Phase 1 Cultural Heritage Impact Assessment:

THE PROPOSED REHABILITATION OF BRIDGE B483 LOCATED ALONG ROAD D1321, THREE RIVERS REGION, MIDVAAL LOCAL MUNICIPALITY, GAUTENG PROVINCE

Prepared for:

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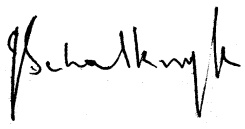
- Revision No: -
- Date: -

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.

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.



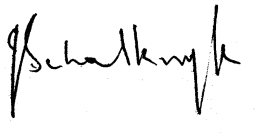
J A van Schalkwyk
Heritage Consultant
August 2021

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 2021

EXECUTIVE SUMMARY

Phase 1 Cultural Heritage Impact Assessment:
THE PROPOSED REHABILITATION OF BRIDGE B483 LOCATED ALONG ROAD D1321, THREE RIVERS REGION, MIDVAAL LOCAL MUNICIPALITY, GAUTENG PROVINCE

Gauteng Department of Roads and Transport propose to rehabilitate the existing bridge (B483), located southeast of Three Rivers along Road D1321 in the Midvaal Local Municipality of Gauteng. The bridge is a single lane, stop-and-go bridge.

In accordance with Section 38 of the NHRA, an independent heritage consultant was appointed by *Envirolution Consulting (Pty) Ltd* to conduct a cultural heritage assessment to determine the cultural heritage significance of Bridge 483.

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, the following can be said about Bridge 483:

- Based on the integrity of the structure, the material used in its construction, and aerial photographs and information obtained from maps, it is possible that this structure is older than 60 years.
- It is unknown if the existing bridge structure replaced and older one – no such remains could be seen in the location of the current bridge.
- It does not show any interesting or unique features in its construction, nor was any unique materials used for building the culvert;
- No important event or person could be related with the bridge;
- It is possibly one of the last remaining single lane, stop-and-go bridges in Gauteng Province.

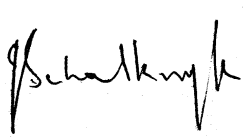
Accordingly, Bridge 483 Bridge has been evaluated to have the following significance rating:

- Generally protected B: Medium significance
    - The implication of this is that the structure should be recorded before its destruction/rehabilitation. After recording, a permit for its destruction must be obtained from SAHRA/PHRA.

Mitigation measures:

Based on the above statements, no mitigation measures are required before the demolishing of the bridge take place.
Legal requirements:

- The legal requirements related to heritage specifically are specified in Section 3 of this report. Generally protected B: Medium significance. The implication of this is that the structure should be recorded before its destruction/rehabilitation. After recording, a permit for its destruction must be obtained from SAHRA/PHRA.



J A van Schalkwyk
Heritage Consultant
August 2021

TECHNICAL SUMMARY

Project description	
Description	Rehabilitation of Bridge B483 along Road D1321
Project name	Bridget B483 Rehabilitation

Applicant
Gauteng Province Department of Roads and Transport

Environmental assessors
Envirolution
Mr G Govender

Property details						
Province	Gauteng					
Magisterial district	Vereeniging					
Municipality	Midvaal					
Topo-cadastral map	2628CA					
Farm name	Uitvlugt 434IR					
Closest town	Vereeniging					
Coordinates	Centre point (approximate)					
	No	Latitude	Longitude	No	Latitude	Longitude
	1	S 26,67252	E 28,02108			
	.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	No
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	Road reserve

[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

BA	Basic Assessment
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
WULA	Water Use Licence Application

Phase 1 Cultural Heritage Impact Assessment:
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1. INTRODUCTION

1.1 Background

Gauteng Department of Roads and Transport propose to rehabilitate the existing bridge (B483), located southeast of Three Rivers along Road D1321 in the Midvaal Local Municipality of Gauteng. The bridge is a single lane, stop-and-go bridge.

