

Phase 1 Cultural Heritage Impact Assessment:

**THE PROPOSED JOHN DUBE EXTENSION 3 TOWNSHIP SITUATED ON PORTION OF REMAINING
EXTENT 1 AND PORTION 83 OF THE FARM GROOTFONTEIN 165-IR, EKURHULENI METROPOLITAN
MUNICIPALITY, GAUTENG PROVINCE**

Prepared for:

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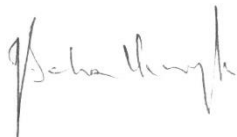


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Specialist competency:

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



J A van Schalkwyk
Heritage Consultant
February 2019

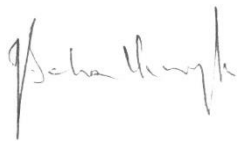


SPECIALIST DECLARATION

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
February 2019

EXECUTIVE SUMMARY

**Phase 1 Cultural Heritage Impact Assessment:
THE PROPOSED JOHN DUBE EXTENSION 3 TOWNSHIP SITUATED ON PORTION OF REMAINING
EXTENT 1 AND PORTION 83 OF THE FARM GROOTFONTEIN 165-IR, EKURHULENI METROPOLITAN
MUNICIPALITY, GAUTENG PROVINCE**

Envirolution Consulting was contracted *Alley Roads Mega Projects* as independent environmental consultant to undertake the EIA process for the proposed John Dube Extension 3 residential development as well as associated infrastructure to be establishment on Portions of remaining extent 1 and Portion 83 of the farm Grootfontein 165-IR, Ekurhuleni Metropolitan Municipality of Gauteng Province.

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 very limited pre-colonial element (Stone Age and Iron Age) as well as a much later colonial (farmer and industrial) component. The second component, although much younger, is an industrial (mining) one, with a rapidly expanding urban component.

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 if the residential development and associated infrastructure would have an impact on any sites, features or objects of cultural heritage significance.

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. It should be noted that the implementation of the mitigation measures is subject to SAHRA/PHRA's approval.

Identified sites

During the physical survey, the following sites, features or objects of cultural were identified, but are viewed as having very low significance due to the fact that they have been totally demolished. Consequently, no mitigation measures are proposed for these sites:

- 6.4.1: Central shaft complex.
- 6.4.2: Workers compound.
- 6.4.3: Houses.
- 6.4.4: School.
- 6.4.5: Community centre.

During the physical survey, the following sites, features or objects were identified as having significance:

- 7.3.1: An old electricity substation. Although all the equipment has been removed, and some of the fittings, e.g. doors and window frames, the buildings are structurally in sound form.
- 7.3.2: A row of old houses, all built according to the same plan; a larger structure occurs to the east of the row of houses.
- 7.3.3: Informal burial site with approximately 50 graves, marked only with packed stone cairns. The graves seem to be very old and none has been visited or cleared of vegetation in a long time.

Impact assessment and proposed mitigation measures

Impact analysis of cultural heritage resources under threat of the proposed development, is based on the present understanding of the development:

IDENTIFIED HERITAGE RESOURCES					
Site No.	Site type	NHRA category	Field rating	Impact rating: Before/After mitigation	Proposed mitigation (Refer to definitions in Section 12.3)
Electricity Substation					
7.3.1	Built structures	Section 34	High significance Grade 4-A	60 27	(1) Avoidance/Preserve; (2) Archaeological investigation
School buildings					
7.3.2	Built structures	Section 34	High significance Grade 4-A	60 27	(1) Avoidance/Preserve; (2) Archaeological investigation
Informal burial site					
7.3.3	Burial site	Section 36	High significance Grade 4-A	60 27	(1) Avoidance/Preserve; (2) Archaeological investigation

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 no sites, features or objects of heritage significance occur in the study area. If heritage features are identified during construction, as stated in the management recommendation, these finds would have to be assessed by a specialist, after which a decision will be made regarding the application for relevant permits.

- If the identified structures are to be demolished, a valid permit would be required from SAHRA/PHRA prior to their destruction. Such a permit will only be issued after the sites has been fully documented – mapped, photographed and described.
- If the graves are to be relocated, the full and correct procedures, as set out in **Section 4 of Addendum**, should be followed.

Reasoned opinion as to whether the proposed activity should be authorised:

- From a heritage point of view, it is recommended that the proposed development be allowed to continue on acceptance of the proposed mitigation measures and the conditions proposed below.

Conditions for inclusion in the environmental authorisation:

- The Palaeontological Sensitivity Map (SAHRIS) indicate that the central portion of the study area has a very high possibility of fossil remains to be found and therefore a field assessment and a protocol for finds is required.
- Should archaeological sites or graves be exposed in other areas during construction work, it must immediately be reported to a heritage practitioner so that an investigation and evaluation of the finds can be made.



J A van Schalkwyk
Heritage Consultant
February 2019

TECHNICAL SUMMARY

Project description	
Description	Development of a township
Project name	John Dube Extension 3 Township

Applicant
Alley Roads Mega Projects

Environmental assessors
Envirovolution Consulting
Ms J Bubala

Property details													
Province	Gauteng												
Magisterial district	Nigel												
Local municipality	Ekurhuleni												
Topo-cadastral map	2628AD												
Farm name	Grootfontein 165-IR												
Closest town	Dunnottar												
Coordinates	Centre point (approximate)												
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No	Latitude	Longitude	No	Latitude	Longitude								
1	S 26,35512	E 28,42766											

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	No
Development exceeding 5000 sq m	Yes
Development involving three or more existing erven or subdivisions	No
Development involving three or more erven or divisions that have been consolidated within past five years	No
Rezoning of site exceeding 10 000 sq m	No
Any other development category, public open space, squares, parks, recreation grounds	No

Land use	
Previous land use	Mining
Current land use	Vacant

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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 - 150 000 Before Present
Middle Stone Age	150 000 - 30 000 BP
Later Stone Age	30 000 - until c. AD 200

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

ACRONYMS and ABBREVIATIONS

ASAPA	Association of Southern African Professional Archaeologists
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)
ESA	Early Stone Age
EIA	Early Iron Age
HIA	Heritage Impact Assessment
I & AP's	Interested and Affected Parties
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

COMPLIANCE WITH THE APPENDIX 6 OF THE 2014 EIA REGULATIONS (AS AMENDED)

Requirements of Appendix 6 – GN R982	Addressed in the Specialist Report
1. (1) A specialist report prepared in terms of these Regulations must contain-	
a) details of-	
i. the specialist who prepared the report; and	Front page
ii. the expertise of that specialist to compile a specialist report including a curriculum vitae;	Page i Addendum Section 6
b) a declaration that the specialist is independent in a form as may be specified by the competent authority;	Page ii
c) an indication of the scope of, and the purpose for which, the report was prepared;	Section 1
(cA) an indication of the quality and age of base data used for the specialist report;	Section 4
(cB) a description of existing impacts on the site, cumulative impacts of the proposed development and levels of acceptable change;	Section 7.3
d) the duration, date and season of the site investigation and the relevance of the season to the outcome of the assessment;	Section 4.2.2
e) a description of the methodology adopted in preparing the report or carrying out the specialised process inclusive of equipment and modelling used;	Section 4
f) details of an assessment of the specific identified sensitivity of the site related to the proposed activity or activities and its associated structures and infrastructure, inclusive of a site plan identifying site alternatives;	Addendum Section 5; Figure 18
g) an identification of any areas to be avoided, including buffers;	Section 8
h) a map superimposing the activity including the associated structures and infrastructure on the environmental sensitivities of the site including areas to be avoided, including buffers;	Figure 18 Addendum Section 5
i) a description of any assumptions made and any uncertainties or gaps in knowledge;	Section 2
j) a description of the findings and potential implications of such findings on the impact of the proposed activity or activities;	Section 7
k) any mitigation measures for inclusion in the EMPr;	Section 9 & 10
l) any conditions for inclusion in the environmental authorisation;	Section 10
m) any monitoring requirements for inclusion in the EMPr or environmental authorisation;	Section 9
n) a reasoned opinion-	
i. whether the proposed activity, activities or portions thereof should be authorised;	Section 10
(iiA) regarding the acceptability of the proposed activity or activities; and	
ii. if the opinion is that the proposed activity, activities or portions thereof should be authorised, any avoidance, management and mitigation measures that should be included in the EMPr, and where applicable, the closure plan;	Section 8, 9, 10
o) a description of any consultation process that was undertaken during the course of preparing the specialist report;	-
p) a summary and copies of any comments received during any consultation process and where applicable all responses thereto; and	-
q) any other information requested by the competent authority.	-
(2) Where a government notice by the Minister provides for any protocol or minimum information requirement to be applied to a specialist report, the requirements as indicated in such notice will apply.	-

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MUNICIPALITY, GAUTENG PROVINCE**

1. INTRODUCTION

1.1 Background

Enviolution Consulting was contracted *Alley Roads Mega Projects* as independent environmental consultant to undertake the EIA process for the proposed John Dube Extension 3 residential development as well as associated infrastructure to be establishment on Portions of remaining Extent 1 and Portion 83 of the farm Grootfontein 165-IR, Ekurhuleni Metropolitan Municipality of Gauteng Province.

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 *Enviolution Consulting (Pty) Ltd* to conduct a cultural heritage assessment to determine if the residential development and associated infrastructure would have an impact on any sites, features or objects of cultural heritage significance.

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

The aim of a full HIA investigation is to provide an informed heritage-related opinion about the proposed development by an appropriate heritage specialist. The objectives are to identify heritage resources (involving site inspections, existing heritage data and additional heritage specialists if necessary); assess their significances; assess alternatives in order to promote heritage conservation issues; and to assess the acceptability of the proposed development from a heritage perspective.

The result of this investigation is a heritage impact assessment report indicating the presence/absence of heritage resources and how to manage them in the context of the proposed development.

Depending on SAHRA's acceptance of this report, the developer will receive permission to proceed with the proposed development, on condition of successful implementation of proposed mitigation measures.

1.2.1 Scope of work

The aim of this study is to determine if any sites, features or objects of cultural heritage significance occur within the boundaries of the area where the residential development and associated infrastructure 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:

- Identify possible archaeological, cultural and historic sites within the proposed development areas;
- 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.

