

***TSIMBA ARCHAEOLOGICAL
FOOTPRINTS (PTY) LTD***



***CULTURAL DIVERSITY, SUSTAINABILITY &
COMMUNITY ENGAGEMENT***



PHASE 1 HERITAGE IMPACT ASSESSMENT FOR THE PROPOSED MAINTENANCE, AS WELL AS DESILTING ACTIVITIES, UPSTREAM AND DOWNSTREAM OF THE VULINDLELA BRIDGE, WHICH IS SITUATED AT PHOLA TOWNSHIP, OGIES, WITHIN THE EMALAHLENI LOCAL MUNICIPALITY, MPUMALANGA.

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PREPARED FOR MDT ENVIRONMENTAL (PTY) LTD

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Tsimba Archaeological Footprints (Pty) Ltd is an independent service provider and apart from their fair remuneration for services rendered have no financial interest in the proposed development. We have disclosed any material information that have or may have the potential to influence the objectivity of any report or decisions base thereon; and are very much aware that a false declaration is misleading and constitutes an offense in terms of regulation 71 of GN No. R. 543.

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TABLE OF CONTENTS

AUTHOR'S CREDENTIALS	2
DECLARATION OF INDEPENDENCE	2
COPYRIGHT	3
CLIENT CONTACT DETAILS	3
TABLE OF CONTENTS	4
FIGURES & TABLES	5
ABBREVIATIONS.....	6
EXECUTIVE SUMMARY	6
Conclusions:	8
Recommendations:	8
INTRODUCTION	9
Project description	9
Aims of this Heritage Impact Assessment.....	11
Scope of works	11
DESCRIPTION OF THE RECEIVING ENVIRONMENT	12
Location.....	12
TERMS AND REFERENCE FOR APPOINTMENT OF AN ARCHAEOLOGICAL/HERITAGE SPECIALIST	13
METHODOLOGY.....	14
ARCHAEOLOGICAL AND HISTORICAL BACKGROUND	16
Brief history of Ogies - Mpumalanga.....	18
DESCRIPTION AND DOCUMENTATION OF THE CULTURAL HERITAGE RESOURCES	19
ASSESSMENT OF SIGNIFICANCE	24
Socio-economic impact assessment	28
REFERENCES	30
APPENDIX A	32
APPENDIX B	35
APPENDIX C	36

FIGURES & TABLES

Figure 1 Map showing the location of the proposed project area.....	12
Figure 2: A closer view of the bridges location	13
Figure 3 crossing: View of the first current bridge	20
Figure 4: The predominant vegetation in the area	21
Figure 5: Some of the electricity power lines within the proposed development servitude.....	21
Figure 6: Open trenches surveyed for archaeological artifacts.....	22
Figure 7: View of the area currently being used a grazing lands	22
Figure 8: Assessment of Social Impacts during construction phase	28
Figure 9: Assessment of Social Impacts during operational phase	28
Table 1: Applicable legislations guiding this study	10
Table 2: Site Significance classification	24
Table 3: The significance weightings for each potential impact	25
Table 4: Impact of Significance.....	26
Table 5: Guide for assessing the magnitude of impact on built heritage or cultural heritage landscape attributes (modified from ICOMOS 2011)	27
Table 6: Impact Assessment table	27

ABBREVIATIONS

ACRONYMS	DESCRIPTION
AIA	Archaeological Impact Assessment
ASAPA	Association of South African Professional Archaeologists
CRM	Cultural Resource Management
DEA	Department of Environmental Affairs
EIA Practitioner	Environmental Impact Assessment Practitioner
EIA	Environmental Impact Assessment
ESA	Early Stone Age
GIS	Geographic Information System
GPS	Global Positioning System
HIA	Heritage Impact Assessment
LSA	Late Stone Age
LIA	Late Iron Age
MIA	Middle Iron Age
MSA	Middle Stone Age
SAHRA	South African Heritage Resources Agency
PHRA-M	Provincial Heritage Resources Agency-Mpumalanga

EXECUTIVE SUMMARY

This Archaeological and Heritage Impact Assessment (AIA/HIA) Report has been prepared to address requirements of Section 38 of the National Heritage Resources Act, Act 25 of 1999 (NHRA) A desktop paleontological study was undertaken by Dr Fourie for this project and has been attached below as *appendix C*. Emalahleni Local Municipality (the proponent), proposes to is planning to conduct maintenance, as well as desilting activities, upstream and downstream of the Vulindlela Bridges, which are situated at Phola Township, Ogies, within the Emalahleni Local Municipality, Mpumalanga. MDT Environmental (Pty) Ltd is preparing the Environmental Impact Assessment terms of the National Environmental Management Act, 1998 (Act No. 107 of 1998) (NEMA).

This report constitutes a summary of the Cultural Heritage Impact Assessment study completed for the above mentioned project. There are two separate, but interlinked, objectives of the Heritage Impact Assessment Study. Firstly, it is to provide a baseline understanding of the known and potential Mpumalanga historical cultural heritage landscape of the project development area. Secondly, it is to design and set in place a strategy and management regime for cultural heritage that is consistent with the provisions of relevant in terms of the requirements of the National Heritage Resources Act, 1999 (Act No. 25 of 1999) (NHRA).The terminology used and the methodology followed with regards to the compilation of the HIA are explained and the legal framework stated (*see Appendix A*).