Envirolution Consulting was contracted as independent environmental consultant to undertake the Basic Assessment and Water Use License process for the demolishing/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 *Envirolution Consulting (Pty) Ltd* to conduct a cultural heritage assessment to determine the cultural heritage significance of Bridge 483.

This report forms part of the Basic Assessment (BA) 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 bridge where the demolishing/rehabilitation is to take place. This included:

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

The project area includes the following properties:

- The single lane bridge along Road D1321 in the Midvaal Local Municipality

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.
- During the site visit the water level was found to be high, with the water flowing very fast. It was therefore deemed unsafe to inspect the underside of the bridge.
- 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 m^2 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 he 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 m^2 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 bridge under investigation, no. 483, is located approximately 4km southeast of Three Rivers and 9km east of Vereeniging along Road D1321 in the direction of Villiers. The bridge crosses the Suikerbosrantrivier (Fig. 1). For more information, see the Technical Summary on p. V above.

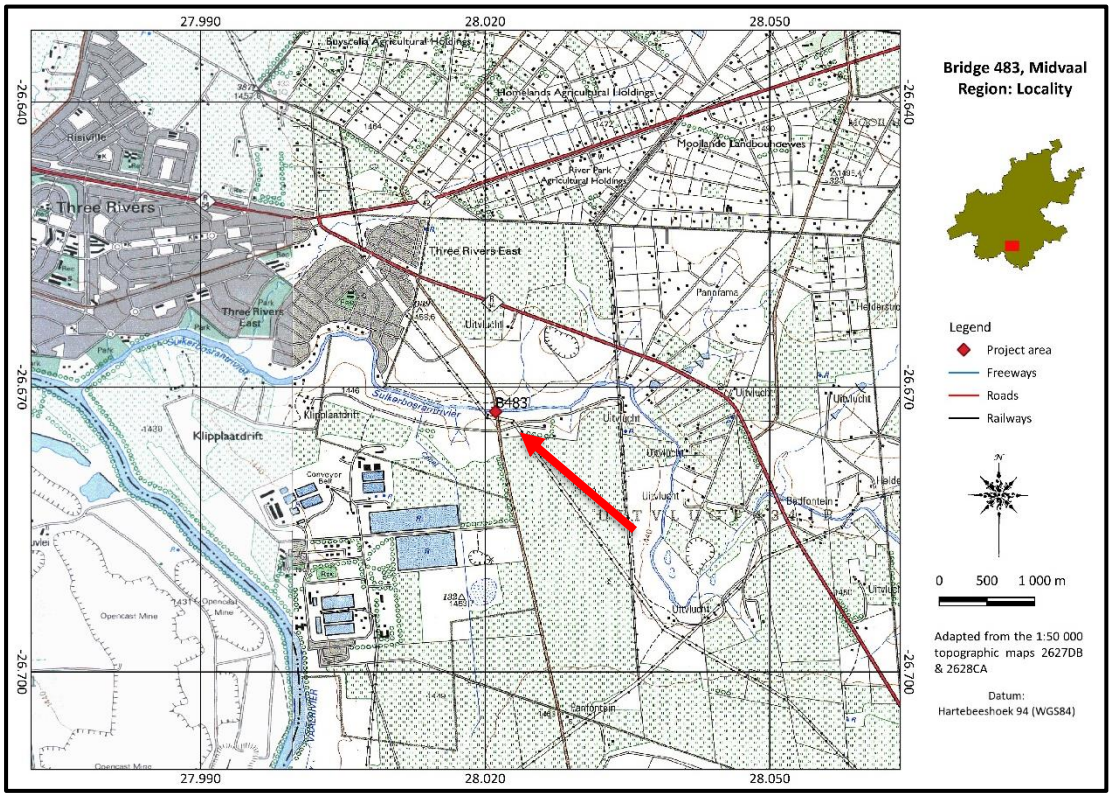


Figure 1. Location of the study area in regional context (arrowed)

4.2 Development proposal

No information regarding the rehabilitation measures proposed for the bridge structure was available during the site visit.

