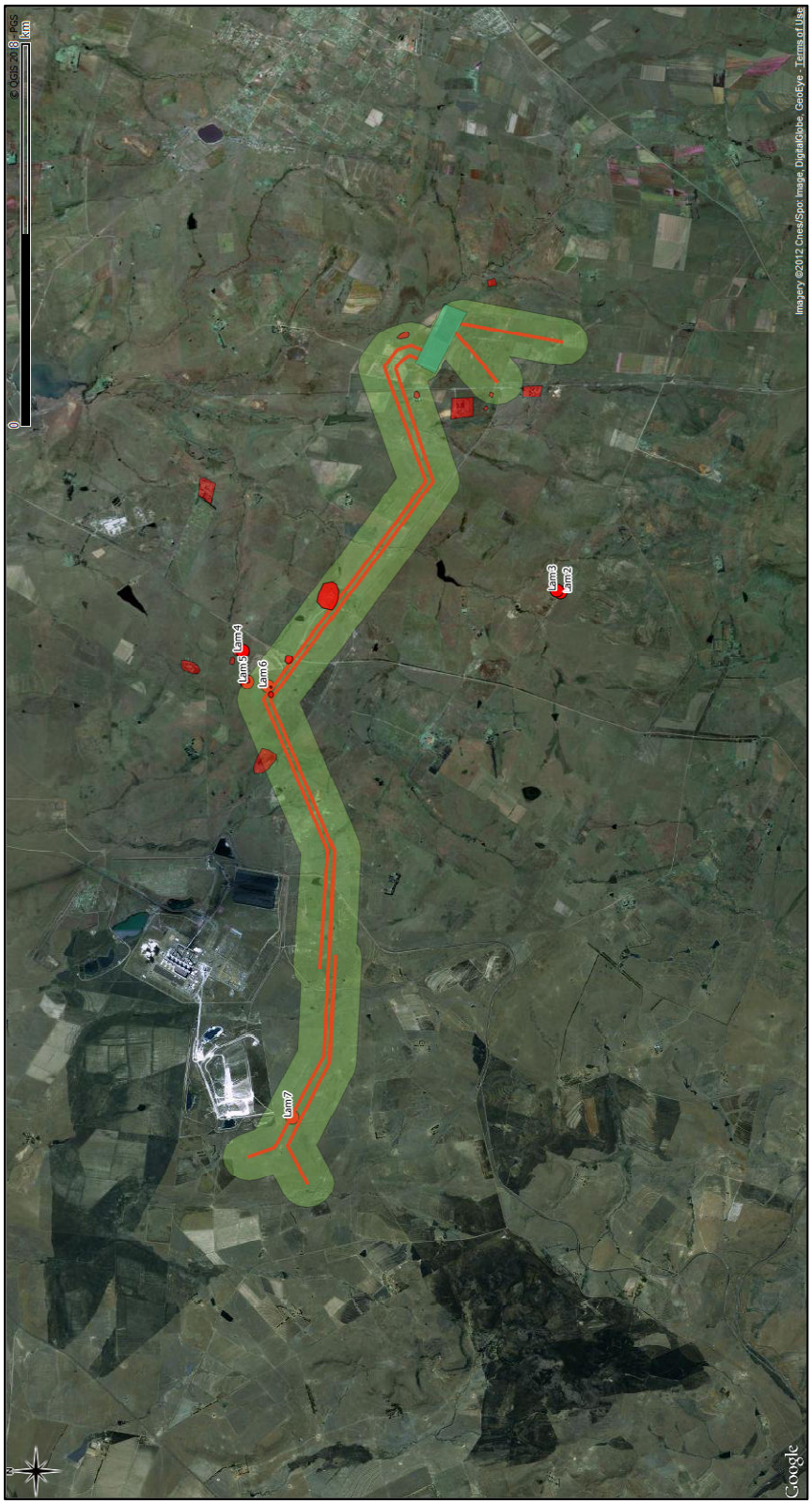


Figure 20– Alignment 4 with 500m buffer and farmsteads/homesteads and other heritage sensitive area indicated in red

