



**PROPOSED MIXED USE RESIDENTIAL
TOWNSHIP - DALPARK EXTENSION 18,
SITUATED ON PORTION 461 OF THE
FARM WITPOORTJIE 117 IR,
EKURHULENI METROPOLITAN
MUNICIPALITY, GAUTENG PROVINCE**

Heritage Impact Assessment (HIA) Report

February 2021

CREDIT SHEET

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REPORT AUTHOR

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Disclaimer; Although all possible care is taken to identify all sites of cultural importance during the investigation of study areas, it is always possible that hidden or sub-surface sites could be overlooked during the study. G&A Heritage and its personnel will not be held liable for such oversights or for costs incurred as a result of such oversights.

Statement of Independence

As the duly appointed representative of G&A Heritage, I Stephan Gaigher, hereby confirm my independence as a specialist and declare that neither I nor G&A Heritage have any interests, be it business or otherwise, in any proposed activity, application or appeal in respect of which the Environmental Consultant was appointed as Environmental Assessment Practitioner, other than fair remuneration for work performed on this project.

SIGNED BY: STEPHAN GAIGHER



MANAGEMENT SUMMARY

Project Name and Location

Proposed mixed use residential township Development – Dalpark Extension 18, situated on Portion 461 of the Farm Witpoortjie 117 IR, Ekurhuleni Metropolitan Municipality, Gauteng Province.

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Date of Report

10 February 2021

MANAGEMENT SUMMARY

The purpose of the management summary is to distil the information contained in the report into a format that can be used to give specific results quickly and facilitate management decisions. It is not the purpose of the management summary to repeat in shortened format all the information contained in the report, but rather to give a statement of results for decision making purposes.

This study focuses on the proposed mixed use residential township – Dalpark Extension 18, situated on Portion 461 of the Farm Witpoortjie 117 IR, Ekurhuleni Metropolitan Municipality, Gauteng Province.

This study encompasses the heritage impact investigation. A preliminary layout has been supplied to lead this phase of this study.

Scope of Work

A Heritage Impact Assessment (including Archaeological, Cultural heritage, Built Heritage and Basic Palaeontological Assessment) to determine the impacts on heritage resources within the study area.

The following is required to perform this assessment:

- A desk-top investigation of the area;
- A site visit to the proposed development site;
- Identify possible archaeological, cultural, historic, built and palaeontological sites within the proposed development area;
- Evaluate the potential impacts of construction and operation of the proposed development on archaeological, cultural, historical resources; built and palaeontological resources; and
- Recommend mitigation measures to ameliorate any negative impacts on areas of archaeological, cultural, historical, built and palaeontological importance.

The purpose of this study is to determine the possible occurrence of sites with cultural heritage significance within the study area. The study is based on archival and document research combined with fieldwork investigations.

Findings and Recommendations

The study area, located on Portion 461 of the Farm Witpoortjie 117 IR in the Ekurhuleni Metropolitan Municipality, was investigated during a field visit and through archival studies.

Most of the proposed area is currently vacant land with wetland areas (Rietpruit). It is not anticipated that the development will be bedrock intrusive and as such a paleontological deposit will not be affected.

At least several hundred graves were observed on the site during the fieldwork. It is recommended that the graves be relocated to a formal, municipal cemetery before commencing with the project.

An old mine shaft and associated infrastructure were observed within the study area. These structures are noted on the topographical map 2628AD_1944. One can thus assume that the structures are at least 77 years old and will be protected under the NHRA. Due to the importance of mining in the evolution of the East Rand urban landscape these structures have significant historic value.

For these reasons, it is important that the site undergoes a second phase of investigation to determine its architectural and historic significance before any structures are demolished.

It is recommended that obscured, subterranean sites be managed if they are encountered.

Findings noted in the report: *van der Walt, J. 2006. Heritage Impact Assessment. Residential development on Portion 58 and remaining extend of Portion 46 of the farm Witpoortjie 117-IR, Ekurhuleni.*

2006 Site	Updated Recommendations
MHC 001	This site is located outside of the current study area and will not be affected.

MHC 005	This is a mine shaft and for safety reasons it should be closed or fenced in.
MHC 002	Recommendations from the 2006 report is supported.
MHC 007	This site is discussed in the findings of the 2021 report and the relevant mitigation is given
MHC 013	This site is located outside of the current study area and will not be affected.
MHC 003	Recommendations from the 2006 report is supported
MHC 010	Same as MHC 007
MHC 011	This site is located outside of the current study area and will not be affected.
MHC 012	This site is located outside of the current study area and will not be affected.
MHC 014	Although this site is within the current study area the archival study showed that it was younger than 60 years and therefore not protected under the NHRA. It was also found that the site did not represent and intrinsic part of the history of the area since it contained very little architectural fabric.

Fatal Flaws

No fatal flaws were identified.

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ABBREVIATIONS

Abbreviation	Meaning
BP	Before Present
BCE	Before the Common Era
Bp	Before Present
c.	circa
CE	Common Era
CSIR	Council for Scientific and Industrial Research
ECO	Environmental Control Officer
EIA	Early Iron Age
ELO	Environmental Liaison Officer
ESA	Early Stone Age
ESMS	Environmental and Social Management System
ESSS	Environmental and Social Safeguard Standards
Fm	Femtometre (10^{-15} m)
GPS	Geographic Positioning System
G-PHRA	Gauteng Provincial Heritage Resources Authority
HIA	Heritage Impact Assessment
ICP	Informed Consultation and Participation
LIA	Late Iron Age
LSA	Late Stone Age
MSA	Middle Stone Age
MYA	Million Years Ago
NHRA	National Heritage Resources Agency
PHRA	Provincial Heritage Resources Agency
PIA	Palaeontological Impact Assessment
PS	Performance Standard
SAHRA	South African Heritage Resource Agency
SAHRIS	South African Heritage Information System
SAPS	South African Police Service
SHE	Safety, Health and Environment
SHEQ	Safety, Health, Environment and Quality
S&EIR	Scoping and Environmental Impact Reporting
Um	Micrometre (10^{-6} m)
WGS 84	World Geodetic System for 1984

GLOSSARY OF TERMS

'Archaeological' means:

- a) Material remains resulting from human activity which are in a state of disuse and are in or on land and are older than 100 years, including artefacts, human and hominid remains and artificial features and structures;
- b) Rock art, being a 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 is older than 100 years including any area within 10 m of such representation; and
- c) Wrecks, being any vessel or aircraft, or any part thereof, which was wrecked in South Africa, whether on land or in the maritime cultural zone referred to in section 5 of the Maritime Zones Act 1994 (Act 15 of 1994), and any cargo, debris or artefacts found or associated therewith, which are older than 60 years or which in terms of national legislation are considered to be worthy of conservation;
- d) Features, structures and artefacts associated with military history which are older than 75 years and the sites on which they are found.

'Circa' is used in front of a particular year to indicate an approximate date.

'Grave' means a place of interment and includes the contents, headstone or other marker of and any other structures on or associated with such place. The South African Heritage Resources Agency (SAHRA) will only issue a permit for the alteration of a grave if it is satisfied that every reasonable effort has been made to contact and obtain permission from the families concerned.

'Paleontological' means any fossilised remains or fossil trace of animals or plants which lived in the geological past, other than fossil fuels or fossiliferous rock intended for industrial use, and any site which contains such fossilised remains or trace.

A **'place'** is defined as:

- a) A site, area or region;
- b) A building or other structure (which may include equipment, furniture, fittings and articles associated with or connected with such building or other structure);
- c) A group of buildings or other structures (which may include equipment, furniture, fittings and articles associated with or connected with such group of buildings or other structures); and (d) an open space, including a public square, street or park; and in relation to the management of a place, includes the immediate surroundings of a place.

'Structures' means any building, works, device, or other facility made by people and which is fixed to land and any fixtures, fittings and equipment associated therewith older than 60 years.

1. General

1.1 Introduction

Ekurhuleni Metropolitan Municipality proposes the development of a mixed use residential township on Portion 461 of the Farm Witpoortjie 117 IR, Ekurhuleni Metropolitan Municipality, Gauteng Province. The aim of the study is to identify all heritage sites, to document these and to assess the significance within local, provincial and national context.

1.2 Property Description and Demarcation

G&A Heritage was appointed by *Metroprojects* to undertake a Heritage Impact Assessment (HIA) for the proposed mixed use residential township – Dalpark Extension 18, situated on Portion 461 of the Farm Witpoortjie 117 IR, Ekurhuleni Metropolitan Municipality, Gauteng Province.

Dalpark is situated in Administrative Region D in the central part of Ekurhuleni, within the East Rand Mining Belt, relatively close to existing job opportunities and urban amenities within the traditional older areas and the CBD's of Boksburg, Brakpan and Springs.

The study area is located in the Dalpark neighbourhood of the East Rand in Gauteng, just southwest of Brakpan. The van Wyk Dam lies just north of the study area. There is a large slimes dam as well as a pipeline on the western border of the site and the southern boundary is defined by a railway line. The eastern boundary is defined by a powerline. The main access to the site is from the Provincial Road R23 (Heidelberg Road) on the eastern boundary of the site. The area under investigation is 216,46ha in extent.

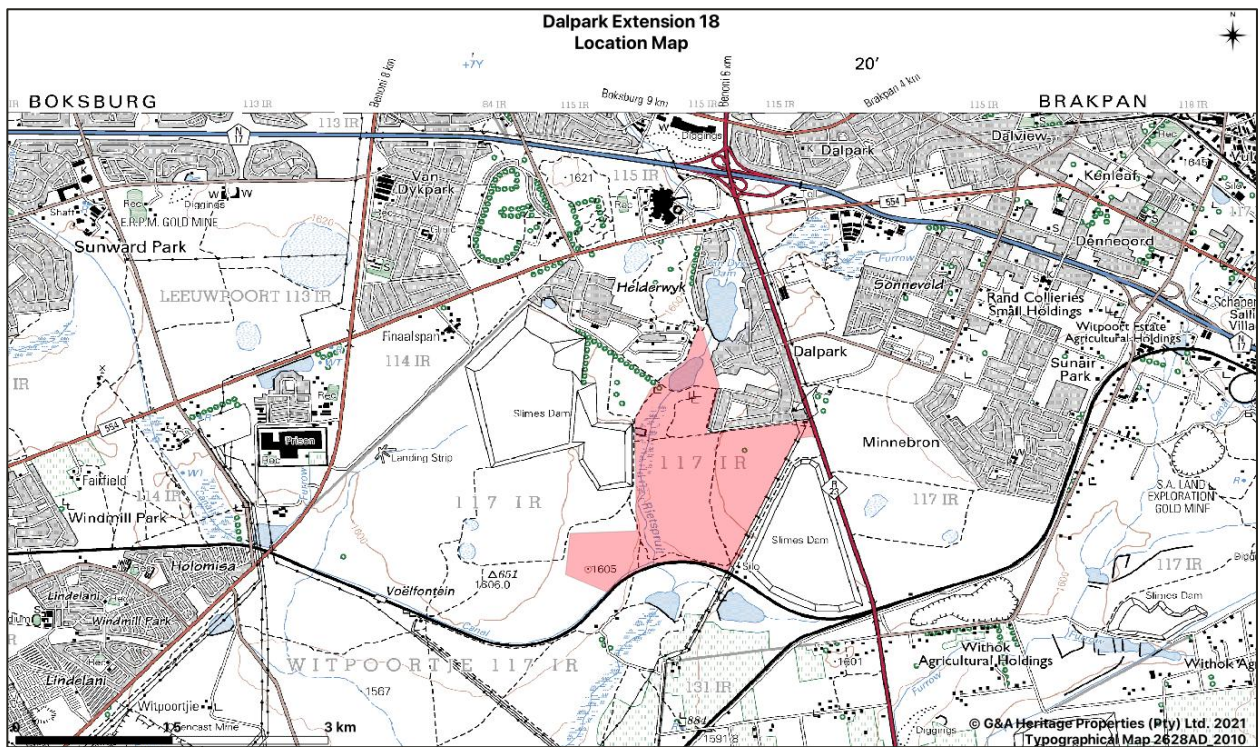


Figure 1. Proposed Dalpark Ext. 18 mixed use residential township Location Map

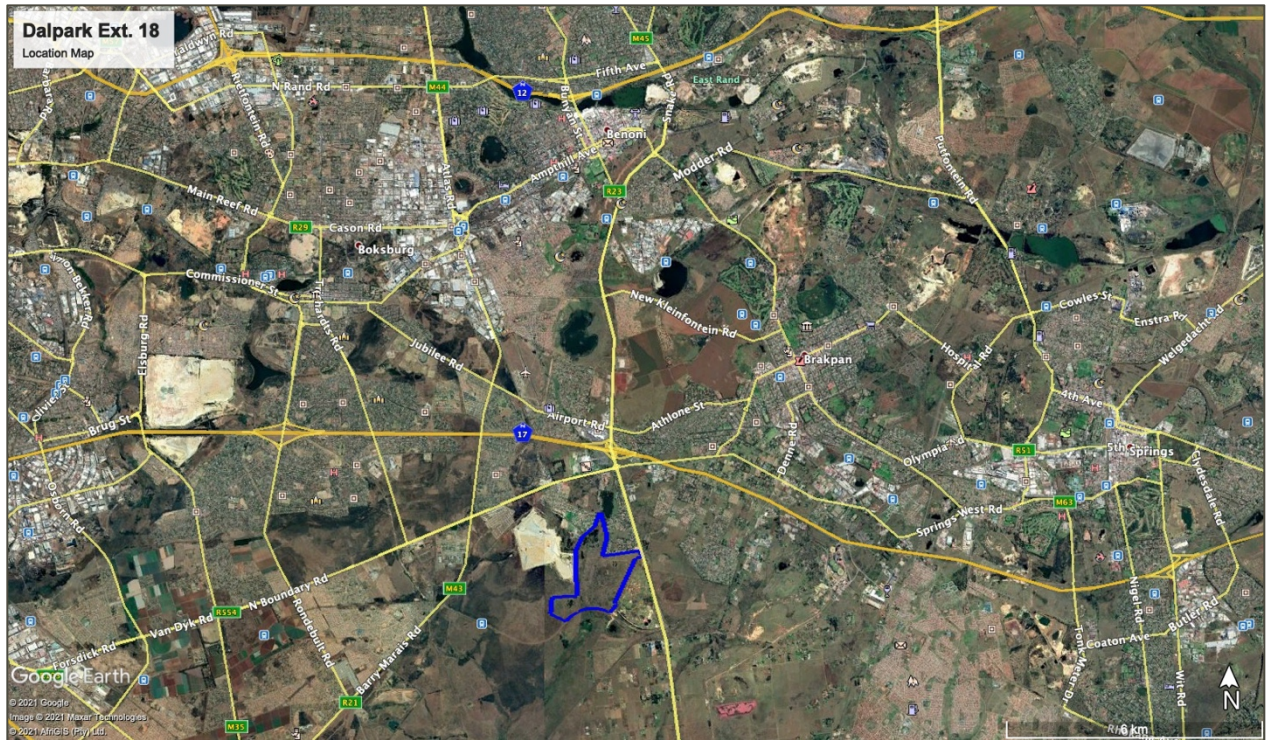


Figure 2. Study Area in Relation to the National Route N17, Boksburg, Brakpan and Springs

1.3 Technical Scope of HIA

This HIA focused only on the areas to be directly affected by the proposed development and is meant to deliver, evaluate and inform on the following aspects:

- (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 the relevant legal descriptions, development proponent requirements and as per international best practise approaches and charters;
- (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.

The following categories of heritage objects are considered.

Graves: Places of interment including the contents, headstone or other marker of and any other structures on or associated with such place. This may include any of the following:

- 1) Ancestral graves,
- 2) Royal graves and graves of traditional leaders
- 3) Graves of victims of conflict i.e. graves of important individuals
- 4) Historical graves and cemeteries older than 60 years
- 5) Other human remains, buried or otherwise.

The removal of graves is subject to the following procedures:

- Notification of the impending removals (using local language media and notices at the grave site);
- Consultation with individuals or communities related or known to the deceased;

- Satisfactory arrangements for the curation of human remains and / or headstones in a museum, where applicable;
- Procurement of a permit from the relevant controlling body;
- Appropriate arrangements for the exhumation (preferably by a suitably trained archaeologist) and re-interment (sometimes by a registered undertaker, in a formally proclaimed cemetery);
- Observation of rituals or ceremonies required by the families.

Movable objects: This includes objects such as historic or rare books and manuscripts, paintings, drawings, sculptures, statuettes and carvings; modern or historic religious items; historic costumes, jewellery and textiles; fragments of monuments or historic buildings; archaeological material; and natural history collections such as shells, flora, or minerals. Discoveries and access resulting from a project may increase the vulnerability of cultural objects to theft, trafficking or abuse. This may include any of the following:

- 1) Objects recovered from the soil or water including archaeological and paleontological objects and material, meteorites and rare geological specimens;
- 2) Ethnographic art and objects
- 3) Military objects
- 4) Objects of decorative art
- 5) Objects of fine art
- 6) Objects of scientific or technological interest
- 7) Books, records, documents, photographic positives and negatives, graphic, film or video material or sound recordings
- 8) Any other prescribed categories, but excluding any object made by a living person.

Protection of Historic Battlefields

Heritage “Places”: A ‘place’ is defined as:

- a) A site, area or region;
- b) A building or other structure (which may include equipment, furniture, fittings and articles associated with or connected with such building or other structure);
- c) A group of buildings or other structures (which may include equipment, furniture, fittings and articles associated with or connected with such group of buildings or other structures); and
- d) An open space, including a public square, street or park; and in relation to the management of a place, includes the immediate surroundings of a place.
- e) Traditional Buildings used in cultural ceremonies.

Heritage Structures: Refers to single or groups of architectural works found in urban or rural settings providing evidence of a particular civilisation, a significant development or a historic event. It includes groups of buildings, structures and open spaces constituting past or contemporary human settlements that are recognised as cohesive and valuable from an architectural, aesthetic, spiritual or socio-cultural perspective. This may also include any building, works, device, or other facility made by people and which is fixed to land and any fixtures, fittings and equipment associated therewith older than 60 years.

