

Phase 1 Cultural Heritage Impact Assessment:

THE PROPOSED REHABILITATION AND UPGRADE OF THE SEDER STREET BRIDGE IN RANDPARK RIDGE, CITY OF JOHANNESBURG METROPOLITAN MUNICIPALITY, GAUTENG PROVINCE

Prepared for:

Envirolution Consulting: Ms S Ismail

- Address: Vista Place Suite 1a & 2, No. 52, Cnr Vorster Avenue & Glen Avenue, Glenanda; Tel: 0861 44 44 99; E-mail: sameera@envirolution.co.za

Prepared by:

J A van Schalkwyk (D Litt et Phil),

- Heritage Consultant: ASAPA Registration No.: 164 - Principal Investigator: Iron Age, Colonial Period, Industrial Heritage.
- Postal Address: 62 Coetzer Avenue, Monument Park, 0181; Tel: 076 790 6777; E-mail: jvschalkwyk@mweb.co.za

Report No: 2020/JvS/056

- Status: Final
- Date: August 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.

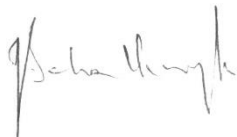


Copy Right:

This report is intended solely for the use of the individual or entity to whom it is addressed or to whom it was meant to be addressed. It is provided solely for the purposes set out in it and may not, in whole or in part, be used for any other purpose or by a third party, without the author's prior written consent.

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
August 2020

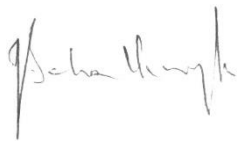


SPECIALIST DECLARATION

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
August 2020

EXECUTIVE SUMMARY

**Phase 1 Cultural Heritage Impact Assessment:
THE PROPOSED REHABILITATION AND UPGRADE OF THE SEDER STREET BRIDGE IN RANDPARK
RIDGE, CITY OF JOHANNESBURG METROPOLITAN MUNICIPALITY, GAUTENG PROVINCE**

The Johannesburg Roads Agency proposes the upgrade and rehabilitation of the Seder Street bridge, between Medlar Road and Frangipani Street in Hymany Park in the Randpark Ridge region.

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 Seder Street bridge.

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.

Based on the background research that was done as well as the site inspection, it can be concluded that the significance, or lack thereof, of the Seder Street bridge lies in the following:

- The bridge is younger than 60 years.
- As far as could be established, no significance event or person could be linked to the bridge.
- It does not show any remarkable or unique features in its construction or materials used.

Accordingly, the Seder Street bridge has been evaluated to have the following significance rating:

- Generally protected C: Low significance
 - Requires no further recording before destruction

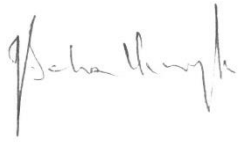
Mitigation measures:

Nyeleti Consulting (Pty) Ltd proposed two different alternatives for the rehabilitation of the Seder Street bridge. Due to the low significance attributed to the Seder Street bridge the following recommendation is made:

- It is recommended that any of the proposed alternatives can be implemented with due consideration to the heritage value of the original structure, i.e. the old masonry section of the bridge.

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 Belgrave Street bridge has a significance rating of: Generally Protected C: Low significance, and therefore a valid permit should be obtained from the Provincial Heritage Resources Agency (PHRA) prior to any work being carried out.

A handwritten signature in black ink, appearing to read 'J A van Schalkwyk'. The signature is written in a cursive style with a vertical line extending downwards from the end.


J A van Schalkwyk
Heritage Consultant
August 2020

TECHNICAL SUMMARY

Project description	
Description	Upgrade and rehabilitation of a double lane low-level bridge across an unnamed tributary of the Klein Jukskei River
Project name	Seder Street Bridge Upgrade

Applicant
Johannesburg Road Agency

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)												
	<table border="1"> <thead> <tr> <th>No</th> <th>Latitude</th> <th>Longitude</th> <th>No</th> <th>Latitude</th> <th>Longitude</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>S 26,17575</td> <td>E 27,99414</td> <td></td> <td></td> <td></td> </tr> </tbody> </table>	No	Latitude	Longitude	No	Latitude	Longitude	1	S 26,17575	E 27,99414			
No	Latitude	Longitude	No	Latitude	Longitude								
1	S 26,17575	E 27,99414											
	.kml files ¹ 												

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	No
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.

TABLE OF CONTENTS

	Page
SPECIALIST DECLARATION	II
EXECUTIVE SUMMARY	III
TECHNICAL SUMMARY	V
1. INTRODUCTION	1
2. LEGISLATIVE FRAMEWORK	2
3. HERITAGE RESOURCES	3
4. PROJECT DESCRIPTION	4
5. STUDY APPROACH AND METHODOLOGY	7
6. DESCRIPTION OF THE AFFECTED ENVIRONMENT	9
7. DESCRIPTION OF THE BRIDGE	14
8. RESULTS: STATEMENT OF SIGNIFICANCE	17
9. MITIGATION MEASURES	18
10. MANAGEMENT AND MITIGATION MEASURES	19
11. CONCLUSIONS AND RECOMMENDATIONS	20
12. REFERENCES	22
13. ADDENDUM	24
1. Indemnity and terms of use of this report	24
2. Assessing the significance of heritage resources and potential impacts	25
3. Mitigation measures	28
4. Curriculum vitae	30