Table 14 - Impact Evaluation: Cultural Landscape – Alternative 5

Impact name:	*Impact on cultural landscape*				
Alternative:	*Alternative 5*				
Description of impact:	*Placement of new substation and transmission lines can have an impact on cultural landscape and its views from vantage points*				
Environmental Risk					
Attribute	**Pre-mitigation**	**Post-mitigation**	**Attribute**	**Pre-mitigation**	**Post-mitigation**
Nature of Impact	-1	-1	Magnitude of Impact	4	3
Extent of Impact	3	3	Reversibility of Impact	4	3
Duration of Impact	4	4	Probability	4	3
Environmental Risk (Pre-mitigation)					**-15**
Environmental Risk (Post-mitigation)					**-9.75**
Degree of confidence in impact prediction:					Medium
Impact Prioritisation					
Public Response					1
Cumulative Impacts					2
The larger study area is already impacted and sensitised towards transmission lines and power generation structures, notably the Amajuba Power Station as well as the UGG infrastructure close to Alternative 3 However the addition of the new alignments and substation may aggravate the cumulative effect of this infrastructure type on the landscape					
Degree of potential irreplaceable loss of resources					3
If the additional infrastructure is planned to be grouped with current transmission lines and other infrastructure the impact on the cultural landscape will not be as high					
Prioritisation Factor					1.5
Final Significance					**-14.625**

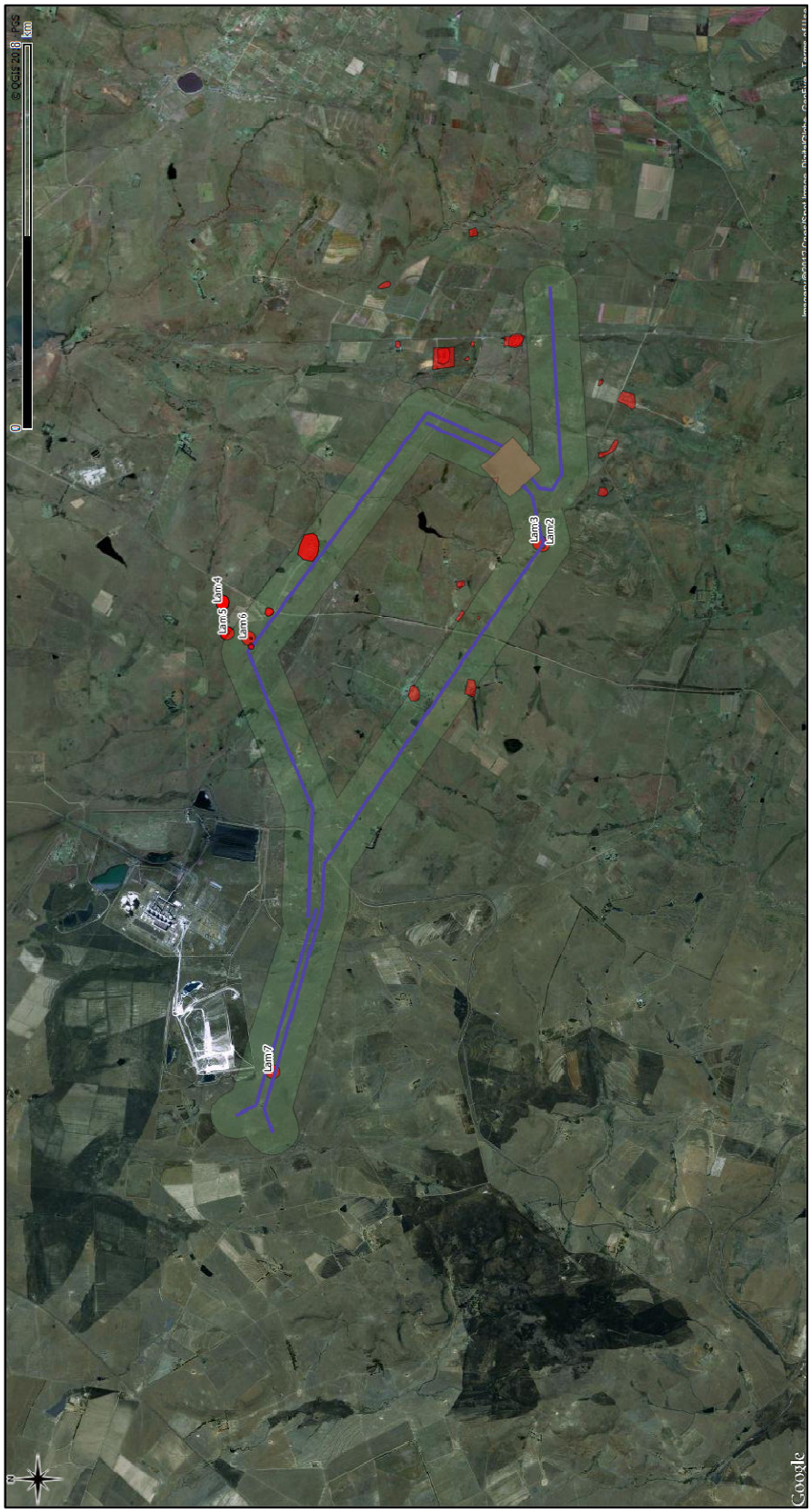


Figure 21– Alignment 5 with 500m buffer and farmsteads/homesteads and other heritage sensitive area indicated in red