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. STUDY APPROACH AND METHODOLOGY

4.1 Extent of the Study

This survey and impact assessment cover all facets of cultural heritage located in the study area as presented in Section 5 below and illustrated in Figures 3 & 4.

4.2 Methodology

4.2.1.1 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 11.

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

4.2.1.2 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 11.

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

4.2.1.3 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.

4.2.1.4 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

The results of the above investigation are presented in Figure 1 below – see list of references in Section 11 – and can be summarised as follows:

- Historic structures, inclusive of buildings, mining related features and bridges, occur in a sporadic manner across the larger landscape as well as in urban centres;
- The Dunnottar military base and former airfield occur to the east of the study area;
- Formal burial sites occur in a number of places in towns and townships;
- Informal burial sites occur sporadically throughout the country side.

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

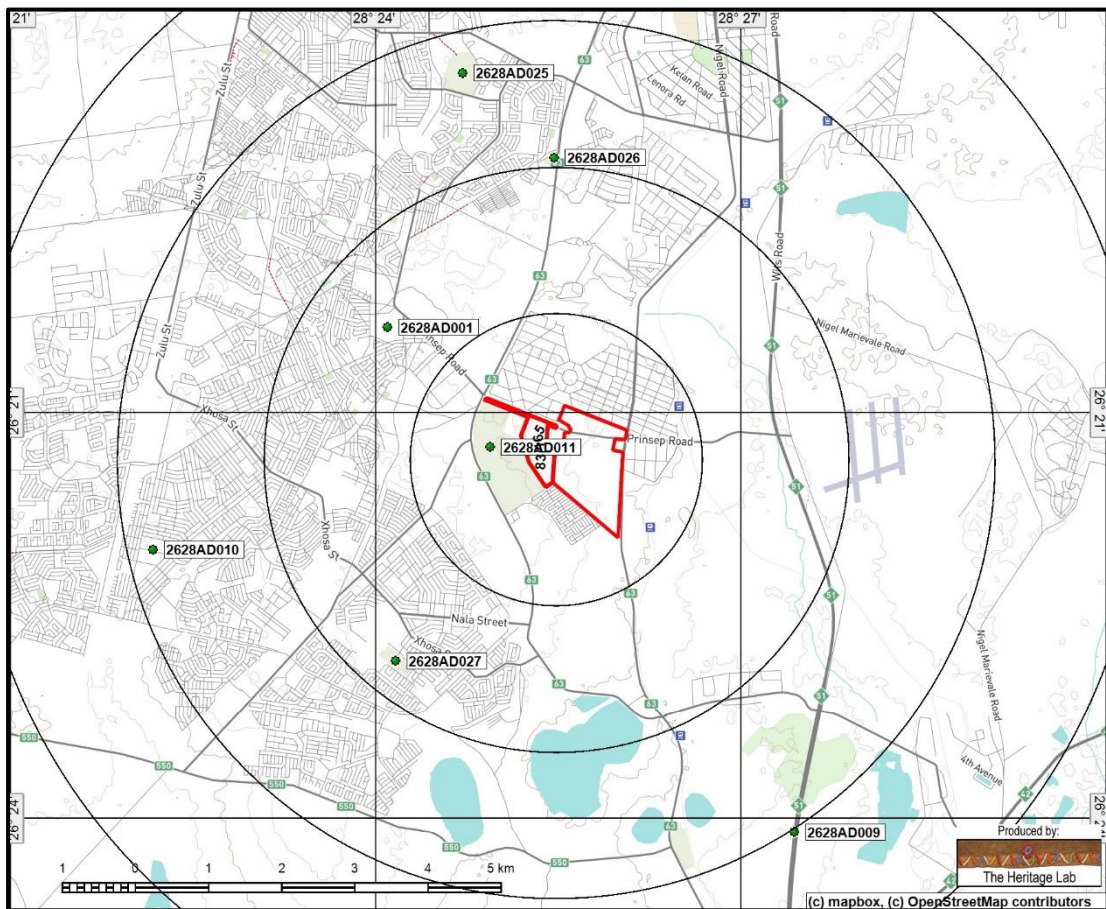


Figure 1. Location of known heritage sites and features in relation to the study area (Circles spaced at a distance of 2km: heritage sites = coded green dots)

4.2.2 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 the *Envirovolution Consulting* by means of maps and .kml files indicating the development area. This was loaded onto an ASUS digital device and used in Google Earth during the field survey to access the areas.

The site was visited on 7 February 2018 and was investigated by walking transects across it – see Fig. 2 below. During the site visit, archaeological visibility much limited due to the tall and dense vegetation cover that was encountered (see Fig. 5 below).

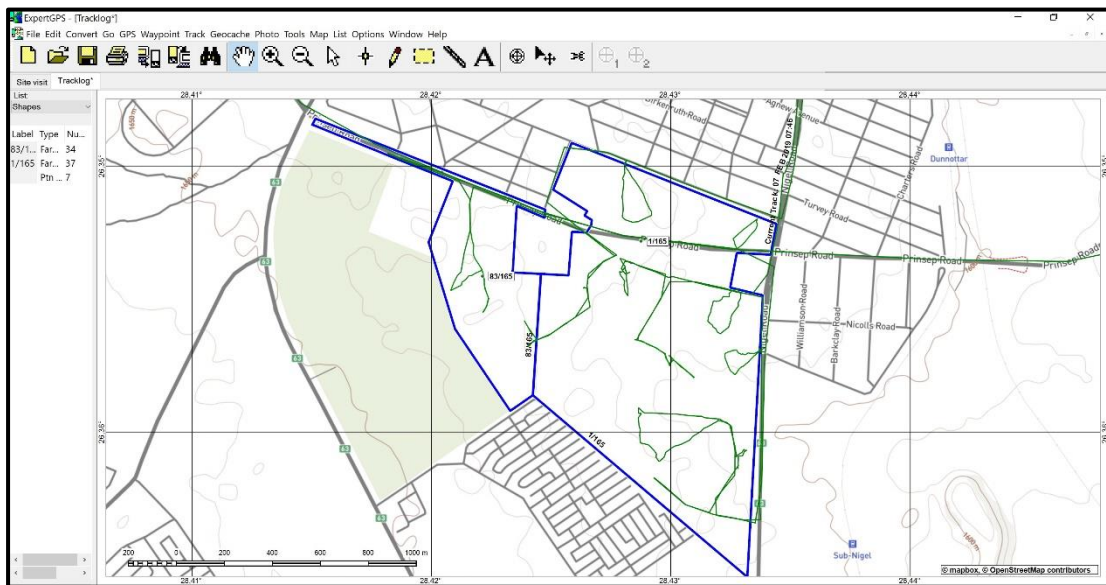


Figure 2. Map indicating the track log of the field survey.
(Site = blue polygon; track log = green line)

4.2.4 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).

The track log and identified sites were recorded by means of a Garmin Oregon 550 handheld GPS device. Photographic recording was done by means of a Canon EOS 550D digital camera.

5. PROJECT DESCRIPTION

5.1 Site location

The proposed township development is located west of the Nigel-Dunnottar Road (M63) and straddles the Valkfontein Road (M45) on the southern outskirts of Dunnottar town. The townships of Duduza is located to the south and Tsakane is located to the west (Fig. 3). For more information, see the Technical Summary on p. V above.

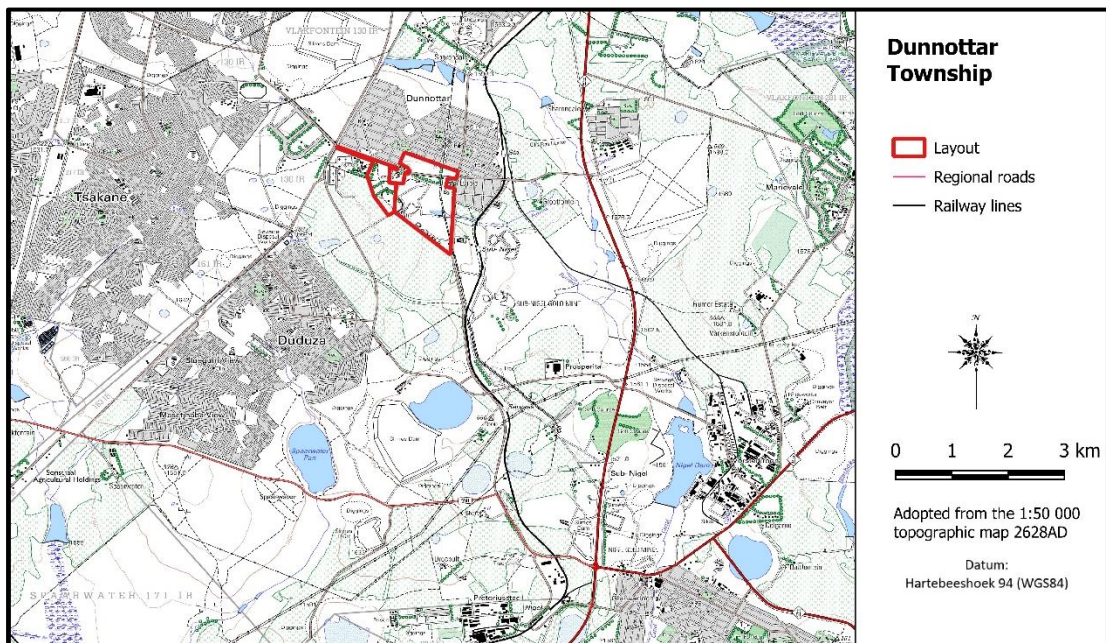


Figure 3. Location of the study area in regional context.
(Study area = red polygon)

5.2 Development proposal

Alley Roads Mega Projects proposes the establishment of a residential development as well as associated infrastructure in Nigel area, Gauteng Province. The total area proposed for development is approximately 141.53 hectares in extent, located within the boundary of Ekurhuleni Metropolitan Municipality of Gauteng Province.

The Residential Development entails the construction of the following land uses:

- Residential 1 Erven units,
- Residential 3 Units,
- Residential 4 Units,
- Business 2 (a taxi rank and normal shops), Public Garage, Undetermined (6.7 hectare), Public Open Space, Community Facility and Public Roads.