LIST OF FIGURES

	Page
Figure 1. Location of the study area in regional context	5
Figure 2. Location of known heritage sites and features in relation to the study area	8
Figure 3. Location of built features of significance in the region of the study area - nil	8
Figure 4. The Palaeontological sensitivity of the study area	10
Figure 5. Aerial view of the bridge location dating to 1938	12
Figure 6. The bridge location indicated on the 1943 version of the 1:50 000 topographic map	12
Figure 7. The bridge location indicated on the aerial photograph dating to 1961	13
Figure 8. Aerial view of the bridge location dating to 2020	13

LIST OF TABLES

	Page
Table 1: Matrix used for assessing the significance of each identified site/feature	17
Table 2: Feature specific analysis	18
Table 2A: Construction Phase: Environmental Management Programme for the project	20
Table 2B: Operation Phase: Environmental Management Programme for the project	20

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

**Phase 1 Cultural Heritage Impact Assessment:
THE PROPOSED REHABILITATION AND UPGRADE OF THE SEDER STREET BRIDGE IN RANDPARK
RIDGE, CITY OF JOHANNESBURG METROPOLITAN MUNICIPALITY, GAUTENG PROVINCE**

1. INTRODUCTION

1.1 Background

The Johannesburg Roads Agency proposes the upgrade and rehabilitation of the Seder Street bridge in Randpark Ridge. The bridge structure regularly experiences flooding (overtop) during rainy conditions, cutting off access across the structure until flood waters subside. Consequently, *Nyeleti Consulting (Pty) Ltd* were appointed as the Consulting Engineer for the design and rehabilitation of bridge structure.

Envirovolution Consulting was contracted by *Nyelethi Consulting (Pty) Ltd* as independent environmental consultant to undertake the Basic Assessment and Water Use License process for the design and rehabilitation of the bridge.

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 Belgrave Street bridge.

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:

- 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.
- Most of the technical details regarding the bridge structure was obtained from the site inspection report produced by *Nyelethi Consulting (Pty) Ltd* (Govender 2019) and is taken to be correct.

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 Seder Street bridge is located across and unnamed tributary of the Klein Jukskei River, between Medlar Road and Frangipani Street in Hymany Park in the Randpark Ridge region west of the Johannesburg CBD in the City of Johannesburg Metropolitan Municipality (Fig. 1). For more information, see the Technical Summary on p. V above.

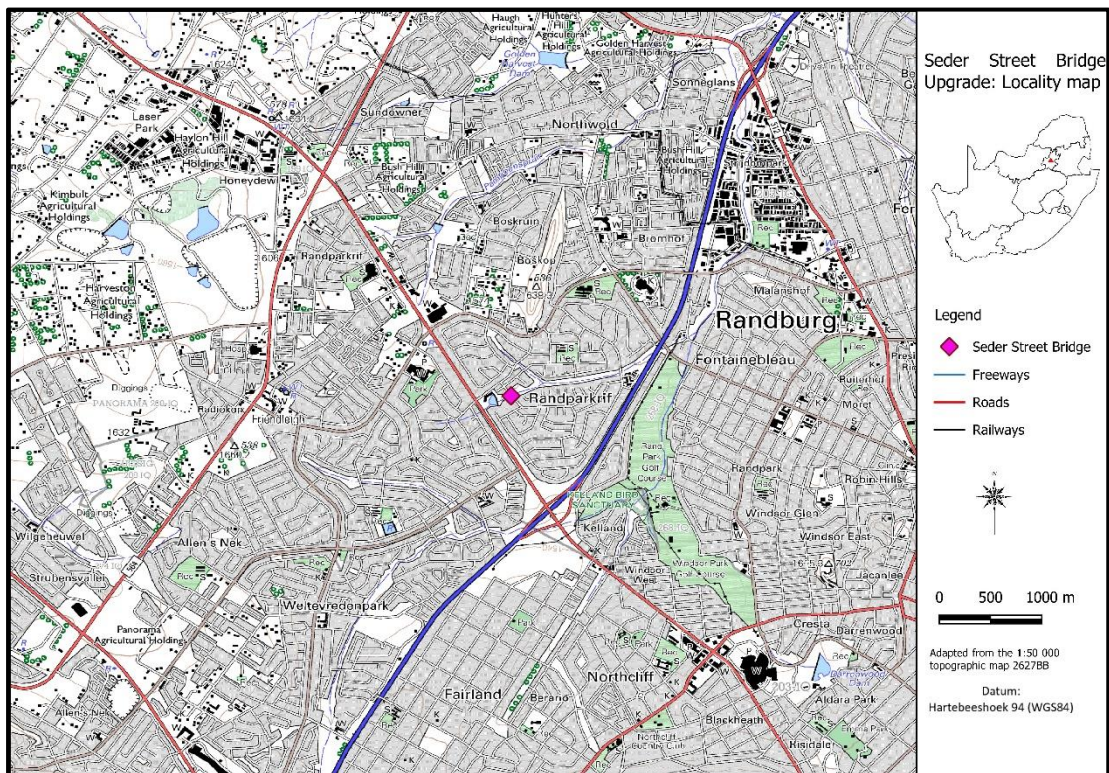


Figure 1. Location of the study area in regional context.

4.2 Development proposal

The information presented in the section below, was taken *ad verbum* from Govender (2019). Two different alternatives were proposed for consideration as possible solution:

4.2.1 Alternative 1 – Rehabilitation of the Existing Structure and Installation of Additional Pipes

This alternative will entail the rehabilitation of the existing concrete structure, installation of additional pipes to increase the hydraulic capacity of the crossing and the installation of additional protection works to the embankments and waterway channel. The existing configuration of the culvert structure will be maintained with additional culvert barrels proposed to be added to the existing structure.