Archaeological Sites

Archaeological sites comprise any combination of structural remains, artefacts, human or ecological elements and may be located entirely beneath, partially above, or entirely above the land or water surface. Archaeological material may be found anywhere on the earth’s surface, singly or scattered over large areas. Such material includes burial areas, human remains, artefacts and fossils. Archaeological sites may include:

- a) Material remains resulting from human activity which are in a state of disuse and are in or on land and are older than 100 years, including artefacts, human and hominid remains and artificial features and structures;
- b) Rock art, being a 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 is older than 100 years including any area within 10 m of such representation; and
- c) Wrecks, being any vessel or aircraft, or any part thereof, which was wrecked, whether on land or in the maritime cultural zone, and any cargo, debris or artefacts found or associated therewith, which are older than 60 years or which in terms of national legislation are considered to be worthy of conservation;

- d) Features, structures and artefacts associated with military history which are older than 75 years and the sites on which they are found.

Paleontological resources: Refers to any fossilised remains or fossil trace of animals or plants which lived in the geological past, other than fossil fuels or fossiliferous rock intended for industrial use, and any site which contains such fossilised remains or trace.

Sacred or Spiritual Sites: Refers to natural features with cultural significance, which may include sacred hills, mountains, landscapes, streams, rivers, waterfalls, caves and rocks; sacred trees or plants, groves and forests; carvings or paintings on exposed rock faces or in caves; and paleontological deposits of early human, animal or fossilised remains. This heritage may have significance to local community groups or minority populations.

1.4 Geographical / Spatial Scope of HIA

The geographic and spatial scope of the HIA centres on the proposed mixed use residential township – Dalpark Extension 18, situated on Portion 461 of the Farm Witpoortjie 117 IR, Ekurhuleni Metropolitan Municipality, Gauteng Province.

Any sites within the directly impacted study areas that can be affected by the proposed development and, where known, are included in this report. Mitigation or secondary investigations take this footprint as the spatial parameters of the study area.

1.5 GPS Trackpath

The following image shows a plotting of the GPS trackpaths recorded during the fieldwork. Several files were combined, and this does not represent a single uninterrupted recording. GPX Files are available.



Figure 3. GPS Trackpath

1.6 Temporal Scope

The proposed project will consist of three phases;

- 1) Planning
- 2) Development
- 3) Operational

Due to the nature of the proposed development, impacts on heritage sites are only anticipated during the development phase of the proposed project. The operational phase will not result in any further alterations to heritage on any significant scale.

2. Legislative Context

2.1 National Legislation

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

- a) *Construction of a road, wall, power line, pipeline, canal or other similar form of linear development or barrier exceeding 300 m in length;*
- b) *Construction of a bridge or similar structure exceeding 50 m in length; and*
- c) *Any development, or other activity which will change the character of an area of land, or water –*
 - 1) *Exceeding 10 000 m² in extent;*
 - 2) *Involving three or more existing erven or subdivisions thereof; or*
 - 3) *Involving three or more erven, or subdivisions thereof, which have been consolidated within the past five years; or*
- d) *The costs of which will exceed a sum set in terms of regulations; or*
- e) *Any other category of development provided for in regulations.*

While the above describes the parameters of developments that fall under this Act., Section 38 (8) of the NHRA is applicable to this development. This section states that;

- (8) *The provisions of this section do not apply to a development as described in subsection (1) if an evaluation of the impact of such development on heritage resources is required in terms of the Environment Conservation Act, 1989 (Act 73 of 1989), or the integrated environmental management guidelines issued by the Department of Environment Affairs and Tourism, or the Minerals Act, 1991 (Act 50 of 1991), or any other legislation: Provided that the consenting authority must ensure that the evaluation fulfils the requirements of the relevant heritage resources authority in terms of subsection (3), and any comments and recommendations of the relevant heritage resources authority with regard to such development have been taken into account prior to the granting of the consent.*

In regard to a development such as this that falls under Section 38 (8) of the NHRA, the requirements of Section 38 (3) applies to the subsequent reporting, stating that;

- (3) *The responsible heritage resources authority must specify the information to be provided in a report required in terms of subsection (2) (a): Provided that the following must be included:*
 - 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;*
 - 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.*
 1. *Ancestral graves,*
 2. *Royal graves and graves of traditional leaders,*
 3. *Graves of victims of conflict (iv) graves of important individuals,*
 4. *Historical graves and cemeteries older than 60 years, and*
 5. *Other human remains which are not covered under the Human Tissues Act, 1983 (Act No.65 of 1983 as amended);*
 - h) *Movable objects, including ;*

1. Objects recovered from the soil or waters of South Africa including archaeological and paleontological objects and material, meteorites and rare geological specimens;
2. Ethnographic art and objects;
3. Military objects;
4. Objects of decorative art;
5. Objects of fine art;
6. Objects of scientific or technological interest;
7. Books, records, documents, photographic positives and negatives, graphic, film or video material or sound recordings; and
8. Any other prescribed categories, but excluding any object made by a living person;
 - i) Battlefields;
 - j) Traditional building techniques.

A **'place'** is defined as:

- a) A site, area or region;
- b) A building or other structure (which may include equipment, furniture, fittings and articles associated with or connected with such building or other structure);
- c) A group of buildings or other structures (which may include equipment, furniture, fittings and articles associated with or connected with such group of buildings or other structures); and (d) an open space, including a public square, street or park; and in relation to the management of a place, includes the immediate surroundings of a place.

'Structures' means any building, works, device, or other facility made by people and which is fixed to land and any fixtures, fittings and equipment associated therewith older than 60 years.

'Archaeological' means:

- a) Material remains resulting from human activity which are in a state of disuse and are in or on land and are older than 100 years, including artefacts, human and hominid remains and artificial features and structures;
- b) Rock art, being a 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 is older than 100 years including any area within 10 m of such representation; and
- c) Wrecks, being any vessel or aircraft, or any part thereof, which was wrecked in South Africa, whether on land or in the maritime cultural zone referred to in section 5 of the Maritime Zones Act 1994 (Act 15 of 1994), and any cargo, debris or artefacts found or associated therewith, which are older than 60 years or which in terms of national legislation are considered to be worthy of conservation;
- d) Features, structures and artefacts associated with military history which are older than 75 years and the sites on which they are found.

'Paleontological' means any fossilised remains or fossil trace of animals or plants which lived in the geological past, other than fossil fuels or fossiliferous rock intended for industrial use, and any site which contains such fossilised remains or trace.

'Grave' means a place of interment and includes the contents, headstone or other marker of and any other structures on or associated with such place. The South African Heritage Resources Agency (SAHRA) will only issue a permit for the alteration of a grave if it is satisfied that every reasonable effort has been made to contact and obtain permission from the families concerned.

The removal of graves is subject to the following procedures as outlined by the SAHRA:

- Notification of the impending removals (using English, Afrikaans and local language media and notices at the grave site);
- Consultation with individuals or communities related or known to the deceased;
- Satisfactory arrangements for the curation of human remains and / or headstones in a museum, where applicable;
- Procurement of a permit from the SAHRA;

- Appropriate arrangements for the exhumation (preferably by a suitably trained archaeologist) and re-interment (sometimes by a registered undertaker, in a formally proclaimed cemetery);
- Observation of rituals or ceremonies required by the families.

The limitations and assumptions associated with this heritage impact assessment are as follows;

- Field investigations were performed on foot and by vehicle where access was readily available.
- Sites were evaluated by means of description of the cultural landscape, direct observations and analysis of written sources and available databases.
- It was assumed that the site layout as provided by the consultant is accurate.
- We assumed that the public participation process performed as part of the Basic Assessment process was sufficiently encompassing not to be repeated in the Heritage Assessment Phase.

Table 1. Impacts on the NHRA Sections

Act	Section	Description	Possible Impact	Action
National Heritage Resources Act (NHRA)	34	Preservation of buildings older than 60 years	Yes	HIA, Phase 2 Assessment Recommended
	35	Archaeological, paleontological and meteor sites	No impact	None
	36	Graves and burial sites	Yes	HIA, Relocation Recommended
	37	Protection of public monuments	No impact	None
	38	Does activity trigger a HIA?	Yes	HIA

Table 2. NHRA Triggers

Action Trigger	Yes/No	Description
Construction of a road, wall, power line, pipeline, canal or other linear form of development or barrier exceeding 300m in length.	No	N/A
Construction of a bridge or similar structure exceeding 50m in length.	No	N/A
Development exceeding 5000 m ²	Yes	Proposed Dalpark Ex.18 mixed use residential township Development. 216,46ha.
Development involving more than 3 erven or sub divisions	No	N/A
Development involving more than 3 erven or sub divisions that have been consolidated in the past 5 years	No	N/A
Re-zoning of site exceeding 10 000 m ²	No	N/A
Any other development category, public open space, squares, parks or recreational grounds	No	N/A

3. Methodology

3.1 Heritage Management

This study defines the heritage component of the EIA process being undertaken for the proposed mixed use residential township – Dalpark Extension 18, situated on Portion 461 of the Farm Witpoortjie 117 IR, Ekurhuleni Metropolitan Municipality, Gauteng Province.

It is described as a first phase (HIA). This report attempts to evaluate both the accumulated heritage knowledge of the area through means of archival research as well as information derived from direct physical observations.

3.2 Inventory

Inventory studies involve the in-field survey and recording of archaeological resources within a proposed development area. The nature and scope of this type of study is defined primarily by the results of the overview study. In the case of site-specific developments, direct implementation of an inventory study may preclude the need for an overview.

There are a number of different methodological approaches to conducting inventory studies. Therefore, the proponent, in collaboration with the archaeological consultant, must develop an inventory plan for review and approval by the SAHRA prior to implementation (*Dincause, Dena F., H. Martin Wobst, Robert J. Hasenstab and David M. Lacy 1984*).

3.3 Evaluating Heritage Impacts

A combination of document research as well as the determination of the geographic suitability of areas and the evaluation of aerial photographs determined which areas could and should be accessed.

After plotting of the site on a GPS the areas were accessed using suitable combinations of vehicle access and access by foot.

Sites were documented by digital photography and geo-located with GPS readings using the WGS 84 datum. An aerial drone was used to evaluate the site from different heights and to improve coverage of the area.

Further techniques (where possible) included interviews with local inhabitants, visiting local museums and information centers and discussions with local experts. All this information was combined with information from an extensive literature study as well as the result of archival studies based on the SAHRA (South African Heritage Resource Agency) provincial databases.

This Heritage Impact Assessment relies on the analysis of written documents, maps, aerial photographs and other archival sources combined with the results of site investigations and interviews with affected people. Site investigations are not exhaustive and often focus on areas such as river confluence areas, elevated sites or occupational ruins.

The following documents were consulted in this study;

- South African National Archive Documents
- SAHRIS (South African Heritage Resources Information System) Database of Heritage Studies
- Historic Maps
- 1944, 1976, 1995, 2002 and 2010 Surveyor General Topographic Map series
- 1952 1:10 000 aerial photo survey
- Google Earth 2021 imagery
- Published articles and books
- JSTOR Article Archive

3.4 Site Visit / Fieldwork Details

Fieldwork for the HIA was done on the 4th of February 2021. Most of the areas were found to be accessible by foot. Vehicular access was possible in most areas. Areas of possible significance were investigated on foot. The survey was tracked using GPS and a track file in GPX format is available on request.

Where sites were identified it was documented photographically and plotted using GPS with the WGS 84 datum point as reference. GPX files are available on request from G&A Heritage.

The study area was surveyed using standard archaeological surveying methods. The area was surveyed using directional parameters supplied by the GPS and surveyed by vehicle and on foot. This technique has proven to result in the maximum coverage of an area.

Standard archaeological documentation formats were employed in the description of sites. Using standard site documentation forms as comparable medium, it enabled the surveyors to evaluate the relative importance of sites found. Furthermore, GPS (Global Positioning System) readings of all finds and sites were taken. This information was then plotted using a **Garmin Colorado** GPS (WGS 84- datum).

Indicators such as surface finds, plant growth anomalies, local information and topography were used in identifying sites of possible archaeological importance. Test probes were done at intervals to determine sub-surface occurrence of archaeological material. The importance of sites was assessed by comparisons with published information as well as comparative collections.

Test excavation is that form of archaeological excavation where the purpose is to establish the nature and extent of archaeological deposits and features present in a location, which it is proposed to develop (though not normally to fully investigate those deposits or features) and allow an assessment to be made of the archaeological impact of the proposed development. It may also be referred to as archaeological testing' (DAHGI 1999a, 27).

'Test excavation should not be confused with, or referred to as, archaeological assessment which is the overall process of assessing the archaeological impact of development. Test excavation is one of the techniques in carrying out archaeological assessment which may also include, as appropriate, documentary research, field walking, examination of upstanding or visible features or structures, examination of aerial photographs, satellite or other remote sensing imagery, geophysical survey, and topographical assessment' (DAHGI 1999b, 18).

3.5 Consultations

Signage indicating the HIA performed and the planned development actions were placed on site. The heritage component will be included in the larger ESIA advertisements placed by the lead consultant.

The following I&AP's were identified as possibly being impacted upon by the development;

- Residents of Brakpan - Dalpark, Helderwyk, Sonneveld and Minnebron neighborhoods.
- Next-of-kin of the deceased persons buried in the identified cemetery.

3.6 Assumptions

It was assumed that the impacted areas will be limited to the proposed development. It is furthermore assumed that the *PaleoSensitivity* Map provided on the SAHRIS platform is comprehensive enough to inform on actions in this regard.

3.7 Gaps / Limitations / Uncertainty

The area was readily accessible.

Due to the intensive cultivation of the field in the study areas, it was difficult to make surface observations of heritage deposits. It is uncertain whether the agricultural activities have damaged or obliterated any heritage sites that may have occurred there previously.

3.8 Specialist Specific Methodology

The scope of work includes:

- the identification and assessment of archaeological, cultural, historic, built and paleontological sites within the study area.
- Archival study of existing data and information for the study area.
- Site inspection and fieldwork.
- This site work includes communicating with local inhabitants to confirm possible locations of heritage and cultural sites.
- Impact assessment has been performed according to the methodology as described in the relevant Section.

4. Description of Affected Environment

4.1 Baseline

Context Relevant to Project Location, Design, Operation, or Mitigation Decisions

4.1.1 Palaeontology

The palaeontology of Western Gauteng is professionally researched in areas. The discovery of the Sterkfontein skeletons put this area in the forefront of palaeontology worldwide. The rule of “absence of evidence is not evidence of absence” should be applied to this area. Taken the rich palaeontology of Western Gauteng it is conceivable that similar finds could be made in this area.

Sections of study area falls within the red designation indicating that a Palaeontological Impact Field Assessment should be conducted, and protocols be put in place for any findings.

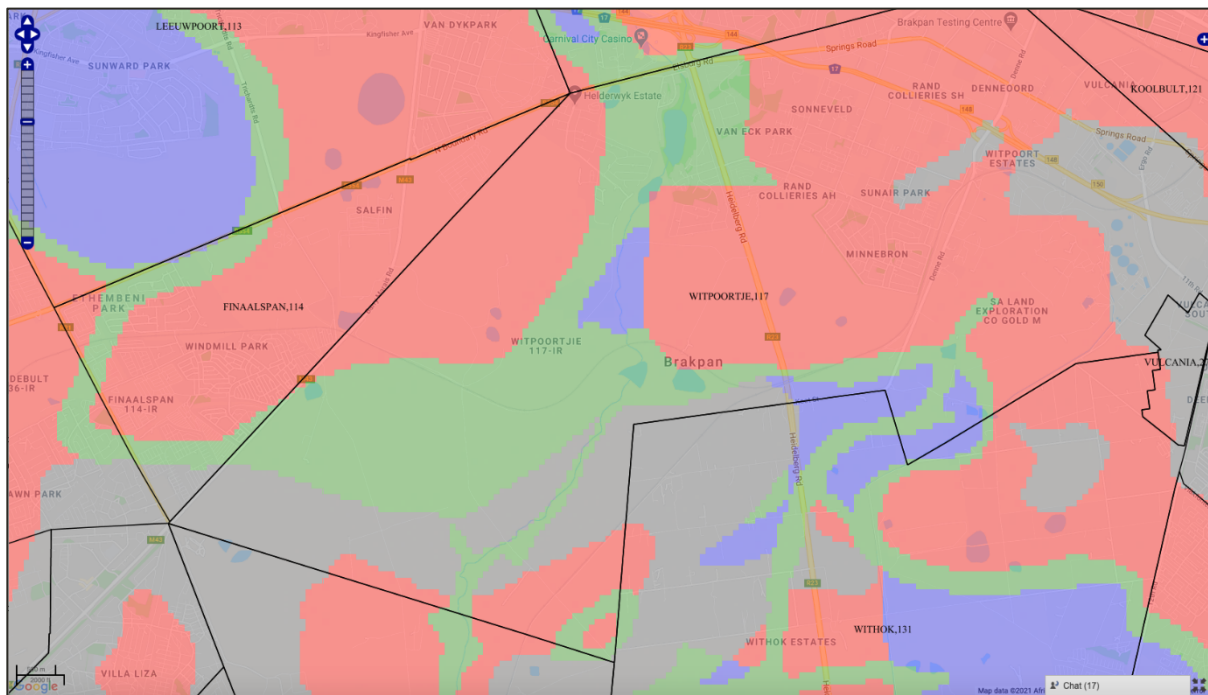


Figure 4. Paleo Sensitivity Map

Table 3. Palaeontological Sensitivity

Colour	Sensitivity	Action Required
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 area will require a minimum of a desktop study. As more information comes to light, SAHRA will continue to populate the map.

4.1.2 Stone Age

No substantial number of Stone Age sites from any period of the Stone Age is known to exist in this area – primarily as a result of a lack of research and general ignorance amongst the layman in recognizing stone tools that often may occur. However, it is possible that the first humans in the Benoni area may have been preceded by *Homo erectus*, who roamed large parts of the world during the Acheulian period of the Early Stone Age, 500 000 years ago. The predecessors of *Homo erectus*, *Australopithecus*, which is considered to be the earliest ancestor of modern humans, lived in the Blaauwbank Valley around Krugersdorp (today part of the Cradle of Humankind – a World Heritage Site) several million years ago.

