HERITAGE GAP ANALYSIS REPORT FOR THE PROPOSED LESEDI POWER GENERATION PROJECT

XSTRATA ALLOYS LESEDI POWER GENERATION PROJECT IN THE TWEEFONTEIN DIVISION,

MPUMALANGA PROVINCE

SEPTEMBER 2010

Prepared by

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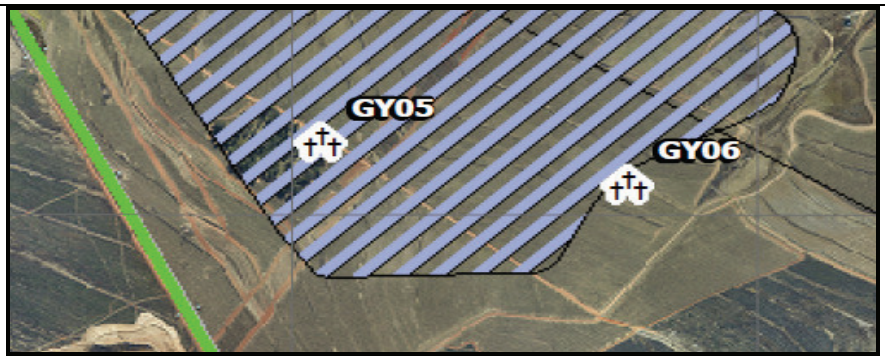
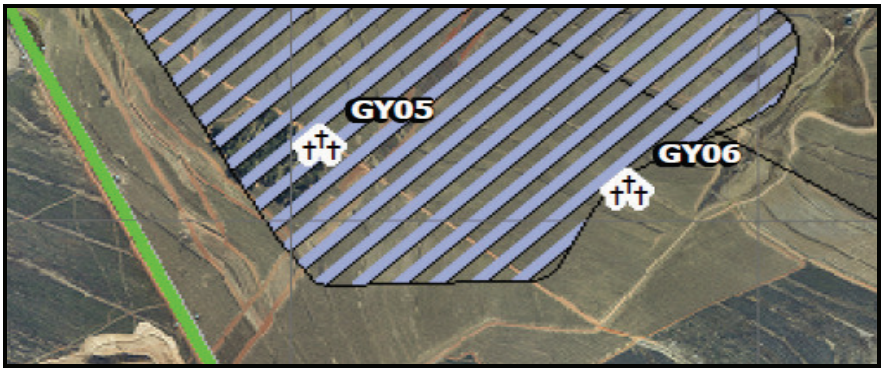
EXECUTIVE SUMMARY

The proposed Lesedi Power Generation Project plans to combust discard coal from the Xstrata group collieries in the Tweefontein Division of the Mpumalanga Province, to generate electricity. The proposed project comprises the design, construction, commissioning and operation of a coal-fired power station with its associated infrastructure and storage areas in the Ogies area.

In terms of legislative requirements, a number of environmental and social studies need to be undertaken before the proposed project may commence. In 2006, a Heritage Impact Assessment (HIA) study was conducted for the Tweefontein Division in 2006 by Dr. Julius C. C. Pistorius. This assessment was undertaken as part of the environmental and social studies required for the Tweefontein Division (Pistorius, 2006), which also includes the proposed Lesedi Power Generation Project area. During the survey, a number of heritage resources were identified in the Tweefontein area such as villages, historical structures, farm complexes (farm homesteads) and graves and grave yards (cemeteries). For the purpose of this heritage gap analysis report, the report for the Tweefontein Division (Pistorius, 2006) was reviewed and all relevant archaeological or heritage resources in the proposed Lesedi Power Generation Project were identified. The report was reviewed and a gap analysis was undertaken to determine if any additional archaeological or heritage work will be required and to determine if there are any sites of significance located in the footprint area of the proposed Lesedi Power Generation Project.

As depicted in the following tables and illustrated on the map in Appendix 3, site GY05 (cemetery) and site GY06 (grave) are located inside the proposed footprint area of the ash dump for the Lesedi Power Generation Project and will be directly impacted by the proposed development. The significance of these impacts is rated highly significant.

1. Site GY05 (Cemetery)	
Project Activities	- Site clearing (removal of vegetation) - Earthmoving activities (bulldozing) - Construction of ash dump
Impacted environment:	- Heritage (Cemetery with four graves)
Description:	Site GY05 consists of a single cemetery (graveyard) with four graves that are all located within a Blue Gum plantation near the middle of a maize field. Four graves are covered with piles of ferricrete stone. Two are fitted with cement headstone stones. These headstones do not have any inscriptions (Pistorius, 2006). As indicated below, site GY05 is located in the footprint area of the ash dump (more detail in the map in Appendix 3).

		
Significance	High	
Mitigation Required	Yes – Grave Relocation	
Parameter	**Description**	**Rating**
Duration	Permanent	5
Spatial Scale	Regional	3
Severity	Permanent damage to items of cultural significance	4
Probability	Certain	5
Significance	High	80%
1. Site GY06 (Grave)		
Project Activities	- Site clearing (removal of vegetation) - Earthmoving activities (bulldozing) - Construction of ash dump	
Impacted environment:	- Heritage (Grave site)	
Description:	Site GY06 consists of a solitary grave located between two agricultural fields. The grave is covered with an iron framework and fenced. The grave is fitted with a cement head stone with no inscription (Pistorius, 2006). As indicated below, site GY06 is located in the footprint area of the ash dump (more detail in the map in Appendix 3). 	
Mitigation Required	Yes – Grave Relocation	

Parameter	Description	Rating
Duration	Permanent	5
Spatial Scale	Regional	3
Severity	Permanent damage to items of cultural significance	4
Probability	Certain	5
Significance	High	80%

According to the current layout of the proposed Lesedi Power Generation Project, these sites need to be mitigated through means of a Grave Relocation Process according to the relevant legislative requirements. As described in Chapter 12, there are four phases required for the relocation of the graves located in the footprint area of the proposed Lesedi Power Generation Project, which include:

1) Phase 1: Survey
2) Phase 2: Social consultation
3) Phase 3: Permitting
4) Phase 5: Reporting

Other sites located in the geographical proximity of the proposed project needs to be monitored and protected from adverse impacts associated with the development.

In addition to the effective implementation of mitigation and management measures, an accredited archaeologist (Association of Southern African Professional Archaeologists) must be appointed to monitor sensitive and manage significant sites during the initial phases of construction. This will ensure that activities associated with the Lesedi Power Generation Project do not adversely impact on sites of archaeological or heritage significance. As described in this report, the significance of impacts on site GY05 and GY06 are rated as high. Conditional to the effective monitoring and management of identified sites during the construction and operational phases in accordance with the National Heritage Resources Act (no 25 of 1999), the significance of impacts anticipated for archaeological and heritage sites during these phases are medium.

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1 INTRODUCTION

The Xstrata Alloys Lesedi Power Generation Project is located within the Xstrata Coal SA Tweefontein Division at the Boschmans Colliery, in the Mpumalanga Province. Mpumalanga Province possesses some of the richest geological, archaeological and cultural heritage in the world such as ancient animal fossils and the famous *Glossopteris* flora. Archaeological artefacts and heritage resources are commonly found and displayed in local towns and museums across the province.

In terms of the National Heritage Resources Act (no25 of 1999) (NHRA), archaeological and heritage resources may not be disturbed without authorisation 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 National Environmental Management Act (NEMA, Act 107 of 1998) states that an integrated environmental management plan (EMP) should (23:2 (b)) "*…identify, predict and evaluate the actual and potential impact on the environment… and cultural heritage…*" In compliance with the relevant legislative requirements, Dr. Julius C. C. Pistorius therefore conducted a "baseline Heritage Impact Assessment (HIA) study" in 2006 as part of previous environmental and social studies required for the Tweefontein Division (Pistorius, 2006). The report by Pistorius formed the foundation of the heritage gap analysis report for the proposed Lesedi Power Generation Project.

Xstrata Alloys propose to develop a low grade coal fired thermal power plant including the construction of an ash dump, with an electrical generation capacity of 300MW. This project is known as the Lesedi Power Generation Project. For the purpose of the heritage gap analysis report, the 2006 report was reviewed and all relevant archaeological or heritage resources in the proposed project area were evaluated. This heritage gap analysis report was compiled to determine if there are any potential sites of heritage significance located in the footprint area of the proposed Lesedi Power Generation Project.

2 TERMS OF REFERENCE

Digby Wells and Associates (Pty) Ltd (Digby Wells) was appointed by Xstrata Alloys ("Xstrata") to investigate relevant environmental and social aspects of the proposed Lesedi Power Generation Project. As part of these investigations, Pistorius' 2006 report was reviewed and integrated into the context of the proposed Xstrata Alloys Lesedi Power Generation Project.

3 STUDY AREA

The Xstrata Alloys Lesedi Power Generation Project is located within the Xstrata Coal South Africa Tweefontein Division at Boschmans Colliery, Mpumalanga Province. The HIA (Pistorius, 2006) was conducted on the farm Tweefontein 13TS and parts of the farms Waterpan 8IS, Zaaiwater 11IS Grootpan 7IS, Tweefontein 328IS and Vlaklaagte 330IS on the Eastern Highveld. The aim of the Pistorius' 2006 study was to identify, assess and document any sites of archaeological and heritage significance located in the project area.

4 EXPERTISE OF THE SPECIALIST

A CV of the heritage specialist for the Lesedi Power Generation Project is attached in Appendix 1.

5 AIMS AND OBJECTIVES

Digby Wells aim to assist the developer in managing the heritage resources located within their project boundaries in a responsible manner. This approach ensures that significant sites are protected, preserved, and developed in terms of the framework provided by the NHRA. Over the years, increased industrial development and urbanisation has resulted in more archaeological and heritage sites being placed at risk during development. Subsequently, more focused environmental and archaeological or heritage impact assessments are being conducted to avoid losing heritage resources (ASAPA, 2009). The objectives of this heritage gap analysis report were therefore to:

- Review Pistorius' 2006 report in context of the proposed Lesedi Power Generation Project and do a gap analysis of all relevant information including applicable maps, tables and figures as stipulated in the relevant South African legislation (NHRA no 25 of 1999);
- Describe and assess potential impacts that may result from project related activities on archaeological and heritage resources in the project area;
- Include applicable mitigation measures for potential impacts on archaeological and heritage resources and suitable recommendations;
- Propose site monitoring (if applicable) detailing the frequency, reasoning, methodology and reporting to be implemented once construction commences; and
- Identify and describe any fatal flaws to the project relating to archaeological and heritage resources in the environment.

6 METHODOLOGY

The heritage gap analysis process consisted of two important steps:

(i) *Review Phase:* The review phase included literature reviews and desktop studies, as well as an examination of existing aerial photographs to identify possible locations where archaeological and heritage sites may be located. This phase was required to gather data and information of the proposed project area, with specific focus on historical sites, graves, architectural sites, archaeological sites and ethnographical information; and

(ii) *Heritage gap analysis phase:* The heritage gap analysis phase was undertaken as part of the integrated EIA/EMP phase to determine if any archaeological or heritage resources are located in the proposed Lesedi Power Generation Project area and/or if additional archaeological and heritage studies will be required. Recommendations were made with regards to potential mitigation and management measures.

7 KNOWLEDGE GAPS

While some archaeological remains may have been overlooked during surveys due to physical limitations (inaccessibly, safety risks and/or unfavourable climatic conditions), additional remains may occur below the soil surface and may only be exposed once development (such as construction and site clearance) commences. During the heritage survey undertaken, no significant limitations or knowledge gaps were experienced by Pistorius (2006). For the purpose of the heritage gap analysis report, a site visit was not undertaken and only a desktop/gap analysis was conducted. The correctness of analysing archaeological and heritage sites in this study is therefore based and dependent on the accuracy of the HIA report compiled by Pistorius (2006).