The addition of at least 3 additional pipe barrels (to match the existing) is required to ensure compliance to the minimum design flood for a class 4 road (1:10 year), and the limit of water to shoulder break point for Q2T (1:20 year) requirement. This results in an upgraded crossing width that is comparable to that of the new precast concrete culvert proposed in option 2 below.

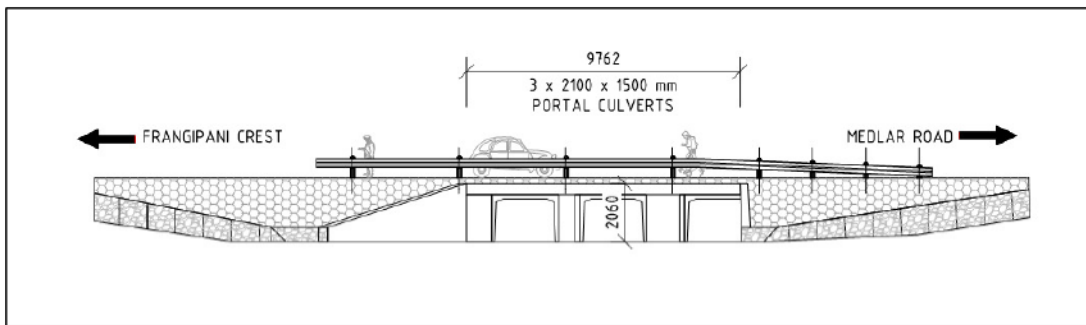
Although this alternative can alleviate the probability of the structure overtopping (provided that the inlets are kept clear and free from blockages at all times), this solution does not adequately address the defects and concerns evident on site (structure orientation towards the properties alongside the downstream channel, etc.). Extensive protection works of the adjoining property boundaries as well as to the exposed services will be required in addition to river training works to redirect the stream to an alignment that would enhance the hydraulics of the downstream waterway channel.

As a result of upgrading works being required (to increase the hydraulic capacity of the structure) for any solution proposed, it is recommended that the upgrade solution address deficiencies and defects (other than just the crossing hydraulic capacity) of the structure.

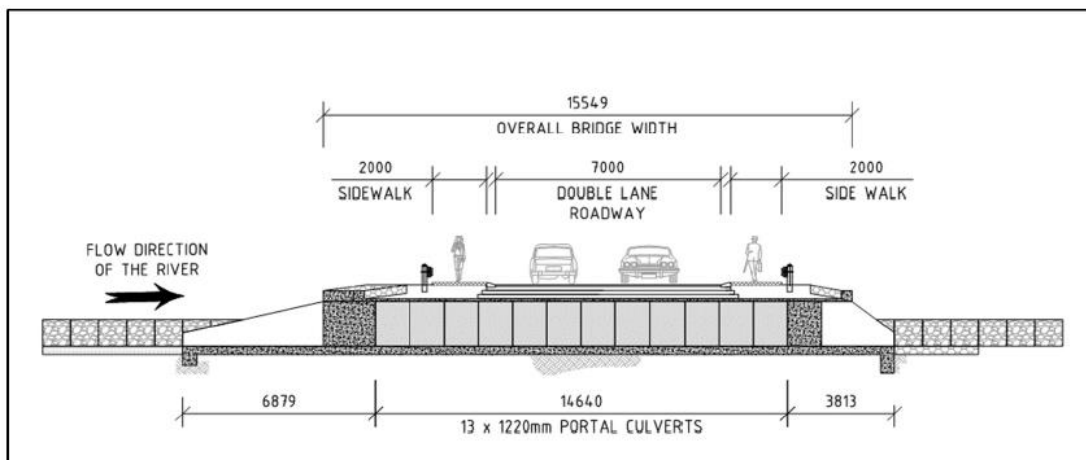
4.2.2 Alternative 2 – Construction of a New Precast Concrete Culvert (Preferred)

This alternative includes the demolition of the existing structure and the construction of a new 3-barrel culvert utilizing rectangular pre-cast portal culverts. The new configuration of the culvert will accommodate the hydraulic capacity required as well as reducing obstructions from larger vegetation and debris transported from upstream towards the structure. The orientation of the new structure as well as the widening, realignment and straightening of the water channel downstream will be directed away from the adjoining private properties, enhancing the flow hydraulics downstream of the structure.

The waterway downstream of the structure is fairly steep with gradients up to 10%. This steep gradient drastically increases the velocity of the water in the waterway, increasing scour potential within the waterway channel and embankments. It is proposed that the waterway channel be lined ('Armorflex' concrete blocks or similar) up to a point where the waterway gradient flattens to allow reduced velocities. In addition, energy dissipaters such as grouted gabion weirs will be constructed at the end of the lined channel area to reduce the velocity of the channel flow.



Elevation of new precast concrete culvert



Long section through proposed upgraded culvert

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 Figure 1.

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.

