

Phase 1 Cultural Heritage Impact Assessment:

**THE REHABILITATION OF PADDA DAM, WESTDENE/MELVILLE REGION OF THE CITY OF
JOHANNESBURG METROPOLITAN MUNICIPALITY, GAUTENG PROVINCE**

Prepared for:

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- Date: May 2020
- Revision No: -
- Date: -

Submission of the report:

It remains the responsibility of the client to submit the report to the South African Heritage Resources Agency (SAHRA) or relevant Provincial Heritage Resources Agency (PHRA) by means of the online SAHRIS System.

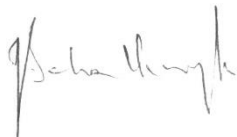


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Specialist competency:

Johan A van Schalkwyk, D Litt et Phil, heritage consultant, has been working in the field of heritage management for more than 40 years. Originally based at the National Museum of Cultural History, Pretoria, he has actively done research in the fields of anthropology, archaeology, museology, tourism and impact assessment. This work was done in Limpopo Province, Gauteng, Mpumalanga, North West Province, Eastern Cape Province, Northern Cape Province, Botswana, Zimbabwe, Malawi, Lesotho and Swaziland. Based on this work, he has curated various exhibitions at different museums and has published more than 70 papers, most in scientifically accredited journals. During this period, he has done more than 2000 impact assessments (archaeological, anthropological, historical and social) for various government departments and developers. Projects include environmental management frameworks, roads, pipeline-, and power line developments, dams, mining, water purification works, historical landscapes, refuse dumps and urban developments.



J A van Schalkwyk
Heritage Consultant
May 2020

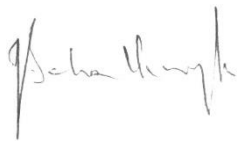


SPECIALIST DECLARATION

I, J A van Schalkwyk, as the appointed independent specialist, in terms of the 2014 EIA Regulations (as amended), hereby declare that I:

- I act as the independent specialist in this application;
- I perform the work relating to the application in an objective manner, even if this results in views and findings that are not favourable to the applicant;
- regard the information contained in this report as it relates to my specialist input/study to be true and correct, and do not have and will not have any financial interest in the undertaking of the activity, other than remuneration for work performed in terms of the NEMA, the Environmental Impact Assessment Regulations, 2014 (as amended) and any specific environmental management Act;
- I declare that there are no circumstances that may compromise my objectivity in performing such work;
- I have expertise in conducting the specialist report relevant to this application, including knowledge of the Act, Regulations and any guidelines that have relevance to the proposed activity;
- I will comply with the Act, Regulations and all other applicable legislation;
- I have no, and will not engage in, conflicting interests in the undertaking of the activity;
- I have no vested interest in the proposed activity proceeding;
- I undertake to disclose to the applicant and the competent authority all material information in my possession that reasonably has or may have the potential of influencing - any decision to be taken with respect to the application by the competent authority; and the objectivity of any report, plan or document to be prepared by myself for submission to the competent authority;
- I have ensured that information containing all relevant facts in respect of the specialist input/study was distributed or made available to interested and affected parties and the public and that participation by interested and affected parties was facilitated in such a manner that all interested and affected parties were provided with a reasonable opportunity to participate and to provide comments on the specialist input/study;
- I have ensured that the comments of all interested and affected parties on the specialist input/study were considered, recorded and submitted to the competent authority in respect of the application;
- all the particulars furnished by me in this specialist input/study are true and correct; and
- I realise that a false declaration is an offence in terms of regulation 48 and is punishable in terms of section 24F of the Act.

Signature of the specialist



J A van Schalkwyk
May 2020

EXECUTIVE SUMMARY

**Phase 1 Cultural Heritage Impact Assessment:
THE REHABILITATION OF PADDA DAM, WESTDENE/MELVILLE REGION OF THE CITY OF
JOHANNESBURG METROPOLITAN MUNICIPALITY, GAUTENG PROVINCE**

The *University of Johannesburg* requested the rehabilitation of the dam referred to as Padda Dam in the Westdene/Melville region of the City of Johannesburg Metropolitan Municipality. Consequently, *Thembakele Consulting Engineers* were appointed as the Consulting Engineer for the design and rehabilitation of Padda Dam Spillway.

In accordance with Section 38 of the NHRA, an independent heritage consultant was appointed by *Envirovolution Consulting (Pty) Ltd* to conduct a cultural heritage assessment to determine the cultural heritage significance of the dam.

This report describes the methodology used, the limitations encountered, the heritage features that were identified and the recommendations and mitigation measures proposed relevant to this. The investigation consisted of a desktop study (archival sources, database survey, maps and aerial imagery) and a physical survey that also included the interviewing of relevant people. It should be noted that the implementation of the mitigation measures is subject to SAHRA/PHRA's approval.

In summary, the following statements can be made about the Padda Dam:

- It is classified as an ordinary earthen embankment dam and exhibit no exceptional qualities in its design or construction.
- From an analysis of various databases, aerial photographs and maps, it is deduced that the Padda Dam is older than 60 years.
 - However, this does not rule out the possibility of any later alterations, additions or repairs that might have been made, and which would not be visible on the aerial photographs, i.e. the 2016 remedial works.
- It cannot be related to any significant individual or event.

However,

- It is older than 60 years and therefore enjoy general protection under the National Heritage Resources Act, No. 25 of 1999;
- It has some significance to the local community, which is much involved in its maintenance and protection and is used by them for recreational purposes (walking, bird watching, picnic).

Accordingly, the Padda Dam has been evaluated to have the following significance rating:

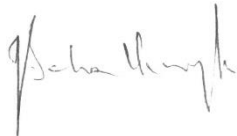
- Generally protected B: Medium significance
 - The implication of this is that the structure should be recorded before its destruction/rehabilitation. As the dam will be retained and the proposed activities is largely remedial in nature and intent, the recording done for this report is seen as sufficient for such purposes.

Legal requirements:

- The legal requirements related to heritage specifically are specified in Section 3 of this report. For this proposed project, the assessment has determined that the Padda Dam has a significance rating of: Generally Protected B: Medium significance, and therefore a valid permit should be obtained from the Provincial Heritage Resources Agency (PHRA) prior to any work being carried out.

In conclusion:

It is our considered opinion, based on the findings of the desktop research together with the fieldwork findings, that the danger posed by the lack of maintenance of the dam wall is sufficient reason to implement the proposed remedial actions, and thereby protecting a heritage site of some significance to the local community.




J A van Schalkwyk
Heritage Consultant
May 2020

TECHNICAL SUMMARY

Project description	
Description	The rehabilitation of Padda Dam
Project name	Rehabilitation of Padda Dam

Applicant
University of Johannesburg

Environmental assessors
Envirovolution
Mr G Govender

Property details													
Province	Gauteng												
Magisterial district	Johannesburg												
Municipality	City of Johannesburg												
Topo-cadastral map	2627BB												
Farm name	Braamfontein 53IR												
Closest town	Johannesburg												
Coordinates	Centre point (approximate)												
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Development criteria in terms of Section 38(1) of the NHR Act	Yes/No
Construction of road, wall, power line, pipeline, canal or other linear form of development or barrier exceeding 300m in length	Yes
Construction of bridge or similar structure exceeding 50m in length	Yes
Development exceeding 5000 sq m	Yes
Development involving three or more existing erven or subdivisions	No
Development involving three or more erven or divisions that have been consolidated within past five years	No
Rezoning of site exceeding 10 000 sq m	No
Any other development category, public open space, squares, parks, recreation grounds	No

Land use	
Previous land use	Farming
Current land use	Urban

¹ Left click on the icon to open the file in Google Earth, if installed on the computer. Alternatively, right click on the icon. In dialog box, select "Save Embedded File to Disk" and save to folder of choice.