Approximately 6471 housing units are proposed which will consist of a combination of low cost to affordable housing.

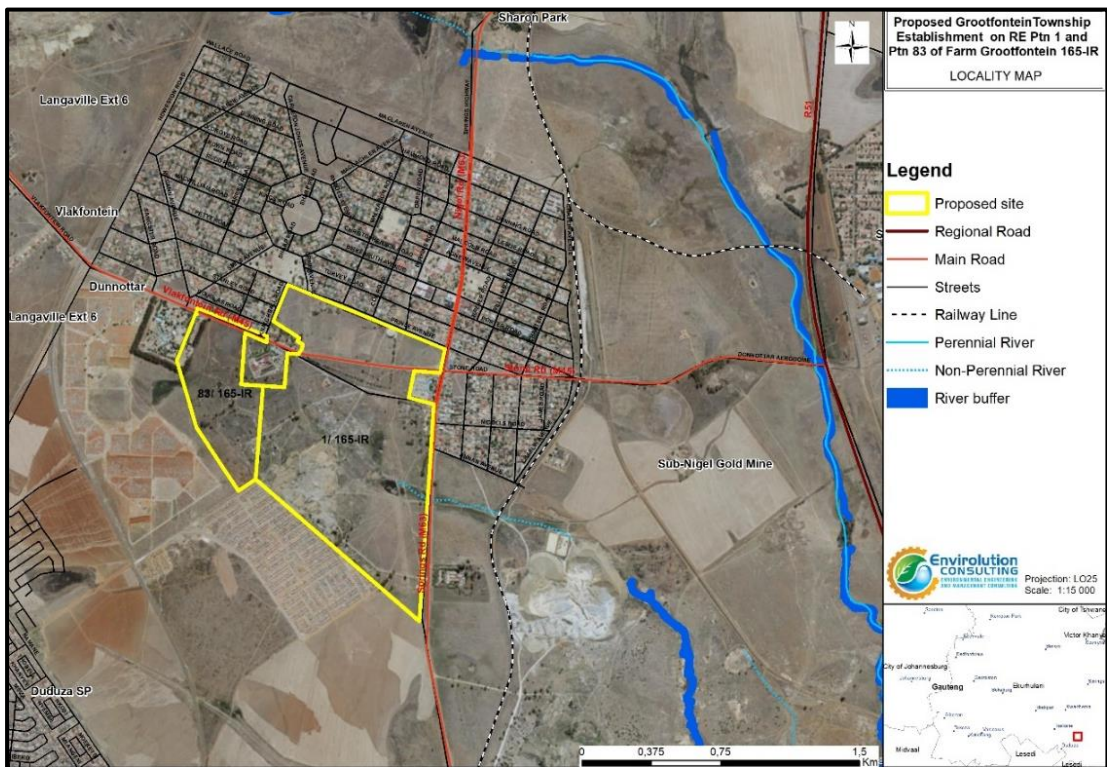
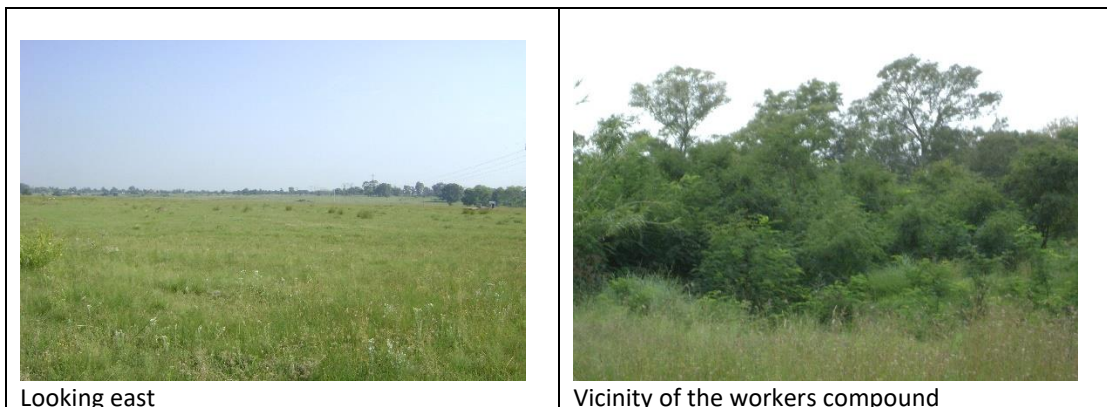


Figure 4. Layout of the proposed development (Map supplied by: Envirolution Consulting)

6. DESCRIPTION OF THE AFFECTED ENVIRONMENT

6.1 Natural Environment

The geology of the study area is made up of fine- to course-grain quartz, shale and coal seams of the Karoo Supergroup. The topography is described as undulating hills and plains. The original vegetation in the study area is classified as Tsakane Clay Grassland, which is part of the Mesic Highveld Grassland (Muncina & Rutherford 2006). However, all of this has been changed due to mining and urban developments (Fig. 5).



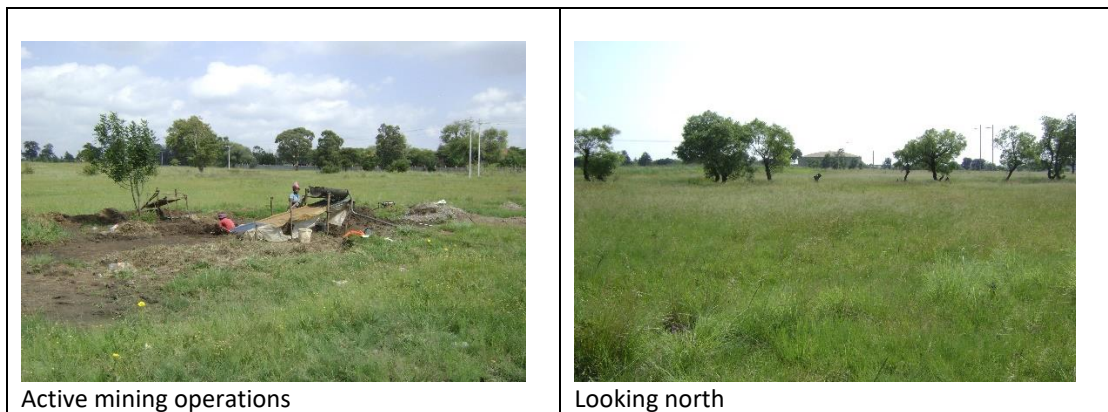


Figure 5. Views over the study area

The Palaeontological Sensitivity Map (SAHRIS) indicate that the central portion of the study area (indicated by the white arrow in Fig. 6) has a very high possibility of fossil remains to be found and therefore a field assessment and 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.

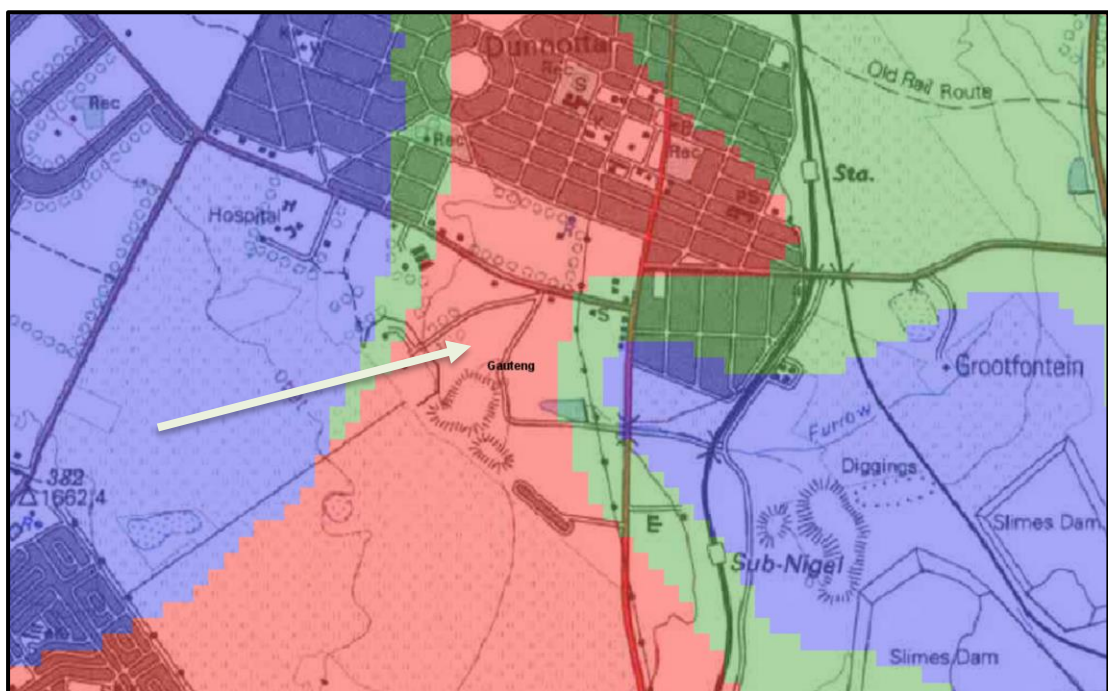


Figure 6. The Palaeontological sensitivity of the study area (arrowed)

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 very limited pre-colonial element (Stone Age and Iron Age) as well as a much later colonial (farmer and industrial) component. The second component, although much younger, is an industrial (mining) one, with a rapidly expanding urban component.

6.2.1 Stone Age

Records indicate that stone tools dating to the Early and Middle Stone Age occurred all over, for example in Benoni (Smuts 1938), the Primrose Ridge (Harcus 1945) area in adjacent Germiston, as well as to the south at Henly-On-Klip (Louw & Van der Elst 1949). Tools dating to this period are mostly found in the vicinity of watercourses, and no sealed, stratified sites (i.e. rock shelter or cave) are known from the region.

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.

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 in the region of Klipriviersberg. Here, a large number of settlements dating to the Later Iron Age occur and, according to Huffman et al (2006/2007) these sites can be related to the Bafokeng people.

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 discovery of gold and later of coal. From early days this region was subjected to intense gold mining activities (Praagh 1906). The result is that most sites and features of heritage significance in the larger region derive from this development.