*Based on the above assessment, the probability of cultural heritage sites, features and objects occurring in the study area is deemed to be **low**.*

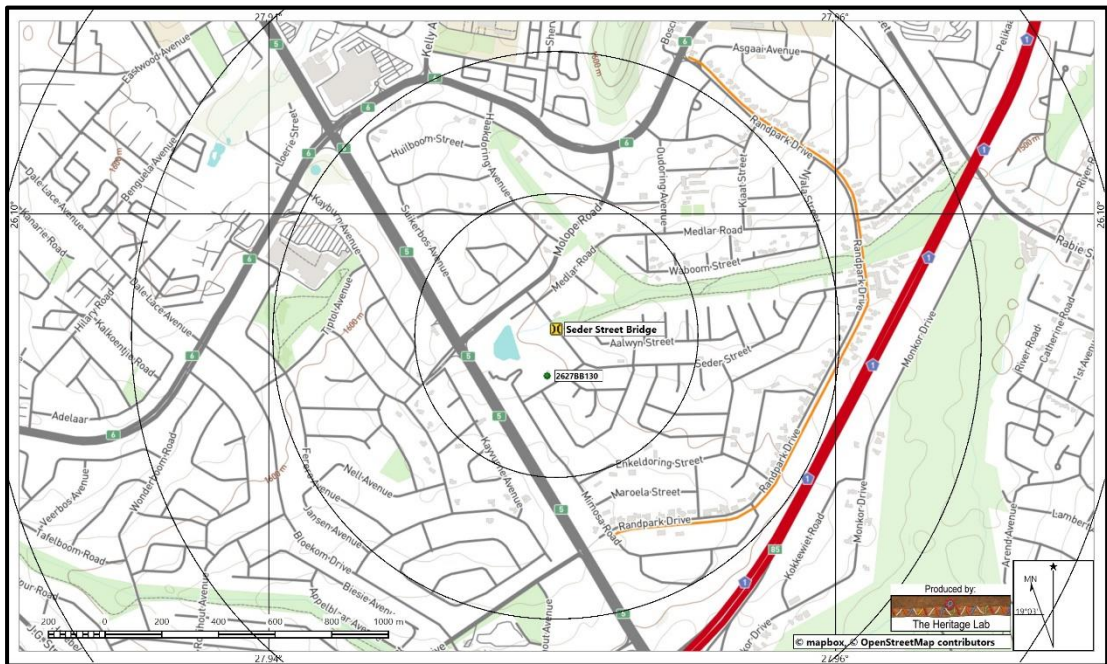


Figure 2. Location of known heritage sites and features in relation to the study area (Circles spaced at a distance of 0,5km: heritage sites = coded green dots)

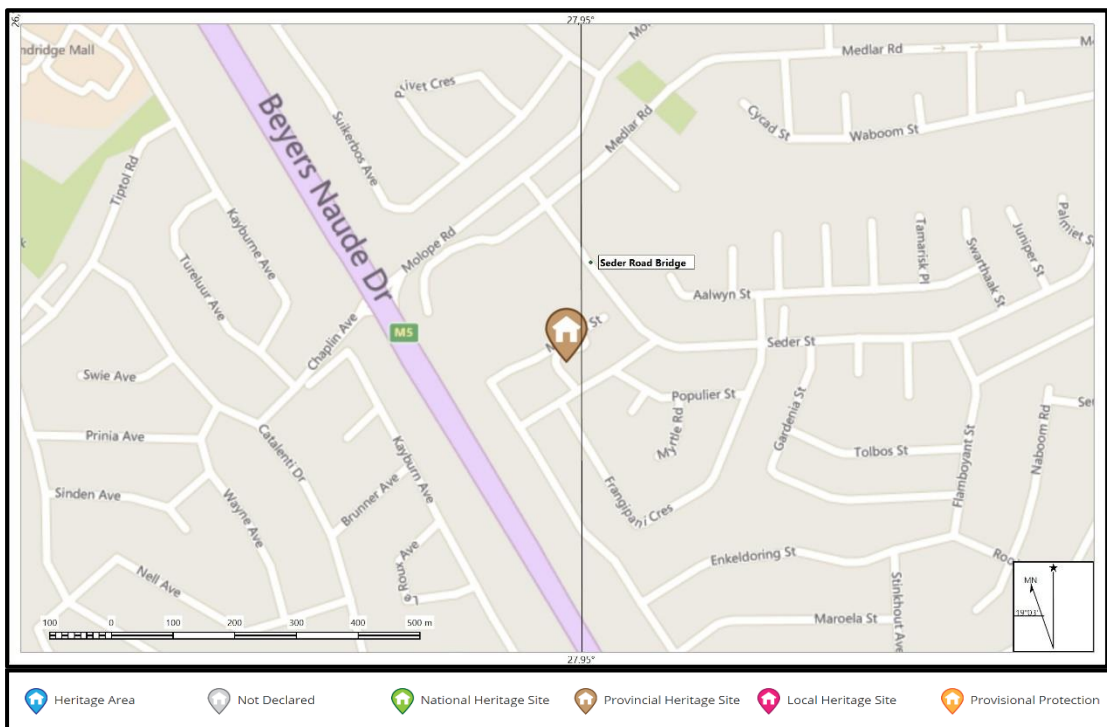


Figure 3. Location of built features of significance in the region of the study area - nil (<http://www.heritageregister.org.za/map-search>: accessed 17 August 2020)

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 21 August 2020 and was investigated by inspecting all the bridge features as well as the immediate surrounding area.