The report submitted by Pistorius claims to be an HIA. However, it is Digby Wells' opinion that the report represents a Phase 1 Archaeological Assessment only, according to Minimum Standards developed by the South African Heritage Resources Agency. A Heritage Impact Assessment should – in addition to archaeological field surveys and assessments such as that undertaken for the purpose of the 2006 report – include in-depth archival and historical surveys, social consultation and public participation, and surveys of the built environment. This enables certain aspects of both tangible and intangible heritage to be identified, such as accurate ages and significance of structures, lived heritage (sacred places / features) and unknown graves.

8 PROJECT DESCRIPTION

The proposed Lesedi Power Generation Project comprises the design, construction, commissioning and operation of a coal-fired power station with its associated infrastructure and storage areas in the Witbank area. The proposed power station will receive coal directly from the mine's new or existing wash plants as well as existing coal dumps via overland conveyors. A 400/132kV double circuit transmission line will supply electricity from the Power Plant to the existing Eskom network. The construction of the proposed 300 MW Lesedi power plant within the existing boundaries of the Tweefontein Colliery will include the following infrastructure:

- 300 MW discard power plant;
- Administrative and power plant buildings and offices;
- Water and wastewater treatment works;
- Water and sewage distribution pipelines;
- Coal stockyard and conveyor system;
- Ash disposal facility;
- Gypsum storage facility;
- Access roads; and
- Water storage facilities.

9 FINDINGS AND DISCUSSIONS

During the archaeological survey conducted for the Tweefontein Project in 2006, a number of heritage resources were identified (Pistorius, 2006). A summary of these heritage resources are listed below.

- Villages (residential areas): The villages are composed of a varying number of individual residences as well as other infrastructure. Some of these residential areas have been demolished whilst others may be earmarked for demolition. These villages are considered to be relatively young although inconspicuous older (historical) structures may occur in some of these residential areas;
- Historical settings/structures: These complexes qualify as historical settings as the buildings in these complexes are close to sixty years or have surpassed this age (in term of the NHRA, no 25 of 1999);
- Scattered historical structures: Historical structures may occur as isolated phenomena across the Tweefontein Project Area. These structures may be inconspicuous as they are part of complexes of structures or occur in isolation somewhere in the project area;
- Farm Complexes (farm homesteads): Farm complexes consisting of farm houses with outbuildings and other infrastructure mainly occur on the western edge and outside the Tweefontein Project Area. It seems as if most of these farm complexes are relatively young although the odd, single historical structure may be found in a particular farm complex on a specific farm. It also appears as if no (historical) family graveyards are associated with these farm homesteads.
- Graves and cemeteries/graveyards: A number of graves and graveyards were observed in the Tweefontein Project Area. A number of graveyards were also observed in the peripheral area, outside the project area. More grave sites possibly exist in the project area as they are difficult to locate considering the vast expanse of the project area and the current dense stand of the vegetation after the high summer rain fall. Grave sites may also been ploughed under during decades of intensive agriculture (Pistorius, 2006). As depicted in the map in Appendix 3, a number of sites are located in the geographical proximity of the proposed Lesedi Power Generation Project.

  Although the above listed sites have been identified in the Tweefontein area, not all of these sites are applicable to the Lesedi Power Generation Project area. The most important sites for this project have been described in more detail in the next chapter (Chapter 10), with specific reference to site GY05 and GY06. These sites

are located in the footprint area of the ash dump and will be directly impacted by the Lesedi Power Generation Project.

Table 12: Description of Site GY05 and GY06

SITE	DESCRIPTION
Graveyard 05 (GY05) 26º 03' 411 / 29º 07' 030	This graveyard merely contains four graves which are all located in the midst of a Blue Gum plantation near the middle of a maize field. All four graves are covered with piles of ferricrete stone while two are fitted with cement headstones. These headstones do not have any inscriptions.
Graveyard 06 (GY06) 26º 03 463 /29º 07 360	This solitary (single) grave is located between two agricultural fields, is covered with an iron framework and is fenced-in.

More information on archaeological and heritage sites recorded in the broader Tweefontein Division is described in the report, attached as Appendix 4 (Pistorius, 2006). The assessment of impacts on site GY05 and GY06, as well as applicable mitigation and management measures are presented in the following chapters (Chapter 10 and 12).

10 IMPACT ASSESSMENT

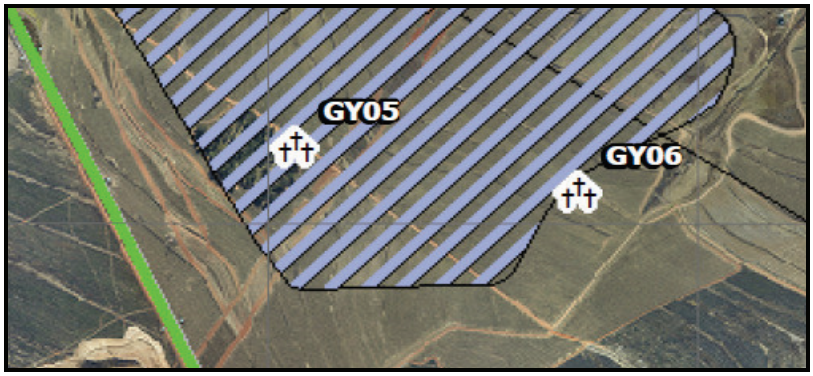
The impact assessment section aims to assess the significance of the potential impacts on archaeological and heritage resources as results of activities associated with the Lesedi Power Generation Project, as outlined in Chapter 8 of this report (Project Description). This section was completed in compliance with the impact assessment criteria implemented for the EIA/EMP report, as well as in accordance with significance ratings and archaeological impact assessment criteria established by the South African Heritage Resources Agency (SAHRA) and Association of Southern African Professional Archaeologists (ASAPA).

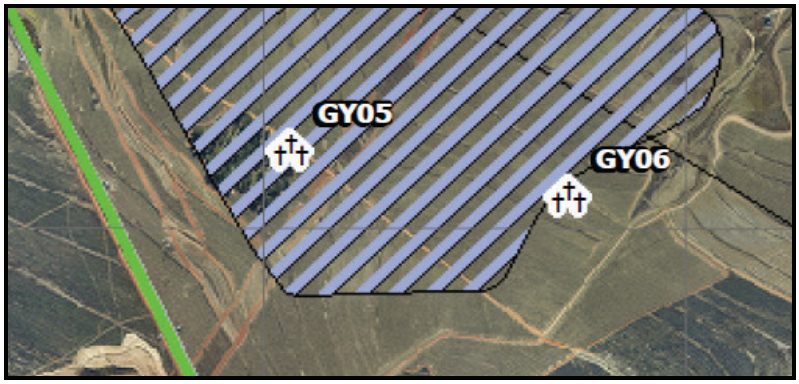
In order to calculate the integrated significance rating of an impact, a number of parameters must be added and the percentage must be worked out; i.e. the severity rating, spatial scale rating and duration rating is added, multiplied by the probability rating, and converted into a percentage e.g. (2+1+3) x 5 = 30, where 30 is converted to a percentage, i.e. 30/75 = 40%. Thus, the matrix first calculates the rating out of 75 and then converts this into a percentage out of 100. The percentage is the figure quoted in the matrix. More details on the impact assessment criteria used in this study and information on the weight assigned to the various parameters for positive and negative impacts in the formula is presented in Appendix 2.

10.1 Construction and Operational Phases

Construction activities associated with the proposed Lesedi Power Generation Project that may impact on sites of archaeological and heritage significance include site clearance and removal of vegetation (for construction of the power plant) and other earth moving activities. In addition, the surface disturbances associateds with the construction of the ash dump may also affect sites of archaeological and heritage significance. The identification, documentation and assessment of archaeological and heritage resources will be completed during the construction and operational phase; thus, no additional impacts area expected during decommissioning and closure phases.

The sites identified in the report by Pistorius (2006) relevant to the proposed Lesedi Power Generation Project have been documented and illustrated on the map in Appendix 3. With reference to this map, and in relation to the infrastructure plan of the Lesedi Power Generation Project, site GY05 and site GY06 will be directly affected by the development (Pistorius, 2006). Site GY05 and site GY06 are located in the footprint area of the proposed development, more specifically the footprint of the ash dump. The impact assessments on these sites are described in more detail in the following tables:

1. Site GY05 (Cemetery)		
Project Activities	- Site clearing (removal of vegetation) - Earthmoving activities (bulldozing) - Construction of ash dump	
Impacted environment:	- Heritage (Cemetery with four graves)	
Description:	Site GY05 consists of a single cemetery (graveyard) with four graves that are all located in the midst of a Blue Gum plantation near the middle of a maize field. Four graves are covered with piles of ferricrete stone. Two are fitted with cement headstones. These headstones do not have any inscriptions (Pistorius, 2006). As indicated below, site GY05 is located in the footprint area of the ash dump (more detail in the map in Appendix 3).  	
Mitigation Required	Yes – Grave Relocation	
Parameter	**Description**	**Rating**
Duration	Permanent	5
Spatial Scale	Regional	3
Severity	Permanent damage to items of cultural significance	4
Probability	Certain	5
Significance	High	80%

1. Site GY06 (Grave)		
Project Activities	- Site clearing (removal of vegetation) - Earthmoving activities (bulldozing) - Construction of ash dump	
Impacted environment:	- Heritage (Grave site)	
Description:	Site GY06 consists of a solitary grave located between two agricultural fields. The grave is covered with an iron framework and fenced. The grave is fitted with a cement head stone with no inscription (Pistorius, 2006). As indicated below, site GY06 is located in the footprint area of the ash dump (more detail in the map in Appendix 3).  	
Mitigation Required	Yes – Grave Relocation	
Parameter	**Description**	**Rating**
Duration	Permanent	5
Spatial Scale	Regional	3
Severity	Permanent damage to items of cultural significance	4
Probability	Certain	5
Significance	High	80%

According to the current project layout (Appendix 3), other sites are also located in the geographical proximity of the development and needs to be protected from adverse impacts. Mitigation and Management measures are discussed in Chapter 12.

11 CUMULATIVE IMPACTS

Archaeological and heritage sites may be adversely affected by cumulative impacts of the industrial, residential, agricultural and mining developments in the area. Adverse cumulative impacts on significant sites may result from surface disturbances, pollution, vandalism, surface clearance and property/structural damage. In Mpumalanga Province, various developments have resulted in the relocation of graves, which has negative emotional and socio-cultural impacts on the values and identities of communities. With reference to the proposed Lesedi Power Generation Project, negative cumulative impacts on sites of archaeological or heritage sites are therefore expected as result of grave relocation procedures for site GY05 and GY06.

Cumulative impacts may also be positive if contributions are made towards archaeological and heritage research or conservation through archaeological and heritage assessments and effective documentation and mitigation of relevant heritage sites in the area. This may promote archaeological and heritage awareness, increase the identification and documentation of significant sites and assist local museums in the preservation of significant artefacts and structures. For the purpose of this study; however, there are no major positive cumulative impacts foreseen on sites of archaeological or heritage sites resulting from the proposed Lesedi Power Generation Project.

