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HERITAGE IMPACT ASSESSMENT FOR THE PROPOSED MIXED-USE DEVELOPMENT TO BE KNOWN AS STONE RIVER'S ARCH ON THE REMAINING EXTENT OF 112 AND THE REMAINING EXTENT OF PORTION 2 OF THE FARM RIETVLEI 101 IR , CITY OF JOHANNESBURG METROPOLITAN MUNICIPALITY, GAUTENG PROVINCE

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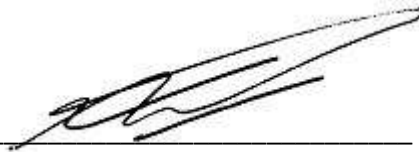
DECLARATION OF INDEPENDENCE

This report has been compiled by PGS Heritage, an appointed Heritage Specialist for GladAfrica Environmental Management. The views stipulated in this report are purely objective and no other interests are displayed in the findings and recommendations of this Heritage Impact Assessment.

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Report Title	Heritage Impact Assessment as part of the Environmental Impact Report for the Proposed Mixed-Use Development to be known as Stone River's Arch on the Remaining Extent Of 112 and the Remaining Extent Of Portion 2 of the Farm Rietvlei 101 IR, City of Johannesburg Metropolitan Municipality, Gauteng Province		
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EXECUTIVE SUMMARY

PGS Heritage (PGS) was appointed by GladAfrica Environmental Management (Pty) Ltd (GladAfrica) to undertake a Heritage Impact Assessment (HIA) as part of the Environmental Impact Report (EIR) for the Proposed Mixed-Use Development to be known as Stone River's Arch on the Remaining Extent Of 112 And The Remaining Extent Of Portion 2 of the Farm Rietvlei 101 IR, City of Johannesburg Metropolitan Municipality, Gauteng Province

During the heritage survey conducted in 2006 a total of 9 heritage site (Four historical structure, four LIA stone walled sites and one cemetery) were identified in the study area. The subsequent re-evaluation of this report confirmed that the two historical house complexes were demolished between 2008 and 2010, while the third structure is now confirmed as not being older than 60 years.

The current report then concludes that from the original 9 sites identified 6 of these are still rated as having heritage significance, while additional stone walled settlement cluster have been delineated that was not part of the original study are but included in the current study.

The development foot print of the proposed development will impact directly on sites **MHC002**, **MHC003**, **MHC004** and **MHC007**. The impact on the sites is rated as medium to high, but with the recommended mitigation this impact can be reduced. The proposed development will also have a positive impact as new data will be generated that will add to the research conducted on the Klipriviersberg LIA stonewalling.

The following site will be directly impacted by the development and the mitigation measures proposed for each site are as follows:

SITE NO	MITIGATION MEASURES
MHC001	<ul style="list-style-type: none">• Demarcate as no-go area with a 20 meter buffer during construction• The site needs to be monitored during construction for any possible impacts by the ECO.• If at any stage the site is disturbed a qualified archaeologist must be contracted to evaluate the damage and make recommendations on the appropriate mitigation measures.• The site needs to be managed through a Heritage Management Plan (HMP) as part of the overall heritage management of heritage sites within the development area during the operational phase of the project.
MHC002	<ul style="list-style-type: none">• Before the site is destructed during development a destruction permit will be required under Section 35 of the NHRA• The application for destruction needs to be backed by extensive mitigation that will require the documentation of the site by means of plan sketches, test excavations to determine the temporal and cultural affinity of the site;• The layout and extent of the site needs to documented and linked into a larger documentation of all the

	<p>LIA stone walling present in the development study area, not only the footprint area but the whole of the study area);</p> <ul style="list-style-type: none"> • After completion of the mitigation report, the developer can then apply for a destruction permit from SAHRA, and construction can commence.
MHC003	<ul style="list-style-type: none"> • If the development layout is changed and the site is kept, it needs to be managed through a Heritage Management Plan (HMP) as part of the overall heritage management of heritage sites within the development area during the operational phase of the project. • If it is not possible to change the layout, it is recommended that the site is destroyed after the following procedure has been followed: <ul style="list-style-type: none"> ○ Before the site is destroyed during development a destruction permit will be required under Section 35 of the NHRA ○ The application for destruction needs to be backed by extensive mitigation that will require the documentation of the site by means of plan sketches, extensive excavations to determine the temporal and cultural affinity of the site; ○ The layout and extent of the site needs to be documented and linked into a larger documentation of all the LIA stone walling present in the development study area, not only the footprint area but the whole of the study area); • After completion of the mitigation report, the developer can then apply for a destruction permit from SAHRA, and construction can commence.
MHC004	<ul style="list-style-type: none"> • Before the site is destroyed during development a destruction permit will be required under Section 35 of the NHRA • The application for destruction needs to be backed by extensive mitigation that will require the documentation of the site by means of plan sketches, test excavations to determine the temporal and cultural affinity of the site; • The layout and extent of the site needs to be documented and linked into a larger documentation of all the LIA stone walling present in the development study area, not only the footprint area but the whole of the study area); • After completion of the mitigation report, the developer can then apply for a destruction permit from SAHRA, and construction can commence.
MHC005	<ul style="list-style-type: none"> • It is recommended that the site is fenced with a 20 meter buffer and supplied with a gate for access if the next-of-ken needs to visit the graves; • The site needs to be managed through a Heritage Management Plan (HMP) as part of the overall heritage management of heritage sites within the development area during the operational phase of the project.
MHC007	<ul style="list-style-type: none"> • Before the site is destroyed during development a destruction permit will be required under Section 34 of the NHRA • The application for destruction needs to be backed by documentation of the site by means of plan sketches; • After completion of the mitigation report, the developer can then apply for a destruction permit from SAHRA, and construction can commence. • It is further recommended that destruction activities for this site is monitored by and qualified archaeologist, as the possibility of child and still born burials close to the labourers housing does exist.
Additional LIA stone walling outside development footprint	<ul style="list-style-type: none"> • Demarcate as no-go area with a 20 meter buffer during construction • The site needs to be monitored during construction for any possible impacts by the ECO. • If at any stage the site is disturbed a qualified archaeologist must be contracted to evaluate the damage and make recommendations on the appropriate mitigation measures. • The site needs to be managed through a Heritage Management Plan (HMP) as part of the overall heritage management of heritage sites within the development area during the operational phase of the project.
MHC006, MHC008, MHC009	No mitigation required

Palaeontology

The National Fossil Sensitivity Map (<http://www.sahra.org.za/map/palaeo>) indicates that the area designated for the proposed development will not require a palaeontological assessment however a finds protocol will be required.

The overall impact risk class on heritage resources (excluding palaeontology, to be determined) is seen as medium to low with mitigation measures. **No fatal flaws were identified** from a cultural, historical, archaeological perspective. Implementation of recommended mitigation measures will ensure that impacts by the development on heritage resources discovered by chance will be kept to a minimum.

CONTENTS

PAGE

1	<i>INTRODUCTION</i>	1
1.1	Scope of the Study	1
1.2	Specialist Qualifications	1
1.3	Assumptions and Limitations	1
1.4	Legislative Context.....	2
1.5	Terminology and Abbreviations.....	3
2	<i>TECHNICAL DETAILS OF THE PROJECT</i>	7
2.1	Site Location and Description	7
2.2	Technical Project Description	8
2.3	Design and Layout.....	8
3	<i>ASSESSMENT METHODOLOGY</i>	9
3.1	Methodology for Assessing Heritage Site Significance	9
3.2	Methodology for Impact Assessment.....	11
4	<i>DESKTOP STUDY findings</i>	16
4.1	Historic Overview of Study Area and Surrounding Landscape	16
5	<i>FIELDWORK FINDINGS</i>	27
5.1	Site 2628AC-MHC001	28
5.2	Site 2628AC-MHC002	33
5.3	Site 2628AC-MHC003	37
5.4	Site 2628AC-MHC004	42
5.5	Site 2628AC-MHC005	46
5.6	Site 2628AC-MHC006	50
5.7	Site 2628AC-MHC007	53
5.8	Site 2628AC-MHC008	56
5.9	Site 2628AC-MHC009	58
5.10	Late Iron Age stone walled sites in larger development site	60
6	<i>MITIGATION MEASURES AND GENERAL RECOMMENDATIONS</i>	62
6.1	Heritage Management Plan for EMP implementation	63
7	<i>HERITAGE MANAGEMENT GUIDELINES</i>	68
7.1	General Management Guidelines	68
7.2	All phases of the project.....	71
8	<i>CONCLUSIONS</i>	73
9	<i>REFERENCES</i>	75

9.1	Published.....	75
9.2	Unpublished	75
9.3	Google Earth.....	76

LIST OF FIGURES

Figure 1 – Human and Cultural Time line in Africa (Morris, 2008)	6
Figure 2 – The study area within its regional context (GladAfrica, 2014).....	7
Figure 3 – Proposed layout of the development	9
Figure 4 - Map of Western and Eastern Bantu movements from the Central Lakes area	20
Figure 5 – Klipriviersberg stone walling layout (Huffman, 2007)	21
Figure 6 – Type N stone walling layout (Huffman, 2007)	22
Figure 7 – Structures indicated on the 1944 topographical map of the study area	23
Figure 8 – Structures indicated on the 1959 topographical map of the study area	24
Figure 9 – Palaeontology sensitivity map as extracted from SAHRIS – study area in red (http://www.sahra.org.za/map/palaeo).....	27
Figure 10 – Study areas of 2006 (green shading)and 2104 (red line).....	28
Figure 11 – Extent of stone walling at 2628AC-MHC001, indicated by red shaded area	29
Figure 12 - Stone walling starting in front of vehicle and continuing upslope (redline indicating first terracing).....	30
Figure 13 - Grain bin platform.....	31
Figure 14 - Potsherds	31
Figure 15 – Extent of stone walling at 2628AC-MHC002, indicated by red shaded area	33
Figure 16 - Stone walling starting in behind of vehicle and continuing to the west (shading indicating position of walling).....	34
Figure 17 - Potsherd with decoration found in enclosure	35
Figure 18 – Extent of stone walling at 2628AC-MHC003, indicated by red shaded area	37
Figure 19 - Ash Midden+	38
Figure 20 - Ash exposed by animals	39
Figure 21 – Site 2628AC-MHC003 in relation to the proposed footprint development	41
Figure 22 – Extent of stone walling at 2628AC-MHC004, indicated by red shaded area	42
Figure 23 – Low stone walling of lareg enclosure at 2628AC-MHC004	43
Figure 24 – Site 2628AC-MHC004 in relation to the proposed footprint development	45
Figure 25 – Position of 2628AC-MHC005in relation to project boundary.....	46
Figure 26 - Cemetery.....	47
Figure 27 - Formal Headstone.....	47
Figure 28 – Site 2628AC-MHC005 as indicated on the 1959 topographical map, in close vicinity to an existing cemetery	48
Figure 29 – Site 2628AC-MHC005 in relation to the proposed footprint development	49

Figure 30 – Condition of the main house, circa 2006..... 50

Figure 31 – Position of the house and outbuilding, circa 2006..... 51

Figure 32 – Google image date 27 May 2014, indicating that the house and out building were demolished..... 51

Figure 33 – Site 2628AC-MHC006 as indicated on the 1959 topographical map..... 52

Figure 34 – Site 2628AC-MHC007 as indicated on the 1944 topographical map..... 53

Figure 35 -Stone foundations..... 54

Figure 36 – Site 2628AC-MHC007 in relation to the proposed footprint development 55

Figure 37 – Structure at MHC008 as documented in 2006. 56

Figure 38 – Position of the house and outbuilding, circa 2006..... 57

Figure 39 – Google image date 11 July 2010, indicating that the house and out building were demolished 57

Figure 40 – Site 2628AC-MHC008 as indicated on the 1944 topographical map..... 58

Figure 41 - Nursery building..... 59

Figure 42 – Position of Site 2628AC-MHC009 as indicated on the 1959 topographical map..... 59

Figure 43 – Delineate LIA stone walling clusters (red shading) in relation to the proposed development foot print 61

LIST OF APPENDICES

Appendix A Heritage Sensitivity and Sites Map

1 INTRODUCTION

PGS Heritage (PGS) was appointed by GladAfrica Environmental Management (Pty) Ltd (GladAfrica) to undertake a Heritage Impact Assessment (HIA) as part of the Environmental Impact Report (EIR) for the Proposed Mixed-Use Development to be known as Stone River's Arch on the Remaining Extent Of 112 And The Remaining Extent Of Portion 2 of the Farm Rietvlei 101 IR, City of Johannesburg Metropolitan Municipality, Gauteng Province

1.1 Scope of the Study

The aim of the study is to identify possible heritage sites and finds that may occur in the proposed development area. The HIA aims to inform the Scoping/EIA in the development of a comprehensive Environmental Management Plan (EMP) to assist the developer in managing the identified heritage resources in a responsible manner in order to protect, preserve, and develop them within the framework provided by the National Heritage Resources Act of 1999 (Act 25 of 1999) (NHRA).

1.2 Specialist Qualifications

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

Wouter Fourie, Principal Investigator for this project, is an Accredited Heritage Practitioner with the APHP (Association of Professional Heritage Practitioners – Western Cape) and is registered with the Association of Southern African Professional Archaeologists (ASAPA) and has CRM accreditation within the said organisation.

1.3 Assumptions and Limitations

- This report is based on the 2006 report completed by the current author for Matakoma Heritage Consultants (MHC);
- No additional field work was done for this report and the current state of the heritage features identified in the 2006 report was not verified again;

- No tracklogs were taken in the 2006 report and subsequently no tracklogs are available for the current report;
- This study excludes a palaeontological assessment and recommendations on palaeontology is based on the Palaeontological Sensitivity map as provided on the South African Heritage Resources Information System (SAHRIS);
- The original study area of the 2006 report is slightly different than that of the current study area; however the development footprint area is the same.

1.4 Legislative Context

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

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

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

- i. National Environmental Management Act (NEMA) Act 107 of 1998
 - a. Basic Environmental Assessment (BEA) – Section (23)(2)(d)
 - b. Environmental Scoping Report (ESR) – Section (29)(1)(d)
 - c. Environmental Impacts Assessment (EIA) – Section (32)(2)(d)
 - d. EMP (EMP) – Section (34)(b)
- ii. National Heritage Resources Act (NHRA) Act 25 of 1999
 - a. Protection of Heritage Resources – Sections 34 to 36; and
 - b. Heritage Resources Management – Section 38
- iii. Minerals and Petroleum Resources Development Act (MPRDA) Act 28 of 2002
 - a. Section 39(3)

The NHRA stipulates that cultural heritage resources may not be disturbed without authorization from the relevant heritage authority. Section 34(1) of the NHRA states that, “no person may alter or demolish any structure or part of a structure which is older than 60 years without a permit issued by the relevant provincial heritage resources authority...”. The NEMA (No 107 of 1998) states that an integrated EMP should (23:2 (b)) “...identify, predict and evaluate the actual and potential impact on the environment,

socio-economic conditions and cultural heritage”. In accordance with legislative requirements and EIA rating criteria, the regulations of SAHRA and ASAPA have also been incorporated to ensure that a comprehensive and legally compatible HIA report is compiled.