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 Pre-feasibility assessment

The objectives of this review were to:

- Gain an understanding of the cultural landscape within which the project is located;
- Inform the field survey.

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** - Figures 2 & 3.

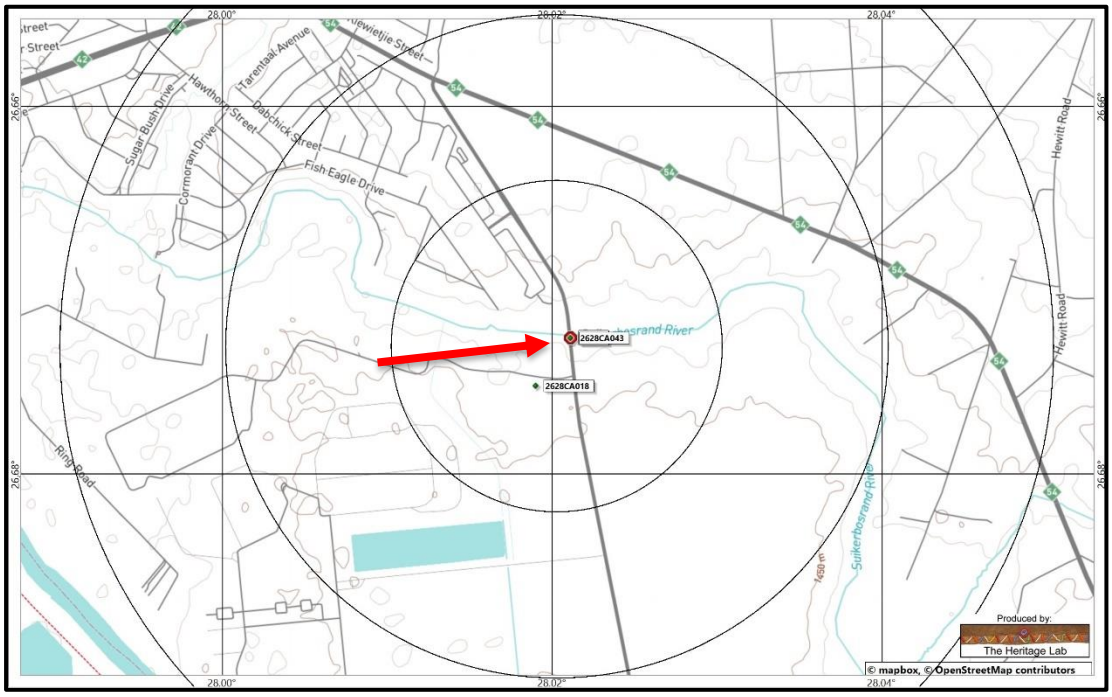


Figure 2. Location of known heritage sites and features in relation to the study area
(heritage sites = coded green dots; bridge position = blue arrow)

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 *Envirolution* by means of maps and .k*ml* 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 25 August 2021 and was investigated by inspecting all the bridge features as well as the immediate surrounding area.