An archival and historical desktop study was undertaken which was used to compile a historical layering of the study area within its regional context. The review of a range of cultural heritage information was undertaken. This included National heritage databases, lists and registers, as well as a range of other documented information (including heritage impact assessment reports and a range of ethno-historic and archaeological sources at both local and regional levels). These components indicated that the landscape within which the project area is associated with has no known heritage resources. The field survey also did not yield anything of cultural heritage significance.

This HIA is a systematic process of identifying the probable results of a proposed policy or action on the cultural heritage of a place and its communities. It is a decision support tool which provides input at the planning, works and operational stages to minimize or eliminate

adverse effects through mitigation and to enhance positive impacts. In places where heritage is included in the EIA system as a component on a legal par with other environmental variables, practice has clearly shown the power of rigorous HIA as a tool to manage change and mitigate risk in order to preserve significance – the basic task of heritage management. As such, this HIA is the most important tool for managing change in Cultural Heritage Resources. Tsimba Archaeological Footprints fully appreciates that the developer retain a strong interest in ensuring that the cultural heritage areas, objects and values identified throughout the project development area are managed in an appropriate fashion and with their direct input.

Recognising the constraints and limitations of the information reviewed and compiled regarding pumalanga cultural heritage of the project development area to which it has had access in the preparation of the HIA. Tsimba will formally commission and provide resources to each of the identified heritage places that they consider might be affected by proposed development activities within the project development area. The terms of reference for these constraints statements will be intentionally broad so as to allow the local community to take the greatest opportunity to describe any areas, objects and values about which they have concerns, especially graves within the older homesteads of the proposed development area

Conclusions:

From a heritage and paleontological perspective, the proposed project is acceptable. The entire stream and its corridors were assessed and no heritage materials were found. Due to the lack of significant heritage resources in the study area the impact of the proposed project on heritage resources is considered low and it is recommended that the proposed project can commence on the condition that the following chance find procedure are implemented as part of the EMPr and based on approval from SAHRA.

Recommendations:

Archaeological and Heritage

- a) Although unlikely, sub-surface remains of heritage sites could still be encountered during the construction activities associated with the project. Such sites would offer

no surface indication of their presence due to heavy plant cover in other areas. The following indicators of unmarked sub-surface sites could be encountered;

- i. Bone concentrations, either animal or human
- ii. Ceramic fragments such as pottery shards either historic or pre-contact
- iii. Stone concentrations of any formal nature

The following recommendations are given should any sub-surface remains of heritage sites be identified as indicated above;

- i. All operators of excavation equipment should be made aware of the possibility of the occurrence of sub-surface heritage features and the following procedures should they be encountered.
 - ii. All construction in the immediate vicinity (50m radius of the site should cease).
 - iii. The heritage practitioner should be informed as soon as possible.
- b) Archaeological watching briefs at regular intervals should also be carried out to insure that no possible archaeological resources are lost during the construction phase.

Paleontological

- a. The following should be conserved: if any palaeontological material is exposed during digging, excavating, drilling or blasting, SAHRA must be notified. All development activities must be stopped and a palaeontologist should be called in to determine proper mitigation measures, especially for shallow caves.
- b. Condition in which development may proceed: It is further suggested that a Section 37(2) agreement of the Occupational, Health and Safety Act 85 of 1993 is signed with the relevant contractors to protect the environment (fossils) and adjacent areas as well as for safety and security reasons.

INTRODUCTION

Project description

This report comprises an impact study on potential archaeological and cultural heritage resources that may be associated with the proposed maintenance, as well as desilting activities, upstream and downstream of the Vulindlela Bridges, which are situated at Phola Township, Ogies, within the Emalahleni Local Municipality, Mpumalanga. This proposed project is guided by the South African legislations given in the table below;

APPLICABLE LEGISLATION AND GUIDELINES USED TO COMPILE THE REPORT	REFERENCE APPLIED
The Constitution of the Republic of South Africa (Act No. 108 of 1996)	
The National Environmental Management Act (Act No. 107 of 1998)	Section 24 Section 28
The National Water Act (Act No. 36 of 1998)	Section 21 (a)(b)
Air Quality Act (Act No. 39 of 2004)	
National Forests Act, Act of 84 of 1998	
The National Heritage Resources Act (Act No. 25 of 1999)	Section 38, 34, 35, 36
Mpumalanga Department of Agriculture, Rural Development, Land and Environment Affairs (DARDLEA).	
Conservation of Agricultural Resources Act (Act No. 85 of 1983)	
Mineral and Petroleum Resources Development Act (Act No. 28 of 2002)	
The National Water Act (Act No. 36 of 1998)	
Mine Health and Safety Act (Act No. 29 of 1996) (MHSA)	
Biodiversity Act (Act 10 of 2004)	
National Infrastructure Plan	

Table 1: Applicable legislations guiding this study

Tsimba Archaeological Footprints (Pty) Ltd was appointed by MDT Environmental (Pty) Ltd to undertake a Heritage Impact Assessment (HIA) which forms part of the Environmental Impact Assessment (EIA) for the proposed development of the maintenance, as well as desilting activities, upstream and downstream of the Vulindlela Bridges, which are situated at Phola Township, Ogies, within the Emalahleni Local Municipality.