12 MITIGATION MEASURES AND MANAGEMENT PLAN

12.1 Mitigation and management of graves and cemeteries

Due to the sensitive nature of graves and heritage protection status of site GY05 and GY06 in the Tweefontein Division area, these sites are rated of high significance. According to the proposed layout plan, these graves are located in the footprint area of the ash dump and needs to be relocated. A grave relocation process needs to be implemented in terms of applicable legislative requirements, such as the National Heritage Resources Act, 1999 (Act 25 of 1999), the Ordinance on Exhumations, 1980 (No 12 of 1980), the Human Tissues Act, 1983 (Act 65 of 1983 as amended) and the Mpumalanga Cemeteries, Crematoria and Exhumation of Bodies Act 8 of 2005.

The Grave Relocation Process will be divided into four phases, commencing with Project initiation and Project management. As illustrated in Figure 1, the four phases required for the relocation of the graves located in the footprint area of the proposed Lesedi Power Generation Project include:

5) Phase 1: Survey
6) Phase 2: Social consultation

7) Phase 3: Permitting
8) Phase 5: Reporting

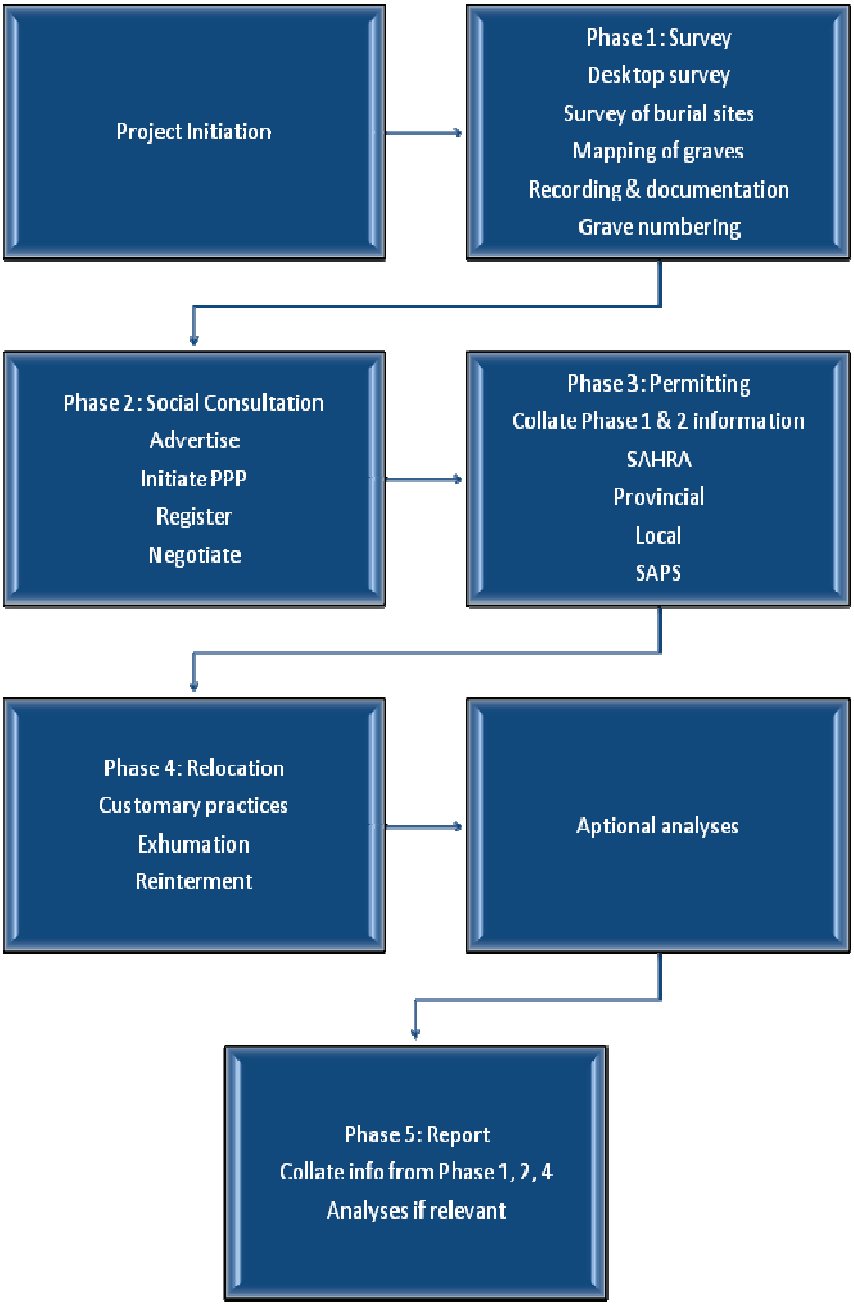


Figure 1: Schematic summary of phases in grave relocation process

If the client decides to review the layout of the proposed Lesedi Power Generation Project (and location of the ash dump) to avoid direct impacts on site GY05 and GY06, these sites will have to be protected. This is also the preferred option in terms of the NHRA, where GY05 and GY06 will be preserved *in situ*. If in situ preservation is considered, each site should be fenced with a 15 – 20 m buffer zone and continuously managed and monitored. Procedures for access by these families to their ancestral graves will also have to be ensured. In essence, *in situ* preservation should include the following mitigation measures:

- Fencing the site (i.e. with palisade, walls, galvanised steel fence or concrete), with a lockable gate on one side;
- A site management plan must be compiled with which the cemetery's conservation during the construction and operational phases can be ensured. The management plan would address aspects such as site monitoring and the cleaning of the cemetery during construction, operational and decommissioning phases.

12.2 General

Due to the subsurface nature of some archaeological and heritage resources, the possibility of uncovering additional sites or structures of significance during the construction or operation of the proposed Lesedi Power Generation Project is probable. If during construction a potential archaeological or heritage site is identified, a qualified heritage specialist must be contacted to assess the find. With reference to the other archaeological and heritage sites identified in the larger Tweefontein Area (Pistorius, 2006), it is recommended that a qualified archaeologist monitor sensitive and manage these significant sites during construction.

13 MONITORING PROGRAM

The purpose of an effective monitoring program is to provide advice to the developer in terms of recommendations for archaeological and heritage components, as part of the integrated environmental management and monitoring plan for the proposed project.

Table 26: Monitoring programme for archaeological and heritage sites

MITIGATION	MONITORING
***In situ* Preservation of cemeteries**	- A site management plan must be compiled with which the heritage sites' conservation during the construction and operational phases can be ensured. - The management plan would address aspects such as site monitoring and the cleaning of the sites during construction, operational and decommissioning phases; - Monitoring of the site's continued preservation must also be undertaken. The frequency of monitoring visits will be outlined in the site management plan; - If grave sites are conserved *in situ*, the affected families will have to be consulted in terms of the future management of the cemetery; procedures for access by these families to their ancestral graves will also have to be ensured; - If the graves will have to be relocated, a full Grave Relocation Process will be initiated and form part of the heritage management and monitoring plan.

If during the construction or operational phases any additional archaeological or heritage resources are found, the development must be temporarily ceased and a qualified archaeologist or heritage specialist be contacted for an assessment of the find.

14 CONCLUSION

Project activities associated with the proposed Lesedi Power Generation development in the Tweefontein Area of the Mpumalanga Province may have a number of impacts on the environment. From an archaeological and heritage point of view, all heritage sites must be protected from construction and operation activities associated with the proposed Lesedi Power Generation Project. As indicated in the impact assessment section (Chapter 10), site GY05 and GY06 in the Tweefontein Division area are of high significance due to the sensitive nature of graves and heritage protection status. According to the current layout plan, these graves are located in the proposed footprint area of the ash dump and needs to be relocated. The grave relocation process needs to be implemented in term of applicable legislative requirements, such as the National Heritage Resources Act, 1999 (Act 25 of 1999), the Ordinance on Exhumations, 1980 (No 12 of 1980), the Human Tissues Act, 1983 (Act 65 of 1983 as amended) and the Mpumalanga Cemeteries, Crematoria and Exhumation of Bodies Act 8 of 2005.If it is decided that the ash dump will be moved (to avoid impact on the grave sites), these sites need to be protected with a buffer zone, and managed in compliance with the National Heritage Resources Act, 1999 (Act 25 of 1999). If the client decides to review the layout of the proposed Lesedi Power Generation Project (and location of the ash dump) to avoid direct impacts on site GY05 and GY06, these sites will have to be protected *in situ*. If *in situ* preservation is considered, each site should be fenced with a 15 – 20 m buffer zone and continuously managed and monitored.

15 REFERENCES

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APPENDIX 1:

CV and Experience of Heritage Specialist

(Marike Fourie)

PERSONAL INFORMATION:

Name:	MARIKE FOURIE
Title:	Environmental Consultant
Company:	Digby Wells and Associates

EDUCATION

- University of Pretoria (UP) 2000 – 2002: BhcS. Degree *Cum Laude*;
- University of Pretoria (UP) 2003 – BhcS. (Hon) Degree *Cum Laude* Specializing in Cultural and Heritage Tourism Management;
- University of Johannesburg (R.A.U) 2005 – 2006: (M.A.) Degree, specializing in Sustainable Development;
- Wildlife Campus (Ecolife) 2007, Certificate in Wildlife Management;
- University of Johannesburg 2008 – present, (PhD) Degree in Environmental Management

Lifetime Membership: Goldenkey International Honorary Society: Membership attained through academic achievement (Honorary Colours) in the BhcS. Degree.

EMPLOYMENT

- 2005 – Lecturer in Sustainable Tourism Development at the University of Johannesburg (previously known as R.A.U)
- 2005 – Lecturer in Geography at Abbott's College, Northcliff
- 2004 – Researcher for South African Veterinary Association (SAVA): Development of Veterinary Museum at Onderstepoort, Pretoria
- 2004 – Administrative Assistant at Financial Services Compensation Scheme (FHCS), London, U.K
- 2002 – 2003 : Research Assistant at University of Pretoria (UP), Archive Assistant & Part-time Travel Writer for Campus Newspaper

EXPERIENCE

Whilst completing a BhcS. (Hon) and Masters Degree, she has done intensive research, fieldwork and impact assessments in the Blouberg area (Limpopo Province). The Hananwa community formed an integral part of the Masters Degree in Sustainable Development as well as an Ethno-botanical assessment of the region (Bhcs). As a lecturer in Sustainable Tourism Development and Geography, she was responsible for the preparation of formal lectures, presentations, practical guidance (excursions) and student evaluation. Other work experiences such as Research assistant for South African Veterinary Association (SAVA) and University of Pretoria (UP) were primarily focussed on resource analysis, literature reviews, compilation of development proposals, data input and constructive recommendations. Current area of expertise at DWA lies in the formulation and implementation of sustainable development initiatives, archaeological impacts assessments and assisting with scoping reports, Environmental Impact Assessments (EIA), local economic development plans (LED) and Environmental Management Plans (EMP).