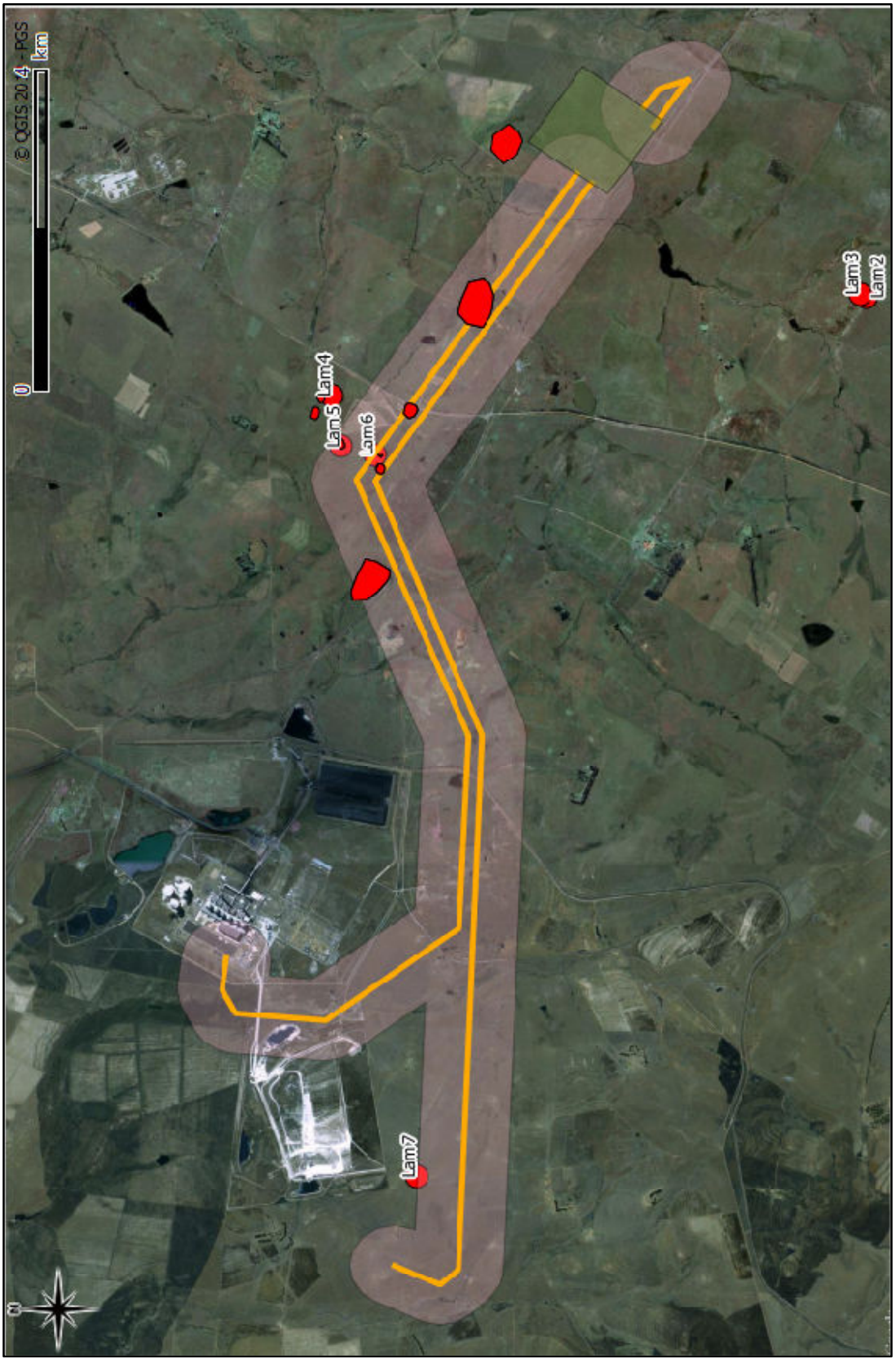


Figure 22– Alignment 8 with 500m buffer and farmsteads/homesteads and other heritage sensitive area indicated in red

Evaluation of the alternative alignments 3 and 8 has shown that although the visual impact on Alternative 3 and 8 may seem high, the existing power and transmission lines and infrastructure has sensitised the area and residents to such infrastructure.

In the case of Alternatives 4 and 5, and specifically Alternative 5, the absence of existing transmission lines and associated infrastructures will lead to a much higher visual impact and impact on the cultural landscape and sense of place.

4 MANAGEMENT GUIDELINES AND PROCEDURES

4.1 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 South African Heritage Resources Agency (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 a further 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 Cultural 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.