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GLOSSARY OF TERMS AND ABBREVIATIONS

TERMS

Bioturbation: The burrowing by small mammals, insects and termites that disturb archaeological deposits.

Cumulative impacts: “Cumulative Impact”, in relation to an activity, means the past, current and reasonably foreseeable future impact of an activity, considered together with the impact of activities associated with that activity, that in itself may not be significant, but may become significant when added to existing and reasonably foreseeable impacts eventuating from similar or diverse activities.

Debitage: Stone chips discarded during the manufacture of stone tools.

Factory site: A specialised archaeological site where a specific set of technological activities has taken place – usually used to describe a place where stone tools were made.

Historic Period: Since the arrival of the white settlers - c. AD 1830 - in this part of the country.

Holocene: The most recent time period, which commenced c. 10 000 years ago.

Iron Age (also referred to as **Early Farming Communities**): Period covering the last 1800 years, when new people brought a new way of life to southern Africa. They established settled villages, cultivated domestic crops such as sorghum, millet and beans, and they herded cattle as well as sheep and goats. As they produced their own iron tools, archaeologists call this the Iron Age.

Early Iron Age	AD 200 - AD 900
Middle Iron Age	AD 900 - AD 1300
Later Iron Age	AD 1300 - AD 1830

Midden: The accumulated debris resulting from human occupation of a site.

Mitigation, means to anticipate and prevent negative impacts and risks, then to minimise them, rehabilitate or repair impacts to the extent feasible.

National Estate: The collective heritage assets of the Nation.

Pleistocene: Geological time period of 3 000 000 to 20 000 years ago.

Stone Age: The first and longest part of human history is the Stone Age, which began with the appearance of early humans between 3-2 million years ago. Stone Age people were hunters, gatherers and scavengers who did not live in permanently settled communities. Their stone tools preserve well and are found in most places in South Africa and elsewhere.

Early Stone Age	2 500 000 - 250 000 Before Present
Middle Stone Age	250 000 - 40-25 000 BP
Later Stone Age	40-25 000 - until c. AD 200

Tradition: As used in archaeology, it is a seriated sequence of artefact assemblages, particularly ceramics.

ACRONYMS and ABBREVIATIONS

AD Anno Domini (the year 0)

ASAPA	Association of Southern African Professional Archaeologists
BC	Before the Birth of Christ (the year 0)
BCE	Before the Common Era (the year 0)
BP	Before Present (calculated from 1950 when radio-carbon dating was established)
CE	Common Era (the year 0)
CRM	Cultural Resources Management
EAP	Environmental Assessment Practitioner
EIA	Early Iron Age
ESA	Early Stone Age
HIA	Heritage Impact Assessment
I & AP's	Interested and Affected Parties
ICOMOS	International Council on Monuments and Sites
LIA	Late Iron Age
LSA	Later Stone Age
MIA	Middle Iron Age
MSA	Middle Stone Age
NASA	National Archives of South Africa
NHRA	National Heritage Resources Act
PHRA	Provincial Heritage Resources Agency
SAHRA	South African Heritage Resources Agency
SAHRIS	South African Heritage Resources Information System

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1. INTRODUCTION

1.1 Background

The *University of Johannesburg* requested the rehabilitation of the dam referred to as Padda Dam in the Westdene/Melville region of the City of Johannesburg Metropolitan Municipality. Consequently, *Thembakele Consulting Engineers* were appointed as the Consulting Engineer for the design and rehabilitation of Padda Dam Spillway.

Envirovolution Consulting was contracted by *Thembakele Consulting Engineers* as independent environmental consultant to undertake the Basic Assessment and Water Use License process for the repair and upgrade of the dam.

South Africa's heritage resources, also described as the 'national estate', comprise a wide range of sites, features, objects and beliefs. However, according to Section 27(18) of the National Heritage Resources Act (NHRA), No. 25 of 1999, no person may destroy, damage, deface, excavate, alter, remove from its original position, subdivide or change the planning status of any heritage site without a permit issued by the heritage resources authority responsible for the protection of such site.

In accordance with Section 38 of the NHRA, an independent heritage consultant was appointed by *Envirovolution Consulting (Pty) Ltd* to conduct a cultural heritage assessment to determine the cultural heritage significance of the dam.

This report forms part of the Environmental Impact Assessment (EIA) as required by the EIA Regulations in terms of the National Environmental Management Act, 1998 (Act No. 107 of 1998) as amended and is intended for submission to the South African Heritage Resources Agency (SAHRA).

1.2 Terms and references

1.2.1 Scope of work

The aim of this study is to determine the cultural heritage significance of the dam where the rehabilitation is to take place. This included:

- Conducting a desk-top investigation of the area;
- A visit to the proposed development site.

The objectives were to:

- Evaluate the potential impacts of construction, operation and maintenance of the proposed development on archaeological, cultural and historical resources;
- Recommend mitigation measures to ameliorate any negative impacts on areas of archaeological, cultural or historical importance.

1.2.2 Assumptions and Limitations

The investigation has been influenced by the following factors:

- Lack of suitable access to all areas of the dam;
- It is assumed that the description of the proposed project, provided by the client, is accurate.
- The unpredictability of buried archaeological remains.
- No subsurface investigation (i.e. excavations or sampling) were undertaken, since a permit from SAHRA is required for such activities.
- It is assumed that the public consultation process undertaken as part of the Environmental Impact Assessment (EIA) is sufficient and that it does not have to be repeated as part of the heritage impact assessment.

2. LEGISLATIVE FRAMEWORK

2.1 Background

Heritage Impact Assessments are governed by national legislation and standards and International Best Practise. These include:

- South African Legislation
 - National Heritage Resources Act, 1999 (Act No. 25 of 1999) (NHRA);
 - Mineral and Petroleum Resources Development Act, 2002 (Act No. 22 of 2002) (MPRDA);
 - National Environmental Management Act 1998 (Act No. 107 of 1998) (NEMA); and
 - National Water Act, 1998 (Act No. 36 of 1998) (NWA).
- Standards and Regulations
 - South African Heritage Resources Agency (SAHRA) Minimum Standards;
 - Association of Southern African Professional Archaeologists (ASAPA) Constitution and Code of Ethics;
 - Anthropological Association of Southern Africa Constitution and Code of Ethics.
- International Best Practise and Guidelines
 - ICOMOS Standards (Guidance on Heritage Impact Assessments for Cultural World Heritage Properties); and
 - The UNESCO Convention concerning the Protection of the World Cultural and Natural Heritage (1972).

2.2 Heritage Impact Assessment Studies

South Africa's unique and non-renewable archaeological and palaeontological heritage sites are 'generally' protected in terms of the National Heritage Resources Act (Act No 25 of 1999, Section 35) and may not be disturbed at all without a permit from the relevant heritage resources authority.