Projects recently involved in include:

- Sadiola Deep Sulphides Project (EIA/EMP, Project Manager), AngloGold Ashanti (AGA), Mali, West Africa;
- Valencia Uranium (EIA/EMP, Assistant Project Manager), Forsys Metals, Namibia, Southern Africa;
- Tselentis and Spitzkop Mining developments (EIAs/EMPs, Archaeological Management), Xstrata, Mpumalanga, South Africa;
- Crown Ergo Mining Operation and related reclamation activities (EIAs/EMPS, Air Quality and Archaeological Management), Gauteng;
- Northern Coal, Weltevreden (EIA/EMP, Archaeological Management), Mpumalanga;
- Etoile (BFS, Preliminary Archaeological Investigations), IMC, Democratic Republic of Congo (DRC);
- Khutala Mineral Optimisation Project, EIA/EMPR, Ingwe Colliery, Mpumalanga, South Africa ;
- Klippoortjie 5 Seam EMPR Addendum, Xstrata Coal, Mpumalanga
- Cleaner Production (CP) Campaign, Water Research Commission (WRC), South Africa;
- Op Goeden Hoop Mining Right Application, NuCoal, Mpumalanga
- Mmamabula Energy Project, CIC, Botswana, including:
    - Mine & Power station EIA/EMPR,
    - Transmission Lines EIA/EMPR,
    - Railway Link and Service Corridor,
    - Kudumatse Groundwater exploration boreholes and
    - Calcrete Mine.
- ATC Mini Opencast Pits EMPR Addendums, Xstrata Coal, Mpumalanga.
- Mareesburg Platinum Joint Venture, Eastern Platinum, Mpumalanga.
- Bankfontein EIA/EMPR, Vaalsands (Pty) Ltd, Free State
- 3L2 Dump EIA/EMPR, Crown Gold Recoveries, Gauteng
- Lime-Chem EIA/EMPR, Lime-Chem (Pty) Ltd, Limpopo Province

Courses and seminars recently attended include:

- Coal Business Seminar (October 2006, Hyatt Hotel, Rosebank);
- Health and Safety Course (January 2007; Edwilo Risk Consultants);
- Corporate Social Investment (March 2007 at Randfontein Estate);
- National Heritage Council: Heritage and Development, April 2009 (presentation on heritage impact assessments);
- Emergency First Aid Training, (IEFA) 2010

APPENDIX 2:

Archaeological Impact Assessment Criteria

(PGS, 2009) and (DWA, 2010)

1. ARCHAEOLOGICAL IMPACT ASSESSMENT CRITERIA

1.1 SAHRA AND ASAPA ASSESSMENT METHODOLOGY:

The significance of archaeological sites is generally also 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),
- Uniqueness and
- Potential to answer present research questions.

Management actions and recommended mitigation, which aims to mitigate and reduce the impact on sites, are 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

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 is generally used for the purpose of archaeological impact assessment reports. This process has been summarised in the table below:

Site Significance (SAHRA and ASAPA)

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	-	Medium	Recording before

(GP.B)		Significance	destruction
Generally Protected C (GP.C)	-	Low Significance	Destruction

1.2 EIA/EMP ASSESSMENT METHODOLOGY:

The impact rating process is designed to provide a numerical rating of the various environmental impacts identified for various project activities. The significance rating process follows the established impact/risk assessment formula:

Significance = Consequence x Probability

Where

Consequence = Severity + Spatial Scale + Duration

And

Probability = Likelihood of an impact occurring

The matrix first calculates the rating out of 75 and then converts this into a percentage out of 100. The percentage is the figure quoted in the matrix. The weight assigned to the various parameters for positive and negative impacts in the formula is presented in the following table:

Impact assessment parameters

Rating	Severity		Spatial scale	Duration	Probability
	Environmental	**Social, cultural and heritage**			
5	Very significant impact/total destruction of a highly valued species, habitat or ecosystem or extremely positive impact over baseline environmental condition.	Irreparable damage to/destruction of highly valued items of great cultural significance or complete breakdown of social order or Extremely positive impact on social, economic and cultural environment.	National/ International	Permanent/ Irreversible (more than 50 years)	Certain/ Normally happens in cases of this nature (80-100% chance of happening)
4	Serious impairment of ecosystem function. or very positive impact over baseline environmental condition.	Serious social issues/Permanent damage to items of cultural significance or very positive impact on social, economic and cultural environment.	Provincial/ Regional	Long Term (25 to 49 years or beyond closure)	Will more than likely happen (60-79% chance)
3	Moderate negative alteration of ecosystem functioning or moderately positive impact over baseline environmental condition.	Moderately important social issues and/or moderately significant damage to items of cultural significance or Moderately positive impact on social, economic and cultural environment.	Regional (substantially beyond site boundary)	Medium Term (5-24 years)	Could happen and has happened here or elsewhere (40-59% chance)
2	Minor effects not affecting ecosystem functioning or Slightly positive impact over baseline environmental condition.	Minor Impacts on the local population, repairable over time. Temporary impairment of the availability of items of cultural significance or Minor positive impact on social, economic and cultural environment.	Local (beyond site boundary and affects neighbours)	Medium-Short Term (1-4 years)	Has not happened yet, but could (20-39% chance)
1	Insignificant effects on the biophysical environment or insignificantly positive impact over baseline environmental condition.	Insignificant social issues / low-level repairable damage to commonplace structures. Positive impact on social, economic and cultural environment or Insignificant positive impact on social, economic and cultural environment.	Site (does not extend beyond site boundary)	Short term (Less than a year)	Conceivable, but only in a set of very specific and extreme circumstances (0-19% chance)

Impacts are rated prior to mitigation and again after consideration of the mitigation measure proposed in the EMP. The significance of an impact is then determined and categorised into one of four categories, as indicated in the following table

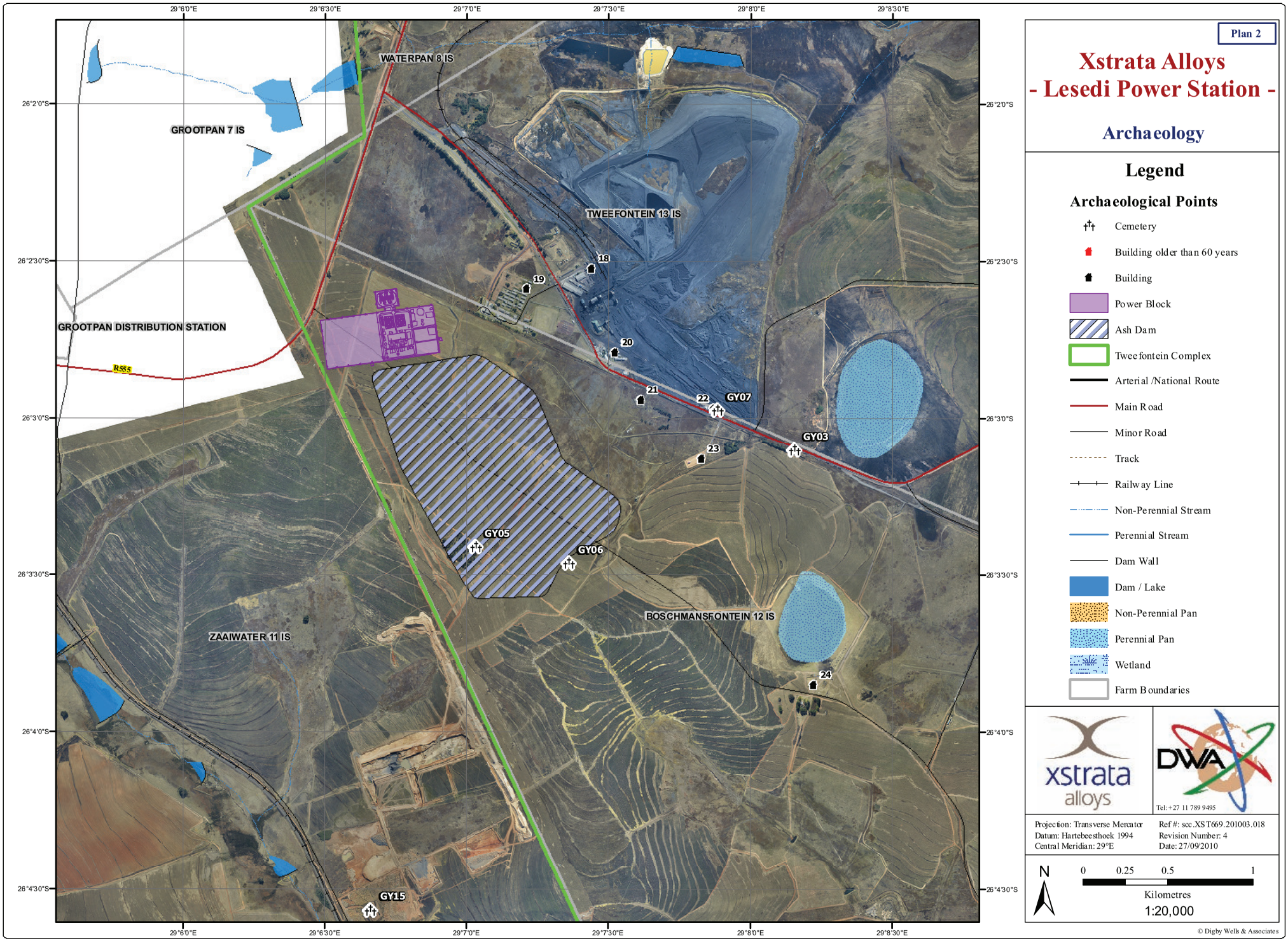
Significance threshold limits

Category	Description	Colour
High	76 %- 100%	
Medium – High	51% – 75%	
Medium - Low	26% – 50%	
Low	0% - 25%	

APPENDIX 3:

Location of Significant Archaeological and Heritage Sites

(DWA, 2009)



Plan 2

Xstrata Alloys
- Lesedi Power Station -

Archaeology

Legend

Archaeological Points

- Cemetery
- Building older than 60 years
- Building
- Power Block
- Ash Dam
- Tweefontein Complex
- Arterial /National Route
- Main Road
- Minor Road
- Track
- Railway Line
- Non-Perennial Stream
- Perennial Stream
- Dam Wall
- Dam / Lake
- Non-Perennial Pan
- Perennial Pan
- Wetland
- Farm Boundaries

xstrata alloys

DWA

Tel: +27 11 789 9495

Projection: Transverse Mercator
Datum: Hartebeesthoek 1994
Central Meridian: 29°E

Ref #: scc.XST669.201003.018
Revision Number: 4
Date: 27/09/2010

N

0 0.25 0.5 1

Kilometres

1:20,000

APPENDIX 4:

Heritage Impact Assessment (HIA) Report

(Pistorius, 2006)

Prepared for:

X STRATA COAL:

TWEEFONTEIN DIVISION

A BASE LINE HERITAGE IMPACT ASSESSMENT STUDY FOR X STRATA COAL'S TWEEFONTEIN DIVISION ON THE EASTERN HIGHVELD IN THE MPUMALANGA PROVINCE OF SOUTH AFRICA

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March 2006

EXECUTIVE SUMMARY

A base line Heritage Impact Assessment (HIA) study as required in terms of Section 38 of the National Heritage Resources Act (No 25 of 1999) was done for X Strata Coal's Tweefontein Division on the farm Tweefontein 13TS and parts of the farms Waterpan 8IS, Zaaiwater 11IS Grootpan 7IS, Tweefontein 328IS and Vlaklaagte 330IS on the Eastern Highveld in the Mpumalanga Province of South Africa. The aims with the HIA study were to establish whether any of the types and ranges of heritage resources as outlined in Section 3 of the National Heritage Resources Act (No 25 of 1999) (see Box 1) do occur in the Tweefontein Project Area and, if so, to determine the nature, the extent and the significance of these remains and to indicate what appropriate mitigation measures should be implemented to reduce any possible impact on these heritage resources should they be affected (damaged, altered or destroyed) by any development project in the short, medium or long term.

The HIA study for the Tweefontein Project Area revealed a narrow range of heritage resources and other infrastructure in the project area. Only the following heritage resources have significance, namely:

- Villages or residential areas older than sixty years or approaching sixty years in age are protected by Section 34 of the National Heritage Resources Act (No 25 of 1999).
- Scattered structures across the project area older than sixty years or approaching this age are also protected by Section 34 of the National Heritage Resources Act (No 25 of 1999). (These structures may be inconspicuous as they are part of complexes of structures or may occur in isolation in the project area).
- Graves and graveyards are protected by various laws, particularly if these graveyards have to be exhumed and relocated.