1.5 Terminology and Abbreviations

Archaeological resources

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

Cultural significance

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

Development

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

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

- vi. any removal or destruction of trees, or removal of vegetation or topsoil

Fossil

Mineralised bones of animals, shellfish, plants and marine animals. A trace fossil is the track or footprint of a fossil animal that is preserved in stone or consolidated sediment.

Heritage

That which is inherited and forms part of the National Estate (historical places, objects, fossils as defined by the National Heritage Resources Act 25 of 1999).

Heritage resources

This means any place or object of cultural significance

Later Stone Age

The archaeology of the last 20 000 years, associated with fully modern people.

Late Iron Age (Early Farming Communities)

The archaeology of the last 1000 years up to the 1800's associated with ironworking and farming activities such as herding and agriculture.

Middle Stone Age

The archaeology of the Stone Age, dating to between 20 000-300 000 years ago, associated with early modern humans.

Palaeontology

Any fossilised remains or fossil trace of animals or plants which lived in the geological past and any site which contains such fossilised remains or trace.

Table 1 - Abbreviations

ABBREVIATIONS	DESCRIPTION
AIA	Archaeological Impact Assessment
ASAPA	Association of Southern African Professional Archaeologists
BAR	Basic Environmental Report
CMP	Conservation Management Plan
CRM	Cultural Resource Management
DWA	Department of Water Affairs
EIA	Environmental Impact Assessment
EMPR	Environmental Management Programme Report
ESA	Early Stone Age
GPS	Global Positioning System
HIA	Heritage Impact Assessment
LIA	Late Iron Age
LSA	Later Stone Age
MSA	Middle Stone Age
NEMA	National Environmental Management Act
NHRA	National Heritage Resources Act
PGS	PGS Heritage
PHRA	Provincial Heritage Resources Authority
SAHRA	South African Heritage Resources Agency
SAHRIS	South African Heritage Resources Information System

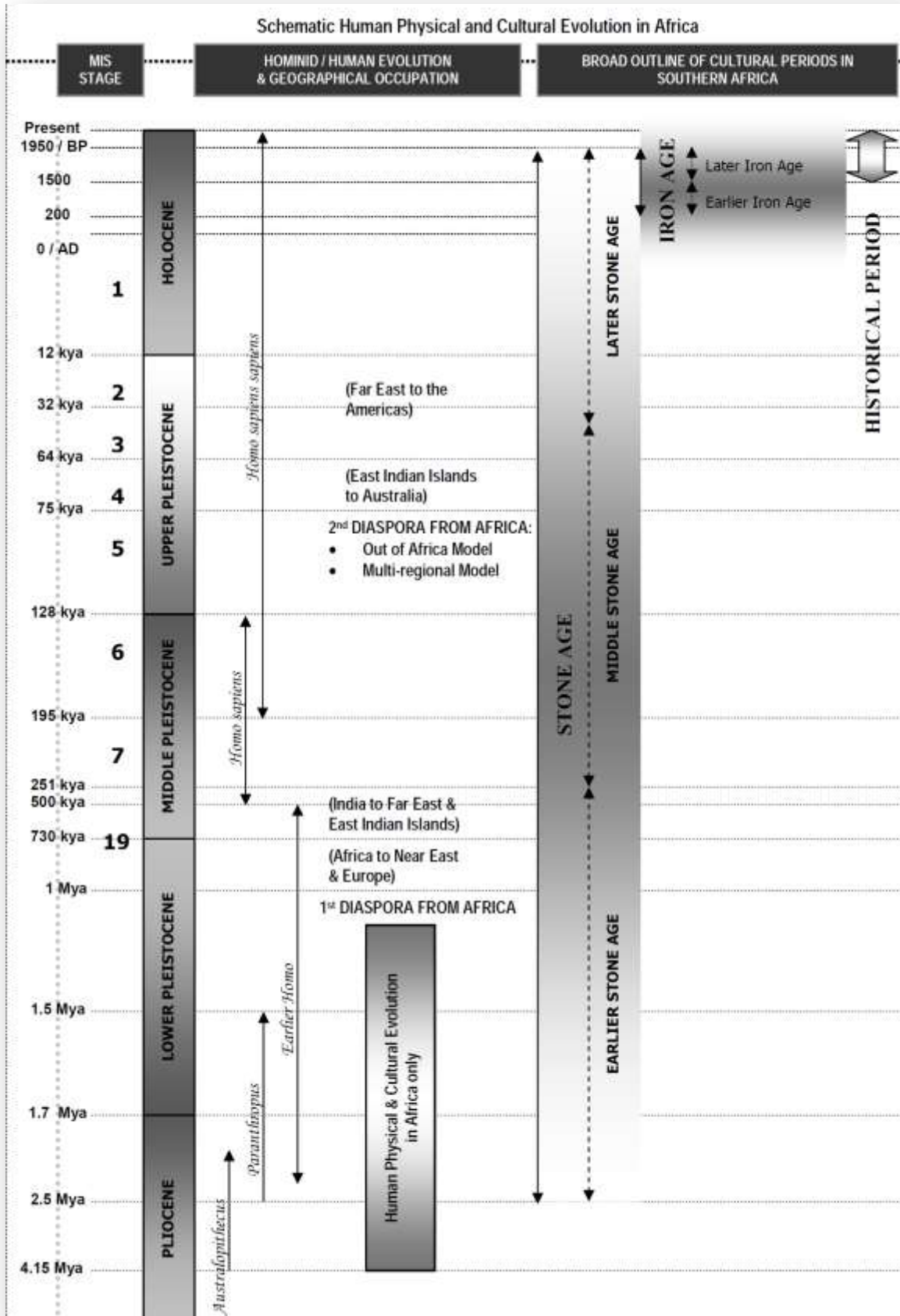


Figure 1 – Human and Cultural Time line in Africa (Morris, 2008)

2 TECHNICAL DETAILS OF THE PROJECT

2.1 Site Location and Description

Description	
Coordinates	S26 18 06.6 E28 02 49.8
Location	The proposed development, which is to be known as Stone River's Arch (SRA), is situated on the Remaining Extent of Portion 2 and the Remainder of Portion 112 of the Farm Rietvlei 101 IR, in the City of Johannesburg, Gauteng (Figure 2). Access to the site is currently gained from Kliprivier Drive. The site is approximately 89 hectares in extent, which borders onto Kliprivier Drive, and lies southeast of Rand Water Board's head office and is north of Aspen Hills Estate
Extent	89 hectares
Land Description	The sites are situated in open wooded grass land currently utilised as grazing.

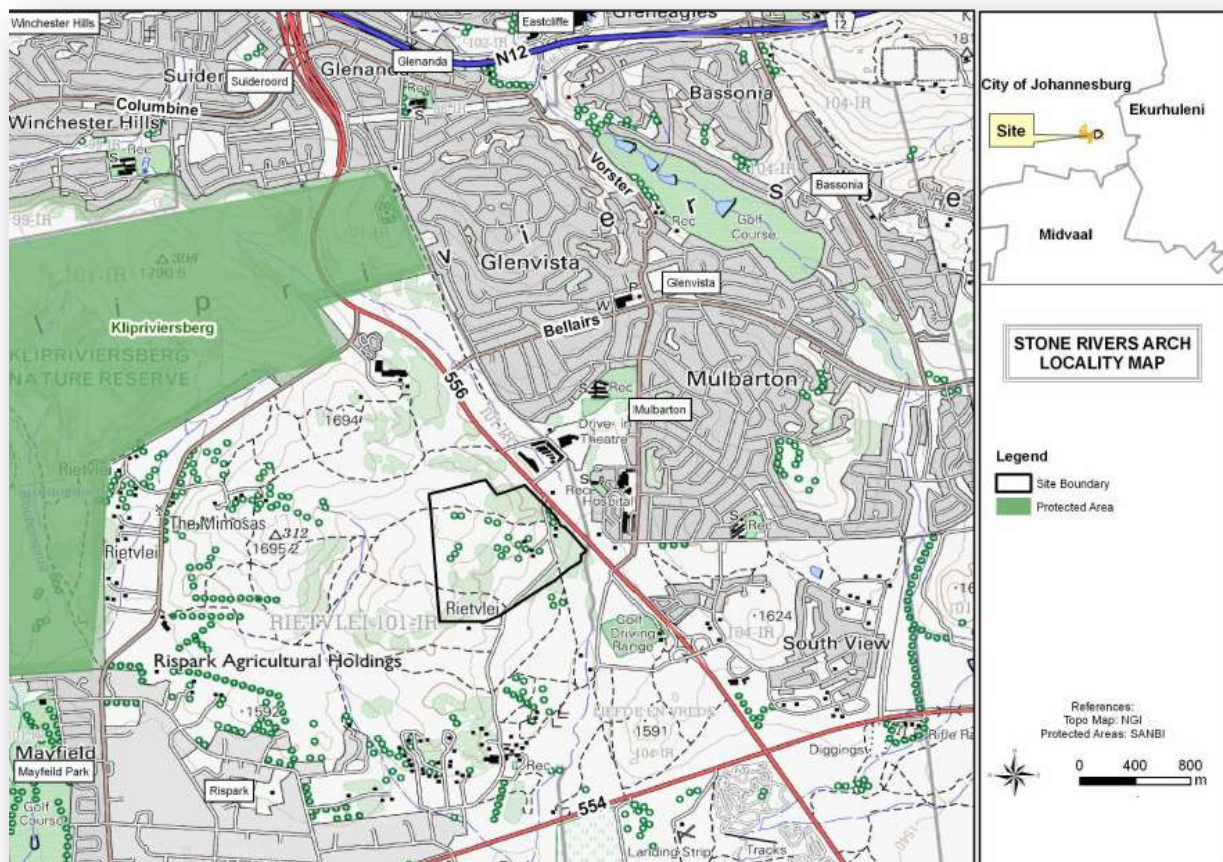


Figure 2 – The study area within its regional context (GladAfrica, 2014)

2.2 Technical Project Description

The following technical description has been extracted from the draft EIR for the project:

This Application for Environmental Authorisation is for the establishment of a mixed-use township development, with a combination of living and working environments. The envisaged development will include 270,000m² of mixed-use typologies such as residential units, offices, commercial and retail as well as eco-tourism uses. The intention is to increase this bulk area if or when the Pretoria Witwatersrand Vereeniging (PWV) road reserve is reduced. This means that the bulk area for development could be increased beyond 300,000m² once the PWV road reserve is relaxed.

To this end, 60% of the 89ha site is to be dedicated to conservation-related activities and eco-tourism purposes, with the intention being to create a natural corridor that links into the south-eastern parts of the Klipriviersberg Nature Reserve.

The development is to be implemented in at least 4 phases over a 20-year period. Each phase of the project will require specific road upgrades all of which affect Kliprivier Drive.

2.3 Design and Layout

The design and layout provides for integration into the natural environment and will include:

- I. Dwelling units;
- II. Hotels;
- III. Shops;
- IV. Restaurants;
- V. Offices;
- VI. Medical Consulting Rooms;
- VII. Institutions;
- VIII. Places of Amusement;
- IX. Private Open Spaces;
- X. A Conservation area which may be proclaimed or formalised in terms of the Protected Areas Act, 2003, which is to be zoned "Private Open Space";
- XI. Erven zoned "Special" for access, access control and conveying of engineering services; and

- XII. Road infrastructure and associated engineering services – an electrical substation, sewerage, storm water attenuation ponds; potable water supply and waste handling facilities (including a recycling station).
- XIII. Other uses by consent, but not noxious industries and warehousing, subject to Property Owners Association and the Township Developers written support and Council’s approval.

Refer to **Figure 3** for the proposed development layout.

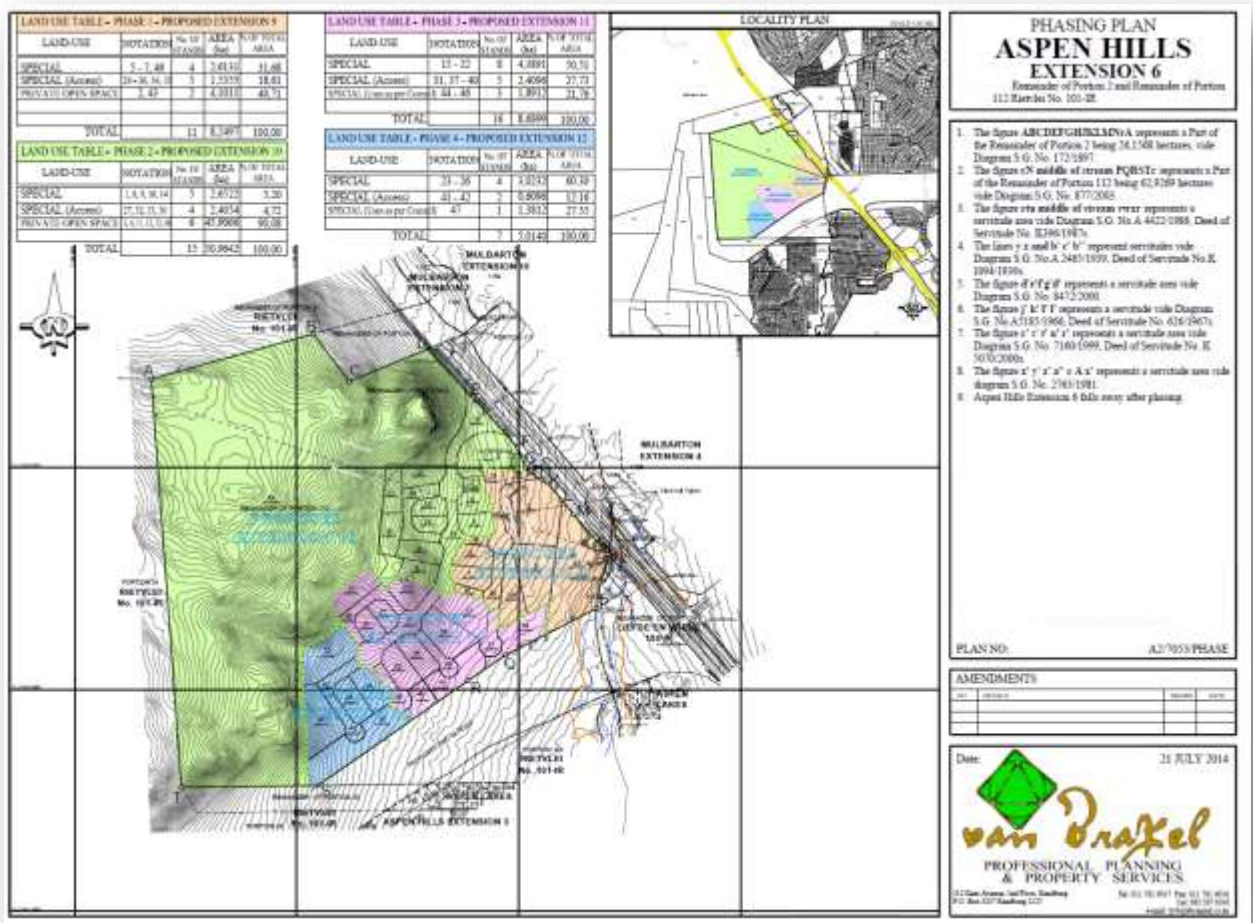


Figure 3 – Proposed layout of the development

3 ASSESSMENT METHODOLOGY

3.1 Methodology for Assessing Heritage Site Significance

This report was compiled by PGS for the Stone River’s Arch Development. The applicable maps, tables and figures are included as stipulated in the NHRA (no 25 of 1999) and the National Environmental Management Act (NEMA) (no 107 of 1998). The HIA process consisted of three steps:

Step I – Literature Review: The background information to the field survey leans greatly on the archival and historical cartographic material assessed as part of the study as well as a study of the available literature.