The Heritage Impact Assessment was conducted as part of the National Environmental Management Act, 1998 (Act No. 107 of 1998) (NEMA) requirements and it also follows the requirements of the National Heritage Resources Act, 1999 (Act No. 25 of 1999) (NHRA). The terminology used and the methodology followed with regards to the compilation of the HIA

are explained and the legal framework stated (*see Appendix A*). International conventions regarding the protection of cultural resources have also been followed. The ICOMOS Burra Charter (1979) was also consulted in producing this report as part of the international conventions for the protection of cultural heritage places.

Aims of this Heritage Impact Assessment

This aims to identify cultural heritage, assess potential impacts and mitigate them with a view to preserve and safeguard heritage resources. It is a measured, thorough presentation of facts and arguments and a realistic set of proposals for remedial and ameliorative action. The HIA process makes it the professional task of the HIA practitioner to find an acceptable approach which will preserve heritage values, satisfy as many stakeholders as possible, and be financially viable and practicable in conservation terms.

The assessment of impacts on heritage is needed today as cultural resources are being not only lost to development, but also exploited at an unsustainable rate. Heritage managers are faced with two principal challenges: ensuring the continuity and continued relevance of culture in the community and protecting both the fabric and significance of heritage assets from exploitation, misuse and degradation as a result of change.

This HIA provides the methodology to;

- a) Safeguard the integrity of heritage resources in the face of these threats from development, or other scenarios of external change;
- b) Negotiate a sustainable balance between the forces of change, progress and conservation in ways that maintain the authenticity of the threatened heritage, preserving its significance, meaning, and function in the life of the community;
- c) Mitigate the adverse impacts of development and change, enhancing and adding value to the heritage as a result.

Scope of works

The project activities that will be undertaken to realise the above objectives are outlined below as follows.

- i. Identification and implementation of emergency measures, which will handle any debris accumulation during the construction phase.

- ii. Community engagement through Environmental awareness programs.
- iii. Dredging and clearing of both Bridges approach areas using frontend loaders and tipper trucks.
- iv. Erosion bags installations at defined points along the stream, (highlighted on layout drawing).
- v. Rubble placement and compaction for construction vehicles movement.

DESCRIPTION OF THE RECEIVING ENVIRONMENT

Location

The proposed project will take place at Phola Township, Ogies, within the Emalahleni Local Municipality, Mpumalanga. The two bridge crossings are located at 26°0'18.03"S, 29°2'18.13"E and S25°59'55.17"S, 29°1'56.67"E in the Phola Township. The site falls within three wards, namely: Ward 28, 30 and 31.