3. It is advisable that an information section on cultural resources be included in the SHEQ training given to contractors involved in surface earthmoving activities. These sections must include basic information on:

   a. Heritage;

   b. Graves;

   c. Archaeological finds; and

   d. Historical Structures.

   This module must be tailor made to include all possible finds that could be expected in that area of construction.

4. In the event that a possible find is discovered during construction, all activities must be halted in the area of the discovery and a qualified archaeologist contacted.

5. The archaeologist needs to evaluate the finds on site and make recommendations towards possible mitigation measures.

6. If mitigation is necessary, an application for a rescue permit must be lodged with SAHRA.

7. 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.

8. If during the initial survey sites of cultural significance is discovered, it will be necessary to develop a management plan for the preservation, documentation or destruction of such a site. Such a

program must include a *watching brief*, timeframe and agreed upon schedule of actions between the company and the archaeologist.

9. In the event that human remains are uncovered or previously unknown graves are discovered a qualified archaeologist needs to be contacted and an evaluation of the finds made.
10. If the remains are to be exhumed and relocated, the relocation procedures as accepted by SAHRA needs to be followed. This includes an extensive social consultation process.

The definition of an archaeological watching brief is a formal program of observation and investigation conducted during any operation carried out for non-archaeological reasons. This will be within a specified area or site on land, inter-tidal zone or underwater, where there is a possibility that archaeological deposits may be disturbed or destroyed. The programme will result in the preparation of a report and ordered archive.

4.2 The purpose of a watching brief is:

- To allow, within the resources available, the preservation by record of archaeological deposits, the presence and nature of which could not be established (or established with sufficient accuracy) in advance of development or other potentially disruptive works
- To provide an opportunity, if needed, for the watching archaeologist to signal to all interested parties, before the destruction of the material in question, that an archaeological find has been made for which the resources allocated to the watching brief itself are not sufficient to support treatment to a satisfactory and proper standard.
- A watching brief is not intended to reduce the requirement for excavation or preservation of known or inferred deposits, and it is intended to guide, not replace, any requirement for contingent excavation or preservation of possible deposits.
- The objective of a watching brief is to establish and make available information about the archaeological resource existing on a site.

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

Table 15: Roles and responsibilities of archaeological and heritage management

ROLE	RESPONSIBILITY	IMPLEMENTATION
A responsible specialist needs to be allocated and should sit in at all relevant meetings, especially when changes in design are discussed, and liaise with SAHRA.	The client	Archaeologist and a competent archaeology supportive team
If chance finds and/or graves or burial grounds are identified during construction or operational phases, a specialist must be contacted in due course for evaluation.	The client	Archaeologist and a competent archaeology supportive 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. (i.e. integrate the archaeological components into employee induction course).	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

5 IMPACT MANAGEMENT

5.1 Pre-construction phase

After the identification and approval of the final route alignment, the design of the transmission line will identify the final alignment and servitude along with the pylon placements for the transmission line.

As soon as this information is available a heritage assessment and a walk down of the final alignment and investigation of each pylon footprint, access and service routes as well as construction camps and laydown area must be done. This will enable the compilation of a site specific heritage management plan for any heritage structures and sites within the footprint area for construction activities.

5.2 Construction phase

Training

- All stakeholders and key personnel should undergo an archaeological induction course during this phase.
    - Induction courses generally form part of the employees' overall training and the archaeological component can easily be integrated into these training sessions.
    - Two courses should be organised –
        - One aimed more at managers and supervisors, highlighting the value of this exercise and the appropriate communication channels that should be followed after chance finds, and
        - The second targeting the actual workers and getting them to recognize artefacts, features and significant sites.
    - This needs to be supervised by a qualified archaeologist.
    - This course should be reinforced by posters reminding operators of the possibility of finding archaeological sites.

The project will encompass a range of activities during the construction phase, including ground clearance, establishment of construction camps area and small scale infrastructure development associated with the project, whereby:.

- Any development of construction camps or access routes that falls outside the transmission line servitudes or substation boundary as provide, must be first surveyed by a qualified archaeologist to identify any impacts on heritage sites in such areas;
- All heritage sites identified in this reports must be demarcated as no-go areas;
- In the case where no other option as to relocated graves and cemeteries have been found this process must be incorporated as stipulated in Section 6.3;
- The heritage sites identified and demarcated must be monitored, as part of a monitoring program, on a regular basis to confirm their preservation during construction activities; and
- Specific management measures for heritage structures.

Cemeteries

- Fence and demarcate as no-go area during construction;
- Fence must be palace with a 10 meter buffer from the closest grave; and
- If it is found that the alignment and pylon positions cannot be moved, a full grave relocation process must be followed.