5.2.4 Documentation

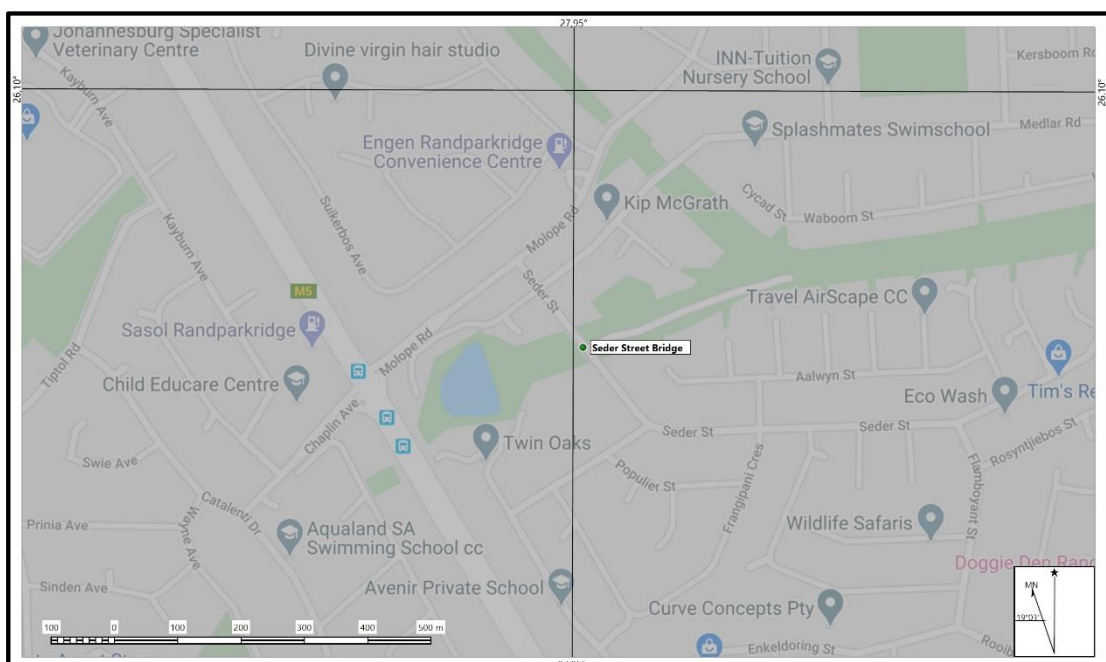
All sites, objects and structures that are identified are documented according to the general minimum standards accepted by the archaeological profession. Coordinates of individual localities are determined by means of the *Global Positioning System* (GPS) and plotted on a map. This information is added to the description in order to facilitate the identification of each locality. Map datum used: Hartebeeshoek 94 (WGS84).

6. DESCRIPTION OF THE AFFECTED ENVIRONMENT

6.1 Natural Environment

The study area lies in a highly transformed environment with a well-established urban setting. The geology of the region is made up of Halfway House Granite. The original vegetation is classified as Egoli Granite Grassland, falling in the Mesic Highveld Grassland Bioregion (Muncina & Rutherford 2006). However, most of this has been transformed due to urbanisation activities. The topography of the region is classified as hill and lowlands.

The Palaeontological Sensitivity Map (SAHRIS) indicate that the study area (Fig. 4) has an insignificant to zero possibility of fossil remains to be found and therefore no palaeontological assessment is required.



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

Figure 4. The Palaeontological sensitivity of the study area

6.2 Cultural Landscape

The aim of this section is to present an overview of the history of the larger region in order to eventually determine the significance of heritage sites identified in the study area, within the context of their historic, aesthetic, scientific and social value, rarity and representivity.

The cultural landscape qualities of the region essentially consist of two components. The first is a rural area in which the human occupation is made up of a pre-colonial (Stone Age and Iron Age) occupation and a much later colonial (farmer) component. The second component is an urban one, most of which developed during the last 100 years or less.

6.2.1 Stone Age

A number of sites are known to occur in the region. These range from MSA sites on the farm Waterval, to Later Stone Age sites, located in small rock shelters near the Jukskei River (Glenferness shelter).

During the late 1990s Prof. Revil Mason excavated a Later Stone Age camp site to the north of the study area. The material obtained from this site is now stored at the Cultural History Museum in Pretoria (Mason 2012). The site was excavated as part of a mitigation project for the Midrand municipal authority. This mitigation project also included work on Late Iron Age site at the Boulders Shopping Centre.

6.2.2 Iron Age

Iron Age people started to settle in southern Africa c. AD 300, with one of the oldest known sites at Broederstroom south of Hartebeespoort Dam dating to AD 470. Having only had cereals (sorghum, millet) that need summer rainfall, Early Iron Age (EIA) people did not move outside this rainfall zone, and neither did they occupy the central interior highveld area. Because of their specific technology and economy, Iron Age people preferred to settle on the alluvial soils near rivers for agricultural purposes, but also for firewood and water.

The occupation of the larger geographical area (including the study area) did not start much before the 1500s. By the 16th century things changed, with the climate becoming warmer and wetter, creating condition that allowed Late Iron Age (LIA) farmers to occupy areas previously unsuitable, for example the treeless plains of the Free State and North West Province.

Substantial archaeological research has been done in the Klipriviersberg region for some time (see Mason 1969, 1986; Huffman 2002; Huffman & Lathy 1997). The stone-walled Late Iron Age settlements

in the region can be classified as either Group I or Group II. Group I (dated to AD 1600 to AD 1700) settlements consists of a central kraal surrounded by a smooth outer periphery wall incorporating small stock enclosures. Group II (dated AD 1700 to 1830s) settlements seem to have developed from Group I and are characterised by more central enclosures and the outer wall includes some scallops for houses along with the typical small stock enclosures. Both settlement types are associated with the Bafokeng, a division of the Sotho-Tswana. It is possible that the Late Iron Age sites at Lone Hill, the Boulders Shopping Centre and Sea Harvest site belong to this latter group of people.