The establishment of the town of Springs is closely associated with the coal mining industry and the development of railway infrastructure in the ZAR. The accidental discovery of a coal seam during gold prospecting at Boksburg in 1887 was the impetus for the construction of the first railway line north of the Vaal River, the so-called *Rand Tram*. This coincided with the founding of the *Nederlandsche Zuid-Afrikaansche Spoorweg-Maatschappij* (NZASM) in June 1887 in the Netherlands. This company was established as a concession by the ZAR government to build and operate a railway line between Pretoria and the Mozambique border.

In July 1888 the ZAR government authorised the NZASM to build and operate the planned light railway line between Johannesburg and Boksburg, and in January 1889 work began. The survey of the route for

the railway line indicated the presence of more coal deposits at Brakpan and The Springs. Deciding on the establishment of its own colliery on The Springs, the NZASM obtained a lease in 1889 and sunk a shallow shaft at a spot where the municipal garages used to be. In November 1889 the Springs Colliery produced its first coal. However, it soon proved that the coal seams on the farm were irregular and difficult to mine. Further prospecting proved that the farm Geduld, north of The Springs, was rich in coal. The NZASM bought the coal mining rights on Geduld. The colliery on The Springs was abandoned and the underground part of the mine was extended to Geduld.

The exploitation of the coal deposits on Geduld was a success and by 1899 there was a total of 18 km of underground galleries connected to the headgear, giving access to various coal seams varying between 30m and 140 m depth below surface level.

In November 1892 the NZASM discovered an underground fire in the abandoned old Springs Mine, which was sealed off. In April 1898 it was found that this fire was still smouldering and in March the following year it had spread to the Geduld works. At the end of this month the Springs Colliery was closed down by flooding the mine and removing the equipment. The mine was finally decommissioned in 1904.

Gold mining in the Nigel region started in the 1890s. In 1895 Sub Nigel and The Central Deep Nigel mines were started (Fig. 7). One of the shafts sank by The Central Nigel Deep in 1898 was abandoned, due to a lack of funding, within 900 ft of what was to become known as the Sub Nigel Main Shoot. This was viewed as the richest deposit of ore on the Witwatersrand. In 1906 The Central Nigel Deep was liquidated and later sold to Sub Nigel. The purchase of the Nigel Deep property increased the claim area of Sub Nigel to 1,375 claims. Further expansion followed in 1921 with the transfer of 500 claims on the farm Grootfontein from Consolidated Gold Fields. In 1925 Sub Nigel successfully tendered for the lease of 2,373 claims on the farm Grootfontein from the Government. In 1927 the sinking of the Betty Shaft, named after the daughter of the then manager W A Quince begun. Sub Nigel became one of the richest mines in the world. Eventually all the gold played out and in 1971 mining at Sub Nigel was stopped; Vlakfontein was closed down in 1977 (Cartwright 1967:132-135; Handley 2004:53-55).

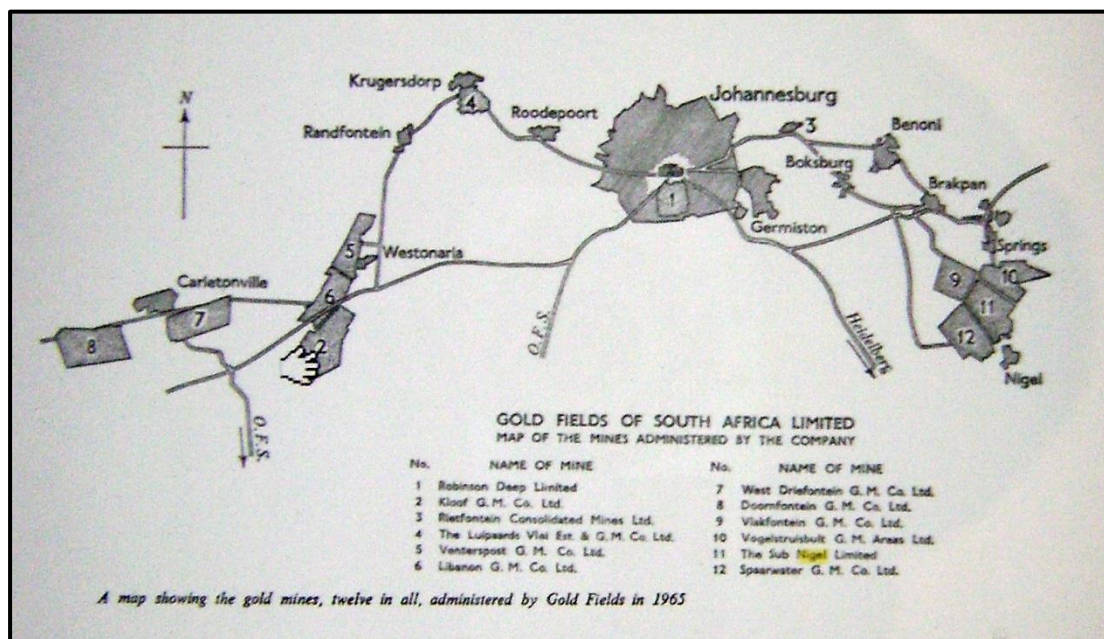


Figure 7. Location of the Sub Nigel mine complex – No. 11 on the map (after Cartwright 1967)

In November 1940, 24 Air School was established at Dunnottar, but was referred to as Nigel. The air school was used to train pilots for WWII, using Miles Masters, Hawker Harts and Oxford aircraft types. By 1944, the first of the well-known North American Harvard's (Fig. 8) arrived and were in use here for training pilots. After the closing down of the 24 Air School in September 1946 (after the War), the field reverted back to the Central Flying School and Air Force pilots were trained by using Harvard aircraft well into the 1980s (Becker 1989).



Figure 8. North American Harvard in action

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 it shows how humans have used the land.

One of the oldest maps from the region, is Troye's map of the gold mining on the Witwatersrand dating to 1890. On it (Fig. 9), it can be seen that two mining operations were already in place south of the farm Grootfontein (the focus area for this study), i.e. on Spaarwater and Varkens Fontein. Apart from farm boundaries, some roads are also indicated, one of which crosses Grootfontein farm.

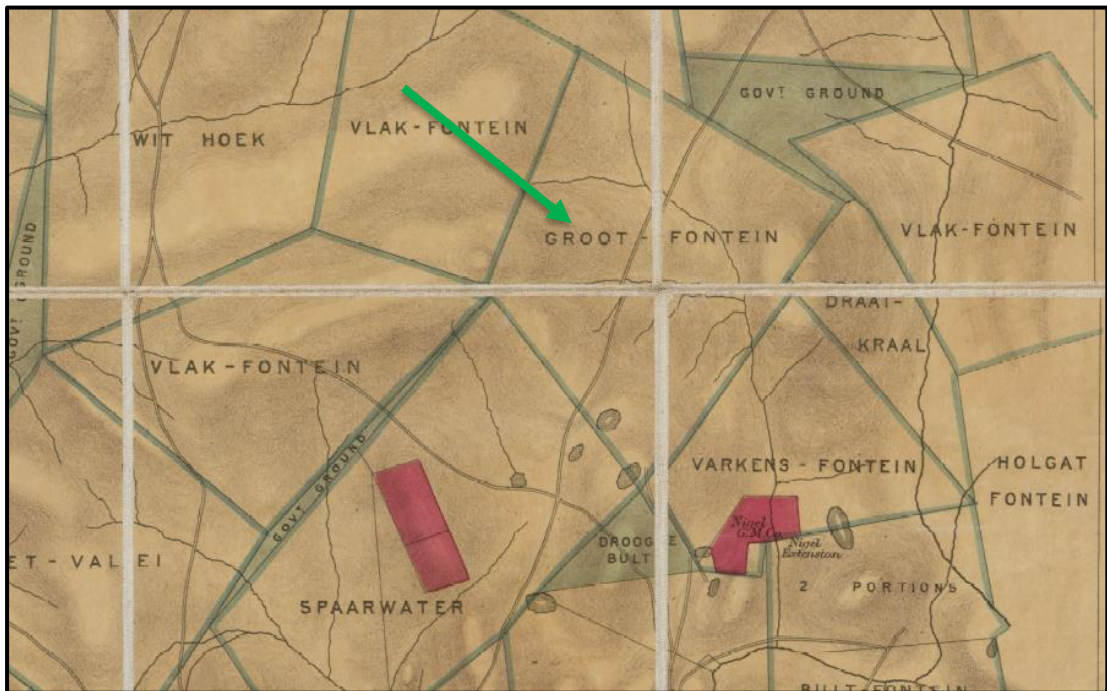


Figure 9. Section of Troye’s Map of the Witwatersrand Gold Fields dating to 1890 (Red coloured portions indicate active mines, i.e. 1890)

The rapid pace of development, largely as a result of the development of the gold and coal mining industries in the region, is reflected on Jeppe’s map dating a mere 10 years (1899) later (Fig. 10) and the Field Intelligence Department (1900) (Fig. 11). Different towns, e.g. Elsburg, Boksburg and Laversburg, now a suburb of Nigel, are indicated, as well as roads and two railway lines.