The coordinates for categories of heritage resources classified as 'Villages', 'Historical Settings' and 'Scattered historical structures' were not determined as these phenomena are clearly visible on the 1: 50 000 topographical maps of the project area. The geographical locations of graves and graveyards were determined with a GPS instrument. These features were also mapped and their coordinates tabulated (Figure 1; Table 1).

Neither the historical remains nor the graveyards in the Tweefontein Project Area may be affected (damaged, altered or destroyed) by any development project before these remains have been subjected to mitigation measures.

Any buildings or structures which are older than sixty years or which approach this age are considered to be historical significant and may not be affected (damaged, altered or demolished) by any development project. The destruction or alteration (restoration) of historical structures can only occur after a historical architect in good standing with the South African Heritage Resources Agency (SAHRA) has obtained the necessary permit from a Provincial Heritage Resources Agency (PHRA).

Any possible historical houses (structures) in the Tweefontein Project Area can therefore not be demolished *prior* to these structures being identified as historical significant and investigated by a historical architect. This specialist must acquire a permit from the Provincial Heritage Resources Authority (PHRA) which would allow for the destruction of such buildings. It is possible that the historical architect may recommend that historical structures be incorporated in the new development. Alterations to historical buildings also require the PHRA's permission before these structures may be renovated or restored.

The graveyards in the Tweefontein Project Area can be considered to be of outstanding significance. Legislation with regard to graveyards includes the National Heritage Resources Act, 1999 (No 25 of 1999), the Ordinance on Exhumations, 1980 (No 12 of 1980) and the Human Tissues Act, 1983 (No 65 of 1983 as amended).

Graveyard could either be preserved *in situ,* or relocated. A mini-management plan has to be complied for the graveyards in the Tweefontein Project Area if they are not relocated in the near future.

Relocations of graveyards are done by forensic archaeologists or by reputed undertakers who are acquainted with the relevant legislation and procedures that have to be followed whenever human remains are exhumed and relocated. This process should be undertaken in compliance with heritage legislation which means that the specialist must obtain a permit from SAHRA and allow for a 60 day public participation process to take place. Standard procedures also require that other laws, provincial regulations and administrative procedures that regulate this activity must be adhered to. Permission must also be obtained from the descendants (if known) of the deceased, the National Department of Health, the Provincial Department of Health, the Premier of the Province and the local police.

CONTENTS

1 INTRODUCTION

This report contains the results of a base line Heritage Impact Assessment (HIA) study done for X Strata Coal's Tweefontein Division spread out across the farm Tweefontein 13TS and parts of the farms Waterpan 8IS, Zaaiwater 11IS Grootpan 7IS,, Tweefontein 328IS and Vlaklaagte 330IS on the Eastern Highveld in the Mpumalanga Province of South Africa. X Strata Coal's Tweefontein Division incorporates various open cast and shaft operations such as the Boschmans, Waterpan and Witcon (Duiker) coal mine operations.

As X Strata Coal's Tweefontein Division is continuously expanding its activities, its various operations need base line information on the types and ranges of heritage resources which may occur in the Tweefontein Project Area as current or future mining operations may affect some of the heritage resources which may exist in the Tweefontein Project Area.

The Eastern Highveld has a rich heritage comprised of remains dating from the pre-historical and from the historical (colonial) periods of South Africa. Pre-historical and historical remains on the Eastern Highveld form a record of the heritage of most groups living in South Africa today. Various types and ranges of heritage resources that qualify as part of South Africa's 'national estate' (outlined in Section 3 of the National Heritage Resources Act [No 25 of 1999]) occur in this region (see Box 1, next page).

Box 1: Types and ranges of heritage resources as outlined in Section 3 of the National Heritage Resources Act (No 25 of 1999)

The National Heritage Resources Act (Act No 25 of 1999, Art 3) outlines the following types and ranges of heritage resources that qualify as part of the national estate, namely:

(a) places, buildings structures and equipment of cultural significance;
(b) places to which oral traditions are attached or which are associated with living heritage;
(c) historical settlements and townscapes;
(d) landscapes and natural features of cultural significance;
(e) geological sites of scientific or cultural importance;
(f) archaeological and paleontological sites;
(g) graves and burial grounds including-
  (i) ancestral graves;
  (ii) royal graves and graves of traditional leaders
  (iii) graves of victims of conflict
  (iv) graves of individuals designated by the Minister by notice in the Gazette;
  (v) historical graves and cemeteries; and
  (vi) other human remains which are not covered by in terms of the Human Tissue Act, 1983 (Act No 65 of 1983)
(h) sites of significance relating to the history of slavery in South Africa;
(i) moveable objects, including -
  (i) objects recovered from the soil or waters of South Africa, including archaeological and paleontological objects and material, meteorites and rare geological specimens;
  (ii) objects to which oral traditions are attached or which are associated with living heritage;
  (iii) ethnographic art and objects;
  (iv) military objects;
  (v) objects of decorative or fine art;
  (vi) objects of scientific or technological interest; and
  (vii) books, records, documents, photographs, positives and negatives, graphic, film or video material 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).

The National Heritage Resources Act (Act No 25 of 1999, Art 3) also distinguishes nine criteria for places and objects to qualify as 'part of the national estate if they have cultural significance or other special value …'. These criteria are the following:

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

2 AIMS WITH THIS REPORT

X Strata Coal's Tweefontein Division intends gradually expanding its current coal mining operations across the farms Tweefontein 13TS and parts of the farms Waterpan 8IS, Zaaiwater 11IS Grootpan 7IS and Vlaklaagte 330IS on the Eastern Highveld in the Mpumalanga Province of South Africa. In order to comply with legislation, X Strata Coal's Tweefontein Division therefore requires knowledge of the possible presence and the significance of any types and ranges of heritage resources (as outlined in Section 3 of the National Heritage Resources Act [No 25 of 1999]) which may occur in the Tweefontein Project Area. X Strata Coal's Tweefontein Division needs this information in order to take pro-active measures with regard to any of the types and ranges of heritage resources which may be affected (damaged, altered or destroyed) when coal mining operations are extended across the project area.

The aims with this base line HIA study therefore were the following:

- to establish whether any of the types and ranges of heritage resources as outlined in Section 3 of the National Heritage Resources Act (No 25 of 1999) (Box 1) do occur in the Tweefontein Project Area and, if so, to determine the nature, the extent and the significance of these remains; and
- to indicate what appropriate mitigation measures should be implemented to reduce any possible impact on any of these heritage resources should they be affected (altered, damaged or destroyed) by any future development activities.

3 METHODOLOGY

3.1 The approach to this study

This base line HIA study was conducted by:

- Surveying on foot selected areas of the Tweefontein Project Area as well as criss-crossing the larger project area with a vehicle. (The very large Tweefontein Project Area prevented a total coverage of its surface area on foot as a result of time and budget constraints).
- Briefly surveying literature relating to the pre-historical and historical context of the Eastern Highveld near Ogies (refer to Parts 4 & 7).
- Interviewing spokespersons to establish the presence of heritage resources such as graveyards or abandoned settlements.
- Consulting maps of the Tweefontein Project Area.
- Consulting archaeological (heritage) data bases such as the one kept at the Mpumalanga Provincial Heritage Resources Agency (Mpumalanga PHRA).
- Integrating all the information obtained from the literature survey, maps and spokespersons with the evidence derived from the fieldwork.

3.2 Fieldwork

The project area covers a considerable surface area and could not be investigated in full due to the large size of this area, the time allowed for the study to be completed and the dense stand of vegetation that have set root as a result of the good summer rains.

It must be noted that ‘disturbed areas’ such as agricultural fields on the Eastern Highveld have proven that graveyards may have survived in the midst of maize fields as many of these features are sometimes protected here with demarcations of some kind.

3.3 Mapping the heritage resources

The coordinates for graves and graveyards were determined with a GPS instrument and tabulated (Table 1). The graves were also mapped (Figure 1). The coordinates for infrastructure and heritage resources classified as 'Villages', 'Historical Settings' and 'Scattered historical structures' were not determined as these residential areas and structures usually occur in complexes which are indicated on the 1: 50 000 topographical maps of the project area.

3.4 Previous surveys

The author of this report has done a few HIA studies in the immediate surrounding of the project area and is therefore not totally unacquainted with the broader area in which the development is planned (see 'Selected Bibliography', Part 7).

The types and ranges as well as the possible presence of heritage resources in the Tweefontein Project Area therefore could to a certain extent be predicted on the basis of experience gained from earlier fieldwork in the broader area.

3.5 The significance of the heritage resources

The significance of the various types and ranges of heritage resources in the Tweefontein Project Area have been determined by using criteria that have been set out by the National Heritage Resources Act (No 25 of 1999) as well as other by other legislation that is relevant to the exhumation and relocation of human remains.

3.6 Assumptions and limitations

It must be pointed out that heritage resources can be found in the most unexpected places. It must also be borne in mind that surveys may not detect all the heritage resources in a given project area. While some remains may simply be missed during surveys (observations), others may occur below the surface of the earth and may only be exposed once development (such as mining) commences.

3.7 Some remarks on terminology

Terms that may be used in this report are briefly outlined in Box 2.

Box 2. Terminologies that may be used in this report

The Heritage Impact Assessment (HIA) referred to in the title of this report includes a survey of heritage resources as outlined in the National Heritage Resources Act, 1999 (Act No 25 of 1999) (See Box 1).

Heritage resources (cultural resources) include all human-made phenomena and intangible products that are the result of the human mind. Natural, technological or industrial features may also be part of heritage resources, as places that have made an outstanding contribution to the cultures, traditions and lifestyles of the people or groups of people of South Africa.

The term 'pre-historical' refers to the time before any historical documents were written or any written language developed in a particular area or region of the world. The historical period and historical remains refer, for the project area, to the first appearance or use of 'modern' Western writing brought to the Witbank-Middelburg-Ogies area by the first Colonists who settled in this area after the 1850's.

The term 'relatively recent past' refers to the 20th century. Remains from this period are not necessarily older than sixty years and therefore may not qualify as archaeological or historical remains. Some of these remains, however, may be close to sixty years of age and may, in the near future, qualify as heritage resources.

It is not always possible, based on observations alone, to distinguish clearly between archaeological remains and historical remains, or between historical remains and remains from the relatively recent past. Although certain criteria may help to make this distinction possible, these criteria are not always present, or, when they are present, they are not always clear enough to interpret with great accuracy. Criteria such as square floor plans (a historical feature) may serve as a guideline. However, circular and square floors may occur together on the same site.

The term 'sensitive remains' is sometimes used to distinguish graves and cemeteries as well as ideologically significant features such as holy mountains, initiation sites or other sacred places. Graves in particular are not necessarily heritage resources if they date from the recent past and do not have head stones that are older than sixty years. The distinction between 'formal' and 'informal' graves in most instances also refers to graveyards that were used by colonists and by indigenous people. This distinction may be important as different cultural groups may uphold different traditions and values with regard to their ancestors. These values have to be recognised and honoured whenever graveyards are exhumed and relocated.

The term 'Stone Age' refers to the prehistoric past, although Late Stone Age peoples lived in South Africa well into the historical period. The Stone Age is divided into an Earlier Stone Age (3 million years to 150 000 thousand years ago) the Middle Stone Age (150 000 years to 40 000 years ago) and the Late Stone Age (40 000 years to 200 years ago).

The term 'Late Iron Age' refers to the period between the 17th century and the 19th century and can therefore include the historical period.

Mining heritage sites refer to old, abandoned mining activities, underground or on the surface, which may date from the pre-historical, historical or the relatively recent past.