5.2.4 *Documentation*

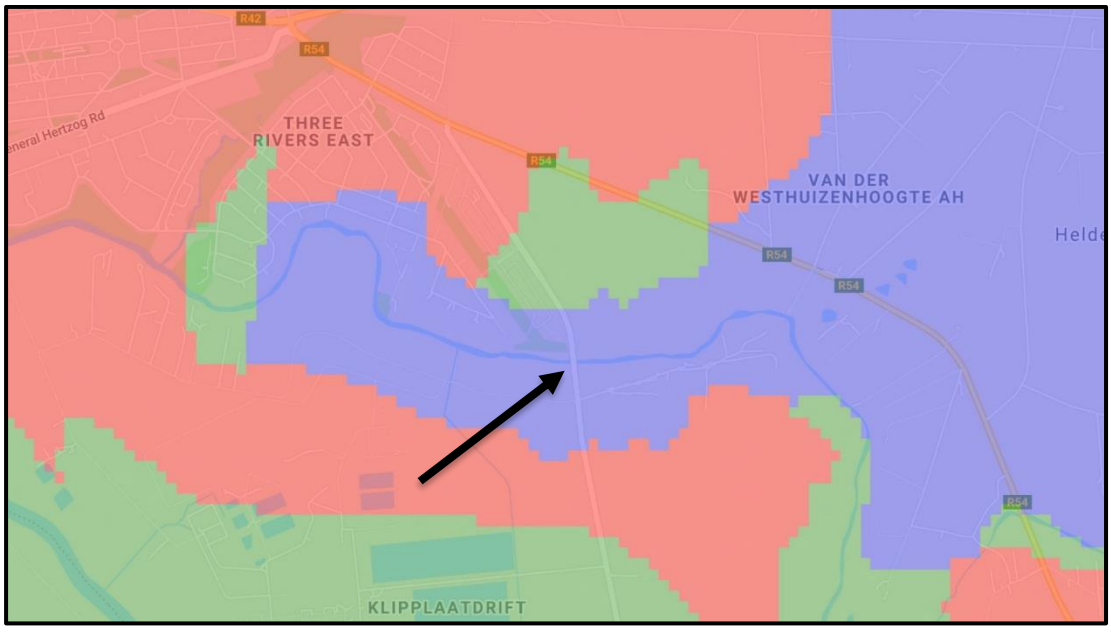
All sites, objects and structures that are identified are documented according to the general minimum standards accepted by the archaeological profession. Coordinates of individual localities are determined by means of the *Global Positioning System* (GPS) and plotted on a map. This information is added 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 fine- to coarse-grained sandstone, shale and coal seams of the Vryheid Formation of the Ecca Group of the Karoo Supergroup.

The Palaeontological Sensitivity Map (SAHRIS) indicate that the study area (Fig. 3) has a low sensitivity of fossil remains to be found and therefore a palaeontological assessment is not required. However, a protocol for finds 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 3. The Palaeontological sensitivity of the study area

The original vegetation is classified as Soweto Highveld Grassland, falling in the Mesic Highveld Grassland Bioregion (Muncina & Rutherford 2006). However, most of this has been transformed due to agricultural activities.

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 which have largely disappeared from the environment due to the development of the second component. The second component is an urban one, most of which developed during the last 150 years or less.

6.2.1 *Stone Age*

This section of the highveld area has been inhabited since Early Stone Age (ESA) times. Tools dating to this period are mostly found in the vicinity of watercourses, e.g. the Vaal River gravels in the Vereeniging area.

T.N. Leslie, the first mayor of Vereeniging (1904), discovered stone tools dating to the Early Stone Age along the Klip River in the 1920s. This site became known as the Klip River Quarry and was proclaimed as national monument in 1943. Other sites were discovered by C van Riet Lowe in the Duncanville & Three Rivers vicinity and the Duncanville Archaeological Site (or Van Riet Lowe Site) was proclaimed a national monument in 1944.

The original dating and evolutionary scheme for the development of tools during this early period, was based on a study of the river terrace gravels of the Vaal River, referred to as the *Older*, the *Younger* and the *Youngest gravels* (Söhnge, Visser & Van Riet-Lowe1937; Breuil 1948). However, on subsequent investigation, the findings derived from this proved to be unacceptable as it was based on incorrect interpretations of the river gravels. It was only with the excavation of similar material from sealed, stratified sites, that it was realised that the material from the river gravels was not in is its primary context, having been uncovered and washed about over many millennia.

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 Witwatersrand and the treeless plains of the Free State.