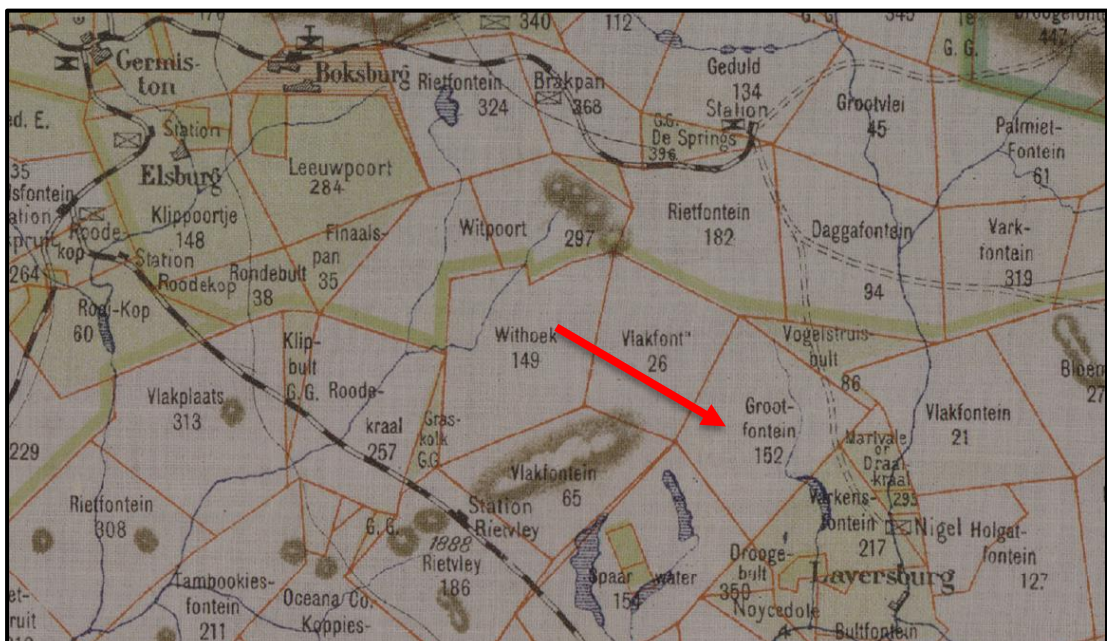


Figure 10. Section of Jeppe’s of the region dating to 1899

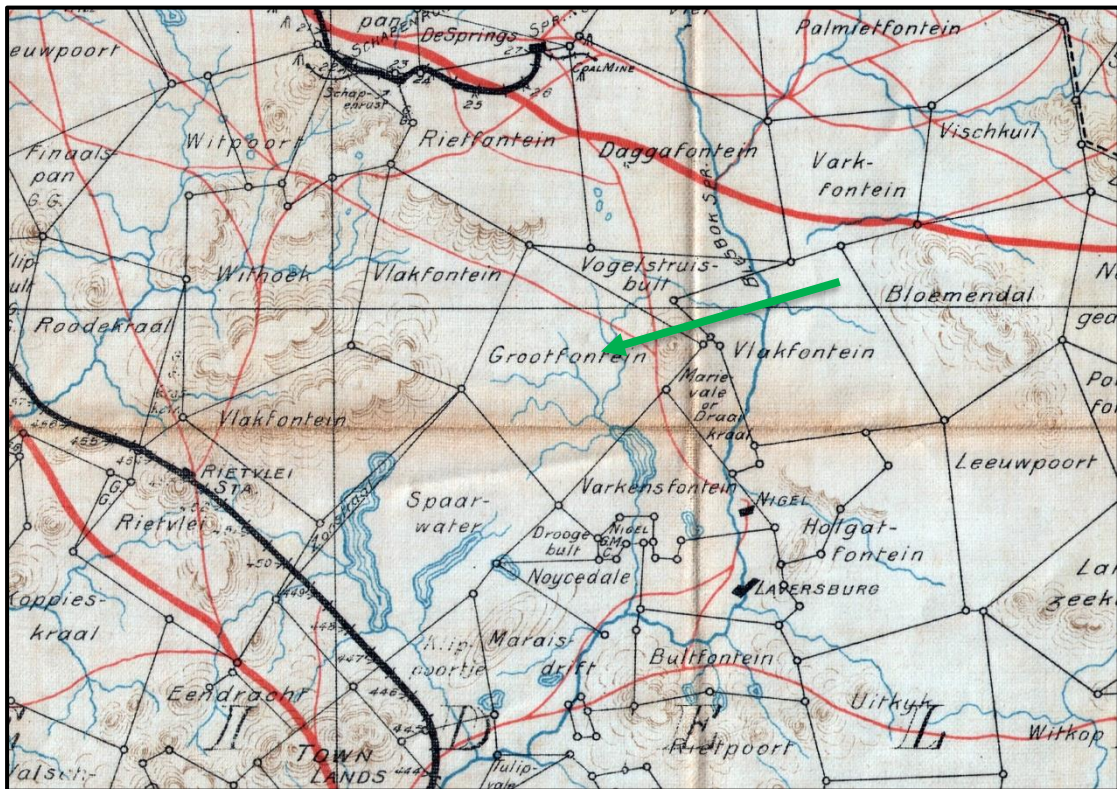


Figure 11. Section of the Imperial Map of South Africa, 1900
(Compiled for Field Intelligence Department, Cape Town)

As already indicated above, mining in the larger region started by the end of the 19th century. Hereafter, things developed rapidly. By 1926 there were already complaints that the compounds were overcrowded. In a letter dated 9th September, the Director of Native Labour wrote to the Secretary for Public Health, in which he made recommendations of how the living conditions in the compound could be improved. There were only 200 cubic feet of airspace which was viewed to be too little. It was recommended that this could be increased by lowering the number of labourers in a room from 56 to 52. If the end bunks could be removed, windows could be made, high up against the wall, which will allow for more light and air (TAB, GNLB, Vol. 369, Ref. 152/26, 1926).

The next two images, aerial photographs (Fig. 12 & Fig. 13) dating respectively to 1938 and 1941, shows a transformed landscape. Significantly, the first of the two existing hospitals, now renamed as the Zanele Mbeki Care Centre, is already in operation. The large, sprawling Sub-Nigel Mining Company No. 3 Shaft takes centre stage in the current study area. To the south west of this is located their compound for unmarried labourers.



Figure 12. Study area on the 1938 version of the aerial photograph
(Photograph: 133_021_06723)



Figure 13. Study area on the 1941 version of the aerial photograph
(Photograph: 162_018_58003)

All the above is not an indication of the warren of activities that took place below ground. As distances increased, new shafts had to be dug. One of these was Shaft No. 3, located in the current study area (Fig. 14). This map dates to 1939. However, on a similar map of the underground workings dating to 1935, this shaft is not included. From this it is deduced that Shaft 3 was completed during the period 1935 to 1939.

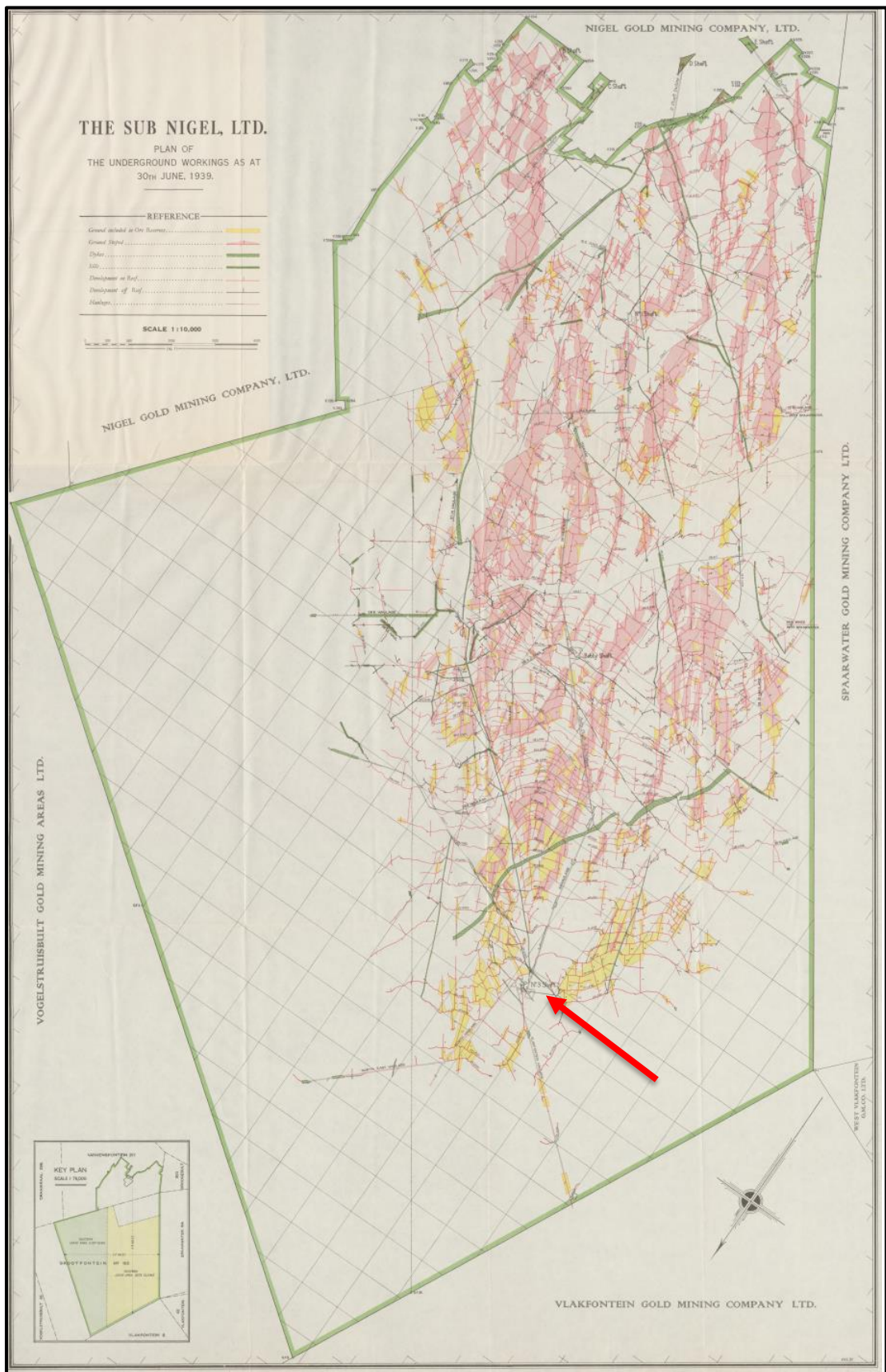


Figure 14. The underground workings at Sub Nigel Mine as of 1939 – No. 3 shaft arrowed (Please note that in this map, north is located to the bottom)

All of the surface elements described above are depicted on the 1944 version of the topographic map (Fig. 15), but in much less detail.