The National Heritage Resources Act (Act No. 25 of 1999, Section 38) provides guidelines for Cultural Resources Management and prospective developments:

"38 (1) Subject to the provisions of subsections (7), (8) and (9), any person who intends to undertake a development categorised as:

- (a) the construction of a road, wall, powerline, pipeline, canal or other similar form of linear development or barrier exceeding 300m in length;*
- (b) the construction of a bridge or similar structure exceeding 50m in length;*
- (c) any development or other activity which will change the character of a site:*
 - (i) exceeding 5 000 m² in extent; or*
 - (ii) involving three or more existing erven or subdivisions thereof; or*
 - (iii) involving three or more erven or divisions thereof which have been consolidated within the past five years; or*

(iv) the costs of which will exceed a sum set in terms of regulations by SAHRA or a provincial heritage resources authority;

(d) the re-zoning of a site exceeding 10 000 m² in extent; or

(e) any other category of development provided for in regulations by SAHRA or a provincial heritage resources authority, must at the very earliest stages of initiating such a development, notify the responsible heritage resources authority and furnish it with details regarding the location, nature and extent of the proposed development.”

And:

“38 (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.”

3. HERITAGE RESOURCES

3.1 The National Estate

The National Heritage Resources Act (No. 25 of 1999) defines the heritage resources of South Africa which are of cultural significance or other special value for the present community and for future generations that must be considered part of the national estate to include:

- places, buildings, structures and equipment of cultural significance;
- places to which oral traditions are attached or which are associated with living heritage;
- historical settlements and townscapes;
- landscapes and natural features of cultural significance;
- geological sites of scientific or cultural importance;
- archaeological and palaeontological sites;
- graves and burial grounds, including-
 - ancestral graves;
 - royal graves and graves of traditional leaders;
 - graves of victims of conflict;
 - graves of individuals designated by the Minister by notice in the Gazette;
 - historical graves and cemeteries; and
 - other human remains which are not covered in terms of the Human Tissue Act, 1983 (Act No. 65 of 1983);
- sites of significance relating to the history of slavery in South Africa;
- movable objects, including-
 - objects recovered from the soil or waters of South Africa, including archaeological and palaeontological objects and material, meteorites and rare geological specimens;
 - objects to which oral traditions are attached or which are associated with living heritage;
 - ethnographic art and objects;

- military objects;
- objects of decorative or fine art;
- objects of scientific or technological interest; and
- books, records, documents, photographic positives and negatives, graphic, film or video material or sound recordings, excluding those that are public records as defined in section 1(xiv) of the National Archives of South Africa Act, 1996 (Act No. 43 of 1996).

3.2 Cultural significance

In the NHRA, Section 2 (vi), it is stated that “cultural significance” means aesthetic, architectural, historical, scientific, social, spiritual, linguistic or technological value or significance. This is determined in relation to a site or feature’s uniqueness, condition of preservation and research potential.

According to Section 3(3) of the NHRA, a place or object is to be considered part of the national estate if it has cultural significance or other special value because of

- its importance in the community, or pattern of South Africa's history;
- its possession of uncommon, rare or endangered aspects of South Africa's natural or cultural heritage;
- its potential to yield information that will contribute to an understanding of South Africa's natural or cultural heritage;
- its importance in demonstrating the principal characteristics of a particular class of South Africa's natural or cultural places or objects;
- its importance in exhibiting particular aesthetic characteristics valued by a community or cultural group;
- its importance in demonstrating a high degree of creative or technical achievement at a particular period;
- its strong or special association with a particular community or cultural group for social, cultural or spiritual reasons;
- its strong or special association with the life or work of a person, group or organisation of importance in the history of South Africa; and
- sites of significance relating to the history of slavery in South Africa.

A matrix (see Section 2 of Addendum) was developed whereby the above criteria were applied for the determination of the significance of each identified site. This allowed some form of control over the application of similar values for similar identified sites.

4. PROJECT DESCRIPTION

4.1 Site location

The Padda Dam is located south of Ayr Road, west of Perth Road and immediately north of the larger Westdene dam, on the boundary between Westdene and Melville in the City of Johannesburg Metropolitan Municipality (Fig. 1). For more information, see the Technical Summary on p. V above.

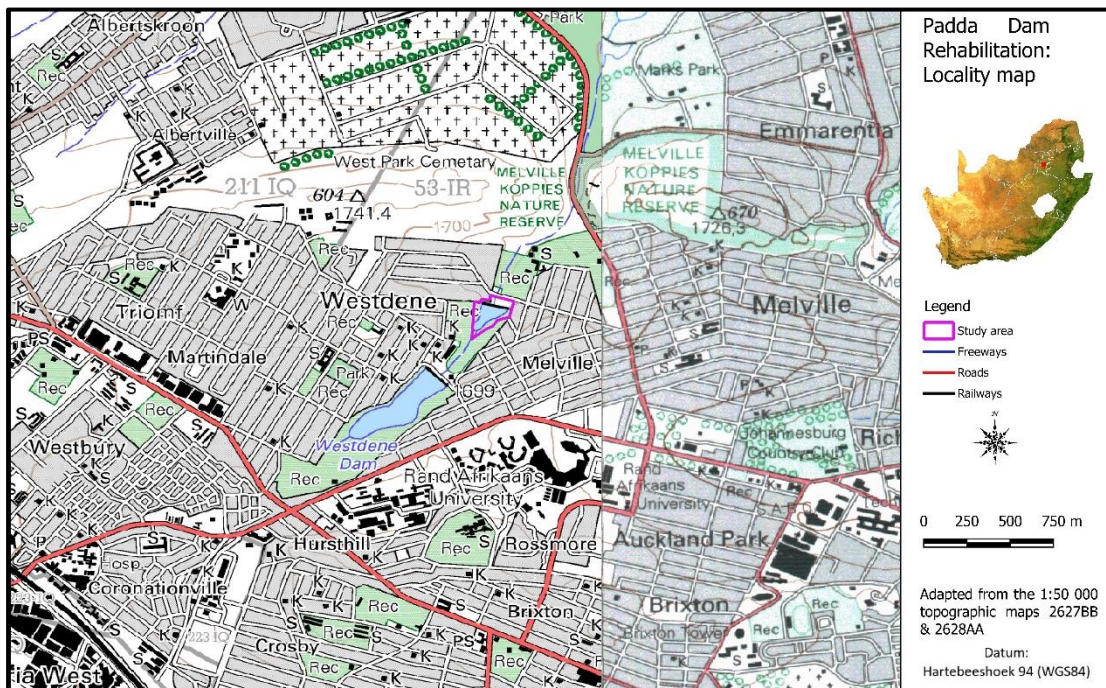


Figure 1. Location of the study area in regional context.

4.2 Development proposal

The University of Johannesburg has determined that Padda Dam has become unsafe as a result of years of neglect and unchecked plant growth taking place on the dam wall. The University of Johannesburg has thus appointed Tembakele Consulting Engineers (TCE) to undertake remedial works on the dam (Fig. 2).

The technical detail presented below was obtained from the technical report prepared by Tembakele Consulting Engineers (TCE) (Kativhu n.d.)

The Padda Dam spillway has deteriorated through gradual erosion over the years due to a lack of maintenance. The Spillway capacity has been compromised and it is no longer as efficient as expected. Temporary works were undertaken in 2016, however the implemented temporary remedial works have since been eroded and washed away. As a result, erosion has taken place around the spillway including the adjacent section of the existing earth fill dam wall. A gap close to 4m wide and about 3m deep, has formed on the dam wall and water is freely flowing out of the dam through the breached section. This has caused further damage downstream of the dam wall. If the spillway and eroded part of the dam wall are not attended to, before the forthcoming rain season, further erosion will definitely take place on the dam wall, resulting in the dam wall failing. Such a situation will be catastrophic to the surrounding community, in particular the Westside Ridge Housing Complex that is located in the flood plain and downstream of the dam. Currently, the dam is a high safety risk to the surrounding community.