The term 'study area', or 'project area' refers to the area where the developer wants to focus its development activities (refer to plan).

Phase I studies refer to surveys using various sources of data in order to establish the presence of all possible types of heritage resources in any given area.

Phase II studies include in-depth cultural heritage studies such as archaeological mapping, excavating and sometimes laboratory work. Phase II work may include the documenting of rock art, engraving or historical sites and dwellings; the sampling of archaeological sites or shipwrecks; extended excavations of archaeological sites; the exhumation of bodies and the relocation of graveyards, etc. Phase II work may require the input of specialists and requires the co-operation and approval of SAHRA.

4 THE TWEEFONTEIN PROJECT AREA

The Tweefontein Project Area covers the farms Tweefontein 13TS and parts of the farms Waterpan 8IS, Zaaiwater 11IS Grootpan 7IS and Vlaklaagte 330IS on the Eastern Highveld in the Mpumalanga Province of South Africa (2529CC Witbank & 2629AA Ogies [1:50 000]; 2628 East Rand [1: 250 000]).

The Highveld's altitude varies between 1200m to 1800m above sea level. The region's vegetation is marked by a treeless savannah while the rainfall varies between 400mm in the far south to 900mm in the north-east. Most of the rain falls in summer, sometimes in the form of thunderstorms. Winter is marked by consecutive moderate cloudless days although it can become bitter cold at night, particularly in the south.

4.1 Location

The Tweefontein Project Area is located directly to the east of Ogies (Phola) and to the south of Witbank on the Eastern Highveld which is bordered by Pretoria and the East Rand in the west; the foot slopes of the Drakensberg range of mountains in the east; the Vaal River and plateau ridge in the south and the Springbok Flats to the north-west.

The Tweefontein Project Area covers a considerable surface area and is a large, near square-shaped block of land. Its northern boundary roughly coincides with the R547 and its western and southern boundaries with the R545. The eastern boundary of the project area runs from the north to the south along the border between the farms Tweefontein 13IS and Klipplaat 14IS (2529CC Witbank & 2629AA Ogies [1:50 000]; 2628 East Rand [1: 250 000]) (Figure 1).

4.2 The altered state of the project area

The vegetation in the Tweefontein Project Area is a typical Highveld grass veldt with few trees. However, the project area can not be described as a pristine piece of land any longer. While large parts of the project area in the south have been ploughed under

for agriculture, mining has firmly been established in the northern part of the project area.

Large tracks of the grass veldt have been altered as they have been changed into maize fields. Wattle and poplar plantations have set root in many places while blue gum trees were planted as avenues, sometimes together with pine trees. Blue gums were also planted to be used for timber in house construction or they served as windbreaks and to demarcate borders between farms. The oddly dispersed clump of Blue Gums on the otherwise vast treeless expanse of the Highveld also provided necessary shade to stock.

Figure 1- The Tweefontein Project Area covers the farms Tweefontein 13IS and parts of the farms Waterpan 8IS, Zaaiwater 11IS Grootpan 7IS and Vlaklaagte 330IS on the Eastern Highveld in the Mpumalanga Province of South Africa (2529CC Witbank 2529CD, 2629AA Ogies [1:50 000]; 2628 East Rand [1: 250 000]) (Figure 1).

Note the presence of graves and graveyards in the project area.

4.3 Contextual background

Considering the range and types of heritage resources listed in the National Heritage Resources Act (No 25 of 1999, see Box 1), it is possible that the following types of heritage resources may exist in the Tweefontein Project Area, namely:

- Stone tools that may date from any of the Stone Age periods.
- Historical remains, particularly farm homesteads that were constructed with sandstone or ferricrete which are associated with 19th century colonial farmers.
- Remains that may be associated with the earliest exploration or mining for coal.
- Remains that date from the more recent past such as homesteads occupied by farmers and their co-workers. These residential remains may be associated with single graves or with small family graveyards.

The following brief historical overview will help to contextualise the Tweefontein Project Area.

4.3.1 Stone Age sites

Stone Age sites are usually associated with stone artefacts found scattered on the surface or as part of deposits in caves and rock shelters. The Stone Age is divided into the Early Stone Age, the Middle Stone Age and the Late Stone Age. The Early Stone Age covers the period from 2.5 million years ago to 150 000 years ago. The Middle Stone Age refers to the time period from 150 000 years ago to 22 000 years ago and the Late Stone Age is the period 22 000 years ago to 300 years ago.

Heritage surveys done on the Eastern Highveld has not revealed the presence of significant numbers of Stone Age sites from any of the different periods identified for the Stone Age. This can largely be attributed to a lack of heritage surveys that have been done in this part of South Africa. Stone Age sites are numerous all over South Africa and tend to crop up even where the presence of humans in the past was not remotely expected.

4.3.2 Late Iron Age remains

No evidence for any Early Iron Age sites has been found on the Eastern Highveld whilst Late Iron Age stone walled sites do occur on the Highveld where numerous pre-*difaqane* and *difaqane* wars took place during the last quarter of the 18th century and during the first three decades of the 19th century. These wars led to the displacement of large numbers of Tswana clans on the Highveld where Mzilikazi's Ndebele caused chaos and havoc. The Ndebele established several settlement complexes in this region and it is possible that Mzilikazi may have established settlements on the Eastern Highveld, between Pretoria and Witbank which have not yet been discovered by anthropologists and archaeologists.

Late Iron Age settlements characterised by extensive dry stonewalls and dating from the 17th century do occur in the Mpumalanga region, particularly in the area between Lydenburg and Machadodorp, but not close to the project area. Late Iron Age communities who contributed to this stone walled architecture were the Sotho, Pedi, Ndebele and Swazi. The stone building tradition that these indigenous groups established many decades before the first colonial settlers arrived, may have influenced the colonial farmers to utilize these same resources as building material for the first farmsteads which arose on the Eastern Highveld.

4.3.3 Historical remains

The Tweefontein Project Area is located to the east of Ogies, approximately twenty five kilometres to the south-west of Witbank. As these two towns are located closest to the Tweefontein Project A the origins and development of these two towns therefore needs closer scrutiny in order to contextualise the Tweefontein Project Area.

The railway line between Pretoria and Lourenzo Marques was built in 1894. It passed close to where Witbank is located today. The first Europeans who came to the area observed the abundance of coal, which was evident on the surface or in the beds of streams. A stage post for wagons close to a large outcrop of whitish stones

(a ‘white ridge’, possibly a sandstone ridge) gave the town its name. Witbank was established in 1903 on a farm known as Swartbos which belonged to Jacob Taljaard.

Ogies serves as an important link in the running railway line running between Pretoria and Maputo which was built in 1896. It is also linked via Broodsnyersplaas, 35km south of Middelburg to join the railway line between Ermelo and Piet Retief to Richards Bay. This railway line carries some of the longest and heaviest trains in the world**.** The town of Ogies developed around the railway station which was built on the farm Ogiesfontein in 1928.

4.3.4 Indigenous architecture

The south-eastern Highveld is characterised by a vernacular architecture in which sand stone and ferricrete was used to build farmsteads and dwellings in urban as well as in rural areas. A historical stone vernacular architecture also occurred in the Karoo and in the eastern parts of the Free State Province of South Africa. One of the major differences in the vernacular stone architecture in the Eastern Highveld and in the eastern Free State Province and in the Karoo is the use of a wider variety of stone types in the Eastern Highveld. In the Karoo and in the eastern Free State Province only sandstone was used as building material.

The origins of a vernacular stone architecture in the south-eastern Highveld may be attributed to the ecological characteristics of the region; the stone built tradition that was set by Late Iron Age communities over large parts of the country from as early as AD1600 and the influence that was brought by European immigrants to the Eastern Highveld during the late 18th and early 19th centuries. The fusion of ecological, traditional, new ideas (influences) and logic therefore may explain the use of stone as building material on the Eastern Highveld.

The ecological character of the Eastern Highveld favoured the use of stone as building material as this region is generally devoid of any natural trees which could be used for timber in the construction of dwellings, outbuildings, cattle enclosures, etc. The scarcity of wood, which was primarily used as fuel for cooking, also prevented the manufacturing of baked (clay) bricks. (Sun-dried bricks were of a lower quality than

those baked on a stack). The need for timber in buildings on the Eastern Highveld therefore required that timber had to be imported from the Bushveld and from east of the escarpment into this region.

Many farmers from Scottish, Irish, Dutch, German and Scandinavian descend farmed in the Eastern Highveld. These colonials brought knowledge of stone masonry from Europe that compensated for the lack of firewood to bake clay bricks. European architectural influence can also be seen in missionary stations such as Botŝabelo near Middelburg which was constructed in the second half of the 19th century. Here the missionary's house, the school buildings and churches all have stone foundations while some of the buildings in the complex have been built in their entirety with stone. Rock types preferred in the southern districts of the Mpumalanga Province were sandstone, ferricrete ('ouklip') granite, shale and slate.

4.3.5 A coal mining heritage

The earliest use of coal (charcoal) in South Africa was during the Iron Age (300-1880AD) when metal workers used charcoal, iron and copper ores and fluxes (quartzite, bone) to smelt iron and copper in clay furnaces.

Colonists are said to have discovered coal in the French Hoek Valley near Stellenbosch in the Cape Province in 1699. The first reported discovery of coal in the interior of South Africa was in the mid-1830 when coal was mined in Natal/Kwa Zulu.

The first exploitation for coal was probably in Kwa Zulu/Natal as documentary evidence refers to a wagon load of coal brought to Pietermaritzburg to be sold in 1842. In 1860 the coal trade started in Dundee when a certain Pieter Smith charged ten shillings for a load of coal dug by the buyer from a coal outcrop in a stream. In 1864 a coal mine was opened in Molteno. The explorer, Thomas Baines mentioned that farmers worked coal deposits in the neighbourhood of Bethal (Transvaal) in 1868. Until the discovery of diamonds in 1867 and gold on the Witwatersrand in 1886, coal mining only satisfied a very small domestic demand.

With the discovery of gold in the Southern Transvaal and the development of the gold mining industry around Johannesburg came the exploitation of the Boksburg-Spring coal fields, which is now largely worked out. By 1899, at least four colliers were operating in the Middelburg-Witbank district, also supplying the gold mining industry. At this time coal mining also has started in Vereeniging. The Natal Colliers importance was boosted by the need to find an alternative for imported Welsh anthracite used by the Natal Government Railways.

By 1920 the output of all operating colliers in South Africa attained an annual figure of 9,5million tonnes. Total in-situ reserves were estimated to be 23 billion tonnes in Witbank-Springs, Natal and Vereeniging. The total in situ reserves today are calculated to be 121 billion tonnes. The largest consumers of coal are Sasol, Iscor and Eskom.

Other economic ventures on the Eastern Highveld include mixed farming such as the production of red meat, grain, maize, sunflowers, potatoes and other vegetables. A wide range of minerals are also mined in the region, namely gold in Gauteng and the Orange Free State and diamonds at Cullinan. Some of the world's largest coal mines are located on the Eastern Highveld supplying amongst other Eskom's power stations such as Dhuva, Arnot and Kendall with coal for the production of electricity.