6.2.3 Historic period

The area that was to become Randburg was originally divided in four farms: Klipfontein, Driefontein, Olievenhoutspoort and Boschkop. Over time the farms were subdivided amongst the descendants of the early settlers. A portion of the farm Boschkop, which included the original farmhouse that was built in 1860, belonged to a J Labuschagne. In 1903 Labuschagne sold this portion of the farm, included the house, to the Randlord John Dale Lace (*The Heritage Register*).

Lace extended the house, adding the gables on either side of a veranda in the front, and building a courtyard around which he placed bedrooms, kitchen, and pantry. In all it had some 25 rooms. He also built a dam, still there, now called Hy Many Dam (<https://www.joburg.org.za/play>).

Unfortunately, Dale Lace lost his fortune and in 1927 the house was taken over by Standard Bank and then sold to businessman Tom Kelly. Kelly extended and restored the house, giving it Cape Dutch gables and changing its name to Hy Many, which refers to the home of the Kelly's, originally from Ireland. The farm consisted of some 1 300 acres, with 25 acres of vegetable gardens. Kelly developed the farm considerably (<https://www.joburg.org.za/play>). Apparently, there also was a well-known swimming pool.

6.3 Site specific review

Although landscapes with cultural significance are not explicitly described in the NHRA, they are protected under the broad definition of the National Estate (Section 3): Section 3(2)(c) and (d) list "historical settlements and townscapes" and "landscapes and natural features of cultural significance" as part of the National Estate.

The examination of historical maps and aerial photographs help us to reconstruct how the cultural landscape has changed over time as is show how humans have used the land.

From Figures 5, 6 & 7 below, dating from 1938, 1943 and 1961 respectively, it can be seen that there was little development, apart from the Hy-Many homestead and farm dam in the region and that Seder Road did not exist yet.

- The implication is that the road, and therefore the bridge as well, is less than 60 years old.



Figure 5. Aerial view of the bridge location dating to 1938 (CS-G photograph: 129_009_73840)

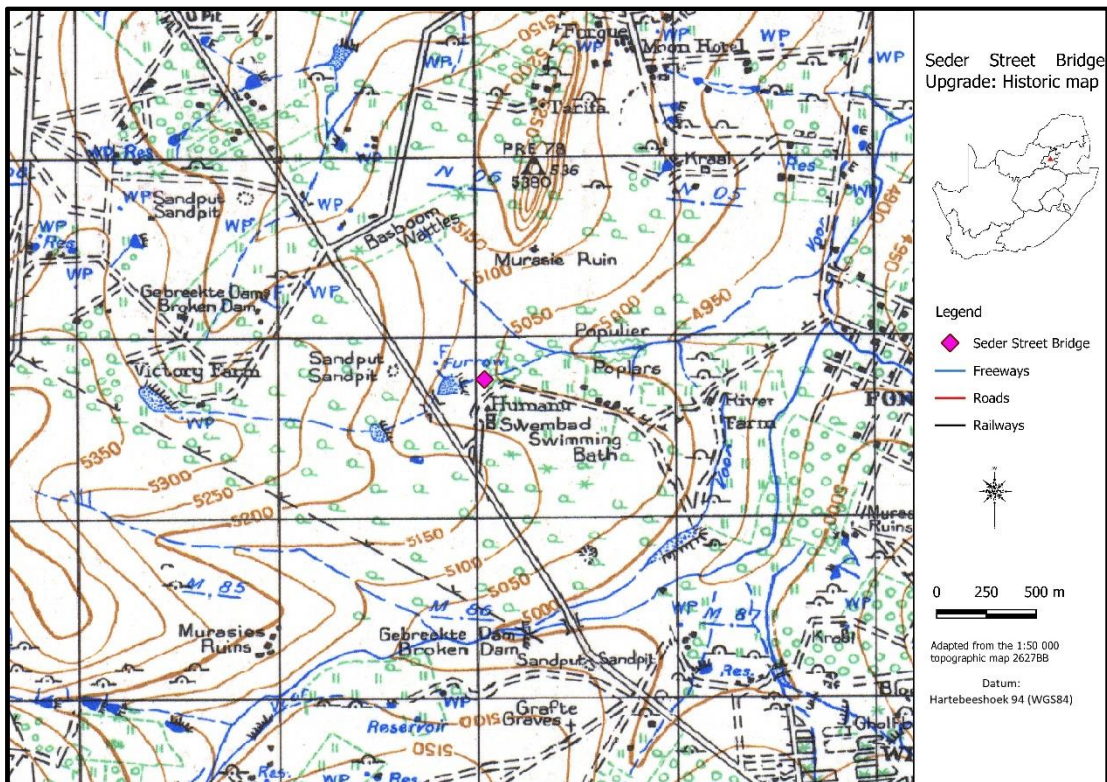


Figure 6. The bridge location indicated on the 1943 version of the 1:50 000 topographic map



Figure 7. The bridge location indicated on the aerial photograph dating to 1961 (CS-G photograph: 438_012_04477)



Figure 8. Aerial view of the bridge location dating to 2020 (Image: Google Earth)

7. DESCRIPTION OF THE BRIDGE

7.1 Existing structure

The following information was taken *ad verbum* from Govender (2019):

“Seder Street is a 2-lane bi-directional road over river district collector. The bridge crosses a spruit which lies downstream of the Hymany Dam and feeds into the Klein Jukskei River. The existing structure is located on a straight horizontal road alignment, and closer to the bottom of a vertical sag curve along the vertical alignment. The current road design speed is 60km/hr. The overall width of the roadway is 7.4m and is made up of 2 trafficked lanes of 3.7m each.