This was also a period of great military tension. Military pressure from Zululand spilled onto the highveld by at least 1821. As a result of this troubled period, Sotho-Tswana people concentrated into large towns for defensive purposes. Because of the lack of trees they built their settlements in stone. These stone-walled villages were almost always located near cultivatable soil and a source of water.

From the air, these homesteads and towns are easily recognised, and it is also possible to determine variations in smaller detail. In its simplest from they resemble a 'fried eggs': that is, the central cattle kraal formed an inner circle and the smooth outer wall the second. In others the layout consists of a group of large primary stone walled enclosures, with associated dwellings linked to it. The latter usually occur in groups of four to five units, facing the associated livestock pens to the centre of the settlement (Mason 1968; Maggs 1976; Taylor 1979).

6.2.3 *Historic period*

White settlers moved into the area during the first half of the 19th century. They were largely self-sufficient, basing their survival on cattle/sheep farming and hunting. Few towns were established and it remained an undeveloped area until the discovered of coal and later gold. During the Anglo-Boer War, a number of skirmishes occurred in the larger area.

In 1878 the pioneer geologist, George Stow, who was prospecting on behalf of the Orange Free State, crossed the Vaal River into the Transvaal and discovered coal on the farm Leeuwkuil. Stow succeeded in interesting Samuel Marks and Isaac Lewis in this discovery, and they formed a company named *De Zuid-Afrikaansche en Oranje-Vrijstaatsche Kolen- en Mineralen-Mijn Vereeniging*. Mining operations began in 1879 and in 1882 the company applied for permission to establish a township on Leeuwkuil. In 1892 the town, named Vereeniging (after the company) was proclaimed. It became a municipality in 1912.

With the discovery of gold on the Witwatersrand, the need for large quantities of water soon became clear. Originally water from local streams was used. However, more water was needed for the processing of the ore and a number of private enterprises, e.g. The Braamfontein Water Company, were given grants to develop supply systems.

It was only by 1905 that the Rand Water commenced with operations. Major schemes were developed to respond to the increased demand for water:

- The Vaal River scheme (Barrage) was developed during the years 1914-1924
- Vereeniging Pump Station (1924)
- Vaal Dam (1938)
- Zuikerbosch Pumping Station (1949)

The Zuikerbosch Pumping Station was developed on the farm Klipplaatdrift 601IQ, a few kilometres southeast of Vereeniging. Earthworks were started in the late 1940s, but the housing was developed only sometime later, as local people appealed against this. Work continued and the pumping station was officially opened by Dr E.G. Jansen in 1954.

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 the available aerial images and topographic maps (Fig. 4 & 5), it is clear that a bridge exited in this location for more than 60 years. However, it is impossible to determine if it is the original bridge or a later one. No signs of any older bridge could be found in the location of the current bridge. It is therefore assumed that it is the original bridge.

Figure 4. Aerial view of the culvert location dating to 1948
(CS-G photograph: 221_005_95113)