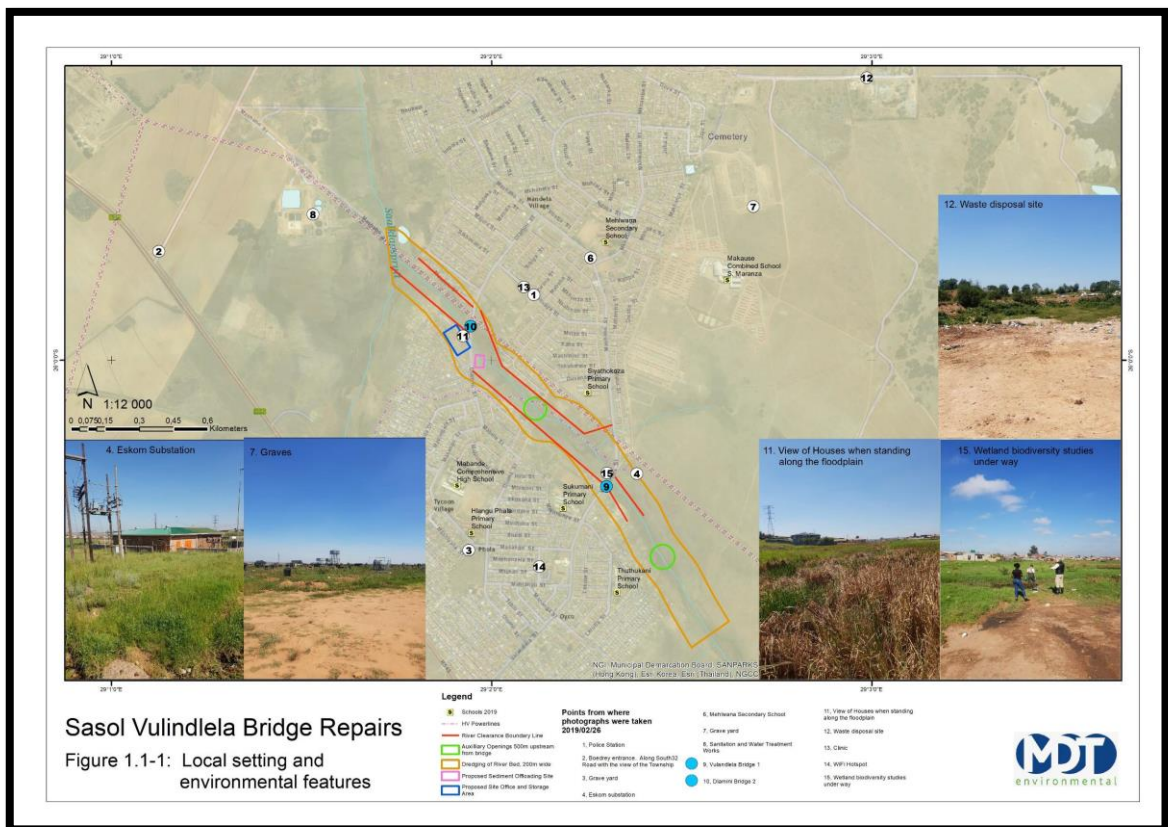


Figure 1 Map showing the location of the proposed project area



Figure 2: A closer view of the bridges location

TERMS AND REFERENCE FOR APPOINTMENT OF AN ARCHAEOLOGICAL/HERITAGE SPECIALIST

Tsimba Archaeological Footprints (Pty) Ltd has been appointed by MDT Environmental (Pty) Ltd to conduct the HIA for the proposed development. According to ICOMOS (2011), the impacts of planned developments (internationally) on heritage have typically been assessed within the framework of Environmental Impact Assessment (EIA) (see Bond et al. 2004) and/or Social Impact Assessment (see Vanclay et al. 2015). MDT Environmental (Pty) Ltd is preparing the Environmental Impact Assessment terms of the National Environmental Management Act, 1998 (Act No. 107 of 1998) (NEMA) This report constitutes a summary of the Cultural Heritage Impact Assessment Study completed for the above mentioned project. The proposed development requires a full HIA, in terms of Section 38 (1) of the NHRA, No. 25 of 1999.

Section 38(1) of the South African Heritage Resources Act (25 of 1999) requires that a heritage study be undertaken for:

- (a) Construction of a road, wall, power line, pipeline, canal or other similar form of linear development or barrier exceeding 300 m in length;
- (b) Construction of a bridge or similar structure exceeding 50 m in length; and

(c) Any development, or other activity which will change the character of an area of land, or water –

(1) Exceeding 10 000 m2 in extent;

(2) Involving three or more existing erven or subdivisions thereof; or

(3) Involving three or more erven, or subdivisions thereof, which have been consolidated within the past five years; or

(d) The costs of which will exceed a sum set in terms of regulations; or

(e) Any other category of development provided for in regulations.

The HIA should be submitted, as part of the impact assessment report or EMPr, to PHRA-M. The heritage body will finally be responsible for the professional evaluation of Phase 1 HIH reports upon which review comments will be issued. 'Best practice' requires Phase 1 HIH reports and additional development information, as per the impact assessment report and/or EMPr, to be submitted in duplicate to PHRA-M after completion of the study. PHRA-M Heritage accepts Phase 1 HIH reports authored by professional archaeologists, accredited with ASAPA or with a proven ability to do archaeological work.

METHODOLOGY

The methodology used in this HIA is based on a comprehensive understanding of the current or baseline situation; the type, distribution and significance of heritage resources as revealed through desk-based study and additional data acquisition, such as archaeological investigations, built heritage surveys, local interviews and recording of crafts, skills and intangible heritage. This is systematically integrated by the use of matrices with information on the nature and extent of the proposed engineering and other works to identify potential sources of impacts on heritage. Mapping of location and distribution of heritage in relation to proposed works or changes is a critical component of this baseline along with the assessment of the condition of resources. The following tasks were also undertaken in relation to the cultural heritage and are described in this report:

1. Review relevant South African legislations, policy and guidelines regarding South Africa cultural heritage and assess its implications to the proposed project.

2. Review existing information (such as previous reports, literature and databases) to identify known areas of archaeological and/or cultural importance in the project development area.
3. Assess the results of previous cultural heritage studies conducted within or in reasonable proximity to the project development area.
4. Settle a process for consulting with local communities and to further identify areas of cultural significance; and management measures that are appropriate in the project development area.
5. Identify, assess and map currently known areas of archaeological and/or cultural significance in the project development area.
6. Highlight issues to be addressed in the Heritage Impact assessment report
7. Prepare a Heritage Impact Assessment Study report documenting the work, including background information, methodology, data sources, assessment results, assumptions, potential impacts and issues, proposed impact mitigations, permitting requirements, conclusions and recommendations.

In respect of historical cultural heritage in the, following requirements were set:

1. At a minimum, a desktop study was undertaken documenting the known and potential historical cultural heritage values.
2. This study done by reference to the National Register and the results of previous heritage studies. There was consultation with local property owners
3. Any archaeological investigation recorded and assessed all types of historical places.
4. A Heritage Impact Assessment was developed for the project. It was to provide a process for the mitigation, management and protection of any places discovered during excavation, construction operations, rehabilitation and decommissioning phases of the project. It was to provide a process for reporting as per section 38 of the NHRA Act of 1999. It was designed to provide procedures for collection of artefacts discovered during the above. It was also designed to provide for a process of archaeological and heritage awareness training for project personnel provided during site induction.