During the Middle Stone Age, 200 000 years ago, modern man or *Homo sapiens* emerged, manufacturing a wider range of tools, with technologies more advanced than those from earlier periods. This enabled skilled hunter-gatherer bands to adapt to different environments. From this time onwards, rock shelters and caves were used for occupation and reoccupation over very long periods of time (Mitchell 2002). Two Middle Stone Age sites at the Withoek Spruit (Brakpan) were researched 17 years ago, but no information on this discovery has been published.

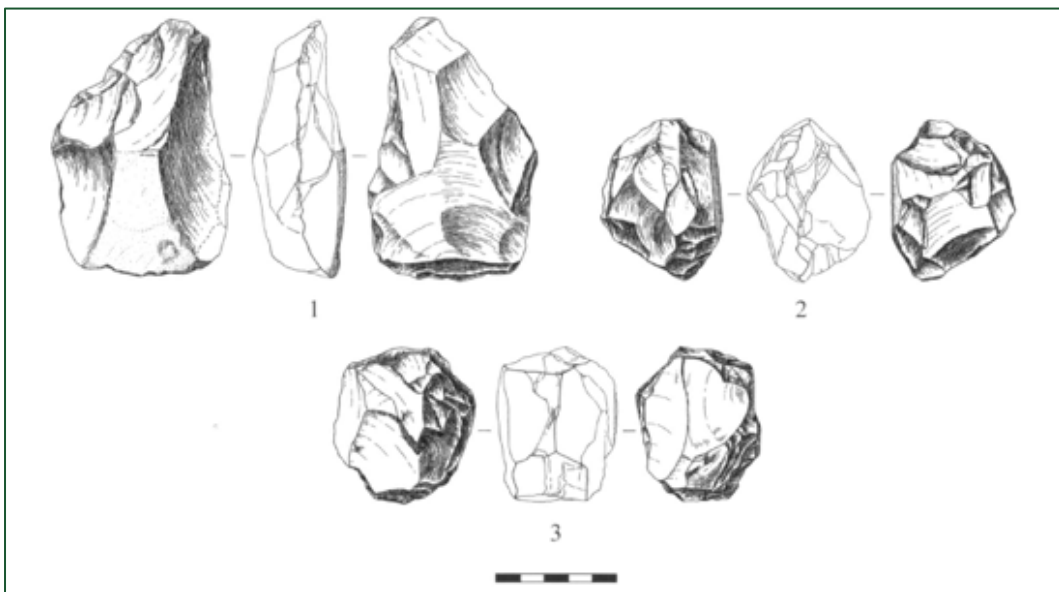


Figure 5. (1) handaxe on flake; (2) thick discoidal core; (3) polyhedral core (Pollarolo, Kuman, Bruxelles, 2010)

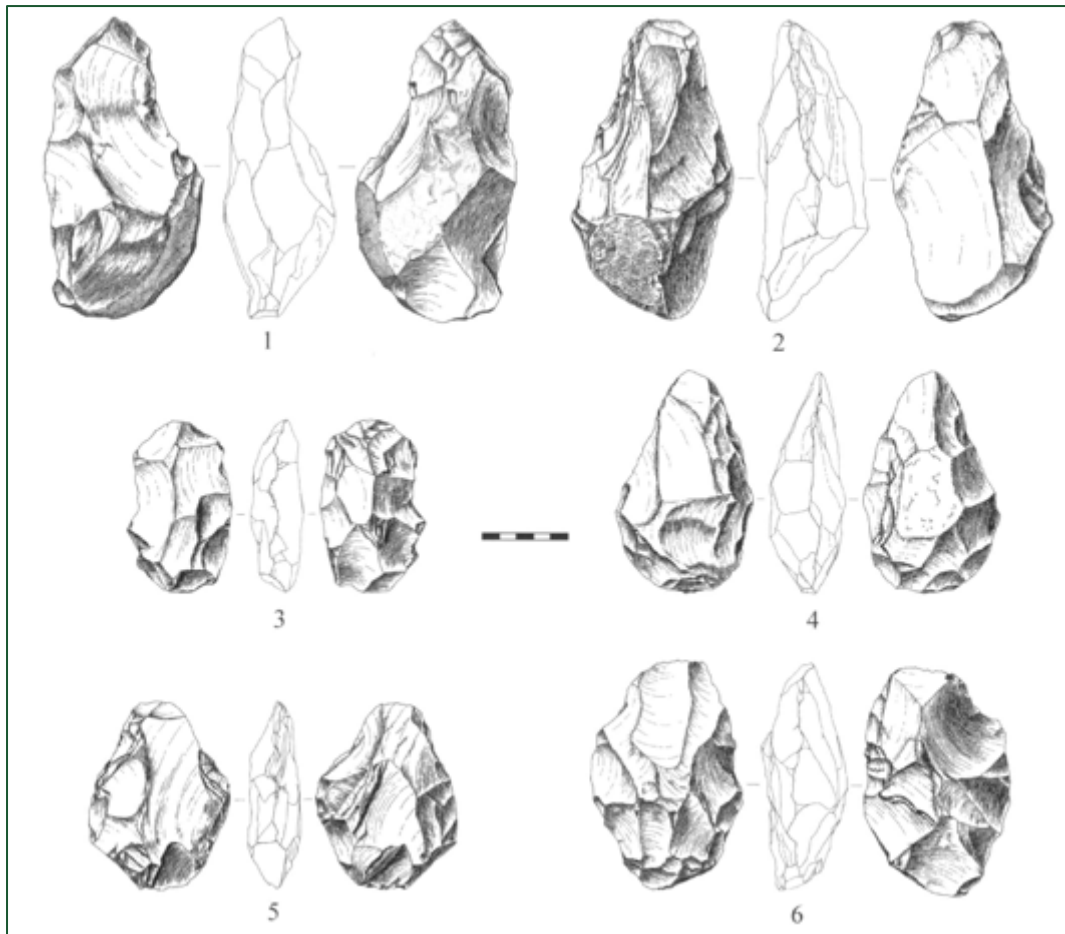


Figure 6. (1,2) Handaxes with large side removal; (3-6) handaxes (Pollarolo, Susino, Kuman, Bruxelles, 2010)

The Late Stone Age, considered to have started some 20 000 years ago, is associated with the predecessors of the San and Khoi Khoi. San hunter-gatherer bands with their small (microlithic) stone tools may have lived in Eastern Gauteng, as a magnificent engraving site near Duncanville attests to their presence in Vereeniging, south of, but close to Ekurhuleni. Stone Age hunter-gatherers lived well into the 19th century in some places in SA, but may not have been present in Brakpan when the first European colonists crossed the Vaal River during the early part of the 19th century. Stone Age sites may occur all over the area where an unknown number may have been obliterated by mining activities, urbanization, industrialization, agriculture and other development activities during the past decades (Morris 2004).

Reverent Patterson discovered some Stone Age deposits in Benoni during 1933, close to the train station. These were probably from the Middle to Late Stone Age.

4.1.3 Iron Age

A considerable number of Late Iron Age, stone walled sites, dating from the 18th and the 19th centuries (some of which may have been occupied as early as the 16th century), occur along and on top of the rocky ridges of the eastern part of the Klipriviersberg towards Alberton. These settlements and features in these sites, such as huts, were built with dry stone, reed and clay available from the mountain and the Klip River (Mason 1968, 1986).

The Late Iron Age sites within Ekurhuleni's south-eastern border are a 'spill-over' from a larger concentration which are located further towards the west, in the Witwatersrand, while large concentrations of stone walled sites are also located directly to the south of Johannesburg, in the mountainous area around the Suikerbosrand in Heidelberg. The stone walled settlements are concentrated in clusters of sites and sometimes are dispersed over large areas making them vulnerable to developments of various kinds. A site consists of a circular or elliptical outer wall that is composed of a number of scalloped walls facing inwards

towards one or more enclosures. Whilst the outer scalloped walls served as dwelling quarters for various family groups, cattle, sheep and goat were stocked in the centrally located enclosures. Huts with clay walls and floors were built inside the dwelling units. Pottery and metal items are common on the sites. However, iron and copper were not produced locally on these sites (Killick 2004).

Some 100 years earlier, African farmers in the Fokeng cluster built stonewalled settlements in the Tshwane area that emphasised the centre/side axis. From the air, these earlier settlements resemble a 'fried egg'; that is, a smooth outer ring about 60 metres across enclosed in a central cattle byre about 20 metres in diameter. This type has its origins among BaFokeng living near the hill Ntsuanatsatsi in the Free State (see pre history of Bloemfontein). When these early BaFokeng people moved north across the Vaal River, they met the ancestors of Southwest Sotho-Tswana, such as BaRolong and BaThlaping. Their interaction helped to create a new type of stonewalling called Klipriviersburg. Besides Johannesburg, Klipriviersburg walling is also found around Pretoria. All of these people were mixed farmers; that is, they herded cattle as well as sheep and goats, and they cultivated sorghums, millets and various beans and peas. They were also capable of making metal tools and jewellery.

The earliest evidence of metal working in the region comes from the site Broederstroom west of Pretoria. Archaeologists have uncovered the remains of at least two stratified villages there that date back to between AD 550 and 700, each with evidence of iron forging. Two major technological steps characterise ancient iron production: smelting and forging. Technically, iron ore is reduced in a furnace to create a bloom. During this smelting process, silica in the host rock melts, flowing off as slag leaving the bloom behind. The bloom has to be forged in an oxidised atmosphere, usually in an open hearth. In both smelting and forging, bellows attached to clay pipes help the operators reach the necessary high temperatures. Culturally, Bantu-speaking people in the recent past compared the smelting process to childbirth, a private and sacred affair. Consequently, the smelter was usually secluded outside the settlement. Forging, in contrast, was comparable to raising the child; and so the forge was located in a public area in the centre of the homestead. The forges at Broederstroom follow this pattern. (<http://www.sahistory.org.za/topic/prehistory-pretoria>)

4.1.4 Historic Era

Farming people did not inhabit the Greater Johannesburg region until the Late Iron Age. Then, beginning in the 15th century, BaFokeng dominated the landscape. A few other Sotho-Tswana people, most notably BaKwena, also lived in the region. Large, stonewalled settlements of both BaKwena and BaFokeng characterised the troubled times of the *difaqane* / *mfecane* at the end of the 18th century. Mzilikazi, however, depopulated the region in 1823; and so, the land appeared empty when Voortrekkers arrived.

The evolution of the region *Southern Transvaal*, its industrial development, rate of urban development and settlement pattern were greatly influenced by geology and mining, following the discovery of gold deposits in 1886.

The first Voortrekker parties crossed the Vaal River and started occupying the area in the 1830's. Farmers started moving into the area and declared farms for themselves, especially after the signing of the Sand River convention in 1852.

Benoni's inauspicious beginnings were in 1881 when then surveyor general, Johan Rissik, found it difficult to assign title deeds to all unclaimed state property. He named the area 'Benoni (Son of my Sorrows)' after the name given by Rachel to her son in the biblical book of Genesis.

"*Brakpan*" was named in 1886, due to the very brackish water from a small pan on the Farm "*Weltevreden*".

The evolution of the region *Southern Transvaal*, its industrial development, rate of urban development and settlement pattern were greatly influenced by geology and mining, following the discovery of gold deposits in 1886 and coal in 1888.

A gold mine in the Witwatersrand Reef on Rietfontein farm that started up in 1893.

Sir George Farrar, the chairman of a mining company, undertook the planning of the rapidly growing mining town of Benoni in 1904. A river was dammed to create a series of reservoirs for mine use. Benoni was declared a township in 1906.



Figure 7. Earliest known photograph of Benoni (1900 - 1910). Published in East Rand Annual in 1936

The *Brakpan Mines Company* sunk its first two gold mine shafts in 1905. Brakpan remained a suburb of Benoni until 1919 when it was granted the status of a municipality and proclaimed as a town.

The *Rand Rebellion* (or *Rand Revolt*) was an armed uprising of white miners in the Area in March 1922. Following a drop in gold prices, the companies tried to cut their costs by reducing wages and promoting more African miners to skilled and supervisory positions at lower rates.

The strike started on 28 December 1921 and became an open rebellion against the state. The workers armed themselves and took over Brakpan, Benoni and some suburbs of Johannesburg. The strike continued for three months, involving bloody clashes between the miners and the military workers. On 9 March, Prime Minister Smuts issued mobilization orders for the Active Citizens Force and declared martial law. The rebellion was crushed by considerable military power (20 000 troops, artillery, tanks and bomber aircraft) and as the cost of over 200 lives.

During the Apartheid Era (1948 to 1994), it was the discriminatory racial segregation (*apartheid*) legislation, enacted by the Nationalist Party (after coming to power in 1948) that extensively transformed the land-use. Citizens were separated into different townships according to their race with buffer strips of at least 100m wide or by environmental buffer zones thus the Black South Africans in the area lived in the Brakpan Old Location.

During the Apartheid Era, designated townships for Blacks were established outside Benoni, namely Daveyton and Wattville. The township of Actonville was established for the habitation of Indians, whilst 'Benoni Proper' was reserved for 'whites only'. These various suburbs remain, although the City is today relatively well integrated and all race groups may live where they choose. Each of these suburbs have their own interesting histories.

The Brakpan Old Location was the backdrop to many anti-apartheid struggles. The people living in the location were actively trying to improve their living conditions and to challenge the laws that were suffocating them.

Mbulelo Vizikhungo Mzamane wrote "*Children of Paradise*" to detail the area and the events of the time, through his own eyes as a young boy living in Brakpan Old Location. It is a poignant story of the innocence and trust of a young, black South African, who does not understand the severity of the situation he is caught in. Although beautifully told, it does not provide specific historical references to events unfolding in the area. It does however mention events and places that can be researched through alternative methods.

Vosloorus was established in 1963 when Black Africans were removed from Stirtonville because it was considered by the government too close to a white town. Stirtonville, renamed Reiger Park, has since become home to Boksburg's coloured community. A local authority was established in 1983 when Vosloorus was given full municipal status.

It has been said that Former Pres. Nelson Mandela was hiding out in the Stirtonville area and surrounds.

The community of Brakpan Old Location were forcibly removed from their homes from 1974 to 1978 and had to re-establish themselves in Tskane approximately 15km South. The Old Location was razed.

In 1988, the town councils of Vosloorus and Reiger Park staged a consumer boycott in Boksburg on the East Rand. The boycott by black and coloured residents followed the reintroduction of petty apartheid measures of the Boksburg Town Council, which at the time was controlled by the Conservative Party (CP). The boycott found enthusiastic corporate support. A number of multinational companies like Colgate-Palmolive, American Cyanamid and Unilever provided buses to ferry shoppers to shops in neighbouring towns, cancelled expansion plans and ran advertisements denouncing the racist Council. The economy of the town suffered and several businesses had to close down.

Since 1978, the recycling of the mine tailings at Brakpan (the largest such dump in the Witwatersrand) has resulted in the recovery of significant residual quantities of gold and uranium.

The Benoni and Brakpan Municipalities were incorporated into the Ekurhuleni metropolitan Municipality in 2001.

Over time gold mining in the area has decreased in importance. Today Benoni is focused more on industry and services, rather than mining, and is used as a service hub for other East Rand towns such as Brakpan, Nigel and Springs. Benoni is also the site of the Benoni Heliport, for the use of helicopters.

Sources:

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<http://www.sacp.org.za/docs/history/fifty3.html>

<http://www.historyworld.net/wrldhis/PlainTextHistories.asp?ParagraphID=otw>

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<http://www.sahistory.org.za/people/david-wilcox-bopape>

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Global.Britannica.com/Brakpan

Historyworld.net

SA History Online/Boksburg

SA History Online/Consumer Boycotts

Boksburg Historical.com

SA Military History.org

Mbulelo Vizikhungo Mzamane, "Children of Paradise"

4.1.5 SAHRIS Database Studies

An extensive research into the SAHRIS database resulted in the identification of the following heritage related studies that have been performed over the last decade in the study area. Only studies within a radius of 50km from the study area were considered.

- Van der Walt, 2006. Heritage Impact Assessment. Residential development on Portion 58 and remaining extend of Portion 46 of the farm Witpoortjie 117-IR, Ekurhuleni.
- Huffman, T. 1993. Archaeological Survey of Witboekspuit, Brakpan.
- Van Schalkwyk, J., Naude, M. 2012. A Survey of Cultural Resources along the Proposed Pwv 16 Road Corridor, Brakpan District.
- Huffman, T. 2005. Archaeological Assessment of the Thubelisha Project, Boksburg.
- Pistorius, J.C.C. 2006. A Phase I Heritage Impact Assessment (HIA) Study for a Proposed New Residential Development on the Farm Modderfontein 761R in Benoni in the Gauteng Province, South Africa.
- Van Schalkwyk, J. 2014. Cultural Heritage Impact Assessment for the Proposed Residential Development, Portion 57, Benoni 771R, Ekurhuleni, Gauteng Province.