The proposed measures entail the rehabilitation of the spillway and repairs to the eroded section of the dam wall. The main objective is to increase the flood handling capacity of the spillway. The proposed rehabilitation of dam spillway will involve the lowering the spillway level and lining of the side of the spillway to increase its flood handling capacity for the 1: 100year flood event.

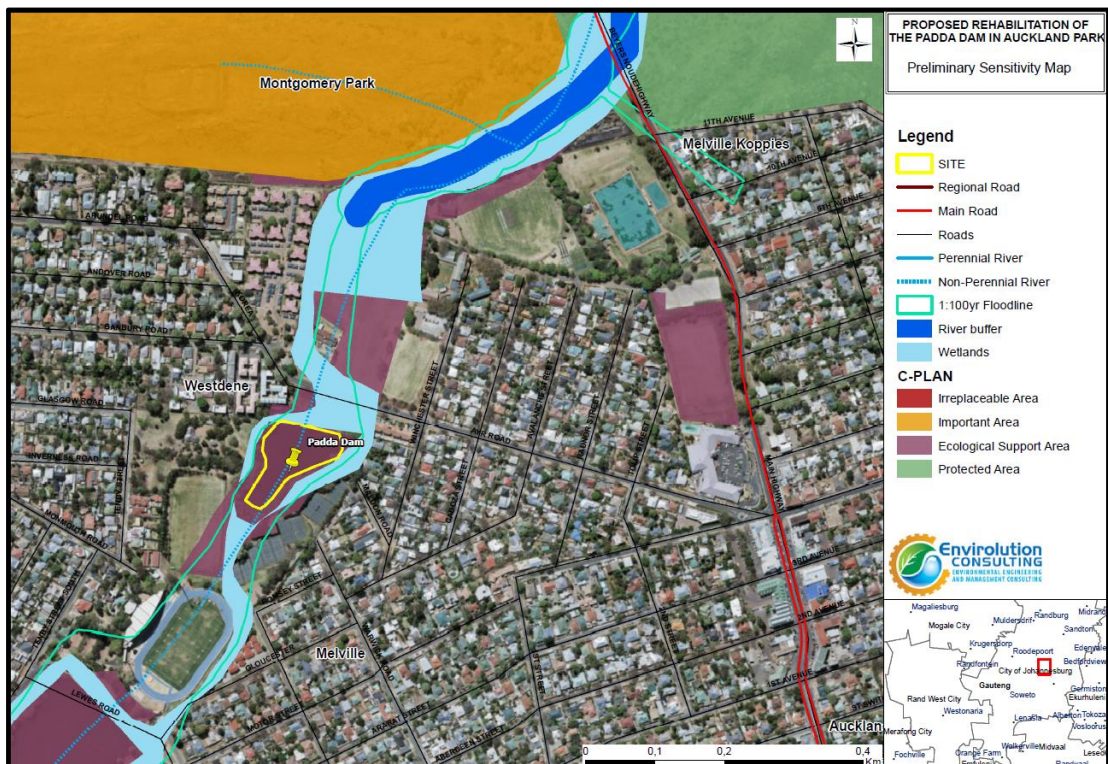


Figure 2. Layout of the dam
(Map supplied by *Envirolution*)

To remedy erosion downstream of the spillway, a Ski-jump on the concrete side-channel spillway is proposed to prevent undercutting of the spillway concrete lining, a training wall is also proposed to protect the eroded embankment section from future erosion. This intervention is viewed to provide a permanent solution to the problem being experienced at the dam. Details of proposed intervention measures are shown below (Fig. 3):

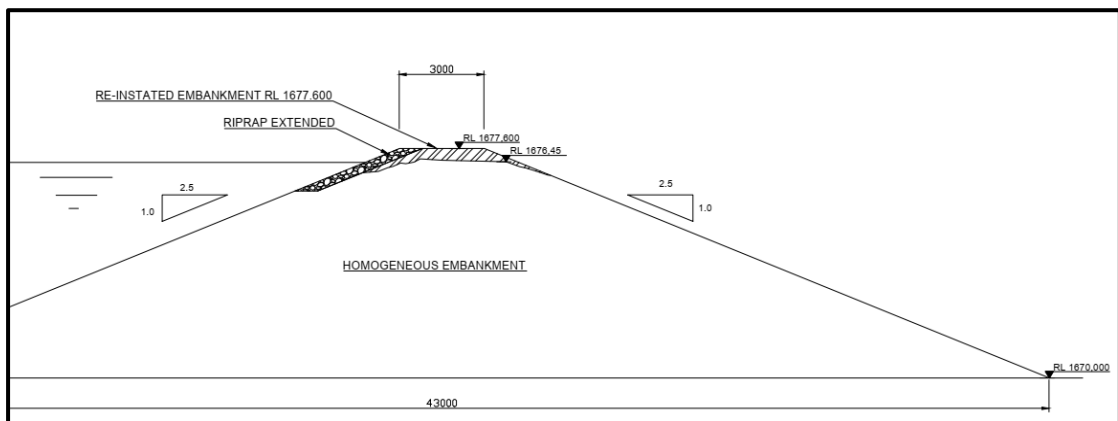


Figure 3. Slope protection
(After Kativhu n.d.)

5. STUDY APPROACH AND METHODOLOGY

5.1 Extent of the Study

This survey and impact assessment cover all facets of cultural heritage located in the study area as presented in Section 4 above and illustrated in Figures 1 & 2.

5.2 Methodology

5.2.1.1 Survey of the literature

A survey of the relevant literature was conducted with the aim of reviewing the previous research done and determining the potential of the area. In this regard, various anthropological, archaeological and historical sources were consulted – see list of references in Section 10.

- Information on events, sites and features in the larger region were obtained from these sources.

5.2.1.2 Survey of heritage impact assessments (HIAs)

A survey of HIAs done for projects in the region by various heritage consultants was conducted with the aim of determining the heritage potential of the area – see list of references in Section 10.

- Information on sites and features in the larger region were obtained from these sources.

5.2.1.3 Data bases

The *Heritage Atlas Database*, various SAHRA databases, the *Environmental Potential Atlas*, the *Chief Surveyor General* and the *National Archives of South Africa* were consulted.

- Database surveys produced a number of sites located in the larger region of the proposed development.

5.2.1.4 Other sources

Aerial photographs and topocadastral and other maps were also studied - see the list of references below.

- Information of a very general nature were obtained from these sources.

5.2.2 Field survey

The field survey was done according to generally accepted archaeological practices, and was aimed at locating all possible sites, objects and structures. The area that had to be investigated was identified by *Envirovolution* by means of maps and *.kml* files indicating the study area. This was loaded onto a Samsung digital device and used in Google Earth during the field survey to access the study area. Geo-rectifying of the aerial photographs and historic maps was done by means of a professional software package: ExpertGPS.

The site was visited on 19 May 2020 and was investigated by walking around the dam, accessing the various features where possible.