Homesteads

- The structures, however, should be avoided, due to the possibility of infant human remains underneath the remains of the structures;
- Fence and demarcate as no-go area during construction; and
- If it is found that the alignment and pylon positions cannot be moved, a qualified archaeologist must monitor construction activities as stipulated in Section 6.2 must be followed.

The walk down and evaluation of the final construction will determine if any further monitoring of heritage structures will be required during construction.

6 CONCLUSIONS AND RECOMMENDATIONS

Heritage resources are unique and non-renewable and as such any impact on such resources must be seen as significant.

During the field work 8 heritage sites were identified that are on or inside the boundary of the proposed alternatives buffer areas. Along with this the evaluation of the cultural landscape took cognisance of farmsteads and homesteads scattered over the study area.

Impacts and mitigation measures as evaluated for the sites is as follows:

6.1 Cemeteries

Four cemeteries were identified within the alternative alignments and sites surveyed. These cemeteries contained a total of 103 graves.

Mitigation recommendations

- Fence and demarcate as no-go area during construction;
- Fence must be palace with a 10 meter buffer from the closest grave; and
- If it is found that the alignment and pylon positions cannot be moved, a full grave relocation process must be followed.

6.2 Homesteads

Three ruined homesteads were identified within the alternative alignments and sites surveyed.

The exact age and time span of occupation of the homesteads are unknown. The architectural design, construction techniques and the artefacts found on the site were used to assume a relative age for the site. These structures and thus the identified homestead seem to be from within the last 60 years and are therefore not protected under the National Heritage Act (Act 25 of 1999). The structures themselves have little or no heritage value or significance due to their relevant recent origins from within the last 60 years.

The structures, however, should be avoided, due to the possibility of infant human remains underneath the remains of the structures.

Mitigation recommendations:

- Fence and demarcate as no-go area during construction; and
- If it is found that the alignment and pylon positions cannot be moved, a qualified archaeologist must monitor construction activities as stipulated in Section 5.2 must be followed.

6.3 Cultural Landscape

The larger study area is already impacted and sensitised towards transmission lines and power generation structures, notably the Amajuba Power Station as well as the UGG infrastructure close to Alternative 3. However the addition of the new alignments and substation may aggravate the cumulative effect of this infrastructure type on the landscape

The visual impact of the proposed transmission lines and substation will be addressed in the Visual Impact Assessment of the EIA, as well as the possible mitigation measures. These mitigation measures will in most instances also alleviate impacts on the cultural landscape.

6.4 Fatal Flaws

No fatal flaws have been identified during the study.

6.5 Assessment of Alternatives

An assessment of the preferred alternatives with regards to impact on heritage, none of the finds during the field work constitute a non-mitigatable issue.

6.5.1 Substation alternatives

No heritage resources were found within the boundary of any of the proposed substation sites, and as such from a direct impact all four sites score the same.

6.5.2 Transmission line alternatives

These alternative transmission line alignments are foremost influenced by the choice of substation position. As none of the four substation alternatives are excluded from heritage findings, the alignments must all be evaluated by means of their relative positions in relations to heritage structures.

Seven heritage sites have been identified as being very close or under proposed alignments, but even these sites can be avoided by micro adjustment of the pylon positions in the field.

The biggest impact of transmission lines from a heritage perspective is on the cultural landscape and its impact on sense of place. The larger study area is already impacted and sensitised towards transmission lines and power generation structures, notably the Majuba Power Station as well as the UGG infrastructure close to Alternative 3. However the addition of the new alignments and substation may aggravate the cumulative effect of this infrastructure type on the cultural landscape.

Table 16 - Impact Evaluation Scoring of Heritage Resources

Alternative Alignment	**Number of heritage structure under or close by**	**Significance rating of cumulative impact of alignment on structure**	**Significance rating of impact of alignment on cultural landscape**
Alt3: Majuba Lambda1 400kV Loopin	LAM4 (Close vicinity) LAM5 (Close vicinity) LAM6 (Close vicinity) LAM7 (Close vicinity)	-6 -6 -6 -6	-12.375
Alt3: Majuba Lambda2 400kV Loopin	LAM4 (Close vicinity) LAM5 (Close vicinity) LAM6 (Close vicinity) LAM7 (Close vicinity)	-6 -6 -6 -6	-12.375
Alt 4: Lambda Majuba TX 400kV	LAM5 (Close vicinity) LAM6 (Under alignment) LAM7 (Under alignment) LAM8 (Close vicinity)	-6 -6 -6 -6	-13.5
Alt5: Lambda Venus 765kV part 1	LAM2(Under alignment) LAM3 (Close vicinity) LAM7 (Under alignment) LAM8 (Close vicinity)	-6 -6 -6 -6	-14.625
Alt5: Lambda Majuba	LAM6 (Close vicinity)	-6	

part 1	LAM7 (Under alignment) LAM8 (Close vicinity)	-6 -6	
Alt8: Lambda Majuba TX 400kV1 and 2	LAM8 (Under alignment) LAM6 (Under alignment) LAM7 (Close vicinity)	-6 -6 -6	-12.375

Evaluation of the alternative alignments 3 and 8 has shown that although the visual impact on Alternative 3 and 8 may seem high, the existing power and transmission lines and infrastructure has sensitised the area and residents to such infrastructure.