The structure consists of 5 precast 1.060m diameter concrete pipe barrels crossing Seder Street. Visual inspection on site revealed concrete apron slabs with cut off walls and cast in-situ wing walls at both the inlet and outlet structures. The outlet is currently elevated above the scoured level of the watercourse downstream of the structure. The overall width of the culvert is 7m. Dense vegetation was also noted at the inlet side of the structure.”

7.2 Materials

The material used in the construction of the bridge is largely cast concrete. The latter technique, although used to some extent prior to that, came into ‘fashion’ only during the Second World War as iron and for that matter all metals was declared a strategic resource. The use of iron was limited to the minimum and was only used for guide rails and other railings, as well as for reinforcing the concrete.

Liebenberg *et al* (1984) describes the history of the development of concrete bridges. The local history does not differ much from that of concrete development in other parts of the world. With the development of pre-stressed and reinforced concrete it became easy to construct large numbers of shorter span bridges much cheaper than it would have been the case with iron or steel.

7.3 Bridge elements

The various elements making up the bridge will be discussed and illustrated in alphabetic order by first defining it, then describing it and lastly by illustrating it.

Abutment Wall:

- Part of a structure which supports the end of a span or accepts the thrust of an arch; it often supports and retains the approach embankment.

Due to the existing structure, it is unknown how this would have looked.

Abutment wingwall:

- Extensions of a retaining wall as part of an abutment; used to contain the fill of an approach embankment.

Cast in-situ wing walls at both the inlet and outlet structures.

Approach road:

- The road leading up to the bridge on both sides.

This is currently a tarmac road, carrying vehicular/pedestrian traffic in an east/west direction.



Bridge deck:

- The roadway portion of a bridge that supports the traffic.

The bridge deck consists of concrete, which is also part of the construction of the bridge. The total width of the bridge deck is just over 7m and it is in excess of 6m long.

Columns:

- Vertical structure member used to support the load of the bridge deck.

None present.

Deck floor:

- The top layer on which the traffic crosses.

This consists of a layer of concrete that forms an integral part of the bridge deck, that was covered over with a thin layer of tar.

Embankment:

- Angled grading of the ground, leading up to the bridge.



Guide rail:

- A low railing alongside the outer edge of a bridge deck used to protect vehicles and pedestrians from going too close to the edge.

Not present.

Pylon:

- A monumental vertical structure marking the entrance to a bridge or forming part of a gateway.

None present.

Railings:

- Usually consists of a structure made up of a number of upright sections or stanchions, on which horizontal railings are suspended.

None present.

Revetment:

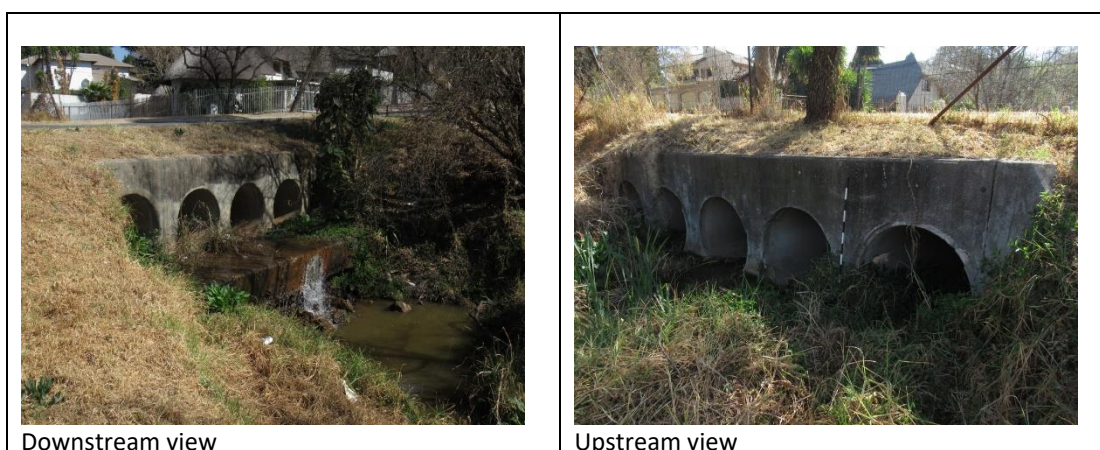
- A facing of masonry or stones to protect an embankment from erosion.

None present.

Superstructure:

- The part of the bridge that spans the obstacle, e.g. river.

The structure consists of 5 precast 1.060m diameter concrete pipe barrels crossing Seder Street. Visual inspection on site revealed concrete apron slabs with cut off walls and cast in-situ wing walls at both the inlet and outlet structures



8. RESULTS: STATEMENT OF SIGNIFICANCE

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:

Based on the background research that was done as well as the site inspection, it can be concluded that the significance, or lack thereof, of the Seder Street bridge lies in the following:

- The bridge is younger than 60 years.
- As far as could be established, no significance event or person could be linked to the bridge.
- It does not show any remarkable or unique features in its construction or materials used.