Step II – Physical Survey: No physical survey was undertaken subsequent to the 2006 field work.

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

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

- site integrity (i.e. primary vs. secondary context),
- amount of deposit, range of features (e.g., stonewalling, stone tools and enclosures),
- Density of scatter (dispersed scatter)
 - Low - <10/50m²
 - Medium - 10-50/50m²
 - High - >50/50m²
- uniqueness and
- potential to answer present research questions.

3.1.1 Site Significance

Site significance classification standards prescribed by the South African Heritage Resources Agency (2006) and approved by the Association for Southern African Professional Archaeologists (ASAPA) for the Southern African Development Community (SADC) region, were used for the purpose of this report (see Table 2).

Table 2 - Site significance classification standards as prescribed by SAHRA

FIELD RATING	GRADE	SIGNIFICANCE	RECOMMENDED MITIGATION
National Significance (NS)	Grade 1	-	Conservation; National Site nomination
Provincial Significance (PS)	Grade 2	-	Conservation; Provincial Site nomination
Local Significance (LS)	Grade 3A	High	Conservation; Mitigation not advised

Local Significance (LS)	Grade 3B	High	Mitigation (Part of site should be retained)
Generally Protected A (GP.A)	Grade 4A	High/Medium	Mitigation before destruction
Generally Protected B (GP.B)	Grade 4B	Medium	Recording before destruction
Generally Protected C (GP.C)	Grade 4C	Low	Destruction

3.2 Methodology for Impact Assessment

The following impact assessment methodology was provided by GladAfrica.

The assessment of the impacts has been conducted according to a synthesis of criteria required by the integrated environmental management procedure.

Table 3 – Impact assessment matrix

Extent	Duration	Intensity	Probability	Weighing Factor (WF)	Significance Rating (SR)	Mitigation Efficiency (ME)	Significance Following Mitigation (SFM)
Footprint	Short term	Low	Probable	Low	Low	High	Low
1	1	1	1	1	0-19	0.2	0-19
Site	Short to Medium		Possible	Low to Medium	Low to Medium	Medium to High	Low to medium
2	2		2	2	20-39	0.4	20-39
Regional	Medium term	Medium	Likely	Medium	Medium	Medium	Medium
3	3	3	3	3	40-59	0.6	40-59
National	Long term		Highly likely	Medium to High	Medium to High	Low to Medium	Medium to High
4	4		4	4	60-79	0.8	60-79
International	Permanent	High	Definite	High	High	Low	High
5	5	5	5	5	80-100	1.0	80-100

3.2.1 Extent

The physical and spatial scale of the impact is classified as:

a) Footprint

The impacted area extends only as far as the activity, such as footprint occurring within the total site area.

b) Site

The impact could affect the whole, or a significant portion of the site.

c) Regional

The impact could affect the area including the neighbouring farms, the transport routes and the adjoining towns.

d) National

The impact could have an effect that expands throughout the country (South Africa).

e) International

Where the impact has international ramifications that extend beyond the boundaries of South Africa

3.2.2 Duration

The lifetime of the impact, that is measured in relation to the lifetime of the proposed development.

a) Short term

The impact will either disappear with mitigation or will be mitigated through a natural process in a period shorter than that of the construction phase.

b) Short to Medium term

The impact will be relevant through to the end of a construction phase.

c) Medium term

The impact will last up to the end of the development phases, where after it will be entirely negated.

d) Long term

The impact will continue or last for the entire operational lifetime of the development, but will be mitigated by direct human action or by natural processes thereafter.

e) Permanent

This is the only class of impact, which will be non-transitory. Mitigation either by man or natural process will not occur in such a way or in such a time span that the impact can be considered transient.

3.2.3 Intensity

The intensity of the impact is considered by examining whether the impact is destructive or benign, whether it destroys the impacted environment, alters its functioning, or slightly alters the environment itself. The intensity is rated as:

a) Low

The impact alters the affected environment in such a way that the natural processes or functions are not affected.

b) Medium

The affected environment is altered, but functions and processes continue, albeit in a modified way.

c) High

Function or process of the affected environment is disturbed to the extent where it temporarily or permanently ceases.

3.2.4 Probability

This describes the likelihood of the impacts actually occurring. The impact may occur for any length of time during the life cycle of the activity, and not at any given time. The classes are rated as follows:

a) Improbable

The possibility of the impact occurring is none, due either to the circumstances, design or experience. The chance of this impact occurring is zero (0%).

b) Possible

The possibility of the impact occurring is very low, due either to the circumstances, design or experience. The chances of this impact occurring is defined as 25%.

c) Likely

There is a possibility that the impact will occur to the extent that provisions must therefore be made. The chances of this impact occurring is defined as 50%.

d) Highly Likely

It is most likely that the impacts will occur at some stage of the development. Plans must be drawn up before carrying out the activity. The chances of this impact occurring is defined as 75%.

e) Definite

The impact will take place regardless of any prevention plans, and only mitigation actions or contingency plans to contain the effect can be relied on. The chance of this impact occurring is defined as 100%.

3.2.5 Mitigation

The impacts that are generated by the development can be minimised if measures are implemented in order to reduce the impacts. The mitigation measures ensure that the development considers the environment and the predicted impacts in order to minimise impacts and achieve sustainable development.

3.2.6 Determination of Significance – Without Mitigation

Significance is determined through a synthesis of impact characteristics as described in the above paragraphs. It provides an indication of the importance of the impact in terms of both tangible and intangible characteristics. The significance of the impact “without mitigation” is the prime determinant of the nature and degree of mitigation required. Where the impact is positive, significance is noted as “positive”. Significance is rated on the following scale:

a) No significance

The impact is not substantial and does not require any mitigation action.

b) Low

The impact is of little importance, but may require limited mitigation.

c) Medium

The impact is of importance and is therefore considered to have a negative impact. Mitigation is required to reduce the negative impacts to acceptable levels.

d) High

The impact is of major importance. Failure to mitigate, with the objective of reducing the impact to acceptable levels, could render the entire development option or entire project proposal unacceptable. Mitigation is therefore essential.

3.2.7 Determination of Significance – With Mitigation

Determination of significance refers to the foreseeable significance of the impact after the successful implementation of the necessary mitigation measures. Significance with mitigation is rated on the following scale:

a) No significance

The impact will be mitigated to the point where it is regarded as insubstantial.

b) Low

The impact will be mitigated to the point where it is of limited importance.

c) Low to medium

The impact is of importance, however, through the implementation of the correct mitigation measures such potential impacts can be reduced to acceptable levels.

d) Medium

Notwithstanding the successful implementation of the mitigation measures, to reduce the negative impacts to acceptable levels, the negative impact will remain of significance. However, taken within the overall context of the project, the persistent impact does not constitute a fatal flaw.

e) Medium to high

The impact is of major importance but through the implementation of the correct mitigation measures, the negative impacts will be reduced to acceptable levels.

f) High

The impact is of major importance. Mitigation of the impact is not possible on a cost-effective basis. The impact is regarded as high importance and taken within the overall context of the project, is regarded as a fatal flaw. An impact regarded as high significance, after mitigation could render the entire development option or entire project proposal unacceptable.

3.2.8 Assessment Weighting

Each aspect within an impact description was assigned a series of quantitative criteria. Such criteria are likely to differ during the different stages of the project's life cycle. In order to establish a defined base upon which it becomes feasible to make an informed decision, it was necessary to weigh and rank all the criteria.

3.2.9 Ranking, Weighting and Scaling

For each impact under scrutiny, a scaled weighting factor is attached to each respective impact. The purposes of assigning such weights serve to highlight those aspects considered the most critical to the various stakeholders and ensure that each specialist's element of bias is taken into account. The weighting factor also provides a means whereby the impact assessor can successfully deal with the complexities that exist between the different impacts and associated aspect criteria.

Simply, such a weighting factor is indicative of the importance of the impact in terms of the potential effect that it could have on the surrounding environment. Therefore, the aspects considered to have a relatively high value will score a relatively higher weighting than that which is of lower importance.

3.2.10 Identifying the Potential Impacts Without Mitigation Measures (WOM)

Following the assignment of the necessary weights to the respective aspects, criteria are summed and multiplied by their assigned weightings, resulting in a value for each impact (prior to the implementation of mitigation measures).

Equation 1:

Significance Rating (WOM) = (Extent + Intensity + Duration + Probability) x Weighting Factor

3.2.11 Identifying the Potential Impacts with Mitigation Measures (WM)

In order to gain a comprehensive understanding of the overall significance of the impact, after implementation of the mitigation measures, it was necessary to re-evaluate the impact.

a) Mitigation Efficiency (ME)

The most effective means of deriving a quantitative value of mitigated impacts is to assign each with a mitigation effectiveness (ME) rating. The allocation of such a rating is a measure of the efficiency and effectiveness, as identified through professional experience and empirical evidence of how effectively the proposed mitigation measures will manage the impact.

Thus, the lower the assigned value the greater the effectiveness of the proposed mitigation measures and subsequently, the lower the impacts with mitigation.

Equation 2:

Significance Rating (WM) = Significance Rating (WOM) x Mitigation Efficiency

or

WM = WOM x ME

b) Significance Following Mitigation (SFM)

The significance of the impact after the mitigation measures are taken into consideration. The efficiency of the mitigation measure determines the significance of the impact. The level of impact is therefore seen in its entirety with all considerations taken into account.

4 DESKTOP STUDY FINDINGS

4.1 Historic Overview of Study Area and Surrounding Landscape

The extent of the background research is limited to information available on SAHRIS and not an extensive background research.

4.1.1 Previous Heritage and Archaeological Impact Assessment Reports

A search of the SAHRIS database (SA Heritage Resources Information System) located five previous Heritage and Archaeological Impact Assessment Reports which identified heritage sites in the general area of the Klipriviersberg. The studies identified were:

- Huffman, T.N. 2004. Archaeological Assessment of Portion 37 Liefde en Vrede 104IR. A Phase 1 Report for the Aspen Hills Development Company (Pty) Ltd. Archaeological Resources Management, School of Geography, Archaeology & Environmental Studies, University of the Witwatersrand.

The study was conducted for the Aspen Hills development directly south of the proposed Stone River's Arch development. Huffman note the position of a cluster of LIA stonewalled sites in the south eastern corner of the development area. Huffman notes two types of walling the first being N-Type (Maggs, 1976) of Group I (Taylor, 1979) dating between 1500-1700 AD with the second being described as Klipriviersberg (Group III) dating between 1750 and 1840 AD.

- Van Schalkwyk, J. 1999. A Survey of Cultural Resources in the Klipriviersberg Nature Reserve, Johannesburg District. National Cultural History Museum.

Van Schalkwyk completed a survey of the Klipriviersberg Nature Reserve, situated 2.5 km to the north west of the current study area. He identifies 28 heritage site of which most are LIA stone walling.

- Huffman, T.N. 1999. Archaeological Survey of Olifantsvlei, Klipriviersberg, Johannesburg. A Phase 1 Report prepared for Planning Development Environmental Services. Archaeological Resources Management, School of Geography, Archaeology & Environmental Studies, University of the Witwatersrand.

The site is situated some 5 km to the west of the current study area. Huffman identified a total of 10 sites all being stone walled sites.

- Huffman, T.N. 1999. Archaeological Survey of the Thaba Ya Botswana Project. A Phase 1 Report prepared for Bohlweki Environmental. Archaeological Resources Management, School of Geography, Archaeology & Environmental Studies, University of the Witwatersrand.

Huffman identified six stone walled settlement on the propose development to the north west of the current proposed development. These stone walled sites have layouts consistent with Group I and III type layouts and dates between 1600 and 1830.

- Fourie, W. 2006. Heritage Assessment. Stone River Arch Development, Rietvlei 101, Johannesburg, Gauteng. Matakoma Heritage Consultants (Pty) Ltd

4.1.2 Archaeological Background

Stone Age

The Stone Age can be roughly divided into three

Earlier Stone Age (400 000 – 2 million Before Present/BP)

Middle Stone Age (30 000 – 300 000 BP)

Later Stone Age (30 000 BP – recent times)

Iron Age

The Iron Age as a whole represents the spread of Bantu speaking people and includes both the Pre-Historic and Historic periods. It can be divided into three distinct periods:

The Early Iron Age: Most of the first millennium AD.

The Middle Iron Age: 10th to 13th centuries AD

The Late Iron Age: 14th century to colonial period.

The Iron Age is characterised by the ability of these early people to manipulate and work Iron ore into implements that assisted them in creating a favourable environment to make a better living. Iron is a very hard metal to work with compared to gold and copper that have lower melting temperatures and therefore are easier to forge. A drawback of gold and copper are the occurrence of ore, which is relatively limited compared to iron.

In Africa, we proceeded technologically directly from the Stone Age in to the Iron Age whereas in Eurasia there was a prolonged Copper and Bronze Age preceding the Iron Age. In southern Africa, metallurgical techniques made their first appearance in a rather advanced state that permitted the smelting of Copper and Iron directly after a Stone Age economic way of live.