6. DESCRIPTION OF THE AFFECTED ENVIRONMENT

6.1 Diachronic overview

The areas that was to become Westdene and Melville are located on part of the original Braamfontein 531R farm. IT originally was the property of two brothers, Lourens and Frans Eduard Geldenhuys. Due to various legal problems, the establishment of Westdene was delayed and it was only proclaimed in 1910. The date of origin for Melville is equally uncertain, but evidence indicated that as early as 1896 the South African Investment and Trust Company sold some stands to the public.

The origin and date of the dams in the region is unclear. It probably served as reservoirs for irrigation and later, when urbanisation took place, for the management of storm water.

The southern dam, commonly referred to as Westdene Dam, became national news for a very tragic reason. On 27 March 1985 a double-decker bus transporting school children to their homes left the road and plunged into the dam. Tragically, 42 of the children died despite the heroic efforts of other scholars who tried to save them. A small monument was erected close to the dam wall to commemorate those who lost their lives.

From the official aerial photograph dating to 1938 (Fig. 3) and the official topographic map dating to 1943 (Fig. 4), the dam can clearly be seen, as well as the urbanisation that took place in the surrounding region. All of this would have had a negative impact on any sites, features and objects that might have existed here in the past, particularly the pre-colonial past.

As has been indicated, the dam, which is the focus of this study, was completed sometime prior to 1938. What it consisted of in terms of the materials used and its size, is unknown at present. However, by viewing the historic aerial photographs it can be seen that the size and layout of the dam has not changed since at least 1938 (Fig. 4, 5, 6 & 7). However, this does not rule out the possibility of any later alterations, additions or repairs that might have been made, and which would not be visible on the aerial photographs, i.e. the 2016 remedial works..



Figure 4. Aerial view of the dam location dating to 1938 (CS-G photograph: 129_014_74013)

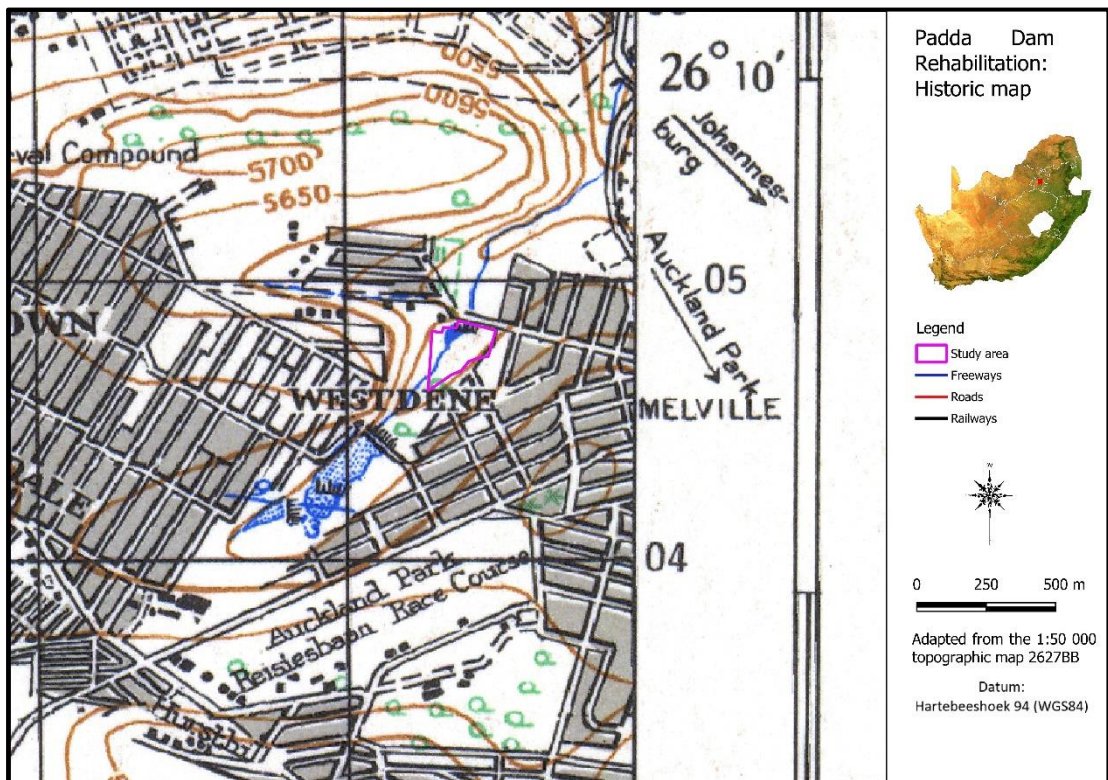


Figure 5. The dam indicated on the 1939 version of the 1:50 000 topographic map



Figure 6. Aerial view of the dam location dating to 1952 (CS-G photograph: 314_005_44495)



Figure 7. Aerial view of the dam location dating to 2020
(Image: Google Earth)

6.2 Padda dam:

6.2.1 Classification

Embankment dam: A dam structure made up of fill material (earth or rock) built up by compacting successive layers of earth, using the most impervious materials to form a core. The length is usually longer than its height. It is calculated that more than 75% of dams in the world are embankment dams.

6.2.2 Impounds:

Unnamed tributary of the Braamfontein Spruit.

6.2.3 Designer/builder:

Unknown

6.2.4 Date:

Pre 1938: It can be seen on the earliest official aerial photographs dating to 1938.

6.2.5 Dam elements:

Base width: The width of the dam measured along the dam/foundation interface

- Impossible to determine due to the level of the water.

Bottom outlet: A dam drain valve is usually installed towards the bottom of the dam wall in close proximity to the original stream bed

- Could not be located due to vegetation growth.

Crest of dam: The elevation of the upper most surface of a dam, usually a road or walkway

- Contains the trellis fence blocking off access to the dam.

Crest length: The developed length of the top of the dam

- c. 120m.

Inlet: Point where the recharge of dam supply starts

- Re-enforced concrete pipe on southern side of the dam.

Riprap: A layer of large uncoursed stones, broken rock, or precast blocks placed in random fashion on the upstream slope of an embankment dam as a protection against wave action

- Hand-placed local stone, at a later stage covered with wire mesh.

Spillway: The arrangement made near the top of dam for the passage of surplus water from the dam

- Right-hand bank of dam – side channel that has completely been washed away.

Spillway channel: A channel or tunnel conveying water from the spillway to the river downstream

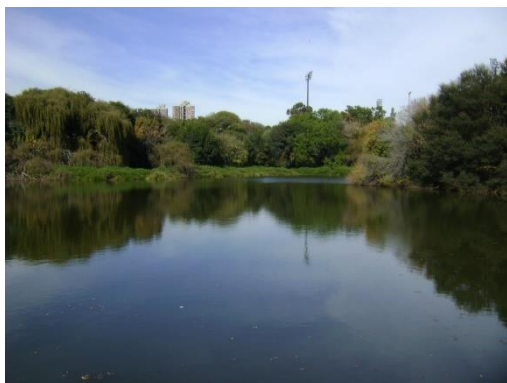
- Uncertain as it has been completely washed away

Structural height: The vertical distance from the lowest point of natural ground on the downstream side of the dam to the highest part of the dam which would impound water

- c. 5m

Leisure activities:

Local people use the dam for recreational purposes, mainly bird watching and picnic.



View across the dam – looking southeast



View across the dam – looking northwest



Figure 8. Various elements regarding the dam

7. RESULTS: STATEMENT OF SIGNIFICANCE AND IMPACT RATINGS

The significance of the site is determined by its aesthetic, architectural, historical, scientific, social, spiritual, linguistic or technical value in relation to the uniqueness, condition of preservation and research potential and is presented in the table below:

- Generally protected B: Medium significance
 - The implication of this is that the structure should be recorded before its destruction/rehabilitation. As the dam will be retained and the proposed activities are largely remedial in nature and intent, the recording done for this report is seen as sufficient for such purposes.