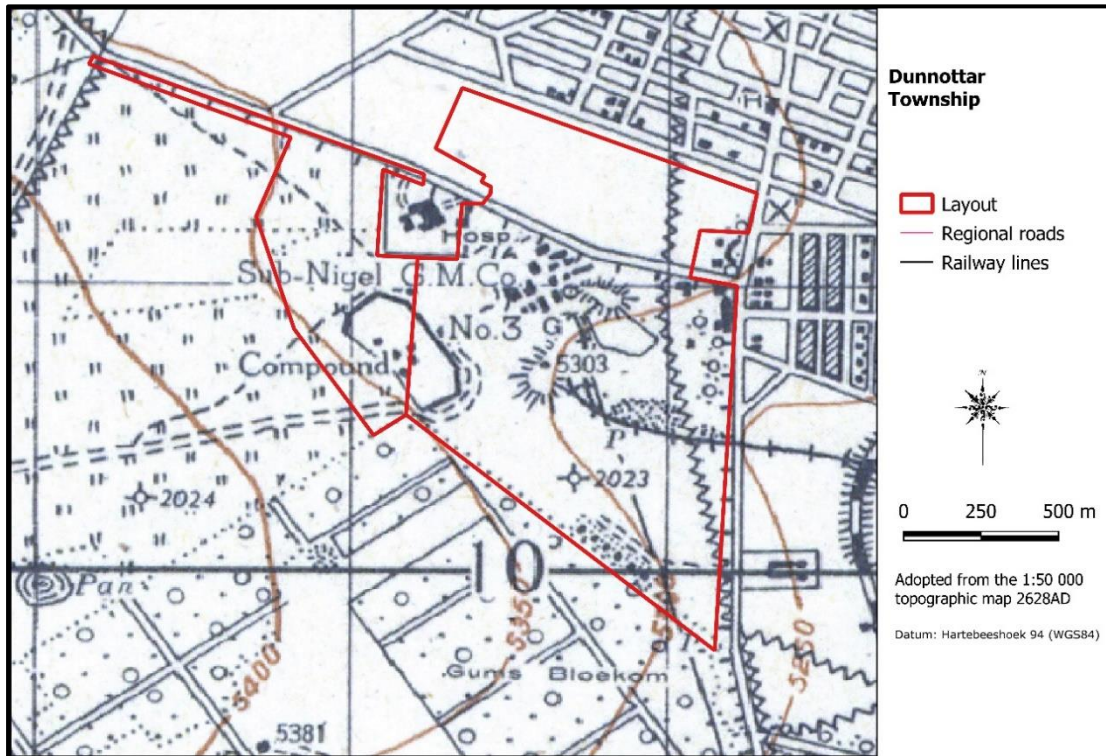


Figure 15. Study area on the 1944 version of the topographic map

By 1952, the second hospital has been constructed and a very large slimes dams can be seen south and east of the central mine complex (Fig. 16).



Figure 16. Study area on the 1952 version of the aerial photograph
(Photograph: 314_009_43109)

6.4 Demolished structures

*A number of features were identified which, in our opinion, has been impacted on to such an extent that it is not worth to implement mitigation measures. These features are discussed below – see Fig. 17 – but should not be confused with those which have been identified as having significance and which are discussed in Section 7 and **Section 5 of Addendum**.*

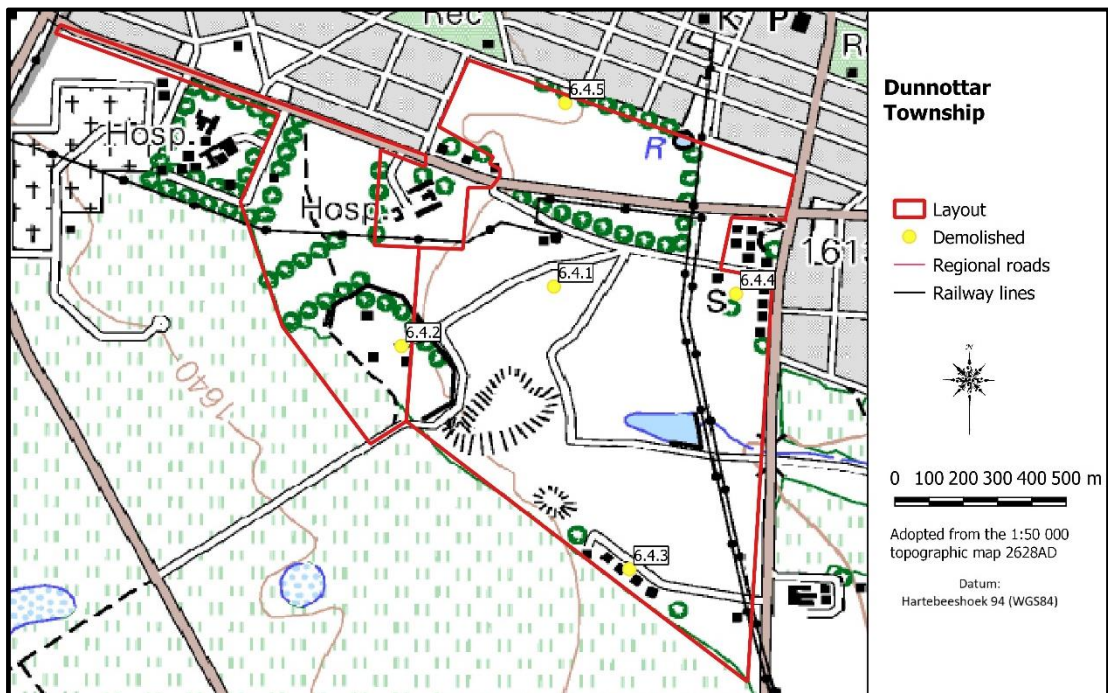
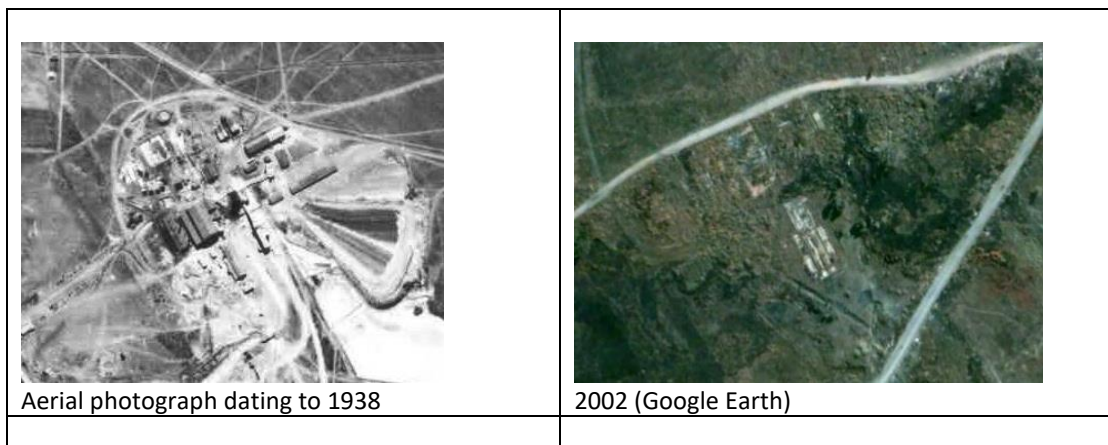
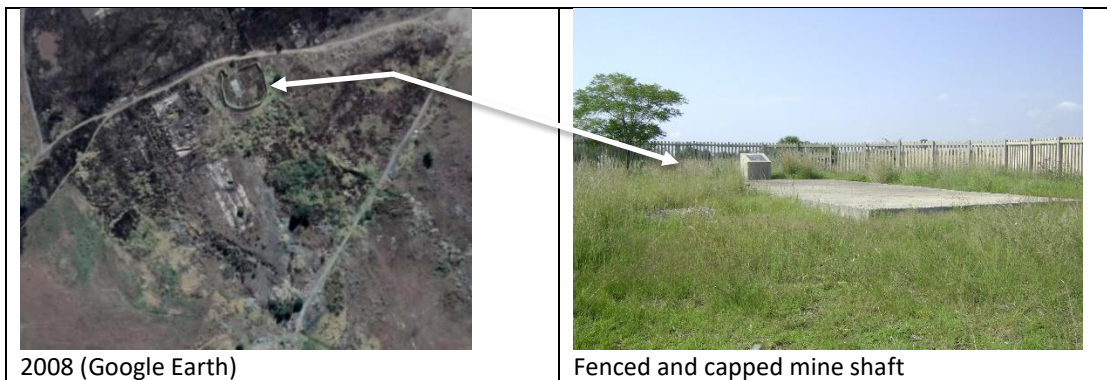


Figure 17. Location of the various demolished features

- 6.4.1: Central complex

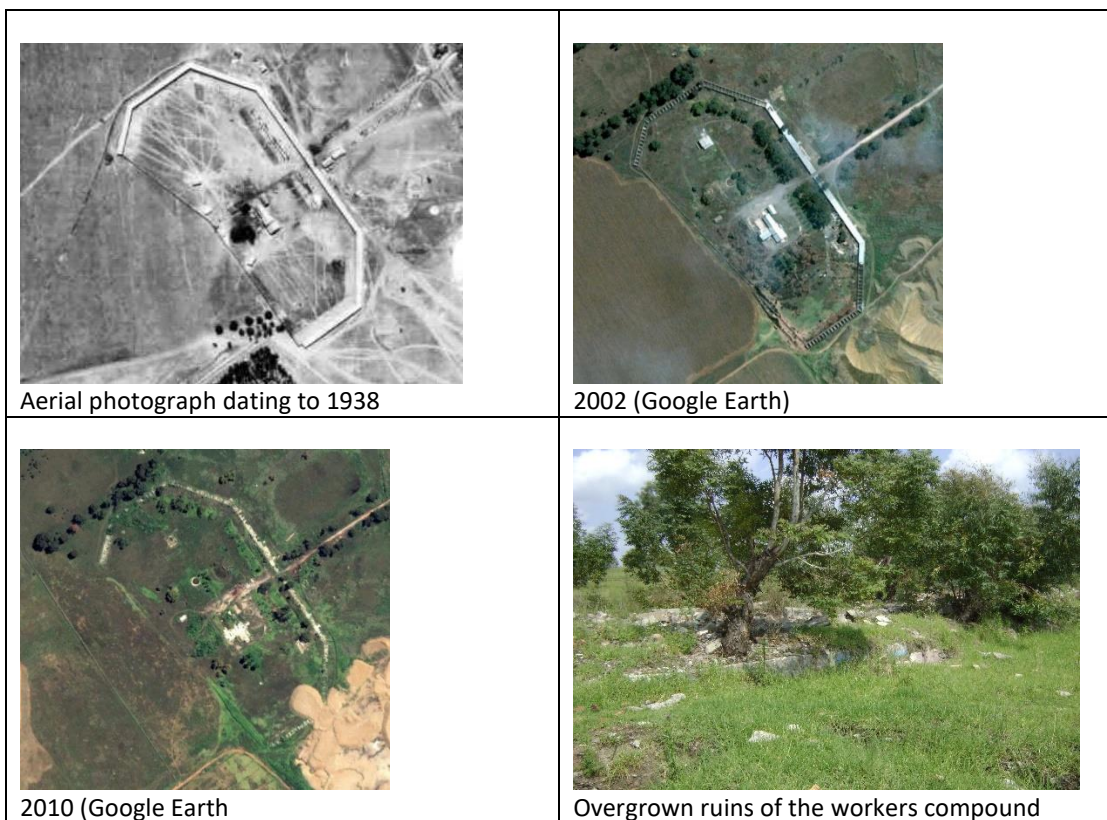
This complex included the original mine shaft (Shaft 3), administrative offices, workshops, etc. By 1938 it seems to have been fully developed and it did not change much over the next couple of years. However, by 2002 everything has been demolished and taken away. One new element was the fencing off and capping of the mine shaft that took place around 2008.