This scenario provides a strong argument that metallurgical technology was introduced from elsewhere and did not develop locally. To effectively smelt iron oxide, ore by reduction requires a temperature of

at least 1100°C that is 400°C below the metals melting point. To obtain a temperature this high was probably unattainable in ancient furnaces. But the prolonged heating of ore in contact with abundant charcoal, needed to obtain a sufficiently high temperature for the reduction of the oxide ores, enable the iron to obtain enough carbon to make it mild steel. If this mild steel was repeatedly heated and hammered during the forge process, it will harden.

Early Iron Age

Early in the first millennium AD, there seem to be a significant change in the archaeological record of the greater part of eastern and southern Africa lying between the equator and Natal. This change is marked by the appearance of a characteristic ceramic style that belongs to a single stylistic tradition. These Early Iron Age people practised a mixed farming economy and had the technology to work metals like iron and copper.

A meaningful interpretation of the Early Iron Age has been hampered by the uneven distribution of research conducted so far; this can be partly attributed to the poor preservation of these early sites.

Linguistic and archaeological research has developed a model of Bantu distribution from Central Africa down towards Southern Africa from around 1000 BC to 500 AD. This movement has resulted in the current tribal distribution as known today (**Figure 4**).

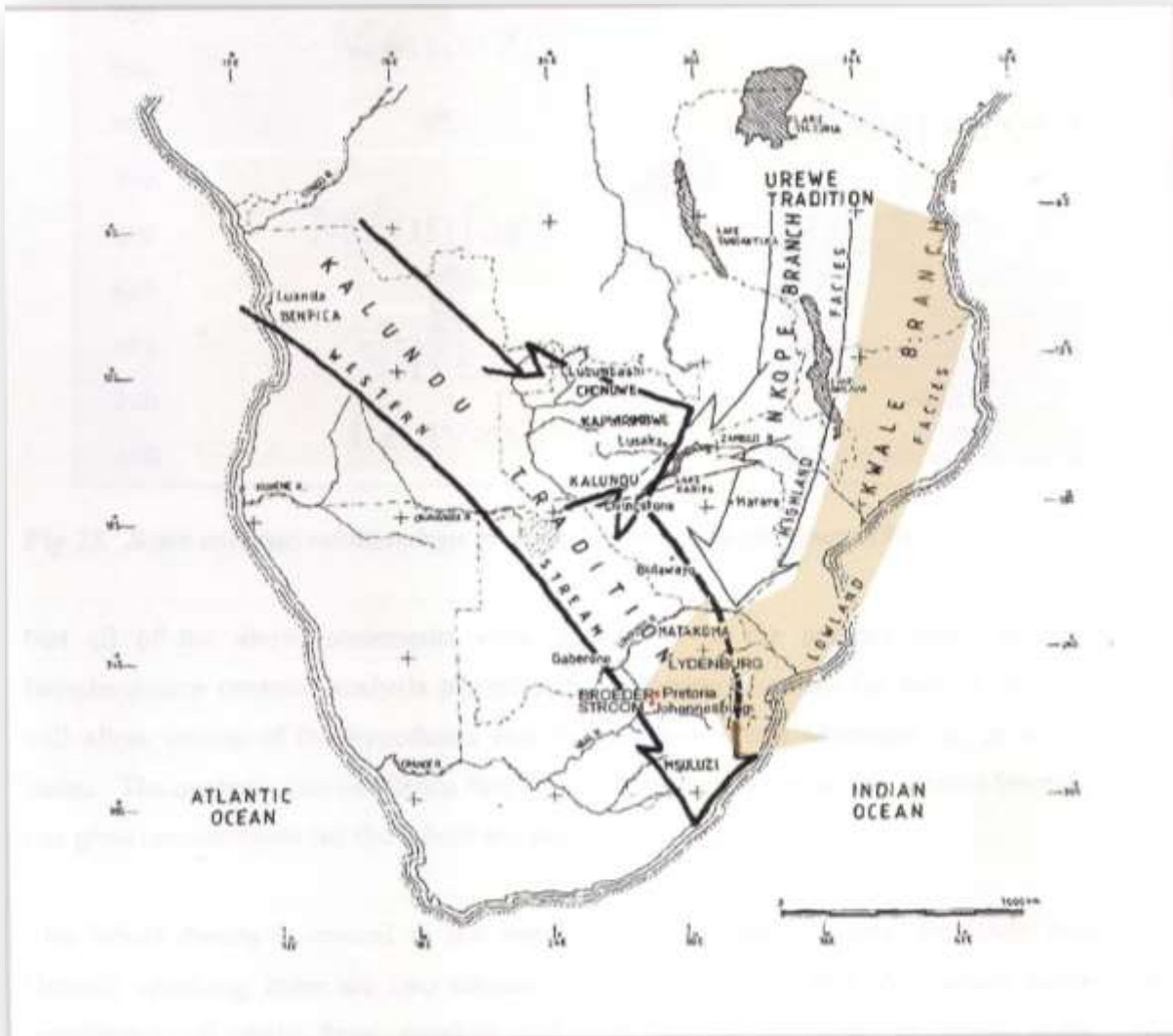


Figure 4 - Map of Western and Eastern Bantu movements from the Central Lakes area

Later Iron Age (LIA) also referred to as early farming communities starts around 1500 AD and continues up to 1840 with the start of colonialisation of the South African interior. One of the main features of the LIA is the remnants of stone walled settlements scattered over large area of southern Africa. These stone walled settlements and characterised by a specific type of layout referred to as the Central Cattle Pattern (CCP). The CCP refer to a settlement pattern where animal enclosures forma circle around a central open space or cattle are kept in a central kraal around which the development of settlements are done (Huffman, 2007).

There are numerous differences in layout of these stone walled settlements which researchers use to assign cultural affinities and/ or associated temporal scales. The main types are Moorpark Cluster

(Moore park/Melora/KwaMaza walling; Nguni, 1500-1600AD), Ntsuanatsatsi Cluster (Types N/V/ Klipriviersberg/Molokwane/Badfontein/Type Z/B/ Thukela and Doornspruit type walling), and Zimbabwe Patterns (Khami and great Zimbabwe) (Huffman, 2007).

The stone walled ruins associated with the Klipriviersberg have undergone numerous research over the past few decades with Mason (1968), Maggs (1976), Taylor (1979), Huffman (ongoing since early 1990's) and more recent Sadr (2012). This research contributed to the understanding of these stone walled settlements from the identification (Mason, 1968; Maggs, 1976) to the interpretation and classification (Maggs, 1967; Taylor, 1979) through to the present with the modelling of the spread of these settlement patterns (Sadr, 2012).

Huffman (2007) has produced a seminal work on the pre-colonial farming societies in which he concisely described and illustrate the types of CCP patterns that are present in southern Africa. He describes the Klipriviersberg (**Figure 5**) and Type N (**Figure 6**) settlement patterns that are prevalent in the Klipriviersberg area as complex settlement patterns with outer walls that sometimes contain scallops to mark back courtyards, numerous small stock pens, straight walls and the occurrence of beehive huts are common.

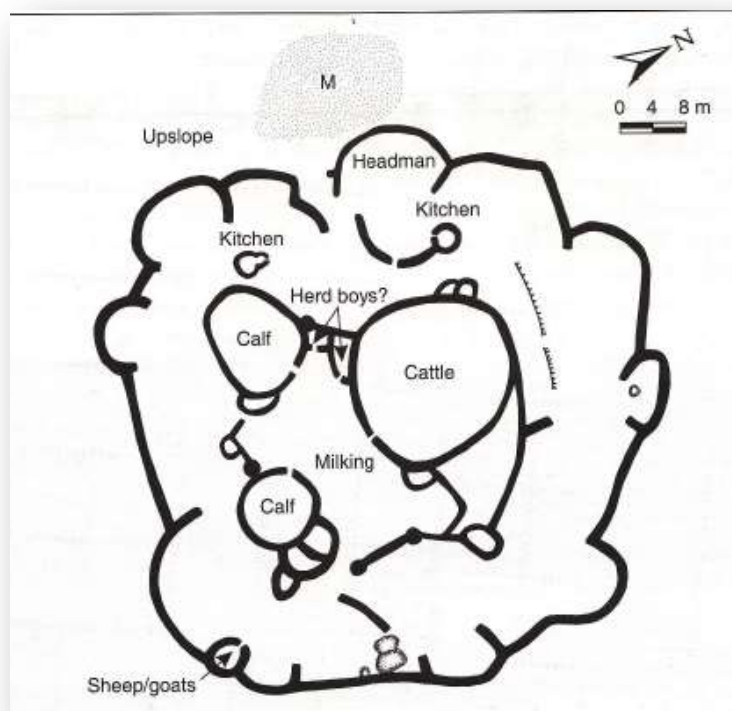


Figure 5 – Klipriviersberg stone walling layout (Huffman, 2007)

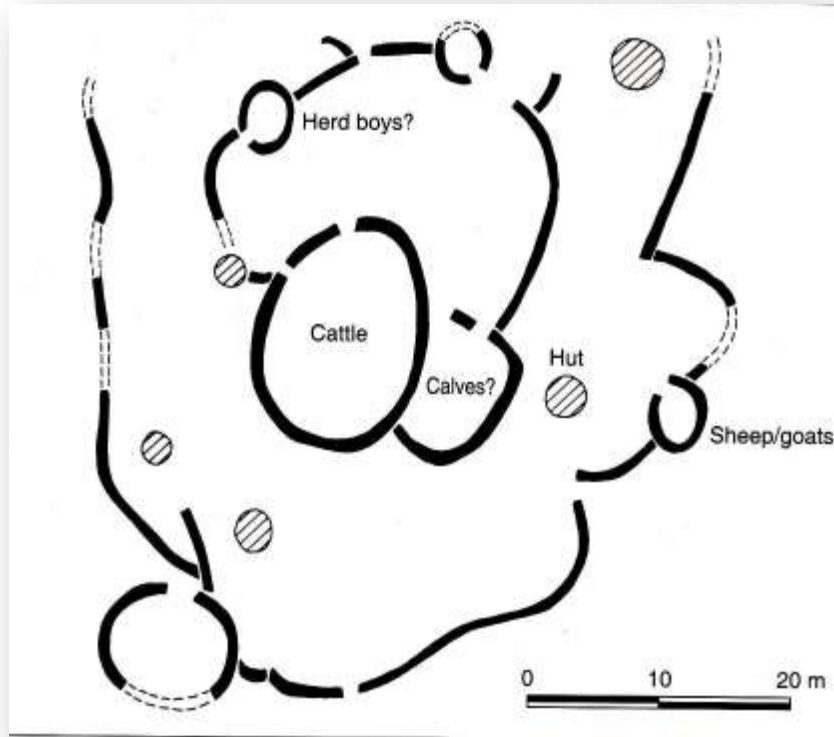


Figure 6 – Type N stone walling layout (Huffman, 2007)

4.1.3 Historical Maps

Historical maps of the study area consulted were the First edition 1:50 000 topo cadastral map – 2628AA dated 1944 and surveyed in 1942, and the Second edition 1:50 000 topo cadastral map – 2628AA dated 1959 and surveyed in 1957.

Both the maps provide interesting information on the historic layout of the farm

- **First Edition 1:50 000 – 2628AC map (1944)**

Evaluation of the map indicates the presence of a cluster of structures in the south-eastern corner of the study area (yellow circle) and a single labour housing (red circle) in the south of the study area.

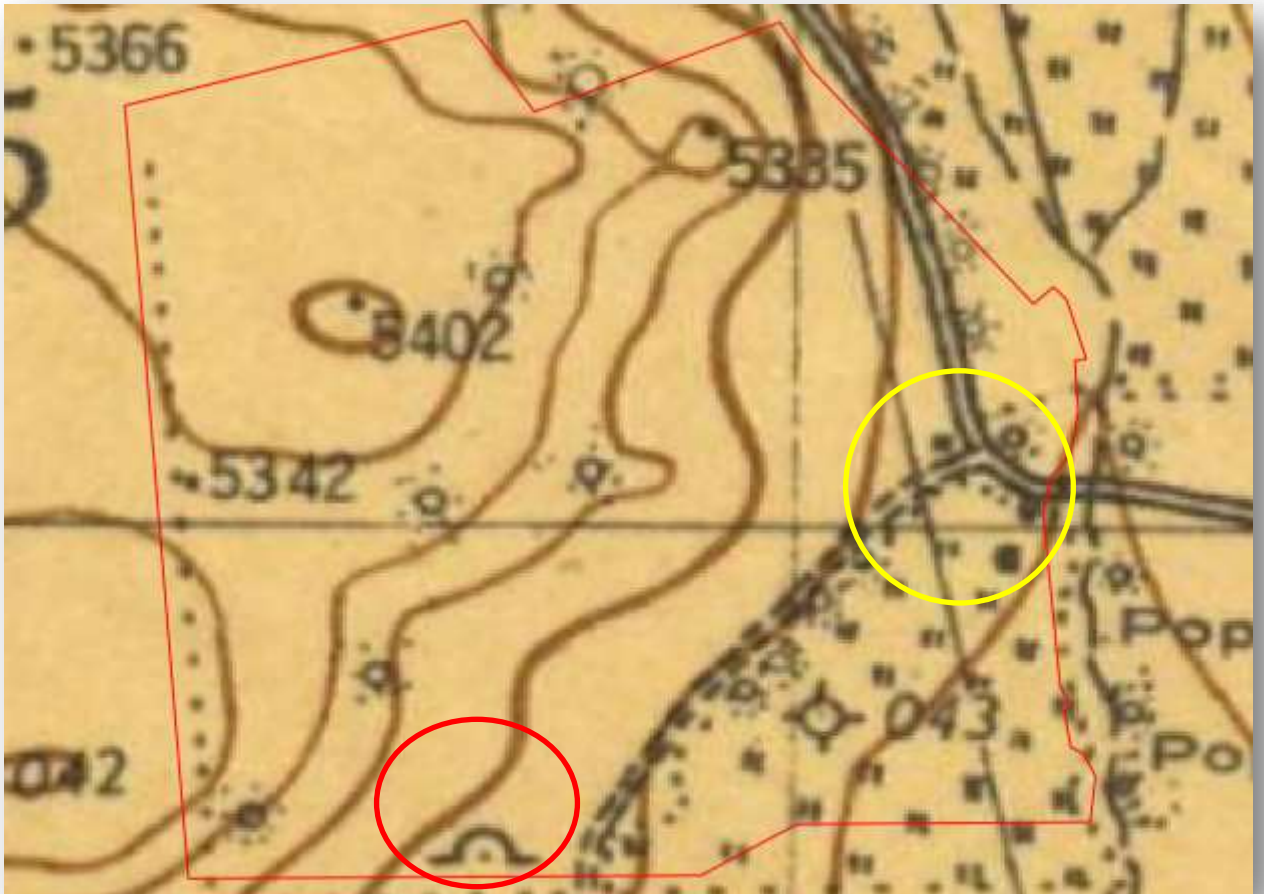


Figure 7 – Structures indicated on the 1944 topographical map of the study area

- **Second Edition 1:50 000 map (1959)**

An evaluation of this map indicates the same structure as in the 1944 map, but with the addition of the Rietvlei farmstead (range circle) in the middle of the study area. The cluster of labourers housing (red circles) seems to have grown and additional to this graves (blue circle) are indicated just south of the development area