Table 1: Matrix used for assessing the significance of each identified site/feature

1. SITE EVALUATION			
1.1 Historic value			
Is it important in the community, or pattern of history	Yes		
Does it have strong or special association with the life or work of a person, group or organisation of importance in history	Yes		
Does it have significance relating to the history of slavery	No		
1.2 Aesthetic value			
It is important in exhibiting particular aesthetic characteristics valued by a community or cultural group	No		
1.3 Scientific value			
Does it have potential to yield information that will contribute to an understanding of natural or cultural heritage	No		
Is it important in demonstrating a high degree of creative or technical achievement at a particular period	No		
1.4 Social value			
Does it have strong or special association with a particular community or cultural group for social, cultural or spiritual reasons	No		
1.5 Rarity			
Does it possess uncommon, rare or endangered aspects of natural or cultural heritage	No		
1.6 Representivity			
Is it important in demonstrating the principal characteristics of a particular class of natural or cultural places or objects	No		
Importance in demonstrating the principal characteristics of a range of landscapes or environments, the attributes of which identify it as being characteristic of its class	Yes		
Importance in demonstrating the principal characteristics of human activities (including way of life, philosophy, custom, process, land-use, function, design or technique) in the environment of the nation, province, region or locality.	No		
2. Sphere of Significance			
	High	Medium	Low
International			
National			
Provincial			
Regional			
Local	Yes		
Specific community	Yes		
3. Field Register Rating			
1.	National/Grade 1: High significance - No alteration whatsoever without permit from SAHRA		
2.	Provincial/Grade 2: High significance - No alteration whatsoever without permit from provincial heritage authority.		
3.	Local/Grade 3A: High significance - Mitigation as part of development process not advised.		
4.	Local/Grade 3B: High significance - Could be mitigated and (part) retained as heritage register site		
5.	Generally protected A: High/medium significance - Should be mitigated before destruction		
6.	Generally protected B: Medium significance - Should be recorded before destruction		
			Yes

7.	Generally protected C: Low significance - Requires no further recording before destruction	
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8. MANAGEMENT AND MITIGATION MEASURES

Heritage sites are fixed features in the environment, occurring within specific spatial confines. Any impact upon them is permanent and non-reversible. Those resources that cannot be avoided and that are directly impacted by the proposed development can be excavated/recorded and a management plan can be developed for future action. Those sites that are not impacted on can be written into the management plan, whence they can be avoided or cared for in the future.

Sources of risk were considered with regards to development activities defined in Section 2(viii) of the NHRA that may be triggered and are summarised in Table 2A and 2B below. These issues formed the basis of the impact assessment described. The potential risks are discussed according to the various phases of the project below.

8.1 Objectives

- Protection of archaeological, historical and any other site or land considered being of cultural value within the project boundary against vandalism, destruction and theft.
- The preservation and appropriate management of new discoveries in accordance with the NHRA, should these be discovered during construction activities.

The following shall apply:

- Known sites should be clearly marked in order that they can be avoided during construction activities.
- The contractors and workers should be notified that archaeological sites might be exposed during the construction activities.
- Should any heritage artefacts be exposed during excavation, work on the area where the artefacts were discovered, shall cease immediately and the Environmental Control Officer shall be notified as soon as possible;
- All discoveries shall be reported immediately to a heritage practitioner so that an investigation and evaluation of the finds can be made. Acting upon advice from these specialists, the Environmental Control Officer will advise the necessary actions to be taken;
- Under no circumstances shall any artefacts be removed, destroyed or interfered with by anyone on the site; and
- Contractors and workers shall be advised of the penalties associated with the unlawful removal of cultural, historical, archaeological or palaeontological artefacts, as set out in the National Heritage Resources Act (Act No. 25 of 1999), Section 51. (1).

8.2 Control

In order to achieve this, the following should be in place:

- A person or entity, e.g. the Environmental Control Officer, should be tasked to take responsibility for the heritage sites and should be held accountable for any damage.
- Known sites should be located and isolated, e.g. by fencing them off. All construction workers should be informed that these are no-go areas, unless accompanied by the individual or persons representing the Environmental Control Officer as identified above.

- In areas where the vegetation is threatening the heritage sites, e.g. growing trees pushing walls over, it should be removed, but only after permission for the methods proposed has been granted by SAHRA. A heritage official should be part of the team executing these measures.

Table 2A: Construction Phase: Environmental Management Programme for the project

Action required	Protection of heritage sites, features and objects		
Potential Impact	The identified risk is damage or changes to resources that are generally protected in terms of Sections 27, 28, 31, 32, 34, 35, 36 and 37 of the NHRA that may occur in the proposed project area.		
Risk if impact is not mitigated	Loss or damage to sites, features or objects of cultural heritage significance		
Activity / issue	Mitigation: Action/control	Responsibility	Timeframe
1. Removal of Vegetation 2. Construction of required infrastructure, e.g. access roads, water pipelines	See discussion in Section 9.1 above	Environmental Control Officer	During construction only
Monitoring	See discussion in Section 9.2 above		

Table 2B: Operation Phase: Environmental Management Programme for the project

Action required	Protection of heritage sites, features and objects		
Potential Impact	It is unlikely that the negative impacts identified for pre-mitigation will occur if the recommendations are followed.		
Risk if impact is not mitigated	Loss or damage to sites, features or objects of cultural heritage significance		
Activity / issue	Mitigation: Action/control	Responsibility	Timeframe
1. Removal of Vegetation 2. Construction of required infrastructure, e.g. access roads, water pipelines	See discussion in Section 9.1 above	Environmental Control Officer	During construction only
Monitoring	See discussion in Section 9.2 above		

9. CONCLUSIONS AND RECOMMENDATIONS

The *University of Johannesburg* requested the rehabilitation of the dam referred to as Padda Dam in the Westdene/Melville region of the City of Johannesburg Metropolitan Municipality. Consequently, *Thembakele Consulting Engineers* were appointed as the Consulting Engineer for the design and rehabilitation of Padda Dam Spillway.

This report describes the methodology used, the limitations encountered, the heritage features that were identified and the recommendations and mitigation measures proposed relevant to this. The investigation consisted of a desktop study (archival sources, database survey, maps and aerial imagery) and a physical survey that also included the interviewing of relevant people. It should be noted that the implementation of the mitigation measures is subject to SAHRA/PHRA's approval.

In summary, the following statements can be made about the Padda Dam:

- It is classified as an ordinary earthen embankment dam and exhibit no exceptional qualities in its design or construction.
- From an analysis of various databases, aerial photographs and maps, it is deduced that the Padda Dam is older than 60 years.
 - However, this does not rule out the possibility of any later alterations, additions or repairs that might have been made, and which would not be visible on the aerial photographs, i.e. the 2016 remedial works.
- It cannot be related to any significant individual or event.

However,

- It is older than 60 years and therefore enjoy general protection under the National Heritage Resources Act, No. 25 of 1999;
- It has some significance to the local community, which is much involved in its maintenance and protection and is used by them for recreational purposes (walking, bird watching, picnic).