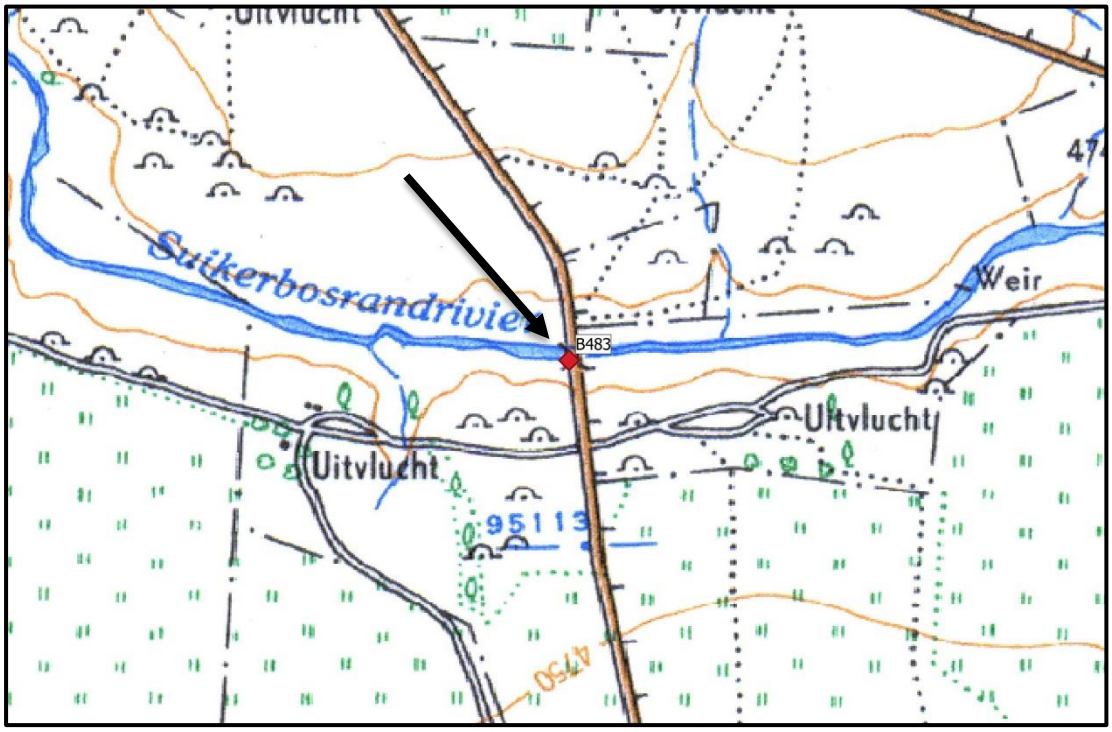


Figure 5. The bridge location indicated on the 1953 version of the 1:50 000 topographic map

Figure 6. The bridge location indicated on the 2021 aerial photograph
(Image: Google Earth)

7. DESCRIPTION OF THE BRIDGE

7.1 Definitions

Bridge/Culvert

A bridge is defined as a structure built to span a physical obstacle, such as a river, valley, or road, without closing the way underneath. Depending on the type of bridge, it can either have support structures above or below the bridge deck. Different types of bridges are beam bridges, truss bridges, arch bridges, suspension bridges and cable-stayed bridges. According to the United States Federal Highway Administration (FHWA) definition, a bridge is anything over 20 feet (6m) in length.

A culvert is defined as a tunnel structure that passes under roads or railways to provide cross drainage of water. Culverts generally have short spans and are usually embedded in the soil. The culvert and the soil around it bear the weight of the roadway/railway and the vehicles using it. Culverts are usually made of reinforced concrete, steel pipes or corrugated iron. Different types of culverts can be identified:

- Pipe culverts are usually circular and is commonly used on roads carrying low volumes of traffic;
- Box culverts are box-shaped, usually prefabricated off-site. It is popular in road design because the shape provides a rigid structure that is appropriate for short spans and in areas with poor soil conditions;
- Culverts can also be a bridge-like structure, usually constructed from cast concrete, can have wing walls, but are shorter than bridges and therefore do not usually have support columns.

7.2 Existing structure

The existing structure can be defined as a “Four Span” bridge as the bridge deck is supported by three columns. In total it is approximately 30m in length, with the spacing between the various columns being approximately 3,8m. The columns were added directly to a basis of concrete and the bridge deck was added to this. It is assumed that all of this was done in reinforced concrete, although the reinforcing could not be detected visually. The bridge deck is of ordinary tar laid down on top of a concrete basis.

The bridge is a single lane bridge, operated on a stop-and-go principle – approaching traffic must stop and wait until vehicles using the bridge has completed crossing it.

 Approach road	 Side view


Wing-wall


Upstream view


Guide rails and railings


Stanchions for fitting the railings


Degraded roadbed and makeshift railings


Possible remains of constructor's camp

Figure 7. Various views of the bridge indicating different elements

8. RESULTS: STATEMENT OF SIGNIFICANCE

The significance of the site/feature 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 and is presented in the tables below.