ARCHAEOLOGICAL AND HISTORICAL BACKGROUND

DATE	DESCRIPTION
2.5 million to 250,000 years ago	The Early Stone Age of South Africa is associated with the Homo erectus hominid. These hominids used a selection of stone tools such as hand axes, which were used for the butchering of animals, scraping their hides and digging for plant foods (Mc Dougalletal 2005). The earliest of these technological phases is known as Oldowan, which is associated with crude flakes and hammer stones and dates to approximately 2 million years ago. These tools are characterised by their large sizes and being created from a single core.
250,000 to 40,000 years ago	The Middle Stone Age, is represented by numerous sites in South Africa. Open camps and rock overhangs were used for shelter. Middle Stone Age bands hunted medium-sized and large prey, including antelope and zebra, although they tended to avoid the largest and most dangerous animals, such as the elephant and the rhinoceros. They also ate seabirds and marine mammals that could be found along the shore and sometimes collected tortoises and ostrich eggs in large quantities
40,000 years ago to the historic past	Basic tool making techniques began to undergo additional change about 40 000 years ago. Small finely worked stone

	<p>implements known as microliths became more common, while the heavier scrapers and points of the Middle Stone Age appeared less frequently. Archaeologists refer to this technological stage as the Late Stone Age. The numerous collections of stone tools from South African archaeological sites show a great degree of variation through time and across the subcontinent. The remains of plant foods have been well preserved at such sites as Melkhoutboom Cave, De Hangen, and Diepkloof in the Cape region. Animals were trapped and hunted with spears and arrows on which were mounted well-crafted stone blades. Bands moved with the seasons as they followed game into higher lands in the spring and early summer months, when plant foods could also be found.</p>
<p>25 000 years ago</p>	<p>Although scholars originally saw the South African rock art as the work of exotic foreigners such as Minoans or Phoenicians or as the product of primitive minds, they now believe that the paintings were closely associated with the work of medicine men, shamans who were involved in the well-being of the band and often worked in a state of trance. Specific representations include depictions of trance dances, metaphors for trance such as death and flight, rainmaking, and control of the</p>

	movement of antelope herds.
1 700 years ago	Early Iron Age People settled along the inland foot of the sand dunes on sandy but humus rich soils would have ensured good crops for the first year or two after they had been cleared (see Maggs 1989). These early agro-pastoralists produced a characteristic pottery style known as Matola. The Matola people also exploited the wild plant and animal resources of the forest and adjacent sea-shore. The communities seem to be small groups of perhaps a few dozen slash-and burn cultivators, moving into a landscape sparsely inhabited by LSA San hunter-gatherers.

Brief history of Ogies - Mpumalanga

Throughout the middle of the 1800 Century AD the Transvaal witnessed range of settlement patterns- the occupation and reoccupation of the region by the different culture groups that contributed to the contemporary peopling of the present day Gauteng Province north and south of the Magaliesburg mountain range. These are some of the various factors that contributed to this historical times settlement of the region.

- The first had to do with the politics (e.g. the Great Trek);
- The other was driven by the discovery natural resources such as the discovery of Diamond in the Kimberley in (1867);
- Coal in the eastern towns of the Witwatersrand, and later:
- Gold on farm Langlaagte.

The attraction of people to natural resources available in this province date as far back as the 1st Millennium AD, to MIA and the LIA periods. Therefore, the availability of natural resources played a pivotal role in the choice of settlement of the Transvaal, based not only from a subsistence point of view but also driven by commerce or commercial gains.

1928 on the farm Oogiesfontein, 'fountain with many "eyes" or springs' the little town of Oogies was established. The town developed around train station built there in 1928. The original name of the town was Oogies but that changed to the current version in 1939. The town was to adopt the name from the town. The development of Oogies is largely attributed to the mining of coal around the area.

According to the records, four mines commenced production around the area in 1889. These were Brugspruit Adit, Maggies Mine, Steenkoolspruit, and Douglas Mine (at Balmoral) also close to Witbank. Coal was certainly mined prior to 1889, although not on an established commercial scale. Woolf Harris, originally from Eastern Europe and educated in geology at a Scottish technical college, visited South Africa in 1872. He identified coal in the Vandyksdrift region, and it is thought that he started the Maggies Mine around 1873. Initially, the demand for coal was limited by high transport costs. Wood was plentiful, and it was not until the discovery of gold on the Witwatersrand that coal mining received the necessary impetus for expansion.

DESCRIPTION AND DOCUMENTATION OF THE CULTURAL HERITAGE RESOURCES

The site survey was conducted on the Wednesday 10 October 2019. The site was surveyed by means of walking along the project servitude. All sites, objects and structures that are identified are documented according to the general minimum standards accepted by the archaeological professional body Association of Southern African Professional Archaeologists (ASAPA). Coordinates of individual localities are determined by means of the *Global Positioning System* (GPS) and plotted on a map. This information is added to the description in order to facilitate the identification of each locality.

In 2009 Pistorius carried out a in a Phase I HIA for Eskom's proposed railway line and associated infrastructure between the existing Pretoria Witbank railway and the Kusile Power Station comments on a cultural landscape that is marked by prehistoric and historical heritage. The HIA noted that this area used to be a rural area that was settled first by hunting and gathering groups over a very long period of time and, subsequently, African farmers during the more recent past and, lastly, by white settlers. Nomadic hunting and gathering groups such as the //Xegwi of Lake Chrissie visited diverse biomes on their yearly

rounds, until they were displaced to marginal areas subsequent to the intensive settlement of their ancestral territories by African farmers and later on, white settlers. They were ultimately hunted down or lived as servants and labourers with African farmers and colonists. Some of the survivors were incorporated into farmer groups. The greater Mpuimalanga area consists of sporadic distribution of Stone Age sites. These have been poorly researched and are sometimes archaeological sites are destroyed by coal exploration and early mining practices and other developments.