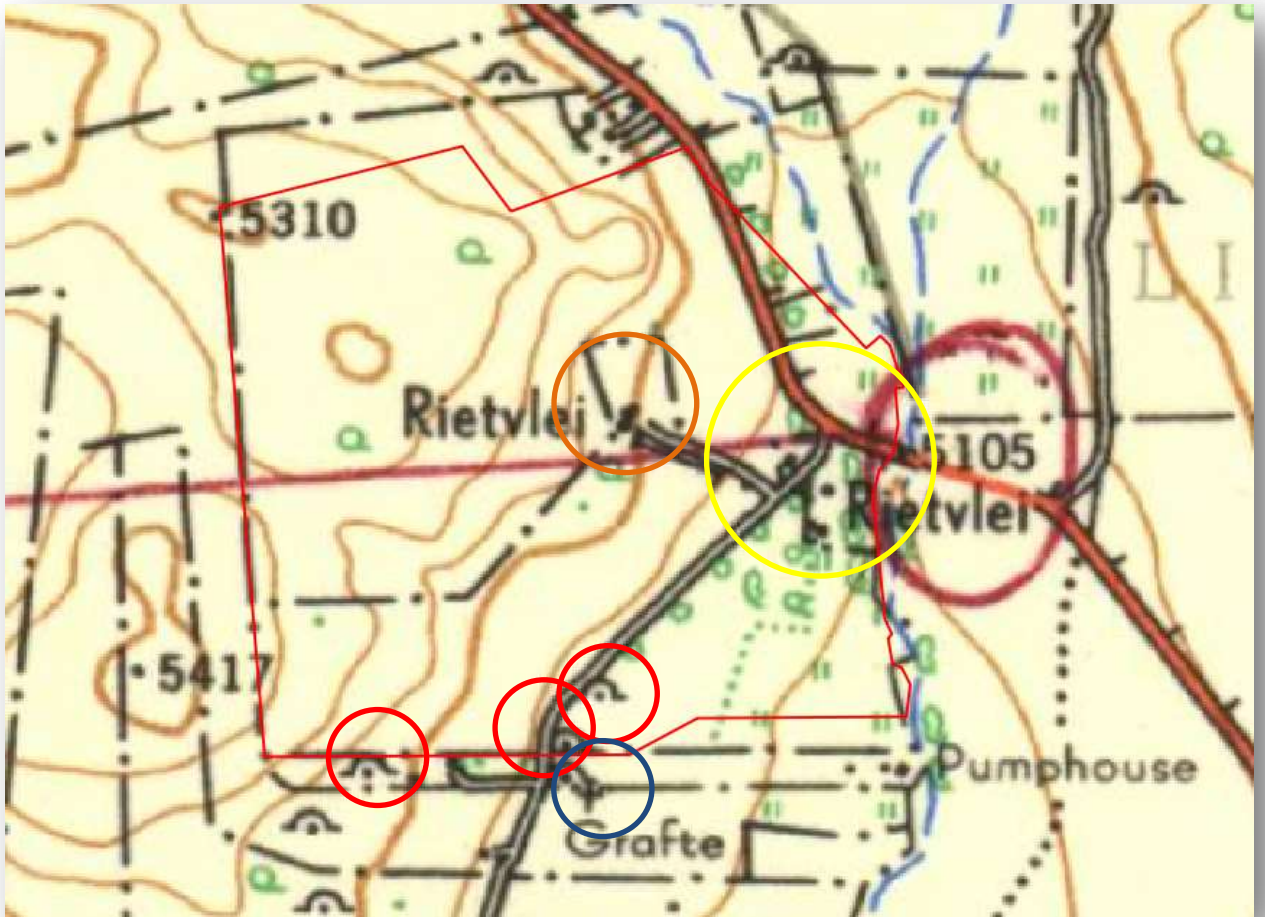


Figure 8 – Structures indicated on the 1959 topographical map of the study area

4.1.4 Historical research

The remainder of portion 2 of the farm Rietvlei is a portion of the original farm Rietvlei 101IR. The farm was originally called Rietvlei no 17 (Deeds office: DB62/129, diagram A, 86/79, SG255/17; Deeds office, DT 3436/1869, diagram A, 172/79, SG172/79). The farm is not mentioned as being one of the first to be occupied in this region, roundabout 1839/40 (see Bergh 1999: 15). Therefore it must have been occupied later.

It is fortunate that the farm did not change hands many times during the first more or less 100 years of its existence. Therefore it is quite easy to reconstruct the history thereof. After this time it however has been subdivided numerous times. Today the farm has been subdivided in various smaller portions of land.

Sarel Johannes Marais first occupied the original farm Rietvlei. It was transferred to him from the Government of the South African Republic (ZAR) on 1 October 1856 (Deeds office, Farm register no 27). Marais stayed the owner of portion A of the farm once the subdivision of the farm started. Portion A was later called portion 1.

On 28 October 1869 portion 2 was transferred to Christoffel Johannes Marais, son of S.J. Marais. When the latter died it was subdivided into four portions and transferred from his estate, respectively to Sarel Johannes Francois Marais, Louis Johannes Wessels Bergh, Christoffel Johannes Marais and Jan Hendrik Perie. This was on 12 July 1911.

On the same date some of the parts of the farm were again consolidated. The portion belonging to S.F.J. (sic) Marais was then also transferred to L.J.W. Bergh. The other two portions were then also consolidated with these and transferred to Petrus Johannes du Preez, again on 12 July 1911 (Deeds office, Farm register no 27). One should not be confused by all these transactions appearing to be on the same date. In those years transactions were usually only written in once in a few years, but then indicated all previous transactions. It means that the latest transaction, which is the consolidation of all four portions, is the only one that really occurred on the indicated date.

Portion 2 of the farm was again transferred on 24 January 1920 to Cornelius Alewyn Johannes Jansen (Deeds office, Farm register no 27). It was only after this date that the farm was subdivided into various smaller portions.

Portion 2, or at least some portions thereof seem to have been in the hands of the Jansen family for quite some time. Documents dating to 1958 for instance still indicate the Jansen family (Deeds office, File 24/6/3, 6666, 3/10/1958). This included the remainder of portion 2, which were transferred on 5 December 1946 from C.A.J. Jansen to Ulrique Jansen. She probably was his daughter and it is indicated that she was a spinster, born on 18 September 1919 (Deeds office, Farm register no 27; Deeds office, File 24/6/3, 101/655/1).

Portions of the remainder were later on divided into portions 62 and 69. Portion 62 was transferred from U. Wegener (born Jansen) to Basil Francois Jansen on 5 October 1962. It therefore seems as if Ulrique Jansen married after 1946 (Deeds office, Farm register no 27; Deeds office, File 24/6/3, 101/655/1, 25/03/1959). On 14 January 1970 this portion was transferred from B.F. Jansen to the Glen

April Development Corporation Limited. From this company it was transferred to Standard Bank of South Africa Limited on 15 April 1981 (Deeds office, Farm register no 27).

Portion 69 was transferred from U. Wegener (born Jansen) to Rietvlei Park (Proprietary) Limited on 3 June 1975 (Deeds office, Farm register no 27). The deeds registers make no mention of portion 112. Looking at the Development Plan provided by Matakoma, it seems as if it is a portion of portion 69. This must be a very recent development.

Many maps, including two old maps were also found in the office of the Surveyor-General. The first of these (Office of the Surveyor-General, 255/17) seems to be the map of the original farm Rietvlei no 17. This map dates to 1917 but does not show any additional information of a historical nature.

The second map, dating to 1879 is of much more interest (Office of the Surveyor-General, 172/79). Some buildings are visible on this map, although it does not indicate what these are. If compared with the Development Plan provided, it seems as if these are on portion 69. The number 69 does occur on this map and seems to indicate this portion, meaning that it has been known by this number at least since 1879, although the first mention of this in the farm register is only 1975 (see above).

Further information of interest on this map is that it indicates that the first owner of the farm, C.J. Marais, still owned it by 1879. At that period in time it was deemed as part of the Heidelberg district, since Johannesburg had not yet been established. The farm was surveyed by A.B. Anderson, government surveyor.

A last bit of information on the farm is found in a file in the deeds office (Deeds office, File 24/6/3). This includes letters indicating that the remainder of portion 2 of the farm Rietvlei was again subdivided on 2 December 2002 and that portion A of this is a part of the township of Mulbarton. This only proves that the development of the area has been in progress for some time and probably is still ongoing.

4.1.5 Palaeontology

A palaeontological assessment is not part of the scope of this assessment; however a search on SAHRIS's palaeontological sensitivity mapping (**Figure 9**) indicates that a palaeontological desktop is not required but a protocol for finds will be required by SAHRA.



1 in 250 000 geological formation layers are courtesy of the Council for GeoScience
 For more information, go to [How to Use the Palaeontological \(fossil\) Sensitivity Map](#)

Colour	Sensitivity	Required Action
RED	VERY HIGH	field assessment and protocol for finds is required
ORANGE/YELLOW	HIGH	desktop study is required and based on the outcome of the desktop study, a field assessment is likely
GREEN	MODERATE	desktop study is required
BLUE	LOW	no palaeontological studies are required however a protocol for finds is required
GREY	INSIGNIFICANT/ZERO	no palaeontological studies are required
WHITE/CLEAR	UNKNOWN	these areas will require a minimum of a desktop study. As more information comes to light, SAHRA will continue to populate the map.

Figure 9 – Palaeontology sensitivity map as extracted from SAHRIS – study area in red
<http://www.sahra.org.za/map/palaeo>

5 FIELDWORK FINDINGS

Field work conducted in 2006 has identified and various heritage features (including stone walling, historical houses and a cemetery) within the development boundary (shaded green in **Figure 10**). The proposed development boundary for the 2014 development (red line in **Figure 10**) overlaps and extends north-west outside the area surveyed during the 2006 field work. A map indicating all the heritage resources as well as their heritage sensitivity are available as **Appendix A**.

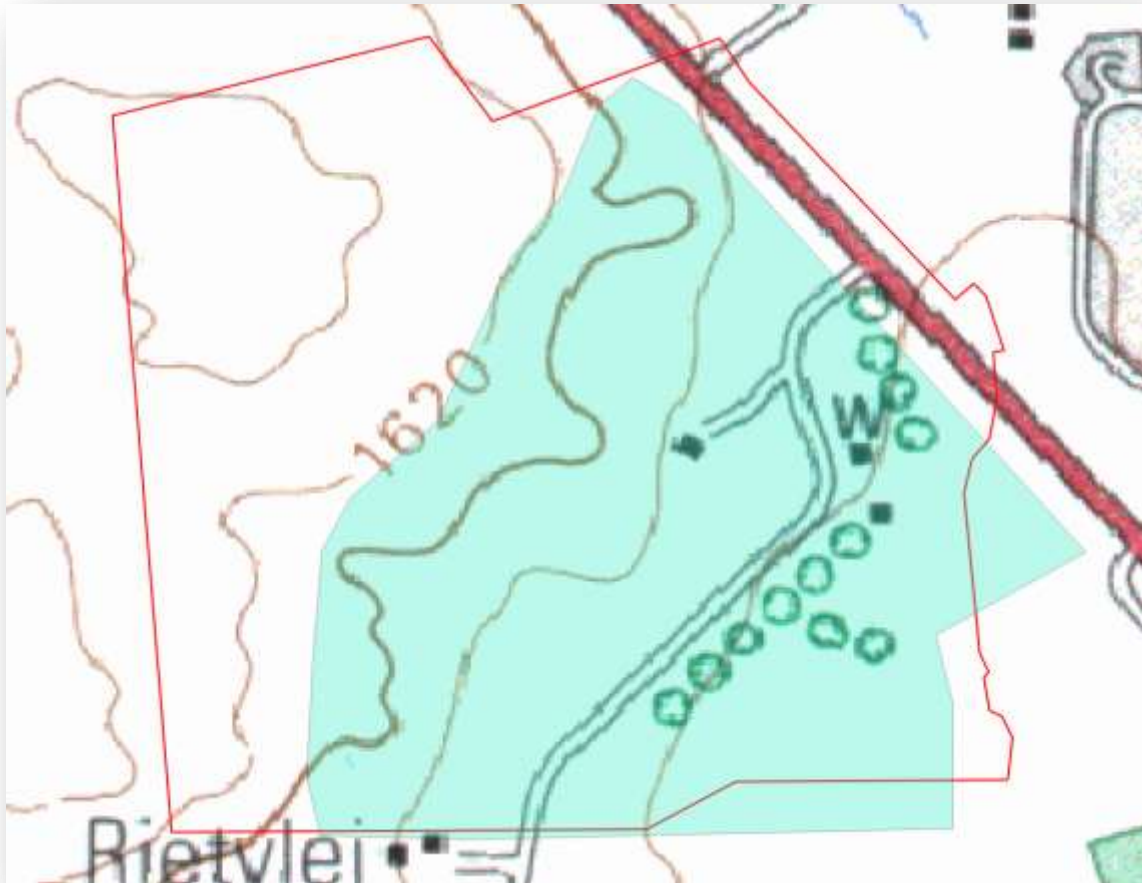


Figure 10 – Study areas of 2006 (green shading) and 2104 (red line)

A few additional stone walling clusters were demarcated from Google as well as high resolution imagery taken in 2004. This enabled the demarcation of heritage sensitive areas and their assessment in relation to the proposed development.

The following section outlines the sites identified in the development area, and evaluates them according to the evaluation criteria of the National Heritage Resources Act.

5.1 Site 2628AC-MHC001

GPS Coordinates: -

S26.29976758 E28.04569244

S26.29930624 E28.04574609

S26.29972466 E28.04378808

The site is situated in the north eastern corner of the property on the ridge dominating the surrounding landscape. The Late Iron Age (LIA) stonewalling (**Figure 12**) that is the main feature of this site extends some 150 metres east to west on the top of the ridge and down towards the northern slope of the ridge.