- Kusel, U. 2007. Cultural Heritage Resource Impact Assessment of the Farm Vlaklaagte 161 Tsakane Benoni Gauteng.
- Van Schalkwyk, J. 2014. Cultural Heritage Impact Assessment for the proposed residential development, Vlakfontein Portion 50, Benoni, Ekurhuleni, Gauteng Province.
- Van der Walt, J. 2008 Cultural Heritage Impact Assessment: Portions 18, 65, 83 and 194 of the Farm Rietfontein 115 JR, Portion 23 and Remaining Extent of Portion 22 of the Farm Weltevreden 118 IR, Benoni, Gauteng Province.
- Van Der Walt, J. 2014. Archaeological Impact Assessment for the proposed Brakpan Memorial Park Development, Gauteng Province.
- Van Der Walt, J. 2009. Archaeological Impact Assessment: Helderwyk Township development on the remainder of Portion 62 of the Farm Witpoortjie 117IR, Brakpan, Ekurhuleni, Gauteng Province.
- Pelser, A. 2011. A Phase I Archaeological Impact Assessment for the rehabilitation of the Boksburg Lake Downstream Wetland in Boksburg, Gauteng Province.
- Van der Walt, J., Birkholtz, P. 2012, Phase 1 Heritage Impact Assessment for the Proposed Development of the ERPM Line Village, Boksburg, Gauteng.
- Birkholtz, P., Salomon, A. 2011. Phase 1 Heritage Impact Assessment: Proposed Development of Farrar Park, Ext. 1 Boksburg, Ekurhuleni Metropolitan Municipality, Gauteng Province.
- Birkholtz, P., Salomon, A. 2011. Phase 1 Heritage Impact Assessment: Proposed Development of Reiger Park Ext. 16 Boksburg, Ekurhuleni Metropolitan Municipality, Gauteng Province.
- Birkholtz, P., Salomon, A. 2011. Phase 1 Heritage Impact Assessment: Proposed Development of Reiger Park Ext. 18 Boksburg, Ekurhuleni Metropolitan Municipality, Gauteng Province.
- Van Schalkwyk, J., Terblanche, M. 2013. Cultural Heritage Impact Assessment for the Proposed Development on Portions 397 and 399 of the Farm Driefontein 85IR, Boksburg, Gauteng Province.
- Birkholtz, P., Salomon, A. 2011. Phase 1 Heritage Impact Assessment: Proposed Development of Farrar Park Ext. 2, Boksburg, Ekurhuleni Metropolitan Municipality, Gauteng Province.
- Birkholtz, P. 2014. Heritage Impact Assessment for Proposed Township Development: Vosloorus Ext 24, Vosloorus Ext 61 and Vosloorus Ext 63, Boksburg Local Municipality, Ekurhuleni Metropolitan Municipality, Gauteng Province.
- Birkholtz, P. 2011. Phase 1 Heritage Impact Assessment: Proposed Comet Ext 14 Development Located on Portion 43 of the Farm Driefontein 85-IR, Boksburg, Ekurhuleni Metropolitan Municipality, Gauteng Province.
- Pelser, A. 2011. A Phase 1 Archaeological Impact Assessment for the Rehabilitation of the Libradene Wetland in Boksburg, Gauteng Province.
- Birkholtz, P., Salomon, A. 2011. Phase 1 Heritage Impact Assessment: Proposed Leeuwpoort North Development located on the remainder of portion 51 and 52 as well as part of portion 22 of the Farm Leeuwpoort 113 IR, Boksburg, Ekurhuleni Metropolitan Municipality, Gauteng Province.
- Magoma, M., Salomon, A. 2013. Archaeological Investigation Study for the proposed Solar Power farm on Portion 12 & 13 of Farm Villa Liza 675 IR Mapleton, Ekurhuleni Metropolitan Municipality, Gauteng Province.
- Van Schalkwyk, J. 2007. Heritage Survey report for the proposed development on portions 43 and 52 of the farm Vlakplaats in the Boksburg Magisterial District, Gauteng.
- Prins, F., Zuma, M. 2010. Cultural Heritage Impact Assessment of the Boksburg Mining Belt Development. (Comet Extension 8 HIA).
- Gaigher, S. 2017. Heritage Impact Assessment for the Proposed Upgrade to Apex Bulk Outfall Sewer Line Phase 1 and Phase 2 near Benoni, Ekurhuleni Metropolitan Municipality, Gauteng Province.
- Gaigher, S. 2017. Heritage Impact Assessment for the Proposed New Modder Ext 4 Residential Development on Part of the Remainder of Portion 1 of the Farm Modderfontein 76 IR near Benoni, Ekurhuleni Metropolitan Municipality, Gauteng Province.

4.2 Relevance of Listed Heritage Studies for the Current Study

(See Section 8.1 – Map of Key Features)

Of specific value for this project are the following studies:

4.2.1 The 2006 report by Jaco van der Walt – Heritage Impact Assessment. Residential development on Portion 58 and remaining extend of Portion 46 of the farm Witpoortjie 117-IR, Ekurhuleni. (italics indicate verbatim)

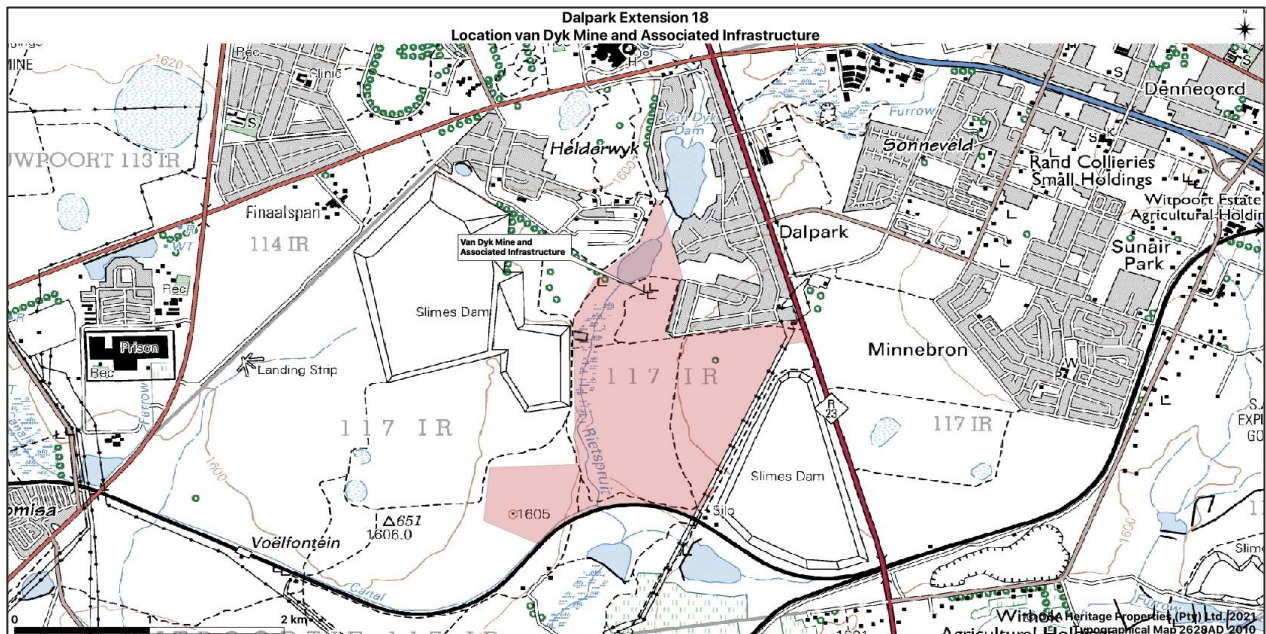


Figure 8. Location Map of the Van Dyk Mine and Associated Infrastructure

Please take note of the sites identified in the 2006 report by Jaco van der Walt – Heritage Impact Assessment – Residential development on Portion 58 and remaining extend of Portion 46 of the farm Witpoortjie 117-IR, Ekurhuleni, in the 9.5 – SAHRIS Database Studies section of this report.

Some dumping takes place within the study area. See section 6.1.2 – Cultural Landscape & Existing Land Use.

During the survey fourteen heritage significant sites were found in the proposed development area. The following section gives an outline of the sites found and the proposed mitigation measures.

A summary of the recommendations for each of the main heritage sites follows:

Archaeological Sites

Stone Age:

No single concentration of artefacts could be found that classifies as a site, the artefacts are scattered over a large area and consists mostly of Middle Stone Age tools. The tools are exposed from pebble layers that are unearthed by burrowing animals and trenches dug for pipelines in the south eastern portions of the proposed development.

Recommendation:

It is recommended that a watching brief are agreed upon to monitor the site during construction to mitigate accidental finds.

Cemeteries

Number of sites found:

Three cemeteries were found – these are sites MHC004, MHC006, MHC009.

Recommendation:

The best option would be the preservation of the cemeteries in situ. Th the development is of such a nature that the site will be severely impacted on the graves and cemetery will have to be relocated. The possibility

of more graves at site MHC009 needs to be established first before development can commence in this location.

If the cemetery were to be preserved in situ, it will have to be fenced off and provided with a gate for access by family members. A buffer zone of at least 10 meters will have to be kept around the cemetery as to facilitate the protection of the site during development.

In the instance that the cemetery needs to be relocated, this must be done with adherence to all legal requirements as well as an extensive social consultation process required within the process. It is well advised that a company with a proven record of accomplishment be used to manage and complete such a project.

Historical Farmsteads

Number of sites found:

One site was found namely MHC008.

Recommendation:

The best option would be the preservation of the farmstead in situ. If development is of such a nature that the site will be severely impacted some mitigation will be necessary. Mitigation will include:

- The site should be recorded (site survey) indicating the footprint of the dwelling and remains of the single outbuilding (including the trees and middens).*
- Small test excavations into the middens are also recommended to obtain datable material for the site.*
- The building should be recorded: photographic recording and measured drawings of the building (floor plan and elevations).*
- The building and structures may be demolished after recording and destruction permit have been granted by SAHRA.*

If the site is to be preserved in situ, it will have to be fenced and a buffer zone of at least 10 meters will have to be kept around the site as to facilitate the protection of the site during construction.

Possible Historic Shaft

Number of sites found:

One site was found namely site MHC005.

Recommendation:

The best option would be the preservation of the site in situ. If the development is of such a nature that the site will be severely impacted on, it is recommended that the site is mapped on scaled plan sketches.

If the site is to be preserved in situ, it will have to be fenced and a buffer zone of at least 10 meters will have to be kept around the site as to facilitate the protection of the site during development.

Stone cairn

Number of sites found:

One site was found namely MHC001.

The purpose of the cairn is not known, however the possibility exists that this might be a single unmarked grave.

Recommendation:

The best option would be the preservation of the site in situ. The the development is of such a nature that the site will be severely impacted on it is recommended that test excavations are done to determine if the site is a grave.

If is the site is not to be impacted upon and to be preserved in situ, it will have to be fenced and a buffer zone of at least 10 meters will have to be kept around the site as to facilitate the protection of the site during development.

Mine shafts

Number of sites found:

Three sites were found namely site MHC002, MHC007, MHC013.

Recommendation:

We are of the opinion that the recommendations must be implemented at site MHC007:

- The concrete covered shaft must be retained and included into an area set aside for appropriate memorialisation.
- The open shaft must be sealed with concrete slabs and incorporated into a site of memorialisation.
- The site of memorialisation must contain signage to warn pedestrians and future visitors of the danger of the covered areas and also inform them of the history of the mine and site.
- The remaining infrastructural elements can be demolished.
- A historical aerial photograph should be included in the final heritage report to indicate the extent of the workings of the mine and also function as an essential historical record to warn the developers of possible occurrences of more shafts. This material is also essential for the historical memorialisation process.
- The site for appropriate memorialisation must be integrated into the design of the development, must be informative and accessible to the public or tourists.

Partially preserved structures and foundations:

Number of sites found:

Four sites was found namely MHC003, MHC010, MHC011, MHC012 and MHC014.

Recommendation:

The best option would be the preservation of the site in situ. If the development is of such a nature that the site will be severely impacted on, the site have been sufficiently documented and recorded and no further action is necessary.

Sites of significance derived from the archival study

The study has shown that the proposed development area fell within an area that was mined for gold during two separate phases. The first mining phase is associated with the Van Dyk Proprietary Mines Limited and lasted from 1904 to 1910. The second and much more intensive mining phase started in 1934 and is associated with the Van Dyk Consolidated Mines Limited. Although the cessation of all mining operations could not be established, it is possible that this must have taken place during the 1960s or possibly even early 1970s.

A Number of significant heritage features were also identified, including mine shafts, mine compounds, married staff quarters, an old dam, old farm buildings as well as cemeteries. Unfortunately most of these features have been demolished. From the above mentioned heritage features only the cemetery, the old dam and the farm buildings have been preserved.

4.2.2 Review of Recommendations

Table 4. Sites of Significance

Site No.	Description	Latitude	Longitude	Relevance to Current Study Area
2628AD-MHC001	Stone cairn	-26.29385993	28.32496664	Not within the Study Area
2628AD-MHC002	Mine shaft	-26.28798321	28.30895578	Relevant and recommendations made stands as per vd Walt's 2006 report.
2628AD-MHC003	Partially preserved structures and foundations	-26.28791984	28.32119646	Relevant and recommendations made stands as per vd Walt's 2006 report.
2628AD-MHC004	Cemetery	-26.27938027	28.32147324	Relevant and recommendations

				made stands as per vd Walt's 2006 report.
2628AD-MHC005	Possibly historical mine shaft	-26.28453758	28.31492261	Relevant and recommendations made stands as per vd Walt's 2006 report.
2628AD-MHC006	Cemetery	-26.28156116	28.31964648	
2628AD-MHC007	Mine shaft	-26.27480309	28.31616648	Relevant and recommendations made stands as per vd Walt's 2006 report.
2628AD-MHC008	Historical farmstead	-26.28639006	28.31296133	Relevant and recommendations made stands as per vd Walt's 2006 report.
2628AD-MHC009	Cemetery	-26.28754224	28.31145141	Relevant and recommendations made stands as per vd Walt's 2006 report.
2628AD-MHC010	Partially preserved structures and foundations	-26.27432775	28.31482764	Relevant and recommendations made stands as per vd Walt's 2006 report.
2628AD-MHC011	Partially preserved structures and foundations	-26.26775189	28.31726401	Not within the Study Area
2628AD-MHC012	Partially preserved structures and foundations	-26.26702820	28.31403865	Not within the Study Area
2628AD-MHC012	Partially preserved structures and foundations	-26.26633183	28.31245213	Not within the Study Area
2628AD-MHC012	Partially preserved structures and foundations	-26.26464279	28.31432305	Not within the Study Area
2628AD-MHC013	Mine shaft	-26.26294822	28.31623865	Not within the Study Area
2628AD-MHC014	Partially preserved structures and foundations	-26.28019000	28.32068000	Relevant and recommendations made stands as per vd Walt's 2006 report.

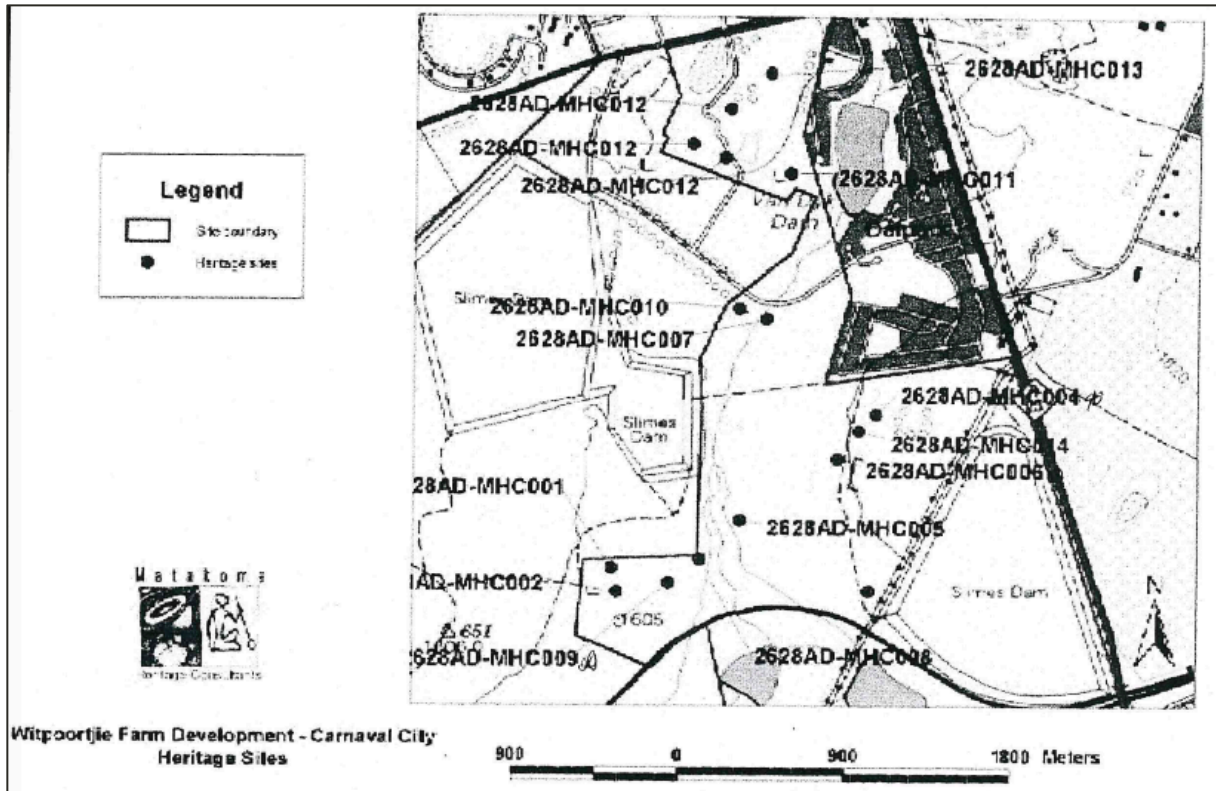


Figure 9. Location Map of Sites from 2006 report by Jaco van der Walt – Heritage Impact Assessment. Residential development on Portion 58 and remaining extend of Portion 46 of the farm Witpoortjie 117-IR, Ekurhuleni



Figure 10. Van der Walt 2006 Sites in relation to Current Study

The recommendations for this report were reviewed for the current study and how they apply to the current project area and layout. The following updated recommendations are given and override the 2006 results. These sites are only the sites for which mitigation was recommended during the 2006 study.

Table 5. Sites of Significance

2006 Site	Updated Recommendations
MHC 001	This site is located outside of the current study area and will not be affected.
MHC 005	This is a mine shaft and for safety reasons it should be closed or fenced in.
MHC 002	Recommendations from the 2006 report is supported.
MHC 007	This site is discussed in the findings of the 2021 report and the relevant mitigation is given
MHC 013	This site is located outside of the current study area and will not be affected.
MHC 003	Recommendations from the 2006 report is supported
MHC 010	Same as MHC 007
MHC 011	This site is located outside of the current study area and will not be affected.
MHC 012	This site is located outside of the current study area and will not be affected.
MHC 014	Although this site is within the current study area the archival study showed that it was younger than 60 years and therefore not protected under the NHRA. It was also found that the site did not represent and intrinsic part of the history of the area since it contained very little architectural fabric.

4.2.3 The 1993 report by Thomas Huffman – Archaeological Survey of Withoekspruit, Brakpan.

Two middle Stone Age sites were found along the edge of the vlei, but they will not be endangered by mining activity. An historic cemetery, however, stands next to a main access road, and it should be fenced.