A few members of the local community approached the archaeological team on the day of the field survey, seeking an explanation on what the project is all about and how it would in-turn benefit them. During the site visit, the archaeological visibility was limited in in and along the stream because of the dense vegetation cover. The vegetation occurs along the stream and its margins (see Figure 4).

Open pit areas and trenches were also surveyed these were mainly man made trenches that were used as borrow pits either for the construction of the current bridges or some other uses by the local community. Archaeological visibility is considered to be very high were open trenches are available (see Figure 6)



Figure 3crossing: View of the first current bridge



Figure 4: The predominant vegetation in the proposed development area

Figure 5: Some of the electricity power lines within the proposed development servitude



Figure 6: Open trenches surveyed for archaeological artifacts



Figure 7: View of the area currently being used as grazing lands

Built Environment

Section 34(1) of National Heritage Resources Act of 1999 protects these structures against any altering.

The study area does not have any structures that are potential heritage/old buildings older than 60 years old.

Archaeological and palaeontological resources

Section 35 (4) No person may, without a permit issued by the responsible heritage resources authority

During the survey, no archaeological and palaeontological sites were recorded.

Cultural Landscapes, Intangible and Living Heritage.

Section 3 (3) of the National Heritage Resources Act, No. 25 of 1999 makes provisions of such places of spiritual significance to individuals

A place or object is to be considered part of the national estate if it has cultural significance or other special value because of—(g) its strong or special association with a particular community or cultural group for social, cultural or spiritual reasons

Long term impact on the cultural landscape is considered to be negligible as the surrounding area consists of a residential area. Visual impacts to scenic routes and sense of place are

also considered to be low due to the previous developments in the area and the lack of significant sites.

Burial Grounds and Graves

36(3) No person may, without a permit issued by SAHRA or a provincial heritage resources authority

No burial grounds and graves were noted within the project site

Public monuments and memorials

37. Public monuments and memorials must, without the need to publish a notice to this effect, be protected in the same manner as places which are entered in a heritage register referred to in section 30.

There are no public monuments and memorials in the study area

Potential Impacts during Pre-Construction phase

It is assumed that the pre-construction phase involves the removal of topsoil and vegetation as well as the establishment of infrastructure needed for the construction phase. These activities can have a negative and irreversible impact on heritage sites. Impacts include destruction or partial destruction of non-renewable heritage resources.

Potential Impacts during Construction Phase

Possible direct impacts may occur during the construction phase if the graves are to be disturbed. The impacts would however be of very low significance due to the fact that the noted graves and burial ground do not fall along proposed development area. During this phase, the impacts and effects are similar in nature but more extensive than the pre-construction phase. These activities can have a negative and irreversible impact on heritage sites. Impacts include destruction or partial destruction of non-renewable heritage resources.

Potential Impacts during Operation Phase

From a heritage perspective, no impact is envisaged during this phase

ASSESSMENT OF SIGNIFICANCE

The “significance” of heritage resources is a fundamental part of this process and will be assessed and factored into the overall assessment of impacts being weighed carefully against predicted impacts and the proposed public benefit that will result from loss or compromise to the heritage. This is where training, experience and professional qualification come into play (*see Author’s Credentials on top*). The importance of authenticity and integrity is based on the significance of heritage values as perceived within the preservation and conservation discourses. Within these two discourses, the intrinsic authenticity and integrity of the heritage object is used as the self-explanatory justification for listing a site as heritage (Tunbridge and Ashworth 1996). Article 26(2) of the Burra Charter emphasises that written statements of cultural significance for heritage resources should be prepared, justified and accompanied by supporting evidence. Site significance classification standards prescribed by SAHRA (2006), and acknowledged by ASAPA for the SADC region, were used for the purposes of this report.

Table 2: Site Significance classification

SAHRA’s Site significance minimum standards			
Filed Rating	Grade	Classification	Recommendation
National Significance (NS)	Grade 1		Conservation; National Site nomination
Provincial Significance (PS)	Grade 2		Conservation; Provincial Site nomination
Local Significance (LS)	Grade 3A	High Significance	Conservation; Mitigation not advised
Local Significance (LS)	Grade 3B	High Significance	Mitigation (Part of site should be

		retained)
Generally Protected A (GP.A)	High/ Medium Significance	Mitigation before destruction
Generally Protected B (GP.B)	Medium Significance	Recording before destruction
Generally Protected C (GP.A)	Low Significance	Destruction

Site Significance calculation formula

Site significance is calculated by combining the following concepts in the given formula.

$$S = (E+D+M) P$$

S = Significance weighting

E = Extent

D = Duration

M = Magnitude

P = Probability

The significance weightings for each potential impact are as follows:

Table 3: The significance weightings for each potential impact

The significance weightings for each potential impact are as follows:		
Aspect	Description	Weight
Probability	Improbable	1
	Probable	2
	Highly Probable	4
	Definite	5
Duration	Short term	1
	Medium term	3
	Long term	4
Scale	Permanent	5
	Local	1
	Site	2

	Regional	3
Magnitude/Severity	Low	2
	Medium	6
	High	8

Table 4: Impact of Significance

Significance		
<p>It provides an indication of the importance of the impact in terms of both tangible and intangible characteristics. (S) is formulated by adding the sum of numbers assigned to Extent (E), Duration (D), and Intensity (I) and multiplying the sum by the Probability.</p> $S = (E+D+M) P$		
<30	Low	Mitigation of impacts is easily achieved where this impact would not have a direct influence on the decision to develop in the area.
30-60	Medium	Mitigation of impact is both feasible and fairly easy. The impact could influence the decision to develop in the area unless it is effectively mitigated.
>60	High	Significant impacts where there is difficult. The impact must have an influence on the decision process to develop in the area.