Figure 11 – Extent of stone walling at 2628AC-MHC001, indicated by red shaded area



Figure 12 - Stone walling starting in front of vehicle and continuing upslope (redline indicating first terracing)

The stone walling forms terracing, and in some cases this terracing is up to 1 metre high. Some of the enclosures show signs of human activity with grain bin platforms (**Figure 13**) and hut foundations being some of the features. Potsherds are scattered over most of the settlement unit, with a low frequency of decorated potsherds found (**Figure 14**).



Figure 13 - Grain bin platform



Figure 14 - Potsherds

The settlement unit conforms to the N-type as identified by Maggs (1976) and Class III – Klipriviersberg walling as identified by Mason (1968) and Huffman (2007.).

In accordance to the classification standards as prescribed by SAHRA, the site is graded as **Local Significant – 3C** and of medium heritage significance.

Impact Evaluation:

The impact rating provided below is based on the methodology described in Section 3.2. The impact rating below assumes that no mitigation measures have been implemented.

IMPACT	EXTENT	DURATION	INTENSITY	PROBABILITY	WEIGHING FACTOR (WF)	SIGNIFICANCE RATING (SR)	MITIGATION EFFICIENCY	SIGNIFICANCE FOLLOWING MITIGATION (SFM)
Impact on heritage structures	Site	Long term	Low	Possible	Medium	Low	High	Very Low
	2	4	1	2	3	27.00	0.2	5

The extent of the site falls inside the development study area but outside the development foot print and as such the impact significance is rated as low, as it is unlikely the site can be impacted by construction activities.

Mitigation:

- Demarcate as no-go area with a 20 meter buffer during construction
- The site needs to be monitored during construction for any possible impacts by the ECO.
- If at any stage the site is disturbed a qualified archaeologist must be contracted to evaluate the damage and make recommendations on the appropriate mitigation measures.
- The site needs to be managed through a Heritage Management Plan (HMP) as part of the overall heritage management of heritage sites within the development area during the operational phase of the project.

5.2 Site 2628AC-MHC002

GPS Coordinates: S26.30190262 E28.04540277

The site is situated on the north eastern slope of the property on the ridge dominating the surrounding landscape. The Late Iron Age stonewalling that is the main feature of this site covers an area of 60 metres in diameter.



Figure 15 – Extent of stone walling at 2628AC-MHC002, indicated by red shaded area



Figure 16 - Stone walling starting in behind of vehicle and continuing to the west (shading indicating position of walling)

Some of the enclosures show signs of human activity with grain hut foundations being features.

Potsherds are scattered over most of the settlement unit, with a low frequency of decorated potsherds found.



Figure 17 - Potsherd with decoration found in enclosure

The settlement unit conforms to the N-type as identified by Maggs (1976) and Class III – Klipriviersberg walling as identified by Mason (1968) and Huffman (2007).

In accordance to the classification standards as prescribed by SAHRA, the site is graded as **Local Significant – 3C** and of medium heritage significance.

Impact Evaluation:

The impact rating provided below is based on the methodology described in Section 3.2. The impact rating below assumes that no mitigation measures have been implemented.

IMPACT	EXTENT	DURATION	INTENSITY	PROBABILITY	WEIGHING FACTOR (WF)	SIGNIFICANCE RATING (SR)	MITIGATION EFFICIENCY	SIGNIFICANCE FOLLOWING MITIGATION (SFM)
Impact on heritage structures	Footprint	Permanent	Medium	Definite	Medium to High	Medium	Medium	Low
	1	5	3	5	4	56.00	0.6	34

The extent of the site falls inside development foot print and as such the impact significance is rated as medium, as the site will be directly impacted by the development

Mitigation:

- Due to the site's heritage grading of **3C**, it is recommended that the site is destructed after the following procedure has been followed:
 - Before the site is destructed during development a destruction permit will be required under Section 35 of the NHRA
 - The application for destruction needs to be backed by extensive mitigation that will require the documentation of the site by means of plan sketches, test excavations to determine the temporal and cultural affinity of the site;
 - The layout and extent of the site needs to be documented and linked into a larger documentation of all the LIA stone walling present in the development study area, not only the footprint area but the whole of the study area);
 - After completion of the mitigation report, the developer can then apply for a destruction permit from SAHRA, and construction can commence.

5.3 Site 2628AC-MHC003

GPS Coordinates: S26.30231568 E28.04566026 and S26.30122134 E28.04640591

The site covers to top of a small koppie that forms part of the main ridge that dominates the northern boundary of the property. The LIA stonewalling that is the main feature of this site covers an area of 100 metres in diameter.



Figure 18 – Extent of stone walling at 2628AC-MHC003, indicated by red shaded area

Some of the enclosures show signs of human activity with large ash middens being the main feature of the site, indicating deposits in the region of 2 metres deep (**Figure 19** and **Figure 20**). Potsherds are scattered over most of the settlement unit, with a low frequency of decorated potsherds found.

The settlement unit conforms to the N-type as identified by Maggs (1976) and Class III-Klipriviersberg as identified by Mason (1968) and Huffman (2007).



Figure 19 - Ash Midden+

In accordance to the classification standards as prescribed by SAHRA, the site is graded as **Local Significant – 3B** and of high heritage significance due to the preservation of the stone walling as well as the depth of cultural deposit present on the site.



Figure 20 - Ash exposed by animals

Impact Evaluation:

The impact rating provided below is based on the methodology described in Section 3.2. The impact rating below assumes that no mitigation measures have been implemented.

IMPACT	EXTENT	DURATION	INTENSITY	PROBABILITY	WEIGHING FACTOR (WF)	SIGNIFICANCE RATING (SR)	MITIGATION EFFICIENCY	SIGNIFICANCE FOLLOWING MITIGATION (SFM)
Impact on heritage structures	Footprint	Permanent	High	Definite	High	Very High	Medium	Medium
	1	5	5	5	5	80.00	0.6	48

The extent of the site falls inside development foot print and as such the impact significance is rated as Very High, as the site will be directly impacted by the development.

The development layout indicates that two buildings are planned in the area of MHC003 (**Figure 21**) and will directly impact on some of the stone walling of this site.

Mitigation:

- Due to the site's heritage grading of **3A**, it is recommended that the layout is changed and the two buildings planned, relocated to another area where it will not impact on heritage resources.
- If the development layout is changed and the site is kept, it needs to be managed through a Heritage Management Plan (HMP) as part of the overall heritage management of heritage sites within the development area during the operational phase of the project.
- If it is not possible to change the layout, it is recommended that the site is destructed after the following procedure has been followed:
 - Before the site is destructed during development a destruction permit will be required under Section 35 of the NHRA
 - The application for destruction needs to be backed by extensive mitigation that will require the documentation of the site by means of plan sketches, extensive excavations to determine the temporal and cultural affinity of the site;
 - The layout and extent of the site needs to be documented and linked into a larger documentation of all the LIA stone walling present in the development study area, not only the footprint area but the whole of the study area);
 - After completion of the mitigation report, the developer can then apply for a destruction permit from SAHRA, and construction can commence.



Figure 21 – Site 2628AC-MHC003 in relation to the proposed footprint development

5.4 Site 2628AC-MHC004

GPS Coordinates: S26.30525001 E28.04466248

The site is situated on the north western foot of the property of the ridge dominating the surrounding landscape (**Figure 22**). The Late Iron Age stonewalling that is the main feature of this site covers an area of 60 metres in diameter. The site consists of a single large low circular stonewalled enclosure with three smaller enclosures located in the centre of the site (Figure 23). An extension of the site extends further towards the west moving into the northern western ridge and up slope outside the development foot print



Figure 22 – Extent of stone walling at 2628AC-MHC004, indicated by red shaded area

No visible deposits or extensive potsherd scatters were detected.

The settlement unit conforms to the N-type as identified by Maggs (1976) and Class III - Klipriviersberg as identified by Mason (1968) and Huffman (2007).



Figure 23 – Low stone walling of large enclosure at 2628AC-MHC004

In accordance to the classification standards as prescribed by SAHRA, the site is graded as **Local Significant – 3C** and of moderate heritage significance.

Impact Evaluation:

The impact rating provided below is based on the methodology described in Section 3.2. The impact rating below assumes that no mitigation measures have been implemented.

IMPACT	EXTENT	DURATION	INTENSITY	PROBABILITY	WEIGHING FACTOR (WF)	SIGNIFICANCE RATING (SR)	MITIGATION EFFICIENCY	SIGNIFICANCE FOLLOWING MITIGATION (SFM)
Impact on heritage structures	Footprint	Permanent	Low	Definite	High	High	Medium	Low
	1	5	1	5	5	60.00	0.6	36

The extent of the site falls inside development foot print and as such the impact significance is rated as High, as the site will be directly impacted by the development.

The development layout indicates that a few are planned in the area of MHC004 (**Figure 24**) and will directly impact on some of the stone walling of this site.

Mitigation:

- Due to the site's heritage grading of **3C**, it is recommended that the site is destructed after the following procedure has been followed:
 - Before the site is destructed during development a destruction permit will be required under Section 35 of the NHRA
 - The application for destruction needs to be backed by extensive mitigation that will require the documentation of the site by means of plan sketches, test excavations to determine the temporal and cultural affinity of the site;
 - The layout and extent of the site needs to be documented and linked into a larger documentation of all the LIA stone walling present in the development study area, not only the footprint area but the whole of the study area);
 - After completion of the mitigation report, the developer can then apply for a destruction permit from SAHRA, and construction can commence.



Figure 24 – Site 2628AC-MHC004 in relation to the proposed footprint development

5.5 Site 2628AC-MHC005

GPS Coordinates: S26.30658575 E28.04636300

The site is that of an informal cemetery consisting of approximately 48 graves, of which 46 graves are stone packed graves and two have formal headstone (**Figure 26**). The date on the formal headstone indicates a 1951 date (**Figure 27**).

This cemetery is most probably associated with the farm labourers that resided on the property. A large number of labourer housing in the vicinity of the cemetery is indicated on the 1944 as well as 1959 topographical maps, while a marker for graves is indicated on the 1959 map, just to the south of MHC005, that could possibly be the same graves indicating that the cemetery could contain graves predating 1957 (**Figure 28**).



Figure 25 – Position of 2628AC-MHC005 in relation to project boundary



Figure 26 - Cemetery



Figure 27 - Formal Headstone



Figure 28 – Site 2628AC-MHC005 as indicated on the 1959 topographical map, in close vicinity to an existing cemetery

In accordance to the classification standards as prescribed by SAHRA, the site is graded as **Local Significant – 3A** and of high heritage significance.

Impact Evaluation:

The impact rating provided below is based on the methodology described in Section 3.2. The impact rating below assumes that no mitigation measures have been implemented.

IMPACT	EXTENT	DURATION	INTENSITY	PROBABILITY	WEIGHING FACTOR (WF)	SIGNIFICANCE RATING (SR)	MITIGATION EFFICIENCY	SIGNIFICANCE FOLLOWING MITIGATION (SFM)
Impact on heritage structures	Site	Long term	Low	Probable	High	Medium	High	Very Low
	2	4	1	1	5	40.00	0.2	8

The cemetery falls outside the development foot print but inside the project area. This area is however part of the road reserve for the PWV16 road (**Figure 29**).

Mitigation:

- It is recommended that the site is fenced with a 20 meter buffer and supplied with a gate for access if the next-of-ken needs to visit the graves;
- The site needs to be managed through a Heritage Management Plan (HMP) as part of the overall heritage management of heritage sites within the development area during the operational phase of the project.



Figure 29 – Site 2628AC-MHC005 in relation to the proposed footprint development

5.6 Site 2628AC-MHC006

GPS Coordinates: S26.30212792 E28.04667413

This is the location of a historical structure build of fired clay bricks. The structure consisted of at least four rooms. The foundations are constructed of stone and modern bricks. The house was occupied by vagrants and in disrepair in 2006 (**Figure 30**). The house was demolished since the 2006 report as can be seen by comparing the 2006 (**Figure 31**) with 2014 (**Figure 32**) Google imagery. A further analysis of the historical imagery indicates that the house was demolished between July 2007 and September 2008.

The age of the house predates 1957 as the 1959 topographical 1:50 00 map indicates the presence of the house and is named *Rietvlei* (**Figure 33**). The 1944 topographical map has no reference to this house. The possibility that the house is older than 60 years and protected under Section 34 of the NHRA cannot be excluded.



Figure 30 – Condition of the main house, circa 2006



Figure 31 – Position of the house and outbuilding, circa 2006



Figure 32 – Google image date 27 May 2014, indicating that the house and out building were demolished



Figure 33 – Site 2628AC-MHC006 as indicated on the 1959 topographical map

Mitigation:

No further action will be required.

5.7 Site 2628AC-MHC007

GPS Coordinates:

S26.30654820 E28.04476976

S26.30702027 E28.04369152

This is the location of the remains of foundations of several square structures build with stone scattered over a 50 meter area. The structures were that of farm labourer houses as can be deduced from the small single rooms the structures comprise of. This is further corroborated by the presence of labourer houses on the First Edition 1:50 000, 2628AC Alberton topographical map, dated 1944 (**Figure 34**). The structures are protected under Section 34 of the NHRA as they are older than 60 years.



Figure 34 – Site 2628AC-MHC007 as indicated on the 1944 topographical map



Figure 35 -Stone foundations

In accordance to the classification standards as prescribed by SAHRA, the site is graded as **Local Significant – 4B** and of low heritage significance.

Impact Evaluation:

The impact rating provided below is based on the methodology described in Section 3.2. The impact rating below assumes that no mitigation measures have been implemented.

IMPACT	EXTENT	DURATION	INTENSITY	PROBABILITY	WEIGHING FACTOR (WF)	SIGNIFICANCE RATING (SR)	MITIGATION EFFICIENCY	SIGNIFICANCE FOLLOWING MITIGATION (SFM)
Impact on heritage structures	Footprint	Permanent	Medium	Likely	Medium	Low	High	Very Low
	1	5	3	3	3	36.00	0.2	7

The site will very likely be impacted by the construction activities in close vicinity to the structures (Figure 36) and the impact is rated as Moderate.

Mitigation:

- Due to the site's heritage grading of **4B**, it is recommended that the site is destroyed after the following procedure has been followed:
 - Before the site is destroyed during development a destruction permit will be required under Section 34 of the NHRA
 - The application for destruction needs to be backed by documentation of the site by means of plan sketches;
 - After completion of the mitigation report, the developer can then apply for a destruction permit from SAHRA, and construction can commence.
- It is further recommended that destruction activities for this site is monitored by and qualified archaeologist, as the possibility of child and still born burials close to the labourers housing does exist.