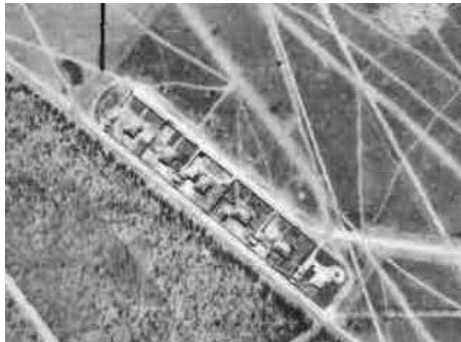
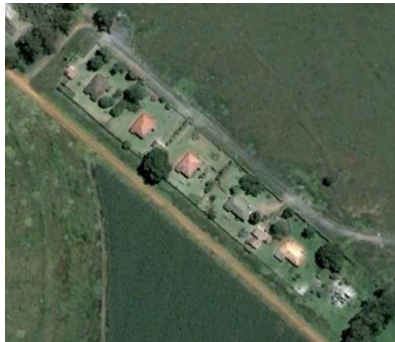


- 6.4.2: Workers compound

The workers compound can clearly be seen on the 1938 version of the official aerial photograph. Compared with later such photographs it was determined that it did not undergo any significant changes over the years. Apart from the physical structure it also included features such as an open-air dance arena and a sports field. However, by 2002 the feature was largely abandoned, with only a few sections still in use. By 2010 it was totally demolished, and nature is in the process of taking it back.





- 6.4.3: Houses

According to aerial photographic evidence, these houses existed from prior to 1938 up to 2005 and by 2008 they were already in ruins and by the time the township was developed, 2013, hardly anything remained. Currently, the different erven are used as informal gardens by township people, planting amongst the ruins of the houses.

 <p>Aerial photograph dating to 1938</p>	 <p>2005 (Google Earth)</p>
 <p>2008 (Google Earth)</p>	 <p>Remains of the houses (2019)</p>

- 6.4.4: School

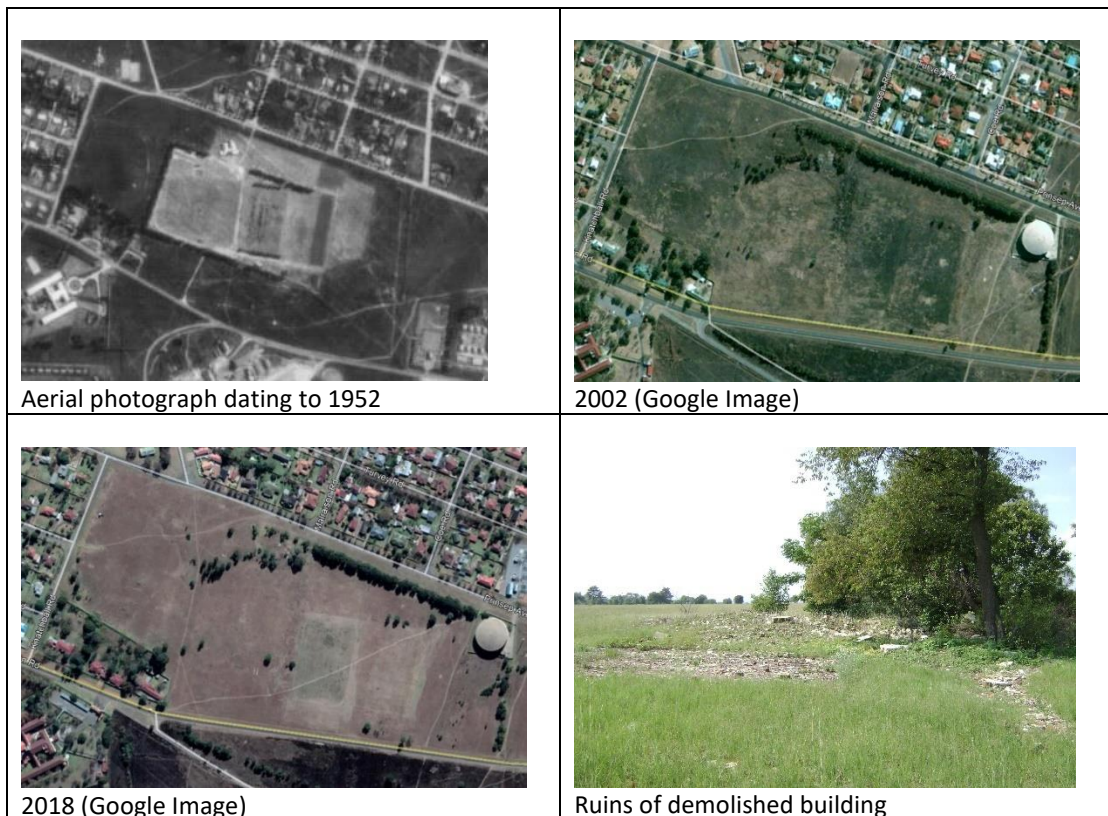
What has been identified as a school used to exist near the eastern boundary of the site. A single large building was located adjacent an old swimming pool. Unfortunately, the rest has been destroyed to such an extent that their original function is difficult to determine.

 <p>Aerial photograph dating to 1938</p>	 <p>2002 (Google Image)</p>
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- 6.4.5: Community centre

An unknown feature consisting of a single building and some open, levelled spaces. It is tentatively identified as a community sports centre, consisting of a club house and sports fields. However, it has been totally destroyed.



7. SURVEY RESULTS

During the physical survey, the following sites, features and objects of cultural significance were identified in the study area (Fig. 18). For more detail see the discussion of each site in **Section 5** of the **Addendum**:

7.1 Stone Age

- No sites, features or objects of cultural significance dating to the Stone Age were identified in the study area

7.2 Iron Age

- No sites, features or objects of cultural significance dating to the Iron Age were identified in the study area.

7.3 Historic period

- 7.3.1: An old electricity substation. Although all the equipment has been removed, and some of the fittings, e.g. doors and window frames, the buildings are structurally in sound form.
- 7.3.2: A row of old houses, all built according to the same plan; a larger structure occurs to the east of the row of houses. It probably formed part of a school and now serves as a nursery.
- 7.3.3: Informal burial site with approximately 50 graves, marked only with packed stone cairns. The graves seem to be very old and none have been visited or cleared of vegetation in a long time.

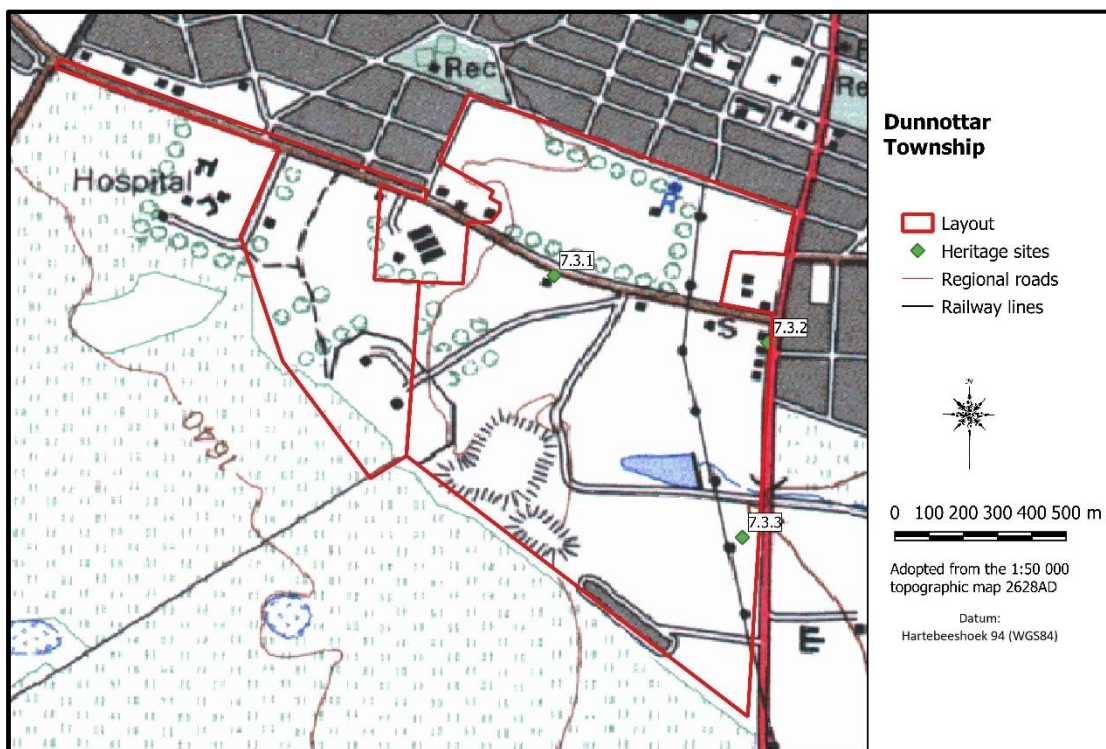


Figure 18. Location of heritage sites in the study area

8. RESULTS: STATEMENT OF SIGNIFICANCE AND IMPACT RATINGS

8.1 Impact assessment

Heritage impacts are categorised as:

- Direct or physical impacts, implying alteration or destruction of heritage features within the project boundaries;
- Indirect impacts, e.g. restriction of access or visual intrusion concerning the broader environment;
- Cumulative impacts that are combinations of the above.