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	No
Does it have strong or special association with the life or work of a person, group or organisation of importance in history	No
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	No

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
International			
National			
Provincial			
Regional			
Local			Yes
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 A: High/medium significance - Should be mitigated before destruction		
6.	Generally protected B: Medium significance - Should be recorded before destruction		
7.	Generally protected C: Low significance - Requires no further recording before destruction		Yes

Table 2: Feature specific analysis

No	Criteria	Yes/No	Rating
1	Is the structure an important or outstanding example of similar (i.e. bridges) structures?	No	Low
2	Does the structure reflect exceptional engineering or technological development?	No	Low
3	Does the structure contain any details of exceptional craftsmanship?	No	Low
4	Does the structure form part of a group of similar structures?	No	Low
5	What is the current state of the integrity of the structure?		Low
6	Has the structure been altered since its original construction?	Yes	Low
7	Were the alterations done in sympathy with its original design?	No	Low
8	Can the structure be considered a landmark in the local/regional neighbourhood?	No	Low
9	Does it contribute to the character of the neighbourhood?	No	Low
10	Can any person, i.e. engineer, builder or public figure be linked with the structure?	No	Low
11	Can a historic event or any other happening be linked to the structure?	No	Low

Based on the above analysis, the overall significance attributed to the structure as a whole is:

- Generally protected C: Low significance
 - Requires no further recording before destruction

9. MITIGATION MEASURES

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

Nyeleti Consulting (Pty) Ltd proposed two different alternatives for the rehabilitation of the Seder Street bridge. Due to the low significance attributed to the Seder Street bridge the following recommendation is made:

- It is recommended that any of the proposed alternatives can be implemented with due consideration to the heritage value of the original structure, i.e. the old masonry section of the bridge.

10. 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.

10.1 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).

10.2 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		

11. CONCLUSIONS AND RECOMMENDATIONS

The Johannesburg Roads Agency proposes the upgrade and rehabilitation of the Seder Street bridge, between Medlar Road and Frangipani Street in Hyman Park in the Randpark Ridge region.

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.

Based on the background research that was done as well as the site inspection, it can be concluded that the significance, or lack thereof, of the Seder Street bridge lies in the following:

- The bridge is younger than 60 years.
- As far as could be established, no significance event or person could be linked to the bridge.
- It does not show any remarkable or unique features in its construction or materials used.

Accordingly, the Seder Street bridge has been evaluated to have the following significance rating:

- Generally protected C: Low significance
 - Requires no further recording before destruction

Mitigation measures:

Nyeleti Consulting (Pty) Ltd proposed two different alternatives for the rehabilitation of the Seder Street bridge. Due to the low significance attributed to the Seder Street bridge the following recommendation is made:

- It is recommended that any of the proposed alternatives can be implemented with due consideration to the heritage value of the original structure, i.e. the old masonry section of the bridge.

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 Belgrave Street bridge has a significance rating of: Generally Protected C: Low significance, and therefore a valid permit should be obtained from the Provincial Heritage Resources Agency (PHRA) prior to any work being carried out.

12. REFERENCES

12.1 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

12.2 Literature

Brodie, N. (ed.) 2008. *The Joburg Book. A guide to the city's history, people and places*. Northlands: Pan Macmillan South Africa.

Govender, G. 2019. *Professional Services for: Detailed Bridge Visual Inspection and Rehabilitation – Seder Bridge*. Unpublished report. Pretoria: Nyeleti Consulting (Pty) Ltd.

Liebenberg, A.C., Trümpelman, V. & Kratz, R.D. 1984. Construction and related design aspects of a large span concrete arch bridge. *The Civil Engineer in South Africa* 26(4):189, 192-194, 195-197, 201, 204.

Mason, R.J. 1969. *The Prehistory of the Transvaal*. Johannesburg: Witwatersrand University Press.

Mason, R.J. 1986. *The origins of black people of Johannesburg and the southern western central Transvaal, AD 350-1880*. Occasional Paper No. 16. Johannesburg. University of the Witwatersrand Archaeological Research Unit.

Mason, R.J. 2012. A built stone alignment associated with an LSA artefact assemblage on Mia Farm, Midrand, South Africa. *South African Archaeological Bulletin* 67(196):214-230.

Mendelsohn, F. & Potgieter, C.T. (reds.). 1986. *Guidebook to Sites of Geological and Mining Interest on the Central Witwatersrand*. Johannesburg: The Geological Society of South Africa.

Muncina, L. & Rutherford, M.C. 2006. *The Vegetation Map of South Africa, Lesotho and Swaziland*. Pretoria: SANBI.

Pollarolo, L., Susino, G., Kuman, K. & Bruxelles, L. 2010. Aucheulean artefacts at Maropeng in the Cradle of Humankind World Heritage Site, Gauteng Province, South Africa. *South African Archaeological Bulletin* 65(191): 3-12.

Shorten, J.R. 1970. *The Johannesburg Saga*. Johannesburg: John R Shorten (Pty) Ltd.

Van der Waal, G-M. 1979. *Projek: Opname Historiese Geboue in Johannesburg. Vierde verslag: Buitewyke*. Volume 1. Johannesburg: Randse Afrikaanse Universiteit.

Van der Waal, G-M. 1986. *Van Mynkamp to Metropolis*. Pretoria: Chris van Resnburg Publikasies.

Van Schalkwyk, J.A. 2019. *Phase 1 Cultural Heritage Impact Assessment: The replacement and upgrade of water reticulation pipelines along a number of streets in Vandia Grove, City of Johannesburg Metropolitan Municipality, Gauteng Province*. Pretoria: Unpublished report 2019/JvS/030.

Wadley, L. 1988. Stone Age sites in the Magaliesberg. In Evers, T.M., Huffman, T.N. & Wadley, L. (eds.) *Guide to Archaeological sites in the Transvaal*. Johannesburg: Dept. of Archaeology, University of the Witwatersrand. Pp. 9-39.

12.3 Archival sources, maps and aerial photographs

1: 50 000 Topographic maps

Google Earth

Aerial Photographs: Chief Surveyor-General

13. 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.