5 THE HERITAGE IMPACT ASSESSMENT STUDY

5.1 Types and ranges of infrastructure in the project area

The survey of the Tweefontein Project Area revealed a relatively narrow range of heritage resources. These heritage resources, as well as other infrastructure with no heritage significance, were classified into the following categories:

- Villages (residential areas) are composed of a varying number of individual residences as well as other infrastructure. Some of these residential areas have been demolished whilst others may be earmarked for demolishment. These villages are usually relatively young although inconspicuous older (historical) structures may occur in some of these residential areas.
- Historical settings which include complexes with historical structures. These complexes qualify as historical settings as the buildings in these complexes are close to sixty years or have surpassed this age.
- Scattered historical structures may occur as isolated phenomena across the Tweefontein Project Area. These structures may be inconspicuous as they are part of complexes of structures or because they may occur in isolation somewhere in the project area.
- Farm Complexes (farm homesteads) consisting of farm homes with outbuildings and other infrastructure mainly occur on the western edge and outside the Tweefontein Project Area. It seems as if most of these farm complexes are relatively young although the odd, single historical structure may be found in a particular farm complex on a specific farm. It also appears as if no (historical) family graveyards are associated with these farm homesteads.
- A number of graves and graveyards were observed in the Tweefontein Project Area whilst a few graveyards were also observed in the peripheral area, outside the project area. (However, the latter are not discussed in this report). More grave sites possibly exist in the project area as they are difficult to locate considering the vast expanse of the project area and the current dense stand of the vegetation after the high summer rain fall. Grave sites may also been ploughed under during decades of intensive agriculture.

The coordinates for the categories of 'Villages', 'Scattered historical structures' and 'Historical Settings' were not determined as these phenomena are clearly visible on the 1: 50 000 topographical maps of the project area. The geographical locations of graves and graveyards were determined with a GPS instrument and tabulated (Table 1). These features were also mapped (Figure 1).

These various categories of heritage resources and other infrastructure are now briefly discussed. Examples from some of these categories are also illustrated with photographs.

5.2 Villages (residential areas)

At least two types of residential areas can be distinguished, namely residential areas that have been demolished and others that are still in existence. Some residential areas, such as Lindiklule however, is gradually being demolished. The following villages or residential areas were distinguished in the project area:

5.2.1 Tweefontein

The Tweefontein village occurs near the north-eastern border of the project area and can be divided into a part which has been demolished and a second part which still exists. The largest part of this village was demolished while a small remaining part incorporates a number of houses and a school building which date from the last few decades.

5.2.2 The demolished Witcon (Duiker) residential area

This mine village used to be located near the southern border of the project area. It was composed of a small residential area with two main tar roads and other sport and relaxation facilities such as a tennis court, bowling green, club house and a swimming pool.

However, this residential area is now demolished. Some of the houses in this residential area were approaching sixty years of age.

5.2.3 The existing Witcon (Duiker) residential area

The existing Witcon residential area is located next to a railway line and incorporates a considerable number of residences which may belong to the South African Railways. All the houses in the residential area were built with face bricks and pitched corrugated iron roofs. These houses are currently still occupied by residents but are severely neglected and many have fallen into a state of disrepair.

It is clear that the houses were built simultaneously as they exhibit the same architectural style. These houses are approaching sixty years in age. The Witcon residential area therefore may soon qualify as a historical landscape.

Figure 2- One of the residences in the existing Witcon residential area (above).

5.2.4 Lindiklule village

This village is occupied by mine workers and is composed of two main roads and two types of residences. Both residence types are relatively young as they were constructed with cement and brick while one type was plastered as well. Both residence types were also fitted with steel window frames.

The first residence type is a rectangular face-brick dwelling that is covered with pitched asbestos sheets. The second residence type is a rectangular plastered house which is covered with a slant roof that consists of asbestos sheets.

Several of the residences in the Lindiklule village have been demolished.

5.2.5 A golf course and residential area

A golf course and adjoining residential area is located near the northern end of the project area. It seems as if the majority of these residences date from the more recent past.

At least one historical house can be associated with this residential complex. It is therefore possible that more historical houses may be found in the residential area next to the golf course.

5.3 Historical settings

Several historical structures clustered together occur in the Tweefontein Project Area. These complexes qualify as historical remains as the buildings in these complexes are close to sixty years or have surpassed this age. These buildings are protected by Section 34 of the National Heritage Resources Act (No 25 of 1999). The following historical buildings or complexes with historical buildings occur:

5.3.1 Administrative offices

The administrative offices in which the environmental section, together with other departments is accommodated is a historical complex of buildings although some of the buildings may have been altered or added in more recent times.

Figure 3- The administrative offices of X Strata Coal Tweefontein Division include several structures which qualify as historical buildings as they approach an age of sixty years (above).

5.3.2 An abandoned hospital

An abandoned hospital near the Lindiklulu village seems to be a very significant complex considering the possibility that the building complex probably served as a mine hospital. This complex of buildings also dates back a few decades into the past.

The hospital complex has been abandoned for some time which has lead to vandalism as the complex is gradually being stripped of building material.

Figure 4- The abandoned mine hospital incorporates a number of buildings which are currently being vandalised as buildings are stripped for building material and features such as doors and window frames (above).

5.3.3 A possible hall and associated structures

What seems like a possible hall and other associated (school?) buildings are located in close proximity of the administrative offices. These structures, together with avenues with Blue Gum and pine trees as well as buildings such as the shop and administrative offices (former residence), all located near the junction of several tar roads, seems to be part of a cultural landscape which is protected by the National Heritage Resources Act (No 25 of 1999).

Figure 5- The possible hall, which may even have served as a farm shed before being changed, close to the administrative offices of X Strata Coal (above).

5.3.4 Scattered (historical) structures

A limited number of structures, some which may have historical significance, occur scattered throughout the Tweefontein Project Area. These structures are not abundant but are inconspicuous as they may be part of complexes of structures in younger residential areas while others occur as isolated phenomena. The following isolated historical structures were listed:

- A historical house between the golf course and the back of the shop and filling station opposite the administrative offices.
- The shop and filling station building referred to above (opposite, to the north) of the administrative offices.
- A dilapidated farm homestead with outbuildings near the Boschman's North Open Cast Mine's entrance gate.

- An abandoned filling station and shop building at the entrance to the demolished Witcon (Duiker) residential area.
- A residence currently used as a garage for vehicle repairs next to the abandoned filling station and shop building referred to above (at the entrance to the demolished Witcon [Duiker] residential area).
- Abandoned mining infrastructure such as shafts, ventilation shafts, quarries, etc, which are older than sixty years, qualify as mining heritage resources.

5.4 Farm Complexes

Farm complexes or farm homesteads consisting of farm homes with outbuildings and other infrastructure mainly occur on the western edge and outside the Tweefontein Project Area. Most of these farm complexes are relatively young although the odd, single historical structure may be found in some of these farm complexes. No family or historical graveyards are associated with these farm homesteads.

5.5 Graves and graveyards

At least thirteen grave sites consisting of single (individual) graves or grave sites with three of more graves were discovered in the Tweefontein Project area. The symbol 'GY' was designated for these structures whether they contain a single or more than one grave. The graves and graveyards include formal and informal graveyards (see Terminology, Box 2). Some of the graveyards date from the more recent past although it seems as if the majority are older than sixty years and therefore qualify as historical cemeteries

It is most likely that this survey did not found all possible graves and graveyards in the Tweefontein Project Area considering the size of this area. Single graves in particular could easily be missed while smaller graveyards may occur in some of the maize fields. It can also be expected that graves have been ploughed under, whether deliberate or by accident, as many of the graves in the project area bear no conspicuous markings such as tombstones or other decorations.

The graves and graveyards have been tabulated and their coordinates determined with a GPS instrument (Table 1; Figure 1). They are now briefly discussed and illustrated with photographs.

5.5.1 Graveyard 01 (GY01)

This is a very large graveyard with several hundreds of graves. The majority of the graves are covered with piles of stone, brick or rubble. Many graves, however, are fitted with granite tomb stones, slabs and granite edgings. A large number of graves are also fitted with cement tomb stones.

GY01 is located on Tweefontein 13IS and is situated between agricultural fields to the north and a large dam (which is currently dry) to the south.

Many of the graves in this cemetery are older than sixty years. Consequently, this graveyard can be classified as historical.

The graveyard is severely neglected. It was once fenced-in and fitted with an entrance gate.

Inscriptions on some of the tombstones read as follow:

- 'In loving memory of our beloved mother Martha F *1912-09-15, †1982-12-16, Ever remembered by her children and grandchildren and great grandchildren, RIP Jacobs'
- 'Mnisi In loving memory of our dear father Siliso Elias * 1945 † 1982-05-02 Lala Ngoxolo from your children'
- Daddy Moses Wilkinson *12-5-1947, †26-9-1980, My beloved husband I will always love and remember you from your wife, son, daughter and grandchildren, RIP'
- 'Rest in peace, Philip Xhaka, * ? †12-2-1978, ???? aunty, wife and kids'
- 'In memory of Andrew Sebuti Sefako, Born on 25-08-1930, Died on 15-06-1968, Remembered by his family, may his soul rest in peace, RIP'

Figure 6- GY01 is a cemetery with several hundred graves. Many of the graves are older than sixty years giving this graveyard a historical identity (above).

5.5.2 Graveyard 02

This graveyard is located next to a prominent haul road a few hundred meters to the north of the Duiker Open Cast Mine.

GY02 is composed of two sections with graves. One section used to be located in a fenced-in area where a large sisal plant is growing. This section contains the graves of the Wazalwa clan. These second section of this graveyard adjoins the first section but is not as neatly maintained as the first section. Together the two sections contain as many as 20 graves. The majority of graves are fitted with cement tomb stones and are edged with cement strips. Only one of the graves in the second section has a decipherable inscription on its tombstone.

Some of the graves are older than sixty years. The graveyard can therefore be classified as historical.

Inscriptions on a number of the tombstone read as follow:

- 'In loving memory of our father Petrus, Born 1809, Died 17-6-1943, RIP'
- 'Maria Magdalinah Mokoena Borne 26 December 1926'
- Mrs Betty Malaza, Wazalwa Mhlaka, 27-03-1920'
- Mr Thomas Malaza, 07-02-1950
- Joseph Simelane, Wazalwa Ngezi, 18-08-1974, Walala Ngezi, 03-05-1976'
- Mr Moses Malaza, Wazalwa, Mhlaka, 13-07-1928, Lala Ngoxolo'
- 'VGE 7-12-73, Washowa, Zikhali, Wazalwa Mhlaka'
- 'Elliot Sibande'

Figure 7- GY02 amongst others contains the graves of members of the Wazalwa clan (above).

5.5.3 Graveyard 03

This graveyard is located next to a dirt road within the boundaries of the Boschmans Colliery. The graveyard is mainly composed of graves with cement head stone. The majority of graves are edged with cement strips. The graveyard contains more than twenty graves.

Figure 8- GY03 next to a dirt road in the Boschman's Colliery (above)

5.5.4 Graveyard 04

This graveyard is located near a stand of Blue Gum trees. According to spokesperson Sameul Makhatswa a large community of farm workers used to live near the Blue Gum trees in the past. Their residences have long been destroyed and the graveyard is the only remaining evidence of the once existing village. More than twenty graves occur in this graveyard.

The graveyard consists of three sections, namely a section that is fenced-in with three graves which are fitted with granite slabs and tombstones. The inscriptions on the tombstones read as follow:

- 'Jem Mokwena, *07-02-1903, †27-06-1960, Robala ka khotso'
- 'Captain Boy Mokwena, *17-04-1920, †31-12-1976, Remembered by wife and children'

- ‘Mokwena Bobby David, * 25-12-1950, †05-09-1999, From your wife and children’

The second (middle) section of the graveyard is composed of a number of graves which are covered with piles of stone.