Table 5: Guide for assessing the magnitude of impact on built heritage or cultural heritage landscape attributes (modified from ICOMOS 2011)

No Change	Negligible change	Minor change	Moderate change	Major change
No change to fabric or setting.	Slight changes to historic building elements or setting that hardly affect it.	Changes to key building elements, such that the asset is slightly different. Change to setting of an historic building, such that it is noticeably changed.	Changes to many key historic building elements, such that the resource is significantly modified. Changes to the setting of an historic building, such that it is significantly modified.	Change to key historic building elements that contribute to Historical significance, such that the resource is totally altered. Comprehensive changes to the setting.

Table 6: Impact Assessment table

Nature: During the construction phase activities resulting in disturbance of surfaces and/or sub-surfaces may destroy, damage, alter, or remove from its original position archaeological material or objects.

	Without Mitigation	With Mitigation
Extent	Local (1)	Local (1)
Duration	Permanent (5)	Permanent (5)
Magnitude	Low (2)	Low(2)
Probability	Not Probable (2)	Not probable (2)
Significance	Low (16)	Low(16)
Status	Negative	Negative
Reversibility	Not irreversible	Not irreversible
Irreversible loss of	No resources were recorded	No resources were

resources	recorded
Can impacts be mitigated?	Yes, a chance find procedure should be implemented.
Mitigation: A chance finds procedure should be implemented.	

Socio-economic impact assessment

Construction phase

The social impacts which are anticipated to occur during the construction phase of the proposed development

Figure 8: Assessment of Social Impacts during construction phase

Socio-economic impacts		Directi on	Exten t	Intensi ty	Duration	Conseque nce Rating	Probability	Significance
Town/General Public	Employment	+	Local 2	Mediu m 3	Mediu m 2	High	Definite	High
	Income	+	Local 2	Mediu m 3	Mediu m 2	High	Highly Probable	High
	Economic growth	+	Local 2	Mediu m 2	Mediu m 2	High	Highly Probable	High
Municipality	Rates	+	Local 2	High 3	Mediu m 2	High	Highly Probable	High
	Stress on water supply	-	Local 2	Mediu m 2	Mediu m 2	High	Definite	High
	Stress on electricity supply	-	Local 2	Mediu m 2	Mediu m 2	High	Definite	High
Urban Environment	Congestion and Traffic	-	Local 2	Low 1	Mediu m 2	Low	Highly Probable	Low
	Aesthetics of Site Location	-	Site 1	Low 1	Mediu m 2	Low	Highly Probable	Low

Operational phase

The social impacts which are anticipated to occur during the operational phase of the proposed development

Figure 9: Assessment of Social Impacts during operational phase

Socio-economic impacts		Directi on	Exten t	Intensi ty	Duration	Conseque nce Rating	Probability	Significance
Town/General public	Employment	+	Local 2	Mediu m 2	Long 3	High	Highly Probable	High
	Income	+	Local 2	High 3	Long 3	High	Highly Probable	High

	Economic growth	+	Local	2	Mediu m	2	Long	3	High	Probable	High	
Municipali ty	Rates	+	Local	2	High	3	Long	3	High	Highly Probable	High	
	Operations	-	Local	2	Mediu m	2	Long	3	High	Probable	High	
	Stress on Water Supply	-	Local	2	High	3	Long	3	High	Definite	High	
	Stress on Electricity Supply	-	Local	2	Mediu m	2	Long	3	High	Definite	High	
Urban Environme nt	Road access	-	Local	2	Low	1	Long	3	6	Medium	Highly Probable	Medi um
	Better road access	+	Local	2	Mediu m	2	Long	3	7	High	Probable	Medi um
	Aesthetics of Site Location	+	Local	2	Low	1	Long	3	6	Medium	Highly Probable	Medi um
Competing developm ents	Loss of income	-	Local	2	Mediu m	2	Mediu m	2	6	Medium	Highly Probable	Medi um

Conclusions:

From a heritage and paleontological perspective, the proposed project is acceptable. The entire stream and its corridors were assessed and no heritage materials were found. Due to the lack of significant heritage resources in the study area the impact of the proposed project on heritage resources is considered low and it is recommended that the proposed project can commence on the condition that the following chance find procedure are implemented as part of the EMPr and based on approval from SAHRA.

Recommendations:

Archaeological and Heritage

- c) Although unlikely, sub-surface remains of heritage sites could still be encountered during the construction activities associated with the project. Such sites would offer no surface indication of their presence due to heavy plant cover in other areas. The following indicators of unmarked sub-surface sites could be encountered;
- iv. Bone concentrations, either animal or human
 - v. Ceramic fragments such as pottery shards either historic or pre-contact
 - vi. Stone concentrations of any formal nature

The following recommendations are given should any sub-surface remains of heritage sites be identified as indicated above;

- iv. All operators of excavation equipment should be made aware of the possibility of the occurrence of sub-surface heritage features and the following procedures should they be encountered.
 - v. All construction in the immediate vicinity (50m radius of the site should cease).
 - vi. The heritage practitioner should be informed as soon as possible.
- d) Archaeological watching briefs at regular intervals should also be carried out to insure that no possible archaeological resources are lost during the construction phase.