Figure 36 – Site 2628AC-MHC007 in relation to the proposed footprint development

5.8 Site 2628AC-MHC008

GPS Coordinates: S26.30300232 E28.04916859

This was the location of the remains of a historical homestead with outbuildings, built with fired clay bricks. Only a few walls were still standing in 2006 (**Figure 37**). The house was demolished since the 2006 report as can be seen by comparing the 2006 (**Figure 38**) with 2010 (**Figure 32**) Google imagery.

The age of the house predates 1944 as the 1944 topographical 1:50 00 map indicates the presence of a few structures in the vicinity of the T-junction of the Old Johannesburg Kliprivier road (Figure 40). The 1944 topographical map has no reference to this house. The possibility that the house is older than 60 years and protected under Section 34 of the NHRA cannot be excluded.



Figure 37 – Structure at MHC008 as documented in 2006.



Figure 38 – Position of the house and outbuilding, circa 2006



Figure 39 – Google image date 11 July 2010, indicating that the house and out building were demolished



Figure 40 – Site 2628AC-MHC008 as indicated on the 1944 topographical map

Mitigation:

No further action will be required.

5.9 Site 2628AC-MHC009

GPS Coordinates: S26.30113014 E28.04857314

The site is that of a building currently utilised as the mains offices and shop of a nursery. The main building is constructed with prefabricated materials. It was confirmed by the owner that the structures was previously utilised as a school. Conforming to the numerous prefabricated school buildings in South Africa.

The building was however constructed after 1957 as it is not indicated on the 1959 map of the area (**Figure 42**).



Figure 41 - Nursery building



Figure 42 – Position of Site 2628AC-MHC009 as indicated on the 1959 topographical map

Mitigation:

No further action will be required, as the structure is not older than 60 years.

5.10 Late Iron Age stone walled sites in larger development site

The public participation conducted by GladAfrica, lead to the comment that not all the heritage resource was identified in the report included in the draft EIR for the current proposed development. This is in part true as the original 2006 report, did not cover the new project study area in totality (as indicated in Section 5, p.27).

A mapping exercise based on high resolution aerial photography of 2003 was done to supplement the 2006 field work with the aim to delineate as far as possible the extent of stone walling in the total project area as supplied by GladAfrica.

Figure 43 depicts the delineated stone walling as identified from the mapping exercise. These walling clusters can be classified as N-type (as identified by Maggs (1976) and Class III-Klipriviersberg as identified by Mason (1968) and Huffman (2007).

In accordance to the classification standards as prescribed by SAHRA, these clusters is graded as Local Significant – 3A and of high heritage significance due to the preservation of the stone walling as well as the depth of cultural deposit present on these sites.

Impact Evaluation:

The impact rating provided below is based on the methodology described in Section 3.2. The impact rating below assumes that no mitigation measures have been implemented.

IMPACT	EXTENT	DURATION	INTENSITY	PROBABILITY	WEIGHING FACTOR (WF)	SIGNIFICANCE RATING (SR)	MITIGATION EFFICIENCY	SIGNIFICANCE FOLLOWING MITIGATION (SFM)
Impact on heritage structures	Site	Long term	Low	Possible	Medium	Low	High	Very Low
	2	4	1	2	3	27.00	0.2	5

The extent of the site falls inside development foot print and as such the impact significance is rated as low, as the site will be directly impacted by the development.

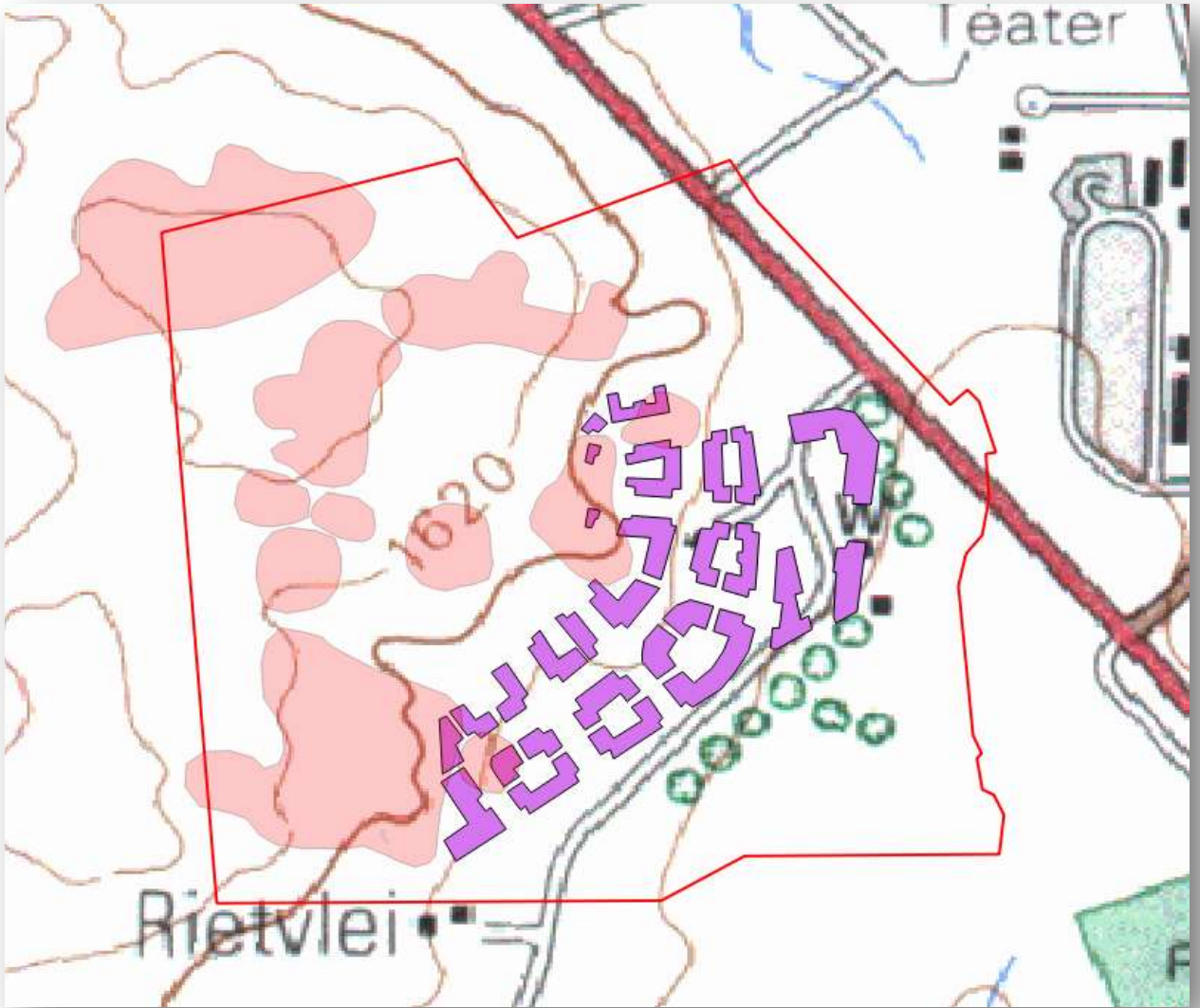


Figure 43 – Delineate LIA stone walling clusters (red shading) in relation to the proposed development foot print

Mitigation:

- Demarcate as no-go area with a 20 meter buffer during construction
- The site needs to be monitored during construction for any possible impacts by the ECO.
- If at any stage the site is disturbed a qualified archaeologist must be contracted to evaluate the damage and make recommendations on the appropriate mitigation measures.
- The site needs to be managed through a Heritage Management Plan (HMP) as part of the overall heritage management of heritage sites within the development area during the operational phase of the project.

6 MITIGATION MEASURES AND GENERAL RECOMMENDATIONS

The risk calculation above has shown that the impact of the proposed development on heritage resources in the study area has a **Low** Impact Risk. However, these calculations were based on the assumption that all activities would be undertaken **without any mitigation** measures implemented. Implementation on the recommended mitigation measures below will ensure that minimal impact on heritage resources will be achieved.

6.1 Heritage Management Plan for EMP implementation

NO.	MITIGATION MEASURES	PHASE	TIMEFRAME	RESPONSIBLE PARTY FOR IMPLEMENTATION	MONITORING PARTY (FREQUENCY)	TARGET	PERFORMANCE INDICATORS (MONITORING TOOL)	COST
<i>Possible finds</i>								
A	Include section on possible heritage finds in induction prior to construction activities take place – Refer to Section 9 of this report	Planning /Pre-Construction	Prior to construction	Applicant ECO Heritage Specialist	ECO (Monthly)	Ensure compliance with relevant legislation and recommendations from SAHRA under Section 36 and 38 of NHRA	No legal directives Legal compliance audit scores (Legal register) (ECO Monthly Checklist/Report)	R5 000
B	Implement chance find procedures in case where possible heritage finds area made	Construction	During construction	Applicant ECO Heritage Specialist	ECO (weekly)	Ensure compliance with relevant legislation and recommendations from SAHRA under Section 36 and 38 of NHRA	ECO Monthly Checklist/Report	Possibly R50 000

NO.	MITIGATION MEASURES	PHASE	TIMEFRAME	RESPONSIBLE PARTY FOR IMPLEMENTATION	MONITORING PARTY (FREQUENCY)	TARGET	PERFORMANCE INDICATORS (MONITORING TOOL)	COST
<i>Identified heritage site</i>								
MHC001	<ul style="list-style-type: none"> Demarcate as no-go area with a 20 meter buffer during construction The site needs to be monitored during construction for any possible impacts by the ECO. If at any stage the site is disturbed a qualified archaeologist must be contracted to evaluate the damage and make recommendations on the appropriate mitigation measures. The site needs to be managed through a Heritage Management Plan (HMP) as part of the overall heritage management of heritage sites within the development area during the operational phase of the project. 	Pre-Construction	Prior to construction	Applicant ECO Heritage Specialist	ECO (weekly)	Ensure compliance with relevant legislation and recommendations from SAHRA under Section 35 and 38 of NHRA	Completion of task issue of final permit	Possibly R10 000
MHC002	<ul style="list-style-type: none"> Before the site is destructed during development a destruction permit will be required under Section 35 of the NHRA The application for destruction needs to be backed by extensive mitigation that will require the documentation of the site by means of plan sketches, test excavations to determine the temporal and cultural affinity of the site; The layout and extent of the site needs to be documented and linked into a larger documentation of all the LIA stone walling present in the development study area, not only the footprint area but the whole of the study area); After completion of the mitigation report, the developer can then apply for a destruction permit from SAHRA, and construction can commence. 	Pre-Construction	Prior to construction	Applicant ECO Heritage Specialist	ECO (weekly)	Ensure compliance with relevant legislation and recommendations from SAHRA under Section 35 and 38 of NHRA	Completion of task issue of final permit	Possibly R80 000

NO.	MITIGATION MEASURES	PHASE	TIMEFRAME	RESPONSIBLE PARTY FOR IMPLEMENTATION	MONITORING PARTY (FREQUENCY)	TARGET	PERFORMANCE INDICATORS (MONITORING TOOL)	COST
MHC003	<ul style="list-style-type: none"> • It is recommended that the layout is changed and the two buildings planned, relocated to another area where it will not impact on heritage resources. • If the development layout is changed and the site is kept, it needs to be managed through a Heritage Management Plan (HMP) as part of the overall heritage management of heritage sites within the development area during the operational phase of the project. • If it is not possible to change the layout, it is recommended that the site is destructed after the following procedure has been followed: <ul style="list-style-type: none"> ○ Before the site is destructed during development a destruction permit will be required under Section 35 of the NHRA ○ The application for destruction needs to be backed by extensive mitigation that will require the documentation of the site by means of plan sketches, extensive excavations to determine the temporal and cultural affinity of the site; ○ The layout and extent of the site needs to be documented and linked into a larger documentation of all the LIA stone walling present in the development study area, not only the footprint area but the whole of the study area); ○ After completion of the mitigation report, the developer can then apply for a destruction permit from SAHRA, and construction can commence. 	Pre-Construction	Prior to construction	Applicant ECO Heritage Specialist	ECO (weekly)	Ensure compliance with relevant legislation and recommendations from SAHRA under Section 35 and 38 of NHRA	Completion of task issue of final permit	Possibly R100 000

NO.	MITIGATION MEASURES	PHASE	TIMEFRAME	RESPONSIBLE PARTY FOR IMPLEMENTATION	MONITORING PARTY (FREQUENCY)	TARGET	PERFORMANCE INDICATORS (MONITORING TOOL)	COST
MHC004	<ul style="list-style-type: none"> • Before the site is destructed during development a destruction permit will be required under Section 35 of the NHRA • The application for destruction needs to be backed by extensive mitigation that will require the documentation of the site by means of plan sketches, test excavations to determine the temporal and cultural affinity of the site; • The layout and extent of the site needs to be documented and linked into a larger documentation of all the LIA stone walling present in the development study area, not only the footprint area but the whole of the study area); • After completion of the mitigation report, the developer can then apply for a destruction permit from SAHRA, and construction can commence. 	Pre-Construction	Prior to construction	Applicant ECO Heritage Specialist	ECO (weekly)	Ensure compliance with relevant legislation and recommendations from SAHRA under Section 35 and 38 of NHRA	Completion of task issue of final permit	Possibly R80 000
MHC005	<ul style="list-style-type: none"> • It is recommended that the site is fenced with a 20 meter buffer and supplied with a gate for access if the next-of-ken needs to visit the graves; • The site needs to be managed through a Heritage Management Plan (HMP) as part of the overall heritage management of heritage sites within the development area during the operational phase of the project. 	Pre-Construction	Prior to construction	Applicant ECO Heritage Specialist	ECO (weekly)	Ensure compliance with relevant legislation and recommendations from SAHRA under Section 35 and 38 of NHRA	Completion of task issue of final permit	Possibly R10 000