Middle Stone Age (ca 250 000 to 30 000 years ago) artifacts were found in several places, and two appeared to be true concentrations (Sites 2 and 4). Site 2 is the rocky area on both sides of the spruit near the crossing at the No. 2 Ventilation Shaft. Flakes, cores and a triangular point were noted. Site 4 at the curve of the spruit on Withoek Estate is an extensive exposure of water worn rocks which had served as a Stone Age quarry. Cores were particularly abundant. Both these sites are above the projected trench line.

An addition to the Stone Age material, a few historic localities were recorded. The foundations and walls of a dairy (Site 3), dating to the 20th century, still stand on Ptn 21 between the large slimes dam and vlei. This structure is well above the vlei, but it is worth noting in case of future developments in that area.

The historic cemetery (Site 1) below the No. 2 Ventilation Shaft, on the other hand, is next to a main access road. This cemetery dates between 1884 and 1921 and contains the graves of Kapp, Steyn, Horn and Ackerman families, some of whom may have been on the Great Trek. Some of the Steyn graves are in the shape of a coffin, and there are other interesting details. Unfortunately, the cemetery has been damaged over the years, but it is still an important site.

Recommendations

The historic cemetery is in a precarious situation next to the access road. This is one of the oldest recorded graveyards on the East Rand, and it should be protected. We have discussed the problem with Mr Andrew on site, and he has agreed to erect a fence to protect the cemetery against heavy traffic.

The two Middle Stone Age sites are not in danger and therefore do not require mitigation.

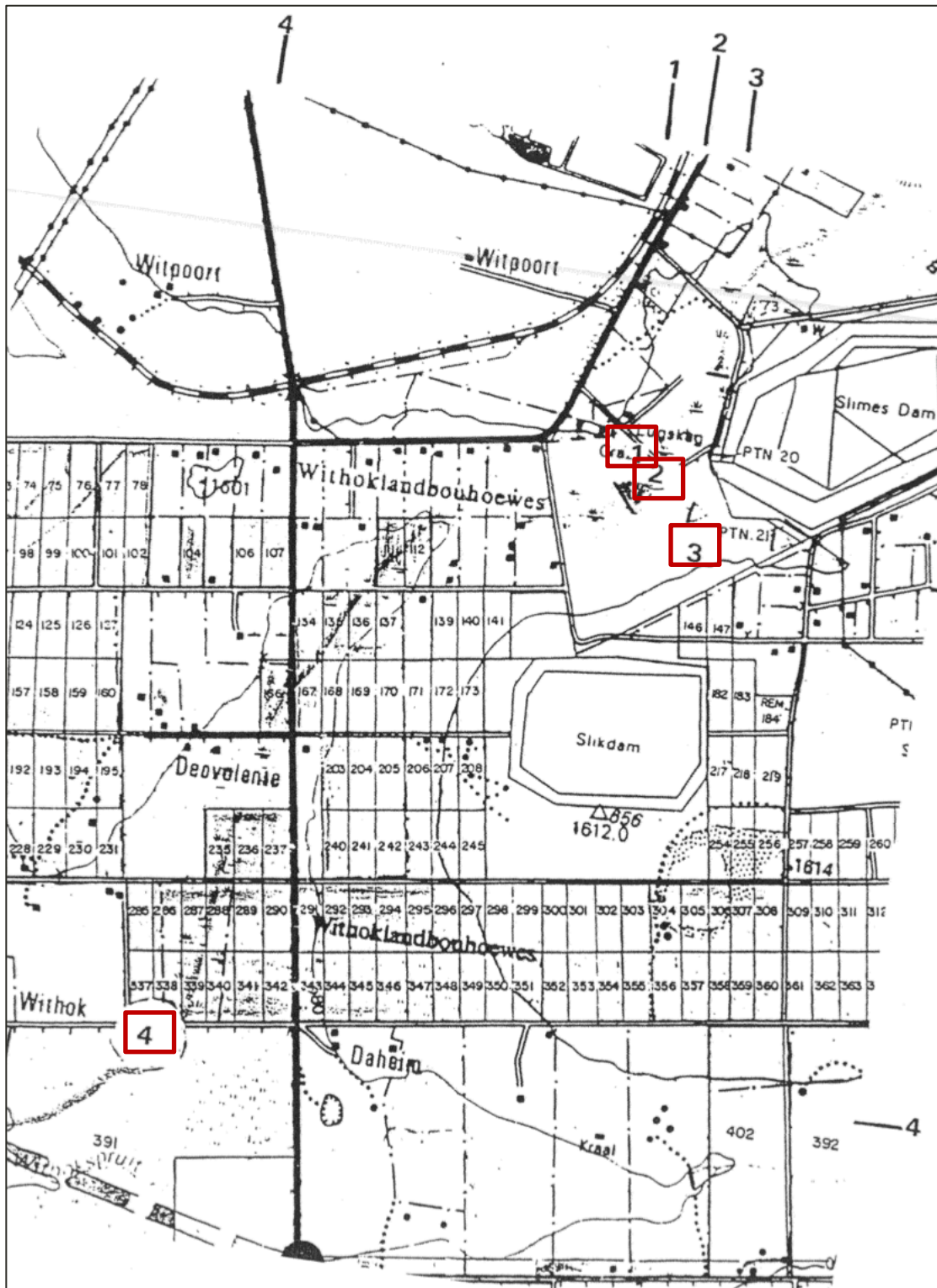


Figure 11. Location Map of Sites from the 1993 report by Thomas Huffman – Archaeological Survey of Witboekspruit, Brakpan

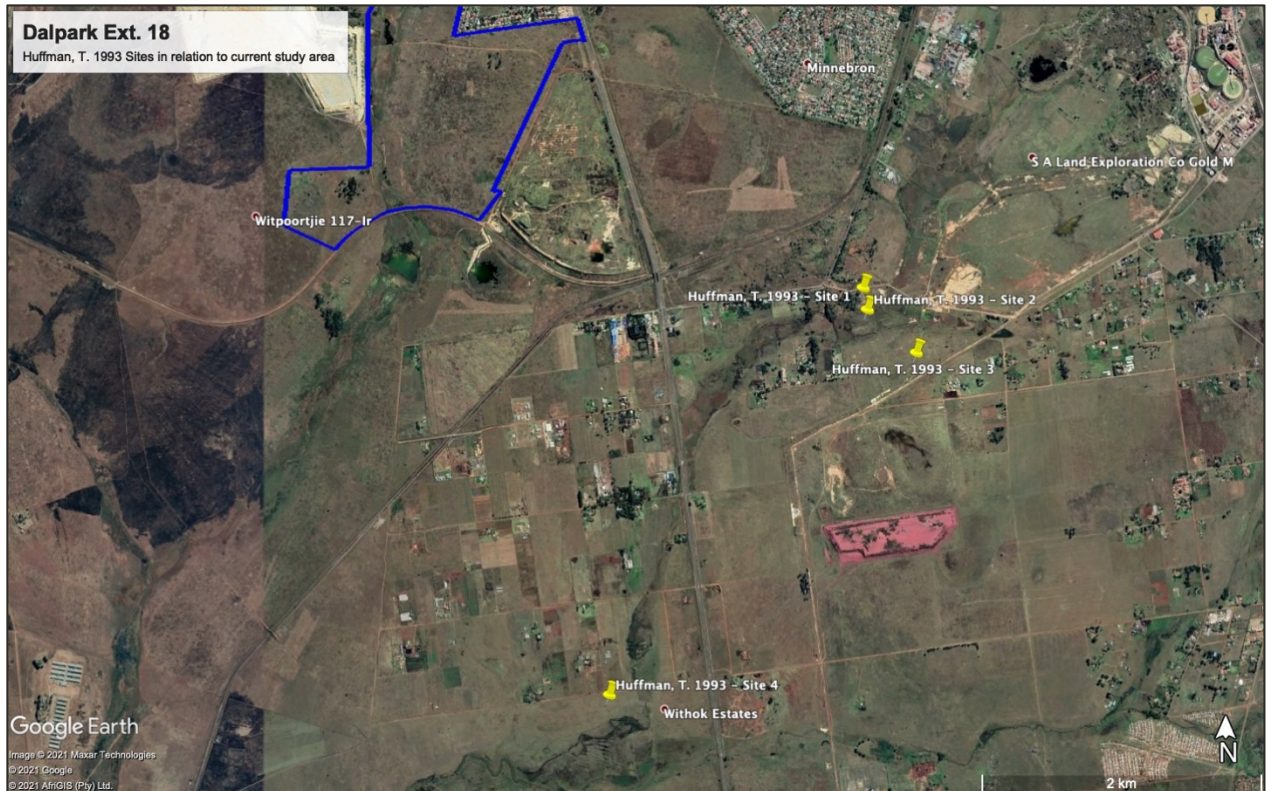


Figure 12. Huffman 1993 Sites in relation to Current Study Area

4.2.4 The 2005 report by Thomas Huffman – Archaeological Assessment of the Thubelisha Project, Boksburg.

Results

The project area covers a flat terrain that has been extensive cultivated in historic times: contour ridges are still clearly visible. The old fields surrounding the remains of a farm complex, marked on the map as **Sedgehill** (Site 1: 26 17 49S 28 16 00E). The remains include the reservoir for a windmill, the walls of a brick building, the foundations of the main house and the foundations of several out buildings. A cemetery was not obvious.

- This farm complex is probably not over 60 years old, and its significance is low.

The cement floor of a dairy (Site 2: six rooms with small feeding troughs) is located about 800m west (26 18 05S 28 15 34E), while the remains of a labourer's compound (Site 3: two rectangular foundations with cement floors, a long back wall and exotic plants) stand nearby (26 18 03S 28 15 38E). Neither appear on the 1 : 50 000 map.

- Sites 2 and 3 have low significance.

A road linking Windmill Park to Rondebult Road (the R21) forms the northern boundary of the project area. It is now used as a dumping ground. One large cinder dump (26 17 28S 28 15 33.9E) could be older, but no other features were obvious.

- On present evidence, the dump has no significance.

A few Middle Stone Age (about 25 000 to 25 000 years ago) artefacts lie widely scattered in the ploughed fields. The artefacts were made mostly out of quartzite. A small concentration occurs on the edge of the pan (Site 4: 26 17 55S 28 15 34.3E) and another about 500m to the south (Site 5: 26 18 05S 28 15 52E).

- Site 4 and 5 have no significance.



Figure 13. Location Map of Sites from the 2005 report by Thomas Huffman – Archaeological Assessment of the Thubelisha Project, Boksburg

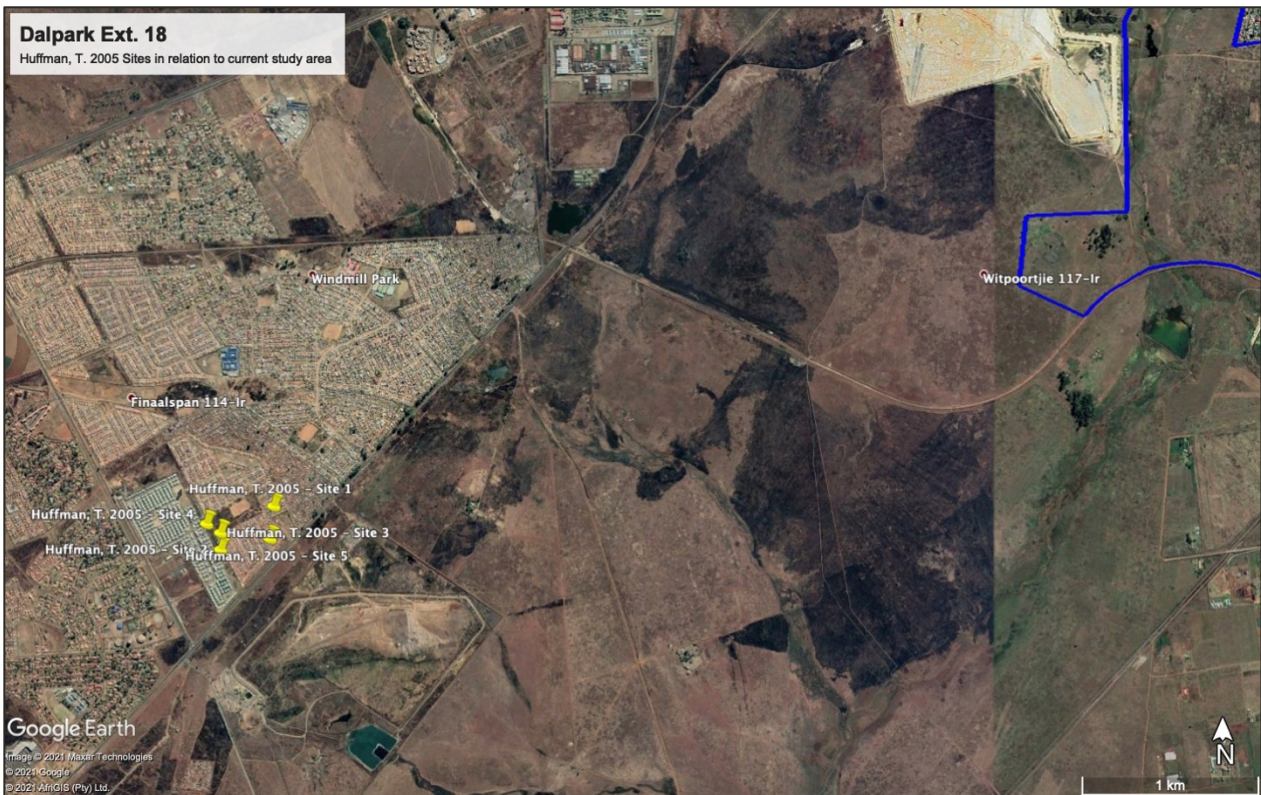


Figure 14. Huffman 2005 Sites in relation to Current Study Area

4.3 Historical Topographical Maps

Especially during the evaluation of historic structures, the use of archived historic maps is very handy. They give a direct chronological reference for such sites and also lead the investigation on the ground.

The following historic map sets are relevant for this study (in chronological order);

- 2628AD_1944
- 2628AD_1976
- 2628AD_1995
- 2628AD_2002
- 2628AD_2010

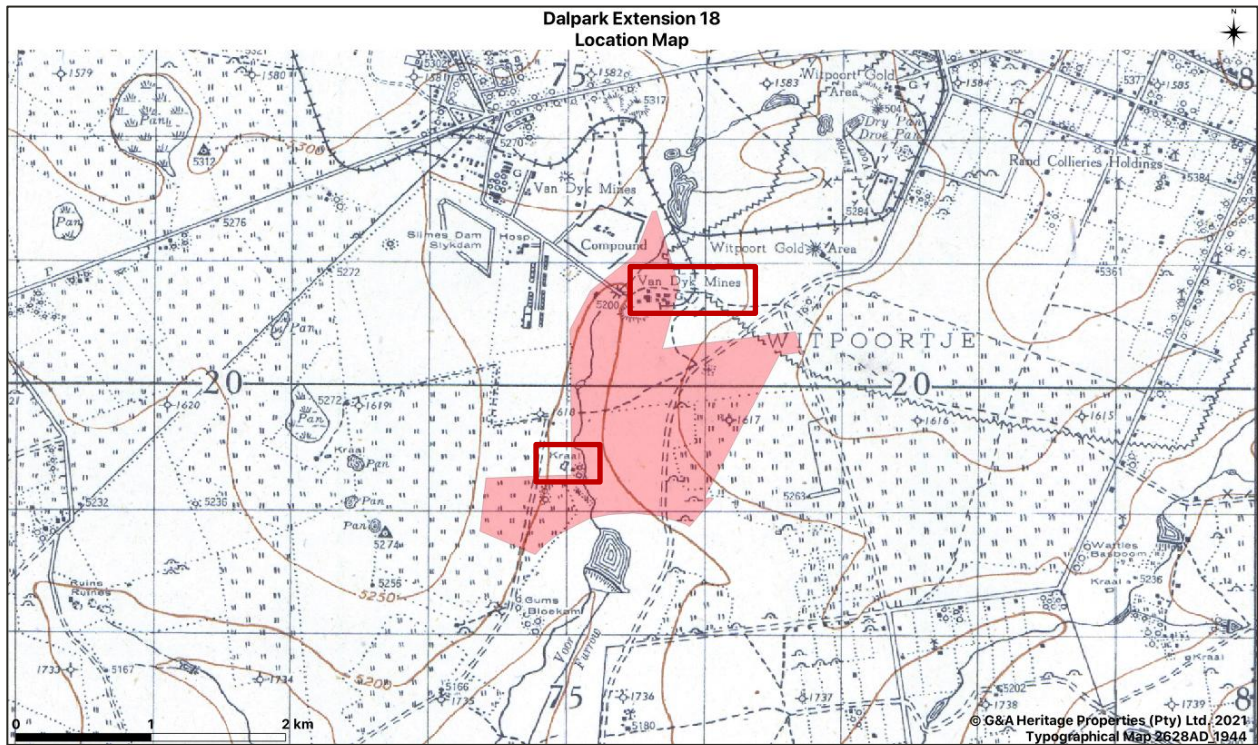


Figure 15. Topographic Map 2628AD_1944

The Van Dyk Mine and associated structures are present on the 1944 topographical map. One can thus assume that the structures are at least 77 years old and will be protected under the NHRA. Due to the importance of mining in the evolution of the East Rand urban landscape these structures have significant historic value.

A kraal is also noted on the western border of the study area.