Accordingly, the Padda Dam has been evaluated to have the following significance rating:

- Generally protected B: Medium significance
 - The implication of this is that the structure should be recorded before its destruction/rehabilitation. As the dam will be retained and the proposed activities is largely remedial in nature and intent, the recording done for this report is seen as sufficient for such purposes.

Legal requirements:

- The legal requirements related to heritage specifically are specified in Section 3 of this report. For this proposed project, the assessment has determined that the Padda Dam has a significance rating of: Generally Protected B: Medium significance, and therefore a valid permit should be obtained from the Provincial Heritage Resources Agency (PHRA) prior to any work being carried out.

In conclusion:

It is our considered opinion, based on the findings of the desktop research together with the fieldwork findings, that the danger posed by the lack of maintenance of the dam wall is sufficient reason to implement the proposed remedial actions, and thereby protecting a heritage site of some significance to the local community.

10. REFERENCES

10.1 Data bases

Chief Surveyor General
Environmental Potential Atlas, Department of Environmental Affairs and Tourism.
Heritage Atlas Database, Pretoria
National Archives of South Africa
SAHRA Archaeology and Palaeontology Report Mapping Project (2009)
SAHRIS Database

10.2 Literature

Kativhu, C.N. n.d. *Regulations for S30A: Emergency Situations: Oral Requests for Verbal Directives*.
Compiled by Thembakele Consulting Engineers.

Richardson, D. 2001. *Historic sites of South Africa*. Cape Town: Struik Publishers.

Van Schalkwyk, J.A. 2004. *Heritage survey of the proposed Orlando Dam precinct development, Orlando, Gauteng*. Pretoria: Unpublished survey 2004/KH/026.

10.3 Archival sources, maps and aerial photographs

1: 50 000 Topographic maps
Google Earth
Aerial Photographs: Chief Surveyor-General

11. ADDENDUM

1. Indemnity and terms of use of this report

The findings, results, conclusions and recommendations given in this report are based on the author's best scientific and professional knowledge as well as available information. The report is based on survey and assessment techniques which are limited by time and budgetary constraints relevant to the type and level of investigation undertaken and the author reserve the right to modify aspects of the report including the recommendations if and when new information may become available from ongoing research or further work in this field, or pertaining to this investigation.

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. The author of this report will not be held liable for such oversights or for costs incurred as a result of such oversights.

Although the author exercises due care and diligence in rendering services and preparing documents, he accepts no liability and the client, by receiving this document, indemnifies the author against all actions, claims, demands, losses, liabilities, costs, damages and expenses arising from or in connection with services rendered, directly or indirectly by the author and by the use of the information contained in this document.

This report must not be altered or added to without the prior written consent of the author. This also refers to electronic copies of this report which are supplied for the purposes of inclusion as part of other reports, including main reports. Similarly, any recommendations, statements or conclusions drawn from or based on this report must make reference to this report. If these form part of a main report relating to this investigation or report, this report must be included in its entirety as an appendix or separate section to the main report.

2. Assessing the significance of heritage resources and potential impacts

A system for site grading was established by the NHRA and further developed by the South African Heritage Resources Agency (SAHRA 2007) and has been approved by ASAPA for use in southern Africa and was utilised during this assessment.

2.1 Significance of the identified heritage resources

According to the NHRA, Section 2(vi) the **significance** of a heritage sites and artefacts is determined by it aesthetic, architectural, historical, scientific, social, spiritual, linguistic or technical value in relation to the uniqueness, condition of preservation and research potential. It must be kept in mind that the various aspects are not mutually exclusive, and that the evaluation of any site is done with reference to any number of these.

Matrix used for assessing the significance of each identified site/feature

1. SITE EVALUATION				
1.1 Historic value				
Is it important in the community, or pattern of history				
Does it have strong or special association with the life or work of a person, group or organisation of importance in history				
Does it have significance relating to the history of slavery				
1.2 Aesthetic value				
It is important in exhibiting particular aesthetic characteristics valued by a community or cultural group				
1.3 Scientific value				
Does it have potential to yield information that will contribute to an understanding of natural or cultural heritage				
Is it important in demonstrating a high degree of creative or technical achievement at a particular period				
1.4 Social value				
Does it have strong or special association with a particular community or cultural group for social, cultural or spiritual reasons				
1.5 Rarity				
Does it possess uncommon, rare or endangered aspects of natural or cultural heritage				
1.6 Representivity				
Is it important in demonstrating the principal characteristics of a particular class of natural or cultural places or objects				
Importance in demonstrating the principal characteristics of a range of landscapes or environments, the attributes of which identify it as being characteristic of its class				
Importance in demonstrating the principal characteristics of human activities (including way of life, philosophy, custom, process, land-use, function, design or technique) in the environment of the nation, province, region or locality.				
2. Sphere of Significance		High	Medium	Low
International				
National				
Provincial				
Regional				
Local				
Specific community				
3. Field Register Rating				
1.	National/Grade 1: High significance - No alteration whatsoever without permit from SAHRA			
2.	Provincial/Grade 2: High significance - No alteration whatsoever without permit from provincial heritage authority.			
3.	Local/Grade 3A: High significance - Mitigation as part of development process not advised.			

4.	Local/Grade 3B: High significance - Could be mitigated and (part) retained as heritage register site	
5.	Generally protected 4A: High/medium significance - Should be mitigated before destruction	
6.	Generally protected 4B: Medium significance - Should be recorded before destruction	
7.	Generally protected 4C: Low significance - Requires no further recording before destruction	

2.2 Significance of the anticipated impact on heritage resources

All impacts identified during the HIA stage of the study will be classified in terms of their significance. Issues would be assessed in terms of the following criteria:

Nature of the impact

A description of what causes the effect, what will be affected and how it will be affected.

Extent

The physical **extent**, wherein it is indicated whether:

- 1 - The impact will be limited to the site;
- 2 - The impact will be limited to the local area;
- 3 - The impact will be limited to the region;
- 4 - The impact will be national; or
- 5 - The impact will be international.

Duration

Here it should be indicated whether the lifespan of the impact will be:

- 1 - Of a very short duration (0–1 years);
- 2 - Of a short duration (2-5 years);
- 3 - Medium-term (5–15 years);
- 4 - Long term (where the impact will persist possibly beyond the operational life of the activity); or
- 5 - Permanent (where the impact will persist indefinitely).

Magnitude (Intensity)

The magnitude of impact, quantified on a scale from 0-10, where a score is assigned:

- 0 - Small and will have no effect;
- 2 - Minor and will not result in an impact;
- 4 - Low and will cause a slight impact;
- 6 - Moderate and will result in processes continuing but in a modified way;
- 8 - High, (processes are altered to the extent that they temporarily cease); or
- 10 - Very high and results in complete destruction of patterns and permanent cessation of processes.

Probability

This describes the likelihood of the impact actually occurring and is estimated on a scale where:

- 1 - Very improbable (probably will not happen);
- 2 - Improbable (some possibility, but low likelihood);
- 3 - Probable (distinct possibility);
- 4 - Highly probable (most likely); or
- 5 - Definite (impact will occur regardless of any prevention measures).

Significance

The significance is determined through a synthesis of the characteristics described above (refer to the formula below) and can be assessed as low, medium or high:

$S = (E+D+M) \times P$; where

S = Significance weighting

E = Extent
 D = Duration
 M = Magnitude
 P = Probability

Significance of impact		
Points	Significant Weighting	Discussion
< 30 points	Low	Where this impact would not have a direct influence on the decision to develop in the area.
31-60 points	Medium	Where the impact could influence the decision to develop in the area unless it is effectively mitigated.
> 60 points	High	Where the impact must have an influence on the decision process to develop in the area.