In the case of Alternatives 4 and 5, and specifically Alternative 5, the absence of existing transmission lines and associated infrastructures will lead to a much higher visual impact and impact on the cultural landscape and sense of place.

Taking in to consideration the existing Transmission line corridors and infrastructure associated with power generation in the area, Alternative 8 and its alignments may have a smaller cumulative impact on heritage resources overall, only impacting on two identified heritage points. The close proximity of the Rietpoort farmstead to the Alternative 8 Substation position may be problematic from a cultural landscape perspective and must be addressed in die Visual Assessment.

7 REFERENCES

BREYTENBACH, J.H. 1986. Geskiedenis van die Tweede Vryheidsoorlog. 1899-1902. Staatsdrukkers, Pretoria.

VAN DER WESTHUIZEN, G & R. 2000. Guide to the Anglo Boer War in the Eastern Transvaal. 1899-1902 100 years.

3.1 General principles

In areas where there has not yet been a systematic survey to identify conservation worthy places, a permit is required to alter or demolish any structure older than 60 years. This will apply until a survey has been done and identified heritage resources are formally protected.

Archaeological and palaeontological sites, materials, and meteorites are the source of our understanding of the evolution of the earth, life on earth and the history of people. In the new legislation, permits are required to damage, destroy, alter, or disturb them. People who already possess material are required to register it. The management of heritage resources are integrated with environmental resources and this means that before development takes place heritage resources are assessed and, if necessary, rescued.

In addition to the formal protection of culturally significant graves, all graves, which are older than 60 years and are not in a cemetery (such as ancestral graves in rural areas), are protected. The legislation protects the interests of communities that have interest in the graves: they may be consulted before any disturbance takes place. The graves of victims of conflict and those associated with the liberation struggle will be identified, cared for, protected and memorials erected in their honour.

Anyone who intends to undertake a development must notify the heritage resource authority and if there is reason to believe that heritage resources will be affected, an impact assessment report must be compiled at the construction company's cost. Thus, the construction company will be able to proceed without uncertainty about whether work will have to be stopped if an archaeological or heritage resource is discovered.

According to the National Heritage Act (Act 25 of 1999 section 32) it is stated that:

An object or collection of objects, or a type of object or a list of objects, whether specific or generic, that is part of the national estate and the export of which SAHRA deems it necessary to control, may be declared a heritage object, including –

- Objects recovered from the soil or waters of South Africa, including archaeological and palaeontological objects, meteorites and rare geological specimens;
- Visual art objects;

- Military objects;
- Numismatic objects;
- Objects of cultural and historical significance;
- Objects to which oral traditions are attached and which are associated with living heritage;
- Objects of scientific or technological interest;
- Books, records, documents, photographic positives and negatives, graphic material, film or video or sound recordings, excluding those that are public records as defined in section 1 (xiv) of the National Archives of South Africa Act, 1996 (Act No. 43 of 1996), or in a provincial law pertaining to records or archives; and
- Any other prescribed category.

Under the National Heritage Resources Act (Act No. 25 of 1999), provisions are made that deal with, and offer protection, to all historic and pre-historic cultural remains, including graves and human remains.

3.2 Graves and cemeteries

Graves younger than 60 years fall under Section 2(1) of the Removal of Graves and Dead Bodies Ordinance (Ordinance no. 7 of 1925) as well as the Human Tissues Act (Act 65 of 1983) and are the jurisdiction of the National Department of Health and the relevant Provincial Department of Health and must be submitted for final approval to the Office of the relevant Provincial Premier. This function is usually delegated to the Provincial MEC for Local Government and Planning or in some cases the MEC for Housing and Welfare. Authorisation for exhumation and reinterment must also be obtained from the relevant local or regional council where the grave is situated, as well as the relevant local or regional council to where the grave is being relocated. All local and regional provisions, laws and by-laws must also be adhered to. In order to handle and transport human remains the institution conducting the relocation should be authorised under Section 24 of Act 65 of 1983 (Human Tissues Act).