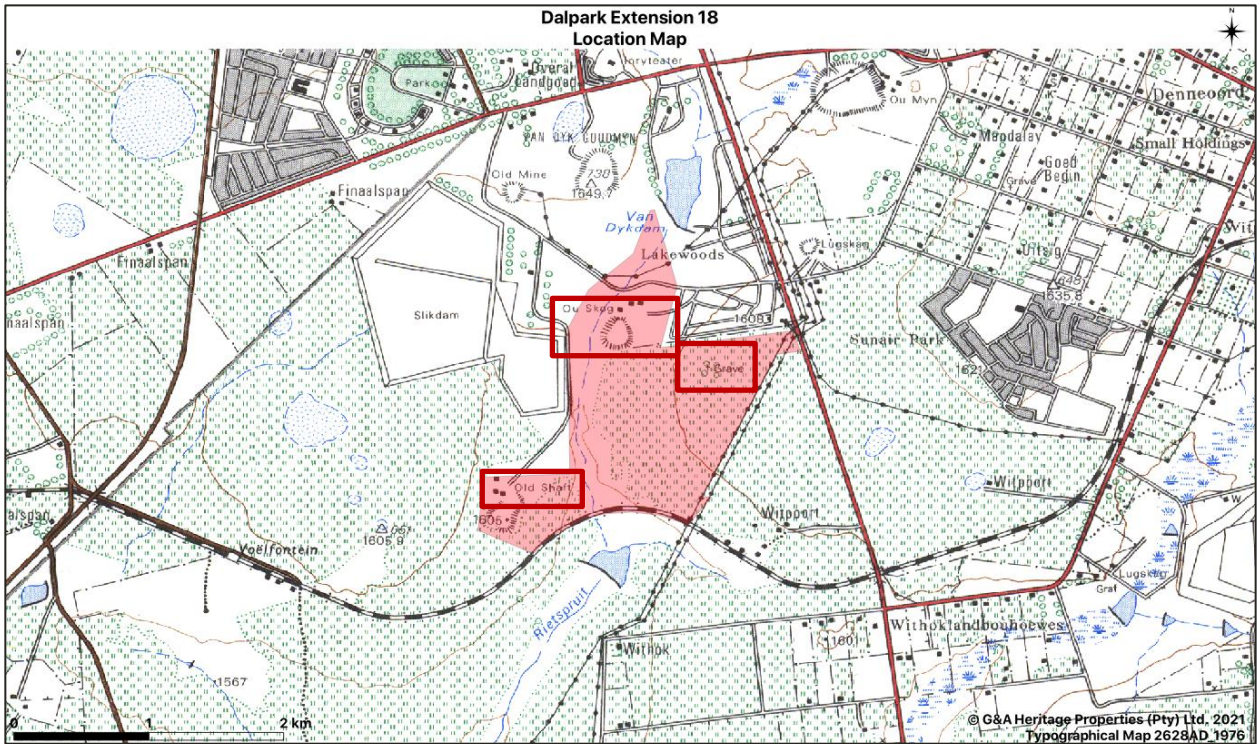


Figure 16. Topographic Map 2628AD_1976

The cemetery observed on the site as well as two old mine shafts are noted on the 1976 topographical map.

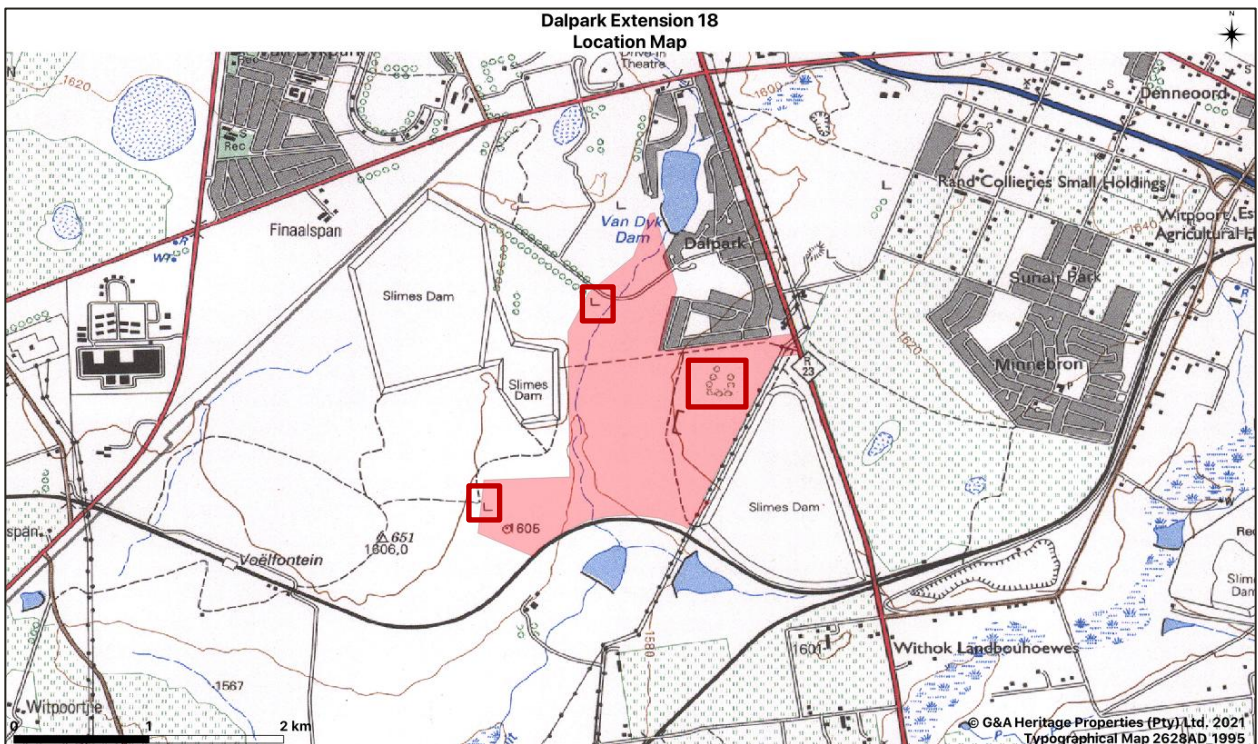


Figure 17. Topographic Map 2628AD_1995

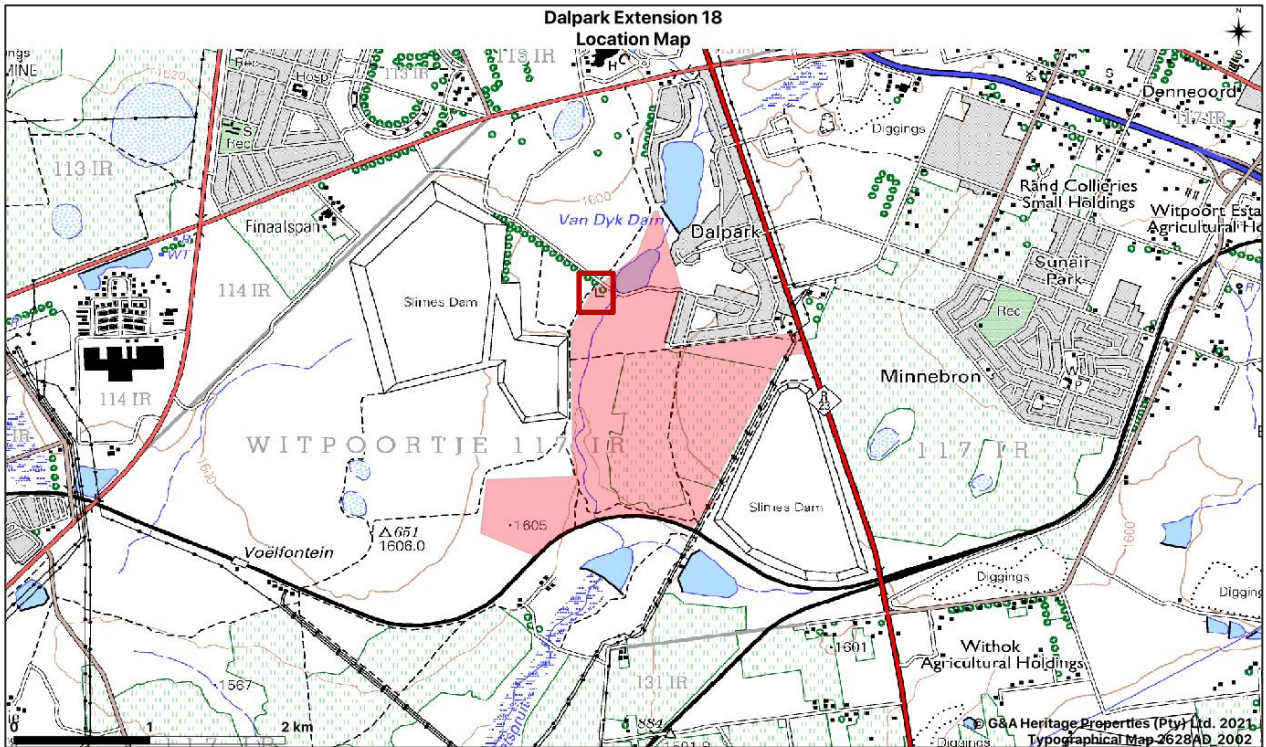


Figure 18. Topographic Map 2628AD_2002

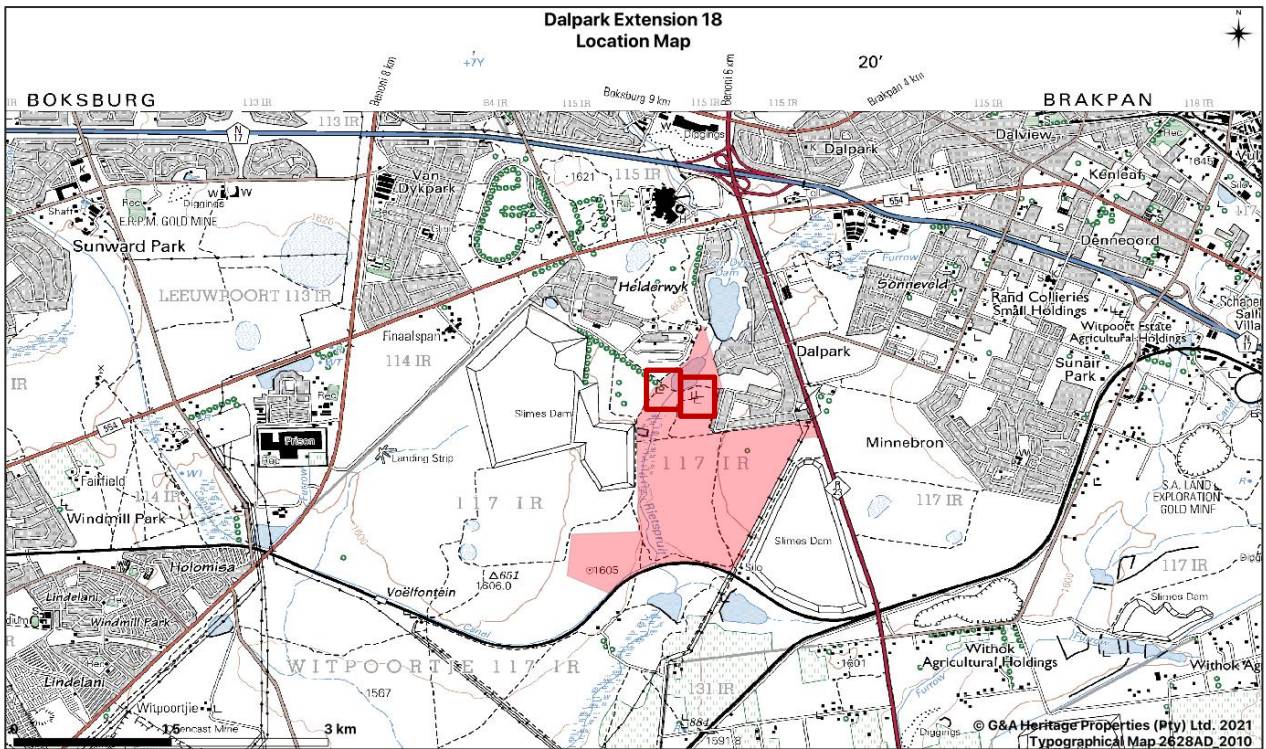


Figure 19. Topographic Map 2628AD_2010

4.4 Cultural Landscape & Existing Land Use

The study area can be described as an old mining area. The main road through the site is currently being used to access the slimes dam on the western border. The area has undergone significant alternations due to previous as well as current land uses.



Figure 20. Access Road to Slimes Dam



Figure 21. Landscape of the Study Area

A wetland occupies the western section of the site (Rietspruit).



Figure 22. Wetland (Rietspruit)



Figure 23. Wetland (Rietspruit)



Figure 24. Wetland (Rietspruit) and Dumping



Figure 25. Dumping

5. Findings

The area was accessed by vehicle and investigated on foot. The areas have been mostly disturbed from green field condition and can be described as an old mining area.

5.1 Pre-Contact Sites

No Pre-Contact Sites could be identified within the study areas as a result of agricultural activities.

5.2 Post-Contact Sites

No Post-Contact Sites could be identified within the study areas as a result of agricultural activities and the general severe alterations to the landscape.

5.3 Built Environment

Dilapidated mining infrastructure was identified on site. These buildings are noted on the 1944 Typographical map 2628AD. One can therefore assume that the structures are at least 77 years old and will be protected under the NHRA. Due to the importance of mining in the evolution of the East Rand urban landscape these structures have significant historic value.



Figure 26. Dilapidated Mining Infrastructure



Figure 27. Dilapidated Mining Infrastructure



Figure 28. Dilapidated Mining Infrastructure



Figure 29. Dilapidated Mining Infrastructure

A slimes dam and pipeline are located just outside the western border of the site. The southern boundary is defined by a railway line.



Figure 30. Slimes Dam on the Western Border of the Site



Figure 31. Pipeline on the Western Border of the Site



Figure 32. Railway Line on the Southern Border of the Site



Figure 33. Powerlines on the Eastern Border of the Study Area

5.4 Grave and Burial Sites

At least several hundred graves were observed on the site during the fieldwork. The GPS Location of the cemetery is 26° 16' 44.62''S 28° 19' 20.58''E.



Figure 34. Aerial Photograph of the Cemetery (Google Earth, June 2017)

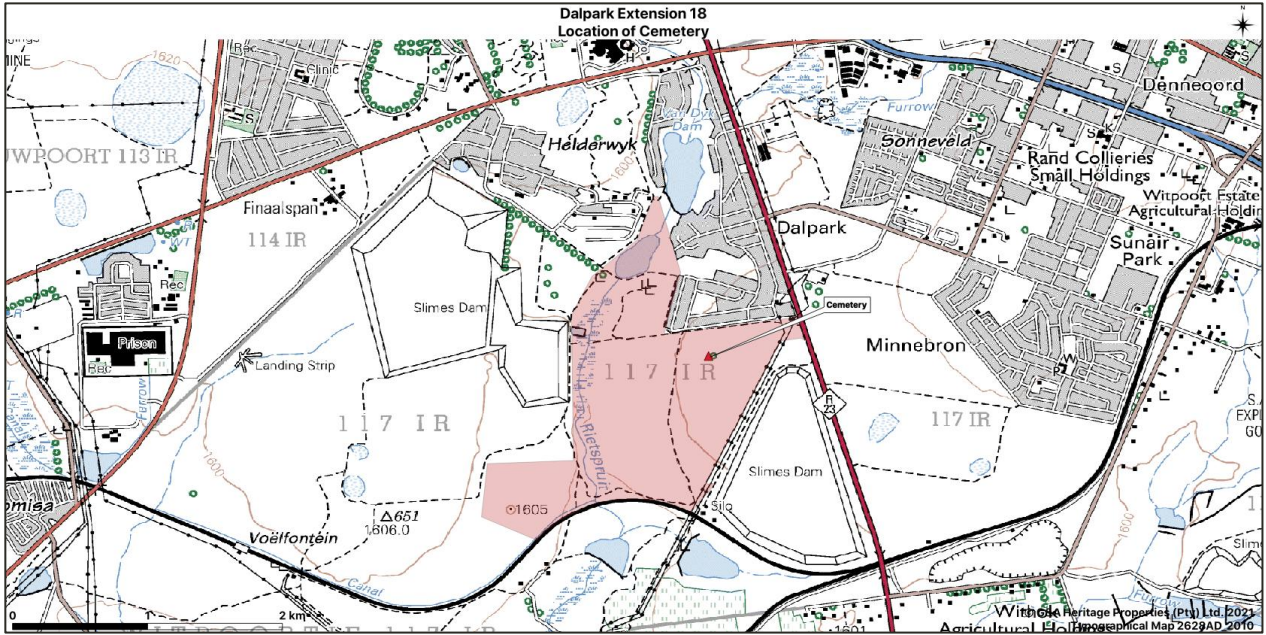


Figure 35. Location Map of the Cemetery



Figure 36. Cemetery as seen from a distance



Figure 37. Cemetery



Figure 38. Grave



Figure 39. Grave



Figure 40. Grave



Figure 41. Grave



Figure 42. Grave



Figure 43. Grave

5.5 Map of Key Features

The key features observed in and around the study areas are noted on the map below.



Figure 44. Map of Key Features

6. Potential Heritage Impacts and Proposed Mitigation

6.1 Assessment of Heritage Potential

6.1.1 Assessment Matrix

Determining Archaeological Significance

In addition to guidelines provided by the National Heritage Resources Act (Act No. 25 of 1999), a set of criteria based on Deacon (J) and Whitelaw (1997) for assessing archaeological significance has been developed for Eastern Cape settings (Morris 2007a). These criteria include estimation of landform potential (in terms of its capacity to contain archaeological traces) and assessing the value to any archaeological traces (in terms of their attributes or their capacity to be construed as evidence, given that evidence is not given but constructed by the investigator).

Estimating site potential

Table 4 (below) is a classification of landforms and visible archaeological traces used for estimating the potential of archaeological sites (after J. Deacon and, National Monuments Council). Type 3 sites tend to be those with higher archaeological potential, but there are notable exceptions to this rule, for example the renowned rock engravings site Driekopseiland near Kimberley which is on landform L1 Type 1 – normally a setting of lowest expected potential. It should also be noted that, generally, the older a site the poorer the preservation, so that sometimes any trace, even of only Type 1 quality, could be of exceptional significance. In light of this, estimation of potential will always be a matter for archaeological observation and interpretation.