Paleontological

- a. The following should be conserved: if any palaeontological material is exposed during digging, excavating, drilling or blasting, SAHRA must be notified. All development activities must be stopped and a palaeontologist should be called in to determine proper mitigation measures, especially for shallow caves.
- b. Condition in which development may proceed: It is further suggested that a Section 37(2) agreement of the Occupational, Health and Safety Act 85 of 1993 is signed with the relevant contractors to protect the environment (fossils) and adjacent areas as well as for safety and security reasons.

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APPENDIX A

Definition of terms adopted in this HIA

The terminology adopted in this document is mainly influenced by the NHRA of South Africa (1999) and the Burra Charter (1979).

Adaptation: Changes made to a place so that it can have different but reconcilable uses.

Artefact: Cultural object (made by humans).

Buffer Zone: Means an area surrounding a cultural heritage which has restrictions placed on its use or where collaborative projects and programs are undertaken to afford additional protection to the site.

Co-management: Managing in such a way as to take into account the needs and desires of stakeholders, neighbours and partners, and incorporating these into decision making through, amongst others, the promulgation of a local board.

Conservation: In relation to heritage resources, includes protection, maintenance, preservation and sustainable use of places or objects so as to safeguard their cultural significance as defined. These processes include, but are not necessarily restricted to preservation, restoration, reconstruction and adaptation.

Contextual Paradigm: A scientific approach which places importance on the total context as catalyst for cultural change and which specifically studies the symbolic role of the individual and immediate historical context.

Cultural Resource: Any place or object of cultural significance

Cultural Significance: Means aesthetic, architectural, historical, scientific, social, spiritual, linguistic or technological value or significance of a place or object for past, present and future generations.

Feature: A coincidental find of movable cultural objects (also see Knudson 1978: 20).

Grading: The South African heritage resource management system is based on a grading system, which provides for assigning the appropriate level of management responsibility to a heritage resource.

Heritage Resources Management: The utilization of management techniques to protect and develop cultural resources so that these become long term cultural heritage which are of value to the general public.

Heritage Resources Management Paradigm: A scientific approach based on the Contextual paradigm, but placing the emphasis on the cultural importance of archaeological (and historical) sites for the community.

Heritage Site Management: The control of the elements that make up the physical and social environment of a site, its physical condition, land use, human visitors, interpretation etc. Management may be aimed at preservation or, if necessary at minimizing damage or destruction or at presentation of the site to the public.

Historic: Means significant in history, belonging to the past; of what is important or famous in the past.

Historical: Means belonging to the past, or relating to the study of history.

Maintenance: Means the continuous protective care of the fabric, contents and setting of a place. It does not involve physical alteration.

Object: Artefact (cultural object)

Paradigm: Theories, laws, models, analogies, metaphors and the epistemological and methodological values used by researchers to solve a scientific problem.

Preservation: Refers to protecting and maintaining the fabric of a place in its existing state and retarding deterioration or change, and may include stabilization where necessary. Preservation is appropriate where the existing state of the fabric itself constitutes evidence of specific cultural significance, or where insufficient evidence is available to allow other conservation processes to be carried out.

Protection: With reference to cultural heritage resources this includes the conservation, maintenance, preservation and sustainable utilization of places or objects in order to maintain the cultural significance thereof.

Place : means a geographically defined area. It may include elements, objects, spaces and views. Place may have tangible and intangible dimensions.

Reconstruction: To bring a place or object as close as possible to a specific known state by using old and new materials.

Rehabilitation: The repairing and/ or changing of a structure without necessarily taking the historical correctness thereof into account (NMC 1983: 1).

Restoration: To bring a place or object back as close as possible to a known state, without using any new materials.

Site: A large place with extensive structures and related cultural objects. It can also be a large assemblage of cultural artefacts, found on a single location.

Sustainable: Means the use of such resource in a way and at a rate that would not lead to its long-term decline, would not decrease its historical integrity or cultural significance and would ensure its continued use to meet the needs and aspirations of present and future generations of people.

APPENDIX B

Definitions of Values

Value	Definition
Historic value	Important in the community or pattern of history or has an association with the life or work of a person, group or organization of importance in history.
Scientific value	Potential to yield information that will contribute to an understanding of natural or cultural history or is important in demonstrating a high degree of creative or technical achievement of a particular period
Aesthetic value	Important in exhibiting particular aesthetic characteristics valued by a community or cultural group.
Social value	Have a strong or special association with a particular community or cultural group for social, cultural or spiritual reasons
Rarity	Does it possess uncommon, rare or endangered aspects of natural or cultural heritage
Representivity	Important in demonstrating the principal characteristics of a particular class of natural or cultural places or object or a range of landscapes or environments characteristic of its class or of human activities (including way of life, philosophy, custom, process, land-use function, design or technique) in the environment of the nation, province region or locality.

APPENDIX C

Paleontological Impact Assessment (Desktop Study)