Confidence

This should relate to the level of confidence that the specialist has in establishing the nature and degree of impacts. It relates to the level and reliability of information, the nature and degree of consultation with I&AP's and the dynamic of the broader socio-political context.

- High, where the information is comprehensive and accurate, where there has been a high degree of consultation and the socio-political context is relatively stable.
- Medium, where the information is sufficient but is based mainly on secondary sources, where there has been a limited targeted consultation and socio-political context is fluid.
- Low, where the information is poor, a high degree of contestation is evident and there is a state of socio-political flux.

Status

- The status, which is described as either positive, negative or neutral.

Reversibility

- The degree to which the impact can be reversed.

Mitigation

- The degree to which the impact can be mitigated.

Nature:		
	Without mitigation	With mitigation
Construction Phase		
Probability		
Duration		
Extent		
Magnitude		
Significance		
Status (positive or negative)		
Operation Phase		
Probability		
Duration		
Extent		
Magnitude		
Significance		
Status (positive or negative)		
Reversibility		
Irreplaceable loss of resources?		
Can impacts be mitigated		

3. Mitigation measures

- *Mitigation: means to anticipate and prevent negative impacts and risks, then to minimise them, rehabilitate or repair impacts to the extent feasible.*

Impacts can be managed through one or a combination of the following mitigation measures:

- Avoidance
- Investigation (archaeological)
- Rehabilitation
- Interpretation
- Memorialisation
- Enhancement (positive impacts)

For the current study, the following mitigation measures are proposed, to be implemented only if any of the identified sites or features are to be impacted on by the proposed development activities:

- (1) Avoidance/Preserve: This is viewed to be the primary form of mitigation and applies where any type of development occurs within a formally protected or significant or sensitive heritage context and is likely to have a high negative impact. This measure often includes the change / alteration of development planning and therefore impact zones in order not to impact on resources. The site should be retained *in situ* and a buffer zone should be created around it, either temporary (by means of danger tape) or permanently (wire fence or built wall). Depending on the type of site, the buffer zone can vary from
 - 10 metres for a single grave, or a built structure, to
 - 50 metres where the boundaries are less obvious, e.g. a Late Iron Age site.
- (2) Archaeological investigation/Relocation of graves: This option can be implemented with additional design and construction inputs. This is appropriate where development occurs in a context of heritage significance and where the impact is such that it can be mitigated. Mitigation is to excavate the site by archaeological techniques, document the site (map and photograph) and analyse the recovered material to acceptable standards. This can only be done by a suitably qualified archaeologist.
 - This option should be implemented when it is impossible to avoid impacting on an identified site or feature.
 - This also applies for graves older than 60 years that are to be relocated. For graves younger than 60 years a permit from SAHRA is not required. However, all other legal requirements must be adhered to.
 - Impacts can be beneficial – e.g. mitigation contribute to knowledge
- (3) Rehabilitation: When features, e.g. buildings or other structures are to be re-used. Rehabilitation is considered in heritage management terms as an intervention typically involving the adding of a new heritage layer to enable a new sustainable use.
 - The heritage resource is degraded or in the process of degradation and would benefit from rehabilitation.
 - Where rehabilitation implies appropriate conservation interventions, i.e. adaptive reuse, repair and maintenance, consolidation and minimal loss of historical fabric.
 - Conservation measures would be to record the buildings/structures as they are (at a particular point in time). The records and recordings would then become the 'artefacts' to be preserved and managed as heritage features or (movable) objects.
 - This approach automatically also leads to the enhancement of the sites or features that are re-used.

- (4) Mitigation is also possible with additional design and construction inputs. Although linked to the previous measure (rehabilitation) a secondary though 'indirect' conservation measure would be to use the existing architectural 'vocabulary' of the structure as guideline for any new designs.
 - The following principle should be considered: **heritage informs design**.
 - This approach automatically also leads to the enhancement of the sites or features that are re-used.
- (5) No further action required: This is applicable only where sites or features have been rated to be of such low significance that it does not warrant further documentation, as it is viewed to be fully documented after inclusion in this report.
 - Site monitoring during development, by an ECO or the heritage specialist are often added to this recommendation in order to ensure that no undetected heritage/remains are destroyed.

4. Curriculum vitae

Johan Abraham van Schalkwyk

Personal particulars

Date of birth: 14 April 1952
Identity number: 520414 5099 08 4
Marital status: Married; one daughter
Nationality: South African

Current address: home

62 Coetzer Ave, Monument Park, Pretoria, 0181
Mobile: 076 790 6777; E-mail: jvschalkwyk@mweb.co.za

Qualifications

1995 DLitt et Phil (Anthropology), University of South Africa
1985 MA (Anthropology), University of Pretoria
1981 BA (Hons), Anthropology, University of Pretoria
1979 Post Graduate Diploma in Museology, University of Pretoria
1978 BA (Hons), Archaeology, University of Pretoria
1976 BA, University of Pretoria

Non-academic qualifications

12th HSRC-School in Research Methodology - July 1990
Dept. of Education and Training Management Course - June 1992
Social Assessment Professional Development Course - 1994
Integrated Environmental Management Course, UCT - 1994

Professional experience

Private Practice
2017 - current: Professional Heritage Consultant

National Museum of Cultural History

1992 - 2017: Senior researcher: Head of Department of Research. Manage an average of seven researchers in this department and supervise them in their research projects. Did various projects relating to Anthropology and Archaeology in Limpopo Province, Mpumalanga, North West Province and Gauteng. Headed the Museum's Section for Heritage Impact Assessments.
1978 - 1991: Curator of the Anthropological Department of the Museum. Carried out extensive fieldwork in both anthropology and archaeology

Department of Archaeology, University of Pretoria

1976 - 1977: Assistant researcher responsible for excavations at various sites in Limpopo Province and Mpumalanga.

Awards and grants

1. Hanisch Book Prize for the best final year Archaeology student, University of Pretoria - 1976.
2. Special merit award, National Cultural History Museum - 1986.
3. Special merit award, National Cultural History Museum - 1991.
4. Grant by the Department of Arts, Culture, Science and Technology, to visit the various African countries to study museums, sites and cultural programmes - 1993.
5. Grant by the USA National Parks Service, to visit the United States of America to study museums, sites, tourism development, cultural programmes and impact assessment programmes - 1998.
6. Grant by the USA embassy, Pretoria, under the Bi-national Commission Exchange Support Fund, to visit cultural institutions in the USA and to attend a conference in Charleston - 2000.
7. Grant by the National Research Foundation to develop a model for community-based tourism - 2001.

8. Grant by the National Research Foundation to develop a model for community-based tourism - 2013. In association with RARI, Wits University.

Publications

Published more than 70 papers, mostly in scientifically accredited journals, but also as chapters in books.

Conference Contributions

Regularly presented papers at conferences, locally as well as internationally, on various research topics, ranging in scope from archaeology, anthropological, historical, cultural historical and tourism development.

Heritage Impact Assessments

Since 1992, I have done more than 2000 Phase 1 and Phase 2 impact assessments (archaeological, anthropological, historical and social) for various government departments and developers. Projects include environmental management frameworks, roads, pipeline-, and power line developments, dams, mining, water purification works, historical landscapes, refuse dumps and urban developments.