The third section of the graveyard is also composed of a number of graves of which the majority are fitted with cement headstones. Most of these graves are edged with bricks. At least one of the graves is fitted with a cement head stone with the following inscription:

- ‘Hannes Mabizela Wavela Go, 1918, ?ambuba Mhla 19-01-1955, Wabe Kwamhla, 01-02-1955’

5.5.5 Graveyard 05

This graveyard merely contains four graves which are all located in the midst of a Blue Gum plantation near the middle of a maize field. All four graves are covered with piles of ferricrete stone while two are fitted with cement tomb stones. These tomb stones do not have any inscriptions.

5.5.6 Grave 06

This solitary grave is located between two agricultural fields, is covered with an iron framework and is fenced-in. The grave is fitted with a cement head stone with no inscription.

5.5.7 Graveyard 07

This historical graveyard contains six graves and is demarcated with a ferricrete wall. The graveyard was used by the De Jager and Groenewald families. This graveyard is historical as most of the graves are older than sixty years.

Inscriptions on six of the seven graves read as follow:

- ‘Hier Rus (HR), O? C De Jager, Geb Mei 13-1886, Overl Mei 23-1918, Ik ben ?ren opstanding’.
- ‘Hier rust Coenraad JC De Jager, Geb 28 Julie 1914, Overl 31 Jan 1917, Veilig in Jesus armen’
- ‘Ter nagedagtenis aan ons liefling seuntntjie Gerhard De Jager, Geb 19-9-1942, Oorl 7-4-1944’
- HR Ons geliefde moeder, Catherina Getruda Groenewald, Geb Lombaard, 4 Aug 1871, Oorl 26 April 1950, Joe, Chris en Katie’
- ‘??? Groenewald, Geb 27 Junie 1900, Overleden Maart 1922’
- ‘Hier rus CJ Groenewald, Geboren 1865 die 28 April, Overlede die 16 Dec 1941, Rus in vrede, Gez 12 vers 1’

Figure 9- GY07 is a historical graveyard as most of the graves in this cemetery are older than sixty years. The graveyard was used by the Groenewald and De Jager families (above).

5.5.8 Graveyard 08

Graveyard 08 is located in the Waterpan North Colliery, next to one of Eskom's 400kv power lines. This graveyard is home to fifteen to twenty graves, the majority of which are fitted with cement head stones. Several of the graves are covered with piles of stone. Most of the inscriptions on the head stones are undecipherable.

At least one of the graves is fitted with a granite headstone with the following inscription:

- 'Ramasilo, *05-08-1904, *25-04-1972, Buried on 30-04-1972'

Figure 10- GY08 is located next to one of Eskom's power lines in the Waterpan North Colliery (above).

5.5.9 Graveyard 09

This graveyard is characterised by at least three graves near two large Blue Gum trees on Tweefontein 3TS. The graves are located in the veldt between a maize field and a railway line. All three graves are fitted with cement head stones with no inscriptions. The graves used to be fenced-in.

Figure 11- Graveyard 09 is located next to two large Blue Gum trees (above).

5.5.10 Graveyard 10

GY10 occurs under Eskom's 400kV power line that crosses the farm Tweefontein 13IS from the north-east to the south-west. It is situated near one of the pylons that carry the power line. The graveyard holds eight graves, three belonging to the Mabona family and one to the Mahlangu family.

The graveyard is currently overgrown with vegetation but is still visited and maintained by family members of the deceased.

Two of the graves are covered with granite slabs and have granite headstone; four of the graves are demarcated with ferricrete stones and two have cement edgings. One of the graves with cement edgings also has a cement head stone.

Inscriptions on some of the head stones read as follow:

- 'In loving memory to Ellen Maliwa, Born 1897, Died 16 April 1942, Rest in peace MABONA'
- 'Hleziphi Mabona, Born 1871, Died ?',
- 'Annie Nomoya, Born 1910, Died 1942, May your soul RIP, GRANNY Mahlangu'
- 'Elem Mabona, Died April 1942'

Figure 12- GY10 under Eskom's 400kV power line on the farm Tweefontein 13IS after it was cleared from vegetation (above).

5.5.11 Graveyard 11

Graveyard 11 is located where the N4 Highway crosses the road running between Ogies and Witbank. This graveyard is composed of two sections, one which used to be fenced-in and a second section which is located outside the fenced-in area. At least seven to eight graves occur in the fenced-in area and perhaps as many as ten outside. A limited number of graves are fitted with headstones with no inscriptions. The majority are covered with piles of stones or bricks.

Figure 13- Graveyard 11 near the crossing between Ogies and Witbank and the N4 (above).

5.5.12 Graveyard 12

This graveyard is supposed to be located next (north) of the N4, near a dam and close to the N4. However, this graveyard with its four graves could not be found. It is possible that the graveyard may have been ploughed under as a maize field that used to exist some distance to the north of the N4 now extends on to the shoulder of the national road.

5.5.13 Graveyard 13 (GY13)

Graveyard 13 is located near the Tweefontein dam but could not be reached at the time of the survey as the access roads leading to the graveyard were flooded as a result of heavy rains.

GRAVES AND GRAVEYARDS	LOCATION AND BRIEF DESCRIPTION OF GRAVES AND GRAVEYARDS
Graveyard 01 **26º 01' 718' 29º 09' 813'**	Large graveyard with several hundreds of graves. Historical
Graveyard 02 **26º 04' 446' 29º 09' 424'**	Graveyard next to haul road in close proximity of Duiker Open Cast Mine. Contains more than 20 graves. Historical
Graveyard 03 **26º 03' 101' 29º 08' 154'**	Located next to a dirt road in the Boschman's Colliery mining area. More than 20 graves. Historical.
Graveyard 04 **26º 03' 854 29º 10 865**	Graveyard located near a stand of Blue Gum trees where a large community of farm workers used to stay. More than 20 graves. Historical.
Graveyard 05 **26º 03' 411 29º 07' 030**	Four graves in a Blue Gum plantation. Two graves covered with ferricrete while two are fitted with cement head stones. Probably historical.
Grave 06 **26º 03 463 29º 07 360**	Single grave in a maize field.
Graveyard 07 **26º 02' 974 29º 07' 884**	A historical cemetery in the Boschmans Colliery. The De Jager and Groenewald families used this graveyard during the first half of the 20th century. Historical.
Graveyard 08 **26º 00' 903 29º 08' 482**	This graveyard is located in the Waterpan North Colliery, next to a 400kV power line.
Graveyard 09 **26º 01' 577 29º 07' 222**	Three graves next to two Blue Gum trees in the Boschmans North Colliery.
Graveyard 10 **26º 01' 520 29º 07' 551**	Graveyard 10 is located under a 400kV power line next to a railway line in the Boschmans North Colliery.
Graveyard 11 **26º 00' 154 29º 07' 155**	GY11 is located near the crossing between the N4 and the road running between Witbank and Ogies. More than 20 graves. Probably historical.
Graveyard 12	Could not be located on the northern shoulder of the N4. May have been ploughed under. The area is currently covered with a maize field.
Graveyard 13	Could not be reached at the time of the survey as access roads to the graveyard were flooded due to high rainfall.

Table 1- Brief description of graves and graveyards in the Tweefontein Project Area (above)

5.6 Significance of the heritage resources

The HIA study revealed a narrow range of heritage resources as well as other infrastructure in the Tweefontein Project Area. The following heritage resources have significance, namely;

- Villages or residential areas which are sixty years or older or which approach sixty years in age are protected by Section 34 of the National Heritage Resources Act (No 25 of 1999).
- Scattered historical structures which may exist across the project area which are older than sixty years or which approach sixty years in age are also protected by Section 34 of the National Heritage Resources Act (No 25 of 1999). These structures are not in an abundance but may be inconspicuous as they are part of complexes of structures or may occur somewhere in isolation
- Graves and graveyards are protected by various laws, particularly if graveyards have to be exhumed and relocated.

5.7 Mitigating the heritage resources

Neither the historical remains nor the graveyards in the Tweefontein Project Area may be affected (damaged, altered or destroyed) by any development project before these remains have been subjected to mitigation measures.

5.7.1 Mitigating the historical remains

Any buildings or structures which are older than sixty years or which approach this age are considered to be historical significant and may not be affected (damaged, altered or demolished) by any development project. The destruction or alteration (restoration) of historical structures can only occur after a historical architect in good standing with the South African Heritage Resources Agency (SAHRA) has obtained the necessary permit from a Provincial Heritage Resources Agency (PHRA).

Any possible historical houses (structures) in the Tweefontein Project Area can therefore not be demolished *prior* to these structures being identified as historical significant and investigated by a historical architect. This specialist must acquire a permit from the Provincial Heritage Resources Authority (PHRA) which would allow for the destruction of such buildings. It is possible that the historical architect may recommend that historical structures be incorporated in the new development. However, alterations to historical buildings also require the PHRA's permission before these structures may be altered (renovated) or demolished.

5.7.2 Mitigating the graveyards

The graveyards in the Tweefontein Project Area can be considered to be of outstanding significance. Legislation with regard to graveyards includes the National Heritage Resources Act, 1999 (No 25 of 1999), the Ordinance on Exhumations, 1980 (No 12 of 1980) and the Human Tissues Act, 1983 (No 65 of 1983 as amended).

Graveyard could either be preserved *in situ,* or relocated. A mini-management plan has to be complied for the graveyards in the Tweefontein Project Area if they are not relocated in the near future.

Relocations of graveyards are done by forensic archaeologists or by reputed undertakers who has to acquire all the necessary permits from SAHRA. This process should be undertaken in compliance with heritage legislation, which means that an accredited specialist must obtain a permit and the 60 day public participation process will have to take place. Standard procedures include that the laws, provincial regulations and administrative procedures that regulate this activity should be adhered to. Permission must be obtained from the descendants (if known), the National Department of Health, the Provincial Department of Health, the Premier of the Province and the local police.

The exhumation of human remains and the relocation of graveyards are done by forensic archaeologists or reputed undertakers who are acquainted with the relevant

legislation and procedures that have to be followed whenever human remains are exhumed and relocated.

6 CONCLUSION

The base line HIA study for the Tweefontein Project Area revealed the following types and ranges of heritage resources and other infrastructure in the project area. Only the heritage resources have any significance, namely:

- Villages or residential areas which are sixty years or older or which are approaching sixty years in age are protected by Section 34 of the National Heritage Resources Act (No 25 of 1999).
- Scattered historical structures across the project area which are older than sixty years or which are approaching this age are also protected by Section 34 of the National Heritage Resources Act (No 25 of 1999). These structures are not abundant but may be inconspicuous as they are part of complexes of structures or may occur somewhere in isolation in the project area.
- Graves and graveyards are protected by various laws, particularly if graveyards have to be exhumed and relocated.

The coordinates for the categories of 'Villages', 'Scattered historical structures' and "Historical Settings' were not determined as these phenomena are clearly visible on the 1: 50 000 topographical maps of the project area. The geographical locations of graves and graveyards were determined with a GPS instrument (Table 1). These features were also mapped (Figure 1).

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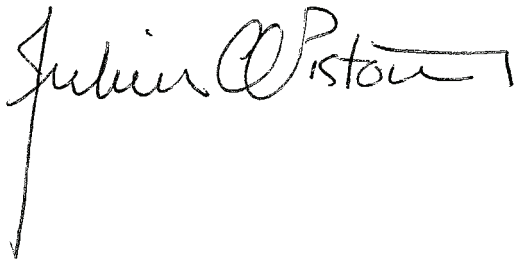

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9 SPOKESPERSONS CONSULTED

Albert Sebuti, Worker at Boschmans Colliery.

Sameul Makhatswa, Farm worker on Zaaiplaats.

Abraham Mdluli, Environmental student at Tweefontein Mine.