Based on the background research that was done as well as the site inspection, the following can be said about Bridge 483:

- Based on the integrity of the structure, the material used in its construction, and aerial photographs and information obtained from maps, it is possible that this structure is older than 60 years.
- It is unknown if the existing bridge structure replaced and older one – no such remains could be seen in the location of the current bridge.

- It does not show any interesting or unique features in its construction, nor was any unique materials used for building the culvert;
- No important event or person could be related with the bridge;
- It is possibly one of the last remaining single lane, stop-and-go bridges in Gauteng Province.

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

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			Yes
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			Yes
1.6 Representivity			
Is it important in demonstrating the principal characteristics of a particular class of natural or cultural places or objects			Yes
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	Low
International			
National			
Provincial			
Regional		Yes	
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 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		

In addition to the above assessment, different types of features (structures) can also be assessed in more specific details – Table 2 below. According to this, the overall rating for the significance of this structure is low.

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?	Yes	Medium
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 groups of similar structures	No	Low
5	What is the current state of the integrity of the structure?		Medium
6	Has the structure been altered since its original construction?	No	Low
7	Were the alterations done in sympathy with its original design?		
8	Can the structure be considered a landmark in the local/regional neighbourhood	Yes	Low
9	Does it contribute to the character of the neighbourhood	Yes	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 B: Medium significance
  - The implication of this is that the structure should be recorded before its destruction/rehabilitation. After recording, a permit for its destruction must be obtained from SAHRA/PHRA.

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.

The following measure for mitigation is recommended:

- The structure (Bridge 483) should be documented (drawn, mapped and photographed) to acceptable (engineering) standards.

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 3A and 3B 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 3A: 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,	See discussion in Section 9.1 above	Environmental Control Officer	During construction only

e.g. access roads, water pipelines			
Monitoring	See discussion in Section 9.2 above		

Table 3B: 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. Construction of additional 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

Gauteng Department of Roads and Transport propose to rehabilitate the existing bridge (B483), located southeast of Three Rivers along Road D1321 in the Midvaal Local Municipality of Gauteng. The bridge is a single lane, stop-and-go 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, the following can be said about Bridge 483:

- Based on the integrity of the structure, the material used in its construction, and aerial photographs and information obtained from maps, it is possible that this structure is older than 60 years.
- It is unknown if the existing bridge structure replaced and older one – no such remains could be seen in the location of the current bridge.
- It does not show any interesting or unique features in its construction, nor was any unique materials used for building the culvert;
- No important event or person could be related with the bridge;
- It is possibly one of the last remaining single lane, stop-and-go bridges in Gauteng Province.

Accordingly, Bridge 483 Bridge 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. After recording, a permit for its destruction must be obtained from SAHRA/PHRA.

Mitigation measures:

Based on the above statements, no mitigation measures are required before the demolishing of the bridge take place.

Legal requirements:

- The legal requirements related to heritage specifically are specified in Section 3 of this report. Generally protected B: Medium significance. The implication of this is that the structure should be recorded before its destruction/rehabilitation. After recording, a permit for its destruction must be obtained from SAHRA/PHRA.

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

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Van Schalkwyk, J.A. 2009b. *Heritage impact survey report for the proposed development on Zoekfontein 468IR, Vereeniging magisterial district, Gauteng Province*. Unpublished report 2009/JvS/058.

Van Schalkwyk, J.A. 2015. *Cultural heritage impact assessment for the proposed Panfontein access road for Rand Water in Midvaal Local Municipality, Gauteng Province*. Unpublished report 2015/JvS/086.

12.3 Archival sources, maps and aerial photographs

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

http://artefacts.co.za
http://*vmus*.adu.org.za
http://www.heritageregister.org.za/map-search
http://www.sahra.org.za/sahris/map/palaeo

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) x 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

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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.