Table 6. Classification of landforms and visible archaeological traces for estimating the potential for archaeological sites (after J. Deacon, NMC as used in Morris)

Class	Landform	Type 1	Type 2	Type 3
L1	Rocky Surface	Bedrock exposed	Some soil patches	Sandy/grassy patches
L2	Ploughed land	Far from water	In floodplain	On old river terrace
L3	Sandy ground, inland	Far from water	In floodplain or near features such as hill/dune	On old river terrace
L4	Sandy ground, coastal	>1 km from sea	Inland of dune cordon	Near rocky shore
L5	Water-logged deposit	Heavily vegetated	Running water	Sedimentary basin
L6	Developed urban	Heavily built-up with no known record of early settlement	Known early settlement, but buildings have basements	Buildings without extensive basements over known historical sites
L7	Lime/dolomite	>5 myrs	<5000 yrs	Between 5000 yrs and 5 myrs
L8	Rock shelter	Rocky floor	Loping floor or small area	Flat floor, high ceiling
Class	Archaeological traces	Type 1	Type 2	Type 3
A1	Area previously excavated	Little deposit remaining	More than half deposit remaining	High profile site
A2	Shell of bones visible	Dispersed scatter	Deposit <0.5 m thick	Deposit >0.5 m thick; shell and bone dense
A3	Stone artefacts or stone walling or other feature visible	Dispersed scatter	Deposit <0.5m thick	Deposit >0.5 m thick

Table 7. Site attributes and value assessment (adopted from Whitelaw 1997 as used in Morris)

Class	Landforms	Type 1	Type 2	Type 3
-------	-----------	--------	--------	--------

1	Length of sequence /context	No sequence Poor context Dispersed distribution	Limited sequence	Long sequence Favourable context High density of arte / ecofacts
2	Presence of exceptional items (incl. regional rarity)	Absent	Present	Major element
3	Organic preservation	Absent	Present	Major element
4	Potential for future archaeological investigation	Low	Medium	High
5	Potential for public display	Low	Medium	High
6	Aesthetic appeal	Low	Medium	High
7	Potential for implementation of a long-term management plan	Low	Medium	High

Assessing site value by attribute

Table 5 is adapted from Whitelaw (1997), who developed an approach for selecting sites meriting heritage recognition status in KwaZulu-Natal. It is a means of judging a site's archaeological value by ranking the relative strengths of a range of attributes (given in the second column of the table). While aspects of this matrix remain qualitative, attribute assessment is a good indicator of the general archaeological significance of a site, with Type 3 attributes being those of highest significance.

6.2 Impact Statement

6.2.1 Assessment of Impacts

A heritage resource impact may be broadly defined as the net change between the integrity of a heritage site with and without the proposed development. This change may be either beneficial or adverse.

Beneficial impacts occur wherever a proposed development actively protects, preserves or enhances a heritage resource. For example, development may have a beneficial effect by preventing or lessening natural site erosion. Similarly, an action may serve to preserve a site for future investigation by covering it with a protective layer of fill. In other cases, the public or economic significance of an archaeological site may be enhanced by actions, which facilitate non-destructive public use. Although beneficial impacts are unlikely to occur frequently, they should be included in the assessment.

More commonly, the effects of a project on heritage sites are of an adverse nature. Adverse impacts occur under conditions that include:

- a) destruction or alteration of all or part of a heritage site;
- b) isolation of a site from its natural setting; and
- c) introduction of physical, chemical or visual elements that are out-of-character with the heritage resource and its setting.

Adverse effects can be more specifically defined as direct or indirect impacts. Direct impacts are the immediately demonstrable effects of a project which can be attributed to particular land modifying actions. They are directly caused by a project or its ancillary facilities and occur at the same time and place. The immediate consequences of a project action, such as slope failure following reservoir inundation, are also considered direct impacts.

Indirect impacts result from activities other than actual project actions. Nevertheless, they are clearly induced by a project and would not occur without it. For example, project development may induce changes in land use or population density, such as increased urban and recreational development, which may indirectly impact upon heritage sites. Increased vandalism of heritage sites, resulting from improved or newly introduced access, is also considered an indirect impact. Indirect impacts are much more difficult to assess and quantify than impacts of a direct nature.

Once all project related impacts are identified, it is necessary to determine their individual level-of-effect on heritage resources. This assessment is aimed at determining the extent or degree to which future opportunities for scientific research, preservation, or public appreciation are foreclosed or otherwise adversely affected by a proposed action. Therefore, the assessment provides a reasonable indication of the relative significance or importance of a particular impact. Normally, the assessment should follow site evaluation since it is important to know what heritage values may be adversely affected.

The assessment should include careful consideration of the following level-of-effect indicators, which are defined below:

- magnitude
- severity
- duration
- range
- frequency
- diversity
- cumulative effect
- rate of change

6.3 Indicators of Impact Severity

Magnitude

The amount of physical alteration or destruction, which can be expected. The resultant loss of heritage value is measured either in amount or degree of disturbance.

Severity

The irreversibility of an impact. Adverse impacts, which result in a totally irreversible and irretrievable loss of heritage value, are of the highest severity.

Duration

The length of time an adverse impact persists. Impacts may have short-term or temporary effects, or conversely, more persistent, long-term effects on heritage sites.

Range

The spatial distribution, whether widespread or site-specific, of an adverse impact.

Frequency

The number of times an impact can be expected. For example, an adverse impact of variable magnitude and severity may occur only once. An impact such as that resulting from cultivation may be of recurring or on-going nature.

Diversity

The number of different kinds of project-related actions expected to affect a heritage site.

Cumulative Effect

A progressive alteration or destruction of a site owing to the repetitive nature of one or more impacts.

Rate of Change

The rate at which an impact will effectively alter the integrity or physical condition of a heritage site. Although an important level-of-effect indicator, it is often difficult to estimate. Rate of change is normally assessed during or following project construction.

The level-of-effect assessment should be conducted and reported in a quantitative and objective fashion. The methodological approach, particularly the system of ranking level-of-effect indicators, must be rigorously documented and recommendations should be made with respect to managing uncertainties in the assessment. (*Zubrow, Ezra B.A., 1984*).

In 2003 the SAHRA (South African Heritage Resources Agency) compiled the following guidelines to evaluate the cultural significance of individual heritage resources:

- **Type of Resource**
 - Place
 - Archaeological Site
 - Structure
 - Grave
 - Palaeontological Feature
 - Geological Feature

- **Type of Significance**
 - Historic Value
 - Important in the community, or pattern of history
 - Important in the evolution of cultural landscapes and settlement patterns
 - Important in exhibiting density, richness or diversity of cultural features illustrating the human occupation and evolution of the nation, province, region or locality.
 - Important for association with events, developments or cultural phases that have had a significant role in the human occupation and evolution of the nation, province, region or community.
 - Important as an example for technical, creative, design or artistic excellence, innovation or achievement in a particular period.
 - It has strong or special association with the life or work of a person, group or organisation of importance in history
 - Importance for close associations with individuals, groups or organisations whose life, works or activities have been significant within the history of the nation, province, region or community.
 - It has significance relating to the history of slavery
 - Importance for a direct link to the history of slavery in South Africa.

 - Aesthetic Value
 - It is important in exhibiting particular aesthetic characteristics valued by a community or cultural group.
 - Important to a community for aesthetic characteristics held in high esteem or otherwise valued by the community.
 - Importance for its creative, design or artistic excellence, innovation or achievement.
 - Importance for its contribution to the aesthetic values of the setting demonstrated by a landmark quality or having impact on important vistas or otherwise contributing to the identified aesthetic qualities of the cultural environs or the natural landscape within which it is located.
 - In the case of an historic precinct, importance for the aesthetic character created by the individual components which collectively form a significant streetscape, townscape or cultural environment.

 - Scientific Value
 - It has potential to yield information that will contribute to an understanding of natural or cultural heritage
 - Importance for information contributing to a wider understanding of natural or cultural history by virtue of its use as a research site, teaching site, type locality, reference or benchmark site.
 - Importance for information contributing to a wider understanding of the origin of the universe or of the development of the earth.
 - Importance for information contributing to a wider understanding of the origin of life; the development of plant or animal species, or the biological or cultural development of hominid or human species.
 - Importance for its potential to yield information contributing to a wider understanding of the history of human occupation of the nation, Province, region or locality.

- It is important in demonstrating a high degree of creative or technical achievement at a particular period
- Importance for its technical innovation or achievement.

a) Does the site contain evidence, which may substantively enhance understanding of culture history, culture process, and other aspects of local and regional prehistory?

- internal stratification and depth
- chronologically sensitive cultural items
- materials for absolute dating
- association with ancient landforms
- quantity and variety of tool type
- distinct intra-site activity areas
- tool types indicative of specific socio-economic or religious activity
- cultural features such as burials, dwellings, hearths, etc.
- diagnostic faunal and floral remains
- exotic cultural items and materials
- uniqueness or representativeness of the site
- integrity of the site

b) Does the site contain evidence which may be used for experimentation aimed at improving archaeological methods and techniques?

- monitoring impacts from artificial or natural agents
- site preservation or conservation experiments
- data recovery experiments
- sampling experiments
- intra-site spatial analysis

c) Does the site contain evidence which can make important contributions to paleo environmental studies?

- topographical, geomorphological context
- depositional character
- diagnostic faunal, floral data

d) Does the site contain evidence which can contribute to other scientific disciplines such as hydrology, geomorphology, pedology, meteorology, zoology, botany, forensic medicine, and environmental hazards research, or to industry including forestry and commercial fisheries?

○ Social Value / Public Significance

- It has strong or special association with a particular community or cultural group for social, cultural or spiritual reasons
- Importance as a place highly valued by a community or cultural group for reasons of social, cultural, religious, spiritual, symbolic, aesthetic or educational associations.
- Importance in contributing to a community's sense of place.

a) Does the site have potential for public use in an interpretive, educational or recreational capacity?

- integrity of the site
- technical and economic feasibility of restoration and development for public use
- visibility of cultural features and their ability to be easily interpreted
- accessibility to the public
- opportunities for protection against vandalism
- representativeness and uniqueness of the site
- aesthetics of the local setting
- proximity to established recreation areas

- present and potential land use
- land ownership and administration
- legal and jurisdictional status
- local community attitude toward development

b) Does the site receive visitation or use by tourists, local residents or school groups?

o Ethnic Significance

Does the site presently have traditional, social or religious importance to a particular group or community?

- ethnographic or ethno-historic reference
- documented local community recognition or, and concern for, the site

o Economic Significance

What value of user-benefits may be placed on the site?

- visitors' willingness-to-pay
- visitors' travel costs

o Scientific Significance

a) Does the site contain evidence, which may substantively enhance understanding of historic patterns of settlement and land use in a particular locality, regional or larger area?

b) Does the site contain evidence, which can make important contributions to other scientific disciplines or industry?

o Historic Significance

a) Is the site associated with the early exploration, settlement, land use, or other aspect of southern Africa's cultural development?

b) Is the site associated with the life or activities of a particular historic figure, group, organization, or institution that has made a significant contribution to, or impact on, the community, province or nation?

c) Is the site associated with a particular historic event whether cultural, economic, military, religious, social or political that has made a significant contribution to, or impact on, the community, province or nation?

d) Is the site associated with a traditional recurring event in the history of the community, province, or nation, such as an annual celebration?

o Public Significance

a) Does the site have potential for public use in an interpretive, educational or recreational capacity?

- visibility and accessibility to the public
- ability of the site to be easily interpreted
- opportunities for protection against vandalism
- economic and engineering feasibility of reconstruction, restoration and maintenance
- representativeness and uniqueness of the site
- proximity to established recreation areas
- compatibility with surrounding zoning regulations or land use
- land ownership and administration
- local community attitude toward site preservation, development or destruction
- present use of site

b) Does the site receive visitation or use by tourists, local residents or school groups?

o Other

▪ Is the site a commonly acknowledged landmark?

▪ Does, or could, the site contribute to a sense of continuity or identity either alone or in conjunction with similar sites in the vicinity?

- Is the site a good typical example of an early structure or device commonly used for a specific purpose throughout an area or period of time?
- Is the site representative of a particular architectural style or pattern?

6.4 Impact Methodology

For each predicted impact, criteria are described. These criteria include the **magnitude** (size or degree scale), which also includes the **type** of impact, being either a positive or negative impact; the **duration** (temporal scale); and the **extent** (spatial scale), as well as the **probability** (likelihood). The methodology is quantitative and generated through a spreadsheet but requires professional judgement in the application of the criteria.

When assessing impacts, broader considerations are also considered, these include the **confidence** with which the assessment was undertaken, the **reversibility** of the impact and the resource **irreplaceability**.

Calculations
(as applied in the excel spreadsheet 'Dalpark Ext.18 mixed use residential township Development.xls')

For each predicted impact, certain criteria are applied to establish the likely **significance** of the impact, firstly in the case of no mitigation being applied and then with the most effective mitigation measure(s) in place.

These criteria include the **magnitude** (size or degree scale), which also includes the **type** of impact, being either a positive or negative impact; the **duration** (temporal scale); and the **extent** (spatial scale). These numerical ratings are used in an equation whereby the **consequence** of the impact can be calculated. Consequence is calculated as follows:

Consequence = type x (magnitude + duration + extent).

To calculate the significance of an impact, the **probability** (or likelihood) of that impact occurring is applied to the consequence.

Significance = consequence x probability

Depending on the numerical result, the impact would fall into a significance category as negligible, minor, moderate or major, and the type would be either positive or negative.

The following tables show the scales used to classify the above variables and define each of the rating categories.

6.4.1 Magnitude

The magnitude refers to the degree of alteration of the affected environmental receptor. The relevant descriptor for magnitude is selected by the user (refer to Table).

Table 8. Description of magnitude and assigned numerical values

Numerical Rating	Magnitude	
	Category	Descriptors
1	Negligible	Natural and/ or social functions and/ or processes are negligibly altered
2	Very low	Natural and/ or social functions and/ or processes are slightly altered
3	Low	Natural and/ or social functions and/ or processes are somewhat altered
4	Moderate	Natural and/ or social functions and/ or processes are moderately altered
5	High	Natural and/ or social functions and/ or processes are notably altered

6	Very high	Natural and/ or social functions and/ or processes are majorly altered
7	Extremely high	Natural and/ or social functions and/ or processes are severely altered

*NOTE: Where applicable, the magnitude of the impact is related to a relevant standard or threshold or is based on specialist knowledge and understanding of that particular field.

6.4.2 Duration

The duration refers to the length of permanence of the impact on the environmental receptor. The relevant descriptor for duration is selected by the user (refer to Table).

Table 9. Description of duration and assigned numerical values

Numerical Rating	Duration	
	Category	Descriptors
1	Immediate	Impact will self-remedy immediately
2	Brief	Impact will not last longer than 1 year
3	Short term	Impact will last between 1 and 5 years
4	Medium term	Impact will last between 5 and 10 years
5	Long term	Impact will last between 10 and 15 years
6	On-going	Impact will last between 15 and 20 years
7	Permanent	Impact may be permanent, or in excess of 20 years

6.4.3 Extent

The extent refers to the geographical scale of impact on the environmental receptor. The relevant descriptor for extent is selected by the user (refer to Table).

Table 10. Description of extent and assigned numerical values

Numerical Rating	Extent	
	Category	Descriptors
1	Very limited	Impacts very limited / felt in isolated areas of the study area
2	Limited	Impacts limited to specific parts of the study area
3	Local	Impacts felt mostly throughout the study area
4	Municipal area	Impacts felt outside the study area, at a municipal level
5	Regional	Impacts felt outside the study area, at a regional / provincial level
6	National	Impacts felt outside the study area, at a national level
7	International	Impacts felt outside the study area, at an international level

6.4.4 Probability

To calculate the significance of an impact, the probability (or likelihood) of that impact occurring is also taken into account. (Refer to Table).

Table 11. Definition of probability ratings

Numerical Rating	Probability	
	Category	Descriptors
1	Highly unlikely / None	Expected never to happen
2	Rare / improbable	Conceivable, but only in extreme circumstances, and/or might occur for this project although this has rarely been known to result elsewhere
3	Unlikely	Has not happened yet but could happen once in the lifetime of the project, therefore there is a possibility that the impact will occur
4	Probable	Has occurred here or elsewhere and could therefore occur
5	Likely	The impact may occur
6	Almost certain / Highly probable	It is most likely that the impact will occur
7	Certain / Definite	There are sound scientific reasons to expect that the impact will definitely occur

6.4.5 Significance

These are auto calculated in the spreadsheet as described above and includes the following categories in Table 11. This table is for illustration only.

Table 12. Application of significance ratings

Range		Significance rating
-147	-109	Major (-)
-108	-73	Moderate (-)
-72	-36	Minor (-)
-35	-1	Negligible (-)
0	0	Neutral
1	35	Negligible (+)
36	72	Minor (+)
73	108	Moderate (+)
109	147	Major (+)

6.4.6 Further Considerations

The following, broader considerations will also be considered. These include the level of confidence in the assessment rating; the reversibility of the impact; and the irreplaceability of the resource as set out in Tables 11, 12 and 13 respectively.

Table 13. Definition of confidence ratings

Rating	Descriptor
Low	Judgement is based on intuition
Medium	Determination is based on common sense and general knowledge

High	Substantive supportive data exists to verify the assessment
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Table 14. Definition of reversibility ratings

Rating	Descriptor
Low	The affected environment will not be able to recover from the impact - permanently modified
Medium	The affected environment will only recover from the impact with significant intervention
High	The affected environmental will be able to recover from the impact

Table 15. Definition of irreplaceability ratings

Rating	Descriptor
Low	The resource is not damaged irreparably or is not scarce
Medium	The resource is damaged irreparably but is represented elsewhere
High	The resource is irreparably damaged and is not represented elsewhere

7. Impact Assessment and Proposed Mitigation

The site was readily accessible, and the confidence level of the provided impact evaluation is as a result high.