Graves older than 60 years, but younger than 100 years fall under Section 36 of Act 25 of 1999 (National Heritage Resources Act) as well as the Human Tissues Act (Act 65 of 1983) and are the jurisdiction of the South African Heritage Resource Agency (SAHRA). The procedure for Consultation Regarding Burial Grounds and Graves (Section 36(5) of Act 25 of 1999) is applicable to graves older than 60 years that are situated outside a formal cemetery administrated by a local authority. Graves in the category located

inside a formal cemetery administrated by a local authority will also require the same authorisation as set out for graves younger than 60 years over and above SAHRA authorisation.

If the grave is not situated inside a formal cemetery but is to be relocated to one, permission from the local authority is required and all regulations, laws and by-laws set by the cemetery authority must be adhered to.

APPENDIX B

HERITAGE ASSESSMENT METHODOLOGY

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

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

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

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

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

The significance of heritage sites was based on four main criteria:

- **Site integrity** (i.e. primary vs. secondary context),
- **Amount of deposit, range of features** (e.g., stonewalling, stone tools and enclosures),
    - Density of scatter (dispersed scatter):
        - Low - <10/50m^2
        - Medium - 10-50/50m^2
        - High - >50/50m^2
- **Uniqueness,** and
- **Potential** to answer present research questions.

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

A - No further action necessary;

B - Mapping of the site and controlled sampling required;

C - No-go or relocate pylon position

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

E - Preserve site

Site Significance

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

Table 17: Site significance classification standards as prescribed by SAHRA

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

APPENDIX C

THE SIGNIFICANCE RATING SCALES FOR THE EIA

IMPACT RATING SYSTEM

Nature	-1	Negative
	1	Positive
Extent	1	Activity (i.e. limited to the area applicable to the specific activity)
	2	Site (i.e. within the development property boundary),
	3	Local (i.e. the area within 5 km of the site),
	4	Regional (i.e. extends between 5 and 50 km from the site
	5	Provincial / National (i.e. extends beyond 50 km from the site)
Duration	1	Immediate (<1 year)
	2	Short term (1-5 years),
	3	Medium term (6-15 years),
	4	Long term (the impact will cease after the operational life span of the project),
	5	Permanent (no mitigation measure of natural process will reduce the impact after construction),
Magnitude/ Intensity	1	Minor (where the impact affects the environment in such a way that natural, cultural and social functions and processes are not affected),
	2	Low (where the impact affects the environment in such a way that natural, cultural and social functions and processes are slightly affected),
	3	Moderate (where the affected environment is altered but natural, cultural and social functions and processes continue albeit in a modified way),
	4	High (where natural, cultural or social functions or processes are altered to the extent that it will temporarily cease), or
	5	Very high / don't know (where natural, cultural or social functions or processes are altered to the extent that it will permanently cease),
Reversibility	1	Impact is reversible without any time and cost,
	2	Impact is reversible without incurring significant time and cost,
	3	Impact is reversible only by incurring significant time and cost,
	4	Impact is reversible only by incurring prohibitively high time and cost,
	5	Irreversible Impact,
Probability	1	Improbable (the possibility of the impact materialising is very low as a result of design, historic experience, or implementation of adequate corrective actions; <25%),
	2	Low probability (there is a possibility that the impact will occur; >25% and <50%),
	3	Medium probability (the impact may occur; >50% and <75%),
	4	High probability (it is most likely that the impact will occur- > 75% probability), or
	5	Definite (the impact will occur).