NO.	MITIGATION MEASURES	PHASE	TIMEFRAME	RESPONSIBLE PARTY FOR IMPLEMENTATION	MONITORING PARTY (FREQUENCY)	TARGET	PERFORMANCE INDICATORS (MONITORING TOOL)	COST
MHC007	<ul style="list-style-type: none"> Before the site is destructed during development a destruction permit will be required under Section 34 of the NHRA The application for destruction needs to be backed by documentation of the site by means of plan sketches; After completion of the mitigation report, the developer can then apply for a destruction permit from SAHRA, and construction can commence. It is further recommended that destruction activities for this site is monitored by and qualified archaeologist, as the possibility of child and still born burials close to the labourers housing does exist. 	Pre-Construction	Prior to construction	Applicant ECO Heritage Specialist	ECO (weekly)	Ensure compliance with relevant legislation and recommendations from SAHRA under Section 35 and 38 of NHRA	Completion of task issue of final permit	Possibly R20 000
Additional LIA stone walling outside development footprint	<ul style="list-style-type: none"> Demarcate as no-go area with a 20 meter buffer during construction The site needs to be monitored during construction for any possible impacts by the ECO. If at any stage the site is disturbed a qualified archaeologist must be contracted to evaluate the damage and make recommendations on the appropriate mitigation measures. The site needs to be managed through a Heritage Management Plan (HMP) as part of the overall heritage management of heritage sites within the development area during the operational phase of the project. 	Pre-Construction	Prior to construction	Applicant ECO Heritage Specialist	ECO (weekly)	Ensure compliance with relevant legislation and recommendations from SAHRA under Section 35 and 38 of NHRA	Completion of task issue of final permit	Possibly R20 000
Operational Phase								
	The heritage resources within the development needs to be managed through a Heritage Management Plan (HMP) as part of the overall heritage management of heritage sites within the development area during the operational phase of the project.	Operational	Applicant Heritage Specialist	Yearly	Ensure compliance with relevant legislation and recommendations from SAHRA under Section 3 and 38 of NHRA	Completion of task issue of final permit	Possibly R20 000	

7 HERITAGE MANAGEMENT GUIDELINES

7.1 General Management Guidelines

1. The National Heritage Resources Act (Act 25 of 1999) states that, any person who intends to undertake a development categorised as-
 - (a) the construction of a road, wall, transmission line, pipeline, canal or other similar form of linear development or barrier exceeding 300m in length;
 - (b) the construction of a bridge or similar structure exceeding 50m in length;
 - (c) any development or other activity which will change the character of a site-
 - (i) exceeding 5 000 m² in extent; or
 - (ii) involving three or more existing erven or subdivisions thereof; or
 - (iii) involving three or more erven or divisions thereof which have been consolidated within the past five years; or
 - (iv) the costs of which will exceed a sum set in terms of regulations by SAHRA or a provincial heritage resources authority;
 - (d) the re-zoning of a site exceeding 10 000 m² in extent; or
 - (e) any other category of development provided for in regulations by SAHRA or a provincial heritage resources authority, must at the very earliest stages of initiating such a development, notify the responsible heritage resources authority and furnish it with details regarding the location, nature and extent of the proposed development.

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

2. In the event that a further heritage assessment is required it is advisable to utilise a qualified heritage practitioner, preferably registered with the Cultural Resources Management Section (CRM) of the Association of Southern African Professional Archaeologists (ASAPA).

This survey and evaluation must include:

- (a) The identification and mapping of all heritage resources in the area affected;
- (b) An assessment of the significance of such resources in terms of the heritage assessment criteria set out in section 6 (2) or prescribed under section 7 of the National Heritage Resources Act;
- (c) An assessment of the impact of the development on such heritage resources;

- (d) An evaluation of the impact of the development on heritage resources relative to the sustainable social and economic benefits to be derived from the development;
 - (e) The results of consultation with communities affected by the proposed development and other interested parties regarding the impact of the development on heritage resources;
 - (f) If heritage resources will be adversely affected by the proposed development, the consideration of alternatives; and
 - (g) Plans for mitigation of any adverse effects during and after the completion of the proposed development.
3. It is advisable that an information section on cultural resources be included in the SHEQ training given to contractors involved in surface earthmoving activities. These sections must include basic information on:
- a. Heritage;
 - b. Graves;
 - c. Archaeological finds; and
 - d. Historical Structures.
- This module must be tailor made to include all possible finds that could be expected in that area of construction.
4. In the event that a possible find is discovered during construction, all activities must be halted in the area of the discovery and a qualified archaeologist contacted.
5. The archaeologist needs to evaluate the finds on site and make recommendations towards possible mitigation measures.
6. If mitigation is necessary, an application for a rescue permit must be lodged with SAHRA.
7. After mitigation, an application must be lodged with SAHRA for a destruction permit. This application must be supported by the mitigation report generated during the rescue excavation. Only after the permit is issued may such a site be destroyed.
8. If during the initial survey sites of cultural significance are discovered, it will be necessary to develop a management plan for the preservation, documentation or destruction of such a site. Such a program must include an archaeological/palaeontological monitoring programme, timeframe and agreed upon schedule of actions between the company and the archaeologist.
9. In the event that human remains are uncovered, or previously unknown graves are discovered, a qualified archaeologist needs to be contacted and an evaluation of the finds made.
10. If the remains are to be exhumed and relocated, the relocation procedures as accepted by SAHRA need to be followed. This includes an extensive social consultation process.

Table 4: Roles and responsibilities of archaeological and heritage management

ROLE	RESPONSIBILITY	IMPLEMENTATION
A responsible specialist needs to be allocated and should attend all relevant meetings, especially when changes in design are discussed, and liaise with SAHRA.	The client	Archaeologist and a competent archaeology support team
If chance finds and/or graves or burial grounds are identified during construction or operational phases, a specialist must be contacted in due course for evaluation.	The client	Archaeologist and a competent archaeology support team
Comply with defined national and local cultural heritage regulations on management plans for identified sites.	The client	Environmental Consultancy and the Archaeologist
Consult the managers, local communities and other key stakeholders on mitigation of archaeological sites.	The client	Environmental Consultancy and the Archaeologist
Implement additional programs, as appropriate, to promote the safeguarding of our cultural heritage. (i.e. integrate the archaeological components into the employee induction course).	The client	Environmental Consultancy and the Archaeologist,
If required, conservation or relocation of burial grounds and/or graves according to the applicable regulations and legislation.	The client	Archaeologist, and/or competent authority for relocation services
Ensure that recommendations made in the Heritage Report are adhered to.	The client	The client
Provision of services and activities related to the management and monitoring of significant archaeological sites.	The client	Environmental Consultancy and the Archaeologist
After the specialist/archaeologist has been appointed, comprehensive feedback reports should be submitted to relevant authorities during each phase of development.	Client and Archaeologist	Archaeologist

7.2 All phases of the project

7.2.1 Archaeology

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

It is possible that cultural material will be exposed during operations and may be recoverable, but this is the high-cost front of the operation, and so any delays should be minimised. Development surrounding infrastructure and construction of facilities results in significant disturbance, but construction trenches do offer a window into the past and it thus may be possible to rescue some of the data and materials. It is also possible that substantial alterations will be implemented during this phase of the project and these must be catered for. Temporary infrastructure is often changed or added to during the subsequent history of the project. In general these are low impact developments as they are superficial, resulting in little alteration of the land surface, but still need to be catered for.

During the construction/operational phase, it is important to recognise any significant material being unearthed, and to make the correct judgment on which actions should be taken. A responsible archaeologist/palaeontologist must be appointed for this commission. This person does not have to be a permanent employee, but needs to attend relevant meetings, for example when changes in design are discussed, and notify SAHRA of these changes. The archaeologist would inspect the site and any development on a recurrent basis, with more frequent visits to the actual workface and operational areas.

In addition, feedback reports can be submitted by the archaeologist to the client and SAHRA to ensure effective monitoring. This archaeological monitoring and feedback strategy should be incorporated into the Environmental Management Plan (EMP) of the project. Should an archaeological/palaeontological site or cultural material be discovered during construction (or operation), such as burials or grave sites, the project needs to be able to call on a qualified expert to make a decision on what is required and if it is necessary to carry out emergency recovery. SAHRA would need to be informed and may give advice on procedure. The developers therefore should have some sort of contingency plan so that operations could move elsewhere temporarily while the material and data are recovered. The project thus needs to have an archaeologist/palaeontologist available to do such work. This provision can be made in an archaeological/palaeontological monitoring programme.

In the case where archaeological material is identified during construction the following measures must be taken:

- Upon the accidental discovery of archaeological material, a buffer of at least 20 meters should be implemented.
- If archaeological material is accidentally discovered during construction, activities must cease in the area and a qualified archaeologist be contacted to evaluate the find. To remove the material permit must be applied for from SAHRA under Section 35 of the NHRA.

7.2.2 Graves

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

- Upon the accidental discovery of graves, a buffer of at least 20 meters should be implemented.
- If graves are accidentally discovered during construction, activities must cease in the area and a qualified archaeologist be contacted to evaluate the find. To remove the remains a permit must be applied for from SAHRA (Section 36 of the NHRA) and other relevant authorities (National Health Act and its regulations). The local South African Police Services must immediately be notified of the find.
- Where it is recommended that the graves be relocated, a full grave relocation process that includes comprehensive social consultation must be followed.

The grave relocation process must include:

- i. A detailed social consultation process, that will trace the next-of-kin and obtain their consent for the relocation of the graves, that will be at least 60 days in length;
- ii. Site notices indicating the intent of the relocation;
- iii. Newspaper notices indicating the intent of the relocation;
- iv. A permit from the local authority;
- v. A permit from the Provincial Department of Health;
- vi. A permit from the South African Heritage Resources Agency, if the graves are older than 60 years or unidentified and thus presumed older than 60 years;
- vii. An exhumation process that keeps the dignity of the remains intact;
- viii. The whole process must be done by a reputable company that is well versed in relocations;
- ix. The exhumation process must be conducted in such a manner as to safeguard the legal rights of the families as well as that of the developing company.

8 CONCLUSIONS

During the heritage survey conducted in 2006 a total of 9 heritage site (Four historical structure, four LIA stone walled sites and one cemetery) were identified in the study area. The subsequent re-evaluation of this report confirmed that the two historical house complexes were demolished between 2008 and 2010, while the third structure is now confirmed as not being older than 60 years.

The current report then concludes that from the original 9 sites identified 6 of these are still rated as having heritage significance, while additional stone walled settlement cluster have been delineated that was not part of the original study but are included in the current study.

The development foot print of the proposed development will impact directly on sites **MHC002**, **MHC003**, **MHC004** and **MHC007**. The impact on the sites is rated as medium to high, but with the recommended mitigation this impact can be reduced. The proposed development will also have a positive impact as new data will be generated that will add to the research conducted on the Klipriviersberg LIA stonewalling.

The following site will be directly impacted by the development and the mitigation measures proposed for each site are as follows:

SITE NO	MITIGATION MEASURES
MHC001	<ul style="list-style-type: none"> • Demarcate as no-go area with a 20 meter buffer during construction • The site needs to be monitored during construction for any possible impacts by the ECO. • If at any stage the site is disturbed a qualified archaeologist must be contracted to evaluate the damage and make recommendations on the appropriate mitigation measures. • The site needs to be managed through a Heritage Management Plan (HMP) as part of the overall heritage management of heritage sites within the development area during the operational phase of the project.
MHC002	<ul style="list-style-type: none"> • Before the site is destroyed during development a destruction permit will be required under Section 35 of the NHRA • The application for destruction needs to be backed by extensive mitigation that will require the documentation of the site by means of plan sketches, test excavations to determine the temporal and cultural affinity of the site; • The layout and extent of the site needs to be documented and linked into a larger documentation of all the LIA stone walling present in the development study area, not only the footprint area but the whole of the study area); • After completion of the mitigation report, the developer can then apply for a destruction permit from SAHRA, and construction can commence.
MHC003	<ul style="list-style-type: none"> • changed and the two buildings planned, relocated to another area where it will not impact on heritage resources. • If the development layout is changed and the site is kept, it needs to be managed through a Heritage Management Plan (HMP) as part of the overall heritage management of heritage sites within the development area during the operational phase of the project. • If it is not possible to change the layout, it is recommended that the site is destroyed after the following procedure has been followed:

	<ul style="list-style-type: none"> ○ Before the site is destructed during development a destruction permit will be required under Section 35 of the NHRA ○ The application for destruction needs to be backed by extensive mitigation that will require the documentation of the site by means of plan sketches, extensive excavations to determine the temporal and cultural affinity of the site; ○ The layout and extent of the site needs to be documented and linked into a larger documentation of all the LIA stone walling present in the development study area, not only the footprint area but the whole of the study area); ● After completion of the mitigation report, the developer can then apply for a destruction permit from SAHRA, and construction can commence.
MHC004	<ul style="list-style-type: none"> ● Before the site is destructed during development a destruction permit will be required under Section 35 of the NHRA ● The application for destruction needs to be backed by extensive mitigation that will require the documentation of the site by means of plan sketches, test excavations to determine the temporal and cultural affinity of the site; ● The layout and extent of the site needs to be documented and linked into a larger documentation of all the LIA stone walling present in the development study area, not only the footprint area but the whole of the study area); ● After completion of the mitigation report, the developer can then apply for a destruction permit from SAHRA, and construction can commence.
MHC005	<ul style="list-style-type: none"> ● It is recommended that the site is fenced with a 20 meter buffer and supplied with a gate for access if the next-of-ken needs to visit the graves; ● The site needs to be managed through a Heritage Management Plan (HMP) as part of the overall heritage management of heritage sites within the development area during the operational phase of the project.
MHC007	<ul style="list-style-type: none"> ● Before the site is destructed during development a destruction permit will be required under Section 34 of the NHRA ● The application for destruction needs to be backed by documentation of the site by means of plan sketches; ● After completion of the mitigation report, the developer can then apply for a destruction permit from SAHRA, and construction can commence. ● It is further recommended that destruction activities for this site is monitored by and qualified archaeologist, as the possibility of child and still born burials close to the labourers housing does exist.
Additional LIA stone walling outside development footprint	<ul style="list-style-type: none"> ● Demarcate as no-go area with a 20 meter buffer during construction ● The site needs to be monitored during construction for any possible impacts by the ECO. ● If at any stage the site is disturbed a qualified archaeologist must be contracted to evaluate the damage and make recommendations on the appropriate mitigation measures. ● The site needs to be managed through a Heritage Management Plan (HMP) as part of the overall heritage management of heritage sites within the development area during the operational phase of the project.
MHC006, MHC008, MHC009	No mitigation required

Palaeontology

The National Fossil Sensitivity Map (<http://www.sahra.org.za/map/palaeo>) indicates that the area designated for the proposed development will not require a palaeontological assessment however a finds protocol will be required..

The overall impact risk class on heritage resources (excluding palaeontology, to be determined) is seen as medium to low with mitigation measures. **No fatal flaws were identified** from a cultural, historical, archaeological perspective. Implementation of recommended mitigation measures will ensure that impacts by the development on heritage resources discovered by chance will be kept to a minimum.

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9.3 Google Earth

All the aerial depictions used in this report are from Google Earth.

**APPENDIX A
HERITAGE SENSITIVITY AND SITES**