7.1 Damage to Graves and Burial Sites

Table 16. Damage to Graves and Burial Sites

Ref:	1			
Project phase	Construction			
Impact	Damage to Grave and Burial Sites			
Description of impact	Construction activities will physically damage burial and grave sites. Professional relocation of all graves within the area is recommended.			
Mitigatability	High	Mitigation exists and will considerably reduce the significance of impacts		
Potential mitigation	Relocation of all affected graves within the proposed development site.			
Assessment	Without mitigation		With mitigation	
Nature	Negative		Negative	
Duration	Permanent	Impact may be permanent, or in excess of 20 years	Brief	Impact will not last longer than 1 year
Extent	Regional	Impacts felt outside the study area, at a regional / provincial level	Limited	Impacts limited to specific parts of the study area
Magnitude	Extremely high	Natural and/ or social functions and/ or processes are severely altered	Low	Natural and/ or social functions and/ or processes are somewhat altered
Probability	Certain / definite	There are sound scientific reasons to expect that the impact will definitely occur	Unlikely	Has not happened yet but could happen once in the lifetime of the project, therefore there is a possibility that the impact will occur
Confidence	High	Substantive supportive data exists to verify the assessment	High	Substantive supportive data exists to verify the assessment
Reversibility	Low	The affected environment will not be able to recover from the impact - permanently modified	High	The affected environmental will be able to recover from the impact
Resource irreplaceability	High	The resource is irreparably damaged and is not represented elsewhere	Medium	The resource is damaged irreparably but is represented elsewhere
Significance	Major - negative		Negligible - negative	
Comment on significance	Graves can be seen as extremely sensitive heritage objects and should be treated as such. Especially the larger graveyard is associated with the mining industry which often showed a lack of respect in regards to deceased workers. There is a strong likelihood that a large amount of these graves are Chinese nationals and the relocation of their remains should be considered.			
Cumulative impacts	Due to high water table levels in the area the burial sites could lead to groundwater contamination.			

7.2 Damage to Historical Built Environment

Table 17. Damage to Historical Built Environment

Ref:		2	
Project phase	Construction		
Impact	Damage to Built Environment		
Description of impact	Direct impacts to historic mining structures are expected during the construction phase of the project.		
Mitigatability	Medium	Mitigation exists and will notably reduce significance of impacts	
Potential mitigation	It is recommended that the sites of historic significance in terms of mining be subjected to a second phase of investigation and documentation and that this forms the basis for the issuing of a permit for destruction from the relevant provincial authority, in this case G-PHRA		
Assessment	Without mitigation		With mitigation
Nature	Negative		Negative
Duration	Short term	impact will last between 1 and 5 years	Brief Impact will not last longer than 1 year
Extent	Limited	Impacts limited to specific parts of the study area	Very limited Impacts very limited / felt in isolated areas of the study area
Magnitude	High	Natural and/ or social functions and/ or processes are notably altered	Negligible Natural and/ or social functions and/ or processes are negligibly altered
Probability	Almost certain / Highly probable	It is most likely that the impact will occur	Unlikely Has not happened yet but could happen once in the lifetime of the project, therefore there is a possibility that the impact will occur
Confidence	High	Substantive supportive data exists to verify the assessment	High Substantive supportive data exists to verify the assessment
Reversibility	Low	The affected environment will not be able to recover from the impact - permanently modified	Medium The affected environment will only recover from the impact with significant intervention
Resource irreplaceability	Medium	The resource is damaged irreparably but is represented elsewhere	Medium The resource is damaged irreparably but is represented elsewhere
Significance	Minor - negative		Negligible - negative
Comment on significance	A permit for the destruction of these structures will need to be obtained from G-PHRA		
Cumulative impacts	Combined with the growing development scene in the Ekurhuleni district the loss of mining related history is compounded.		

7.3 Excavation of Palaeontological Materials

Table 18. Excavation of Palaeontological Materials

Ref:		3	
Project phase	Construction		
Impact	Excavation of Palaeontological Materials		
Description of impact	If pylon placements are to intrude deeper than 10m (the upper ceiling of these deposits) it could unearth fossiliferous materials.		
Mitigatability	High	Mitigation exists and will considerably reduce the significance of impacts	
Potential mitigation	A chance finds protocol for fossils should be included in the ESMP.		
Assessment	Without mitigation		With mitigation
Nature	Negative		Positive
Duration	Long term	Impact will last between 10 and 15 years	Short term impact will last between 1 and 5 years
Extent	Limited	Impacts limited to specific parts of the study area	Limited Impacts limited to specific parts of the study area
Magnitude	High	Natural and/ or social functions and/ or processes are notably altered	Low Natural and/ or social functions are somewhat altered
Probability	Unlikely	Has not happened yet but could happen once in the lifetime of the project, therefore there is a possibility that the impact will occur	Unlikely Has not happened yet but could happen once in the lifetime of the project, therefore there is a possibility that the impact will occur
Confidence	Medium	Determination is based on common sense and general knowledge	Medium Determination is based on common sense and general knowledge
Reversibility	Low	The affected environment will not be able to recover from the impact - permanently modified	High The affected environmental will be able to recover from the impact
Resource irreplaceability	Medium	The resource is damaged irreparably but is represented elsewhere	Medium The resource is damaged irreparably but is represented elsewhere
Significance	Minor - negative		Negligible - positive
Comment on significance	Due to the limited research on palaeontology in this area, the recovery of fossils will actually be beneficial to science if the recovery is done correctly.		
Cumulative impacts	Mining activities (prospecting) in the area can result in a cumulative increased impact, but also an expansion of knowledge.		

7.4 Damage to Unidentified or Buried Archaeological Sites

Table 19. Damage to Unidentified or Buried Archaeological Sites

Ref:		4	
Project phase	Construction		
Impact	Unidentified/Sub-surface Archaeological Remains		
Description of impact	Archaeological deposits not identified during the fieldwork or which are buried under the predominant and shifting alluvial sands could be uncovered during the construction activities.		
Mitigatability	High	Mitigation exists and will considerably reduce the significance of impacts	
Potential mitigation	A walkdown survey of the final alignment and pylon placements is recommended.		
Assessment	Without mitigation		With mitigation
Nature	Negative		Positive
Duration	Short term	impact will last between 1 and 5 years	Long term Impact will last between 10 and 15 years
Extent	Local	Impacts felt mostly throughout the study area	Regional Impacts felt outside the study area, at a regional / provincial level
Magnitude	High	Natural and/ or social functions and/ or processes are notably altered	Moderate Natural and/ or social functions and/ or processes are moderately altered
Probability	Unlikely	Has not happened yet but could happen once in the lifetime of the project, therefore there is a possibility that the impact will occur	Likely The impact may occur
Confidence	Medium	Determination is based on common sense and general knowledge	High Substantive supportive data exists to verify the assessment
Reversibility	Low	The affected environment will not be able to recover from the impact - permanently modified	High The affected environmental will be able to recover from the impact
Resource irreplaceability	Medium	The resource is damaged irreparably but is represented elsewhere	Medium The resource is damaged irreparably but is represented elsewhere
Significance	Negligible - negative		Minor - positive
Comment on significance	Although information on archaeological sites are scant, there is a possibility of encountering Stone Age and Iron Age sites subterraneanly.		
Cumulative impacts	The growth of the granite mining industry could negatively affect stone walled sites (if they occur - none were identified during fieldwork) and the impact of construction activities could compound this effect.		

8. Conclusions and Recommendations

The site for the proposed mixed use residential township – Dalpark Extension 18, situated on Portion 461 of the Farm Witpoortjie 117 IR, Ekurhuleni Metropolitan Municipality, Gauteng Province was investigated during a field visit and through archival studies.

Most of the proposed area is currently vacant land with wetland areas (Rietspruit). It is not anticipated that the development will be bedrock intrusive and as such paleontological deposits will not be affected.

At least several hundred graves were observed on the site during the fieldwork. It is recommended that the graves be relocated to a formal, municipal cemetery before commencing with the project. It is important to note that these graves most likely form part of the mining history of the area and as such have intrinsic historical value as well.

An old mine shaft and associated infrastructure were observed within the study area. These structures are noted on the topographical map 2628AD_1944. One can thus assume that the structures are at least 77 years old and will be protected under the NHRA. Due to the importance of mining in the evolution of the East Rand urban landscape these structures have significant historic value.

For these reasons, it is important that the site undergoes a second phase of investigation to determine its architectural and historic significance before any structures are demolished. If the site can be fenced off and made safe this can be omitted.

Several sites were identified in the 2006 report by Jaco van der Walt – Heritage Impact Assessment – Residential development on Portion 58 and remaining extent of Portion 46 of the farm Witpoortjie 117-IR, Ekurhuleni. These should be handled as per the site-specific recommendations given in this reports section on previous studies as well as the executive summary.

It is recommended that obscured, subterranean sites be managed if they are encountered.

It is recommended that a Chance Finds Protocol for palaeontological finds be compiled and included in the EMP for the project.

9. Chance Finds Protocol

It is important to note that, although unlikely, sub-surface remains of heritage sites could still be encountered during construction of the project. Such sites would offer no surface indication of their presence due to the high state of alterations in some areas as well as heavy vegetation cover in other areas. The following indicators of unmarked sub-surface sites could be encountered:

- Ash deposits (unnaturally grey appearance of soil compared to the surrounding substrate);
- Bone concentrations, either animal or human;
- Ceramic fragments such as pottery shards either historic or pre-contact;
- Stone concentrations of any formal nature.

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

- All operators of excavation equipment should be made aware of the possibility of the occurrence of sub-surface heritage features and the following procedures should they be encountered.
- All construction in the immediate vicinity (50m radius of the site) should cease.
- The heritage practitioner should be informed as soon as possible.
- Mitigation measures (such as refilling etc.) should not be attempted.
- The area in a 50m radius of the find should be cordoned off with hazard tape.
- Public access should be limited.
- The area should be placed under guard.
- No media statements should be released until such time as the heritage practitioner has had enough time to analyze the finds.

Should any archaeological, palaeontological or cultural heritage resources, including graves or human remains (as defined and protected by the NRA 1999) be identified during the vegetation cleaning, surface scraping, trenching, excavation or construction phases of the development, it is recommended that the process as described below is followed.

On-site Reporting Process:

- The identifier should immediately notify his / her supervisor of the find(s).
- The identifier's supervisor should report the incident to the on-site SHE / SHEQ officer within 24 hours of the find(s).
- Should the find(s) relate to human remains, the on-site SHE / SHEQ officer should immediately notify the nearest SAPS station of the find(s).
- The on-site SHE / SHEQ officer should report the find(s) to the appointed ECO / ELO officer within 24 hours after the find(s) was / were reported by the relevant supervisor.
- Within 72 hours of the find(s) being reported to the SHE / SHEQ officer, the ECO / ELO officer should ensure that the find(s) is reported on the SAHRIS Database and the relevant heritage specialist is contacted to make arrangements for a heritage inspection.
- Should the find(s) relate to human remains, the ECO/ ELO officer should ensure that the heritage inspection coincides with the SAPS inspection, to verify if the find(s) is / are of forensic, authentic (informal / older than 60 years) or archaeological (older than 100 years) origin.
- The heritage specialist should compile a heritage site inspection report based on the site-specific findings. The report should make recommendations for the destruction, conservation or mitigation of the find(s) and prescribe a recommended way forward for the development. The report should be submitted to the ECO / ELO officer, who should ensure submission thereof on the SAHRIS database.
- SAHRA / the relevant PHRA will state legal requirements for the development to proceed in the SAHRA / PHRA comments on the heritage inspection report.
- The developer should proceed with implementation of the SAHRA / PHRA comment requirements, which may well stipulate permit specifications to proceed.
 - Should the permit specifications stipulate further Phase 2 archaeological investigations (including grave mitigation), a suitable accredited heritage specialist should be appointed to conduct the work according to the applicable SAHRA / PHRA process.

- The heritage specialist should apply for the permit.
- Upon issue of the SAHRA / PHRA permit, the Phase 2 heritage mitigation program may commence.
- Should the permit specifications stipulate destruction of the find(s) under a SAHRA / PHRA permit, the developer should immediately proceed with the permit application.
- Upon the issue of the SAHRA / PHRA permit, the developer may legally proceed with the destruction of the archaeological, palaeontological or cultural heritage resource(s).
- Upon completion of the Phase 2 heritage mitigation program, the heritage specialist will submit a Phase 2 report to the ECO / ELO officer, who should in turn ensure the submission thereof on the SAHRIS database.
- Report recommendations may include that the remainder of a heritage site be destroyed under a SAHRA / PHRA permit.
- Should the find(s) relate to human remains of forensic origin, the matter will be directly addressed by SAPS. A SAHRA / PHRA permit will not be applicable.

NOTE: the SAHRA / PHRA permit and process requirements relating to the mitigation of human remains requires suitable advertising of the find(s), consultation, mitigation and re-internment / deposition process.

Duties of the Supervisor:

1. The supervisor should ensure that all activities in the vicinity of the find(s) are ceased immediately upon the reporting thereof by the identifier.
2. The supervisor should ensure that the location of the find(s) is secured within 24 hours of the reporting thereof by means of a temporary fence allowing for a 5 – 10m heritage conservation buffer zone around the find(s). The temporary conserved area should be sign-posted as a “No Entry – Heritage Site” zone.
3. Where development was impacted on the resource, no attempt should be made to remove artefacts / objects / remains further from their context and should any artefacts / objects / remains that has / have been removed should be collected and placed within the conservation area or kept for safekeeping with the SHE / SHEQ officer.
4. It is imperative that where development has impacted on any archaeological, palaeontological or cultural heritage resources, the context of the find(s) be preserved as much as possible for interpretive and sample testing purposes.
5. The supervisor should record the name, company and capacity of the identifier and compile a brief report describing the events surrounding the find(s).
6. The report should be submitted to the SHE / SHEQ officer at the time of the incident report.

Duties of the SHE / SHEQ officer:

1. The SHE / SHEQ officer should ensure that the location of the find(s) is recorded with a GPS. A photographic record of the find(s), including implementation of temporary conservation measures, should be compiled. Where relevant a scale bar, or object that can indicate the scale, should be inserted in the photographs for interpretive purposes.
2. The SHE / SHEQ officer should ensure that the supervisor’s report, GPS co-ordinate and photographic record of the find(s) are submitted to the ECO / ELO officer.
3. Should the find(s) relate to human remains, the SHE / SHEQ officer should ensure that the mentioned reporting be made available to the SAPS at the time of the incident report.
4. Any retrieved artefacts / objects / remains should, in consultation with the ECO / ELO officer, be kept in a safe place (preferable on site).

Duties of the ECO / ELO officer:

1. The ECO / ELO officer should ensure that the incident is reported on the SAHRIS Database. (The ECO / ELO officer should ensure that he / she is registered on the relevant SAHRIS case with SAHRIS authorship to the case at the time of appointment to enable heritage reporting.)
2. The ECO / ELO officer should ensure that the incident report is forwarded to the heritage specialist for interpretive purposes at his / her soonest opportunity and prior to the heritage site inspection.
3. The ECO / ELO officer should facilitate appointment of the heritage specialist by the developer / construction consultant for the heritage inspection.
4. The ECO / ELO officer should facilitate access by the heritage specialist to any retrieved artefacts / objects / remains that have been kept in safekeeping.

5. Should the find(s) relate to human remains, the SHE / SHEQ officer should facilitate coordination of the heritage site inspection and the SAPS site inspection.
6. The ECO / ELO officer should facilitate heritage reporting and heritage compliance requirements by SAHRA / the relevant PHRA, between the developer / construction consultant, the heritage specialist, the SHE / SHEQ officer (where relevant) and the SAPS (where relevant).

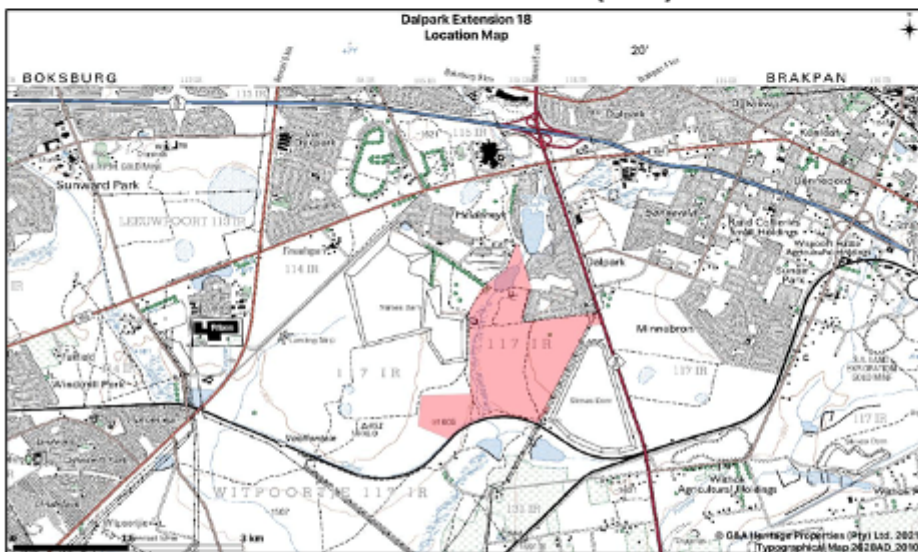
Duties of the Developer / Construction Consultant:

1. The developer / construction consultant should ensure that an adequate heritage contingency budget is accommodated within the project budget to facilitate and streamline the heritage compliance process in the event of identification of incidental archaeological, palaeontological and / or cultural heritage resources during the course of the vegetation cleaning, surface scraping, trenching, excavation or construction phases of the development, when resources not visible at the time of the surface assessment may be exposed.

10. Public Participation



NOTICE OF PHASE 1 HERITAGE IMPACT ASSESSMENT (HIA) APPLICATION



Notice is hereby given that an application for a Phase 1 Heritage Impact Assessment (HIA) in terms of Section 38 of the National Heritage Resources Act (Act 25 of 1999) will be lodged with the South African Heritage Resources Agency (SAHRA) and the Provincial Heritage Resource Authority Gauteng (PHRAG).

PROJECT NAME: Heritage Impact Assessment for the Proposed Residential Township Development – Dalpark Ext. 18 on Portion 461 of the Farm Witpoortjie 117 IR in Dalpark, Ekurhuleni Metropolitan Municipality of Gauteng Province.

NAME OF THE PROPONENT: Ekurhuleni Metropolitan Municipality.

LOCATION: The site is located on Portion 461 of the Farm Witpoortjie 117 IR in Dalpark, Ekurhuleni Metropolitan Municipality of Gauteng Province. A small section of the site borders the Regional Route R23 near Boundary / Elsburg and Springs Roads.

ANY ENQUIRIES SHOULD BE REFERRED TO:

G&A Heritage Properties (Pty) Ltd.

Public Participation Registration and Enquiries

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Louis Trichardt, 0920

Figure 45. Site Notice



Figure 46. Site Notice placed at a Point of Interest



Figure 47. Site Notice placed at a Point of Interest

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