CONSEQUENCE

PROBABILITY

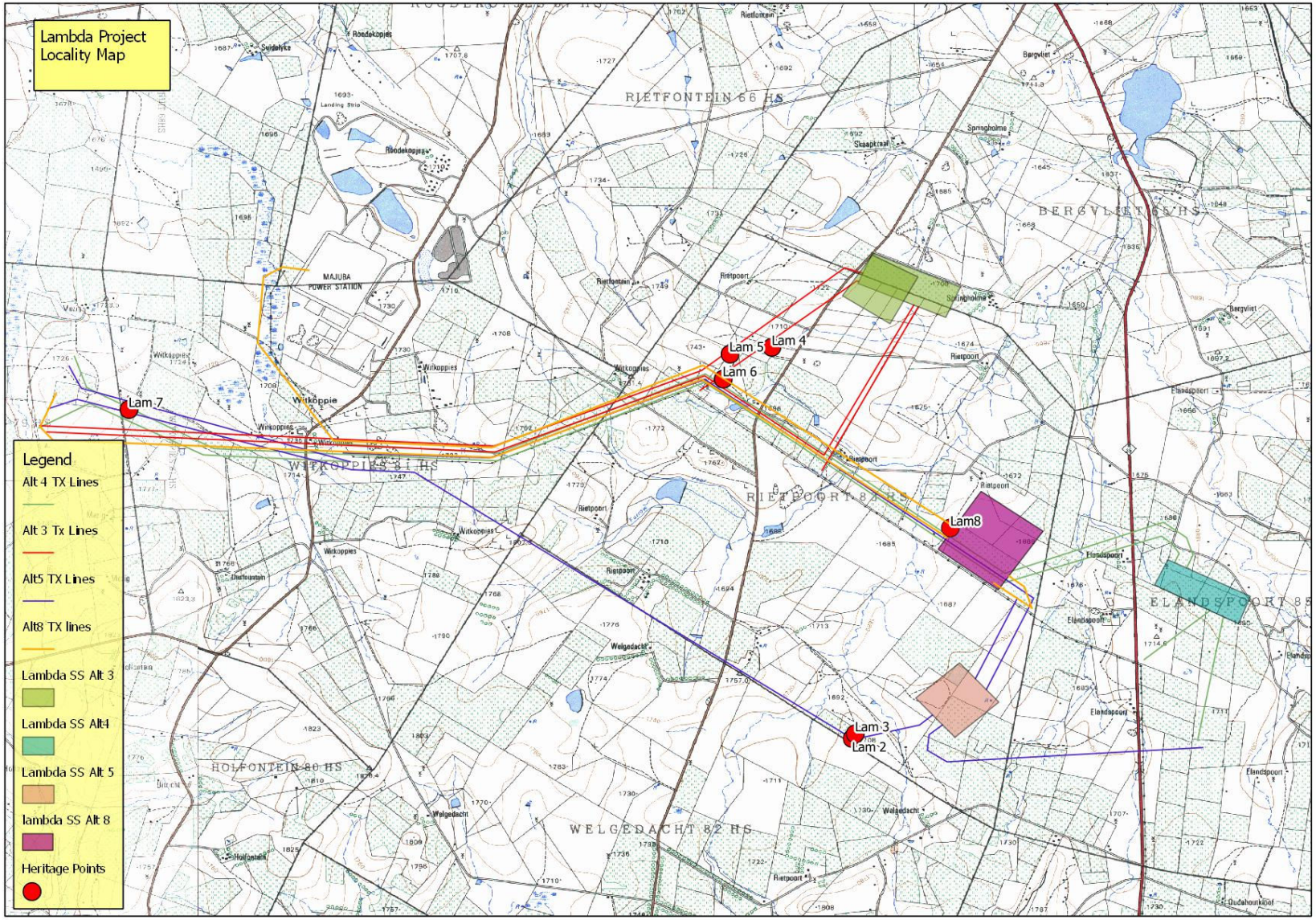
ENVIRONMENTAL RISK

Public feedback	1	Low: issues raised in < 30% of responses,
	2	Medium: issue raised in >30% and < 60% of responses,
	3	High: issues raised in >60%,
Cumulative Impact	1	Low: Considering the potential incremental, interactive, sequential, and synergistic cumulative impacts, it is unlikely that the impact will result in spatial and temporal cumulative change
	2	Medium: Considering the potential incremental, interactive, sequential, and synergistic cumulative impacts, it is probable that the impact will result in spatial and temporal cumulative change,
	3	High: Considering the potential incremental, interactive, sequential, and synergistic cumulative impacts, it is highly probable/definite that the impact will result in spatial and temporal cumulative change,
Irreplaceable loss of resources	1	Low: Where the impact is unlikely to result in irreplaceable loss of resources,
	2	Medium: Where the impact may result in the irreplaceable loss (cannot be replaced or substituted) of resources but the value (services and/or functions) of these resources is limited,
	3	High: Where the impact may result in the irreplaceable loss of resources of high value (services and/or functions),
Degree of Confidence	Low	> 60% certain of impact prediction,
	Medium	>30 and < 60% certain of impact prediction,
	High	< 30% certain of impact prediction.

PRIORITISATION FACTOR

APPENDIX D

HERITAGE MAPS


Lambda Project
Locality Map
Legend
Alt 4 TX Lines
Alt 3 Tx Lines
Alt5 TX Lines
Alt8 TX lines
Lambda SS Alt 3
Lambda SS Alt4
Lambda SS Alt 5
lambda SS Alt 8
Heritage Points
Lam 7
Lam 5
Lam 4
Lam 6
Lam8
Lam 3
Lam 2
MAJUBA
POWER STATION
RIETFONTEIN 66 HS
WITKOPPIES 81 HS
RIETPOORT 84 HS
HOLFONTEIN 80 HS
WELGEDACHT 82 HS
ELANDSPOORT 85