Impact analysis of cultural heritage resources under threat of the proposed development, is based on the present understanding of the development and is summarised in Table 1 below:

Table 1: Impact assessment

IDENTIFIED HERITAGE RESOURCE: Electricity substation					
Nature: Township development activities would have a permanent and irreversible impact on this structure.					
		Without mitigation		With mitigation	
Extent	Region		Site		
Duration	Permanent		Permanent		
Intensity	Low		Low		
Probability	Definite		Probable		
Significance	Medium (60)		Low (27)		
Status (positive or negative)	Negative		Neutral		
Reversibility	Non-reversible		Non-reversible		
Irreplaceable loss of resources?	Yes		No		
Can impacts be mitigated	Yes				
Mitigation: Full documentation					
Cumulative impact: Loss of information regarding early technological development in the region.					
Site No.	Site type	NHRA category	Field rating	Impact rating: Before/After mitigation	Proposed mitigation (Refer to definitions in Section 12.3)
Electricity Substation					
7.3.1	Built structures	Section 34	High significance Grade 4-A	60	(1) Avoidance/Preserve; (2) Archaeological investigation
				27	

IDENTIFIED HERITAGE RESOURCE: School building					
Nature: Township development activities would have a permanent and irreversible impact on this structure.					
		Without mitigation		With mitigation	
Extent	Region		Site		
Duration	Permanent		Permanent		
Intensity	Low		Low		
Probability	Definite		Probable		
Significance	Medium (60)		Low (27)		
Status (positive or negative)	Negative		Neutral		
Reversibility	Non-reversible		Non-reversible		
Irreplaceable loss of resources?	Yes		No		
Can impacts be mitigated	Yes				
Mitigation: Full documentation					
Cumulative impact: Loss of information regarding early technological development in the region.					
Site No.	Site type	NHRA category	Field rating	Impact rating: Before/After mitigation	Proposed mitigation (Refer to definitions in Section 12.3)
School buildings					
7.3.2	Built structures	Section 34	High significance Grade 4-A	60	(1) Avoidance/Preserve; (2) Archaeological investigation
				27	

IDENTIFIED HERITAGE RESOURCE: Informal burial site					
Nature: Township development activities would have a permanent and irreversible impact on this structure.					
			Without mitigation	With mitigation	
Extent			Region	Site	
Duration			Permanent	Permanent	
Intensity			Low	Low	
Probability			Definite	Probable	
Significance			Medium (60)	Low (30)	
Status (positive or negative)			Negative	Neutral	
Reversibility			Non-reversible	Non-reversible	
Irreplaceable loss of resources?			Yes	No	
Can impacts be mitigated			Yes		
Mitigation: Full documentation					
Cumulative impact: Loss of information regarding early settlement in the region.					
Site No.	Site type	NHRA category	Field rating	Impact rating: Before/After mitigation	Proposed mitigation (Refer to definitions in Section 12.3)
Informal burial site					
7.3.3	Burial site	Section 36	High significance Grade 4-A	60	(1) Avoidance/Preserve; (2) Archaeological investigation
				27	

9. 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.

9.1 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).

9.2 Control

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

- A person or entity, e.g. the Environmental Control Officer, should be tasked to take responsibility for the heritage sites and should be held accountable for any damage.
- Known sites should be located and isolated, e.g. by fencing them off. All construction workers should be informed that these are no-go areas, unless accompanied by the individual or persons representing the Environmental Control Officer as identified above.
- In areas where the vegetation is threatening the heritage sites, e.g. growing trees pushing walls over, it should be removed, but only after permission for the methods proposed has been granted by SAHRA. A heritage official should be part of the team executing these measures.

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

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

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

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

9.3 Mitigation measures

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

For the current study, the following mitigation measures are proposed (see **Section 4** of the **Addendum** for a discussion of all mitigation measures):

- Site 7.3.1: Built structure (substation)
 - (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; or, alternatively
 - (2) Archaeological investigation: 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.

- Site 7.3.2: Built structure (school buildings)
 - (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; or, alternatively
 - (2) Archaeological investigation: 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.

- Site 7.3.3: Burial site
 - (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; or, alternatively
 - (2) Archaeological investigation/relocation: 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.

10. CONCLUSIONS AND RECOMMENDATIONS

Envirovolution Consulting was contracted *Alley Roads Mega Projects* as independent environmental consultant to undertake the EIA process for the proposed John Dube Extension 3 residential development as well as associated infrastructure to be establishment on Portions of remaining extent 1 and Portion 83 of the farm Grootfontein 165-IR, Ekurhuleni Metropolitan Municipality of Gauteng Province.

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 very limited pre-colonial element (Stone Age and Iron Age) as well as a much later colonial (farmer and industrial) component. The second component, although much younger, is an industrial (mining) one, with a rapidly expanding urban component.

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. It should be noted that the implementation of the mitigation measures is subject to SAHRA/PHRA's approval.

Identified sites

During the physical survey, the following sites, features or objects of cultural were identified, but are viewed as having very low significance due to the fact that they have been totally demolished. Consequently, no mitigation measures are proposed for these sites:

- 6.4.1: Central shaft complex.
- 6.4.2: Workers compound.
- 6.4.3: Houses.
- 6.4.4: School.
- 6.4.5: Community centre.

During the physical survey, the following sites, features or objects were identified as having significance:

- 7.3.1: An old electricity substation. Although all the equipment has been removed, and some of the fittings, e.g. doors and window frames, the buildings are structurally in sound form.
- 7.3.2: A row of old houses, all built according to the same plan; a larger structure occurs to the east of the row of houses.
- 7.3.3: Informal burial site with approximately 50 graves, marked only with packed stone cairns. The graves seem to be very old and none has been visited or cleared of vegetation in a long time.

Impact assessment and proposed mitigation measures

Impact analysis of cultural heritage resources under threat of the proposed development, is based on the present understanding of the development:

IDENTIFIED HERITAGE RESOURCES					
Site No.	Site type	NHRA category	Field rating	Impact rating: Before/After mitigation	Proposed mitigation (Refer to definitions in Section 12.3)
Electricity Substation					
7.3.1	Built structures	Section 34	High significance Grade 4-A	60 27	(1) Avoidance/Preserve; (2) Archaeological investigation
School buildings					
7.3.2	Built structures	Section 34	High significance Grade 4-A	60 27	(1) Avoidance/Preserve; (2) Archaeological investigation
Informal burial site					
7.3.3	Burial site	Section 36	High significance Grade 4-A	60 27	(1) Avoidance/Preserve; (2) Archaeological investigation

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 no sites, features or objects of heritage significance occur in the study area. If heritage features are identified during construction, as stated in the management recommendation, these finds would have to be assessed by a specialist, after which a decision will be made regarding the application for relevant permits.

- If the identified structures are to be demolished, a valid permit would be required from SAHRA/PHRA prior to their destruction. Such a permit will only be issued after the sites has been fully documented – mapped, photographed and described.

- If the graves are to be relocated, the full and correct procedures, as set out in **Section 4 of Addendum**, should be followed.

Reasoned opinion as to whether the proposed activity should be authorised:

- From a heritage point of view, it is recommended that the proposed development be allowed to continue on acceptance of the proposed mitigation measures and the conditions proposed below.

Conditions for inclusion in the environmental authorisation:

- The Palaeontological Sensitivity Map (SAHRIS) indicate that the central portion of the study area has a very high possibility of fossil remains to be found and therefore a field assessment and a protocol for finds is required.
- Should archaeological sites or graves be exposed in other areas during construction work, it must immediately be reported to a heritage practitioner so that an investigation and evaluation of the finds can be made.

11. REFERENCES

11.1 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

11.2 Literature

Becker, D. 1989. *Yellow Wings. The story of the Joint Air Training Scheme in World War 2*. Pretoria: SAAF Museum

Cartwright, A.P. 1967. *Gold paved the way. The story of of the Gold Fields Group of Companies*. London: Palgrave Macmillan

Ekurhuleni Metropolitan Municipality 2003. *State of the Environment Report*.

Handley, J.R.F. 2004. *Historic overview of the Witwatersrand Goldfields*. Howick: RF Handley.

Harcus, J. 1945. A Middle Stone Age Industry from Primrose Ridge, District Germiston, Transvaal. *South African Journal of Science* XLI: 459-464.

Huffman, T.N. et al. 2006/7. Stone walling in the Klipriviersberg: archaeological mitigation for the Aspen Hills development project. *Southern African Field Archaeology* 15 & 16:42-56.

Louw, J & Van der Elst, W. 1949. Two new African Chelles-Acheul or Stellenbosch Stage 1 sites. *South African Archaeological Bulletin* IV(16): 111-115.

Mason, R. 1968. *Prehistory of the Transvaal*. Johannesburg: Witwatersrand University Press.

Praagh, L.V. (ed.) 1906. *The Transvaal and its mines*. London: Praagh & Lloyd.

Smuts, J.C. 1938. Past Climates and Pre-Stellenbosch stone implements of Rietvlei (Pretoria) and Benoni. *Transactions of the Royal Society of Southern Africa* XXV: 367-388.

Van Schalkwyk, J.A. 2004. *Heritage impact assessment: Payneville Ext. 3*. Pretoria: Unpublished report 2004KH055.

Van Schalkwyk, J.A. 2005. *Heritage impact assessment: John Dube Village (Duduza Extension 4)*. Pretoria: Unpublished report 2005KH052.

Van Schalkwyk, J.A. 2008. *Heritage impact survey report for the proposed development on Portion 258 of the farm Geduld 123IR, Johannesburg magisterial district, Gauteng Province*. Pretoria: Unpublished report 2008/JvS/098.

Van Schalkwyk, J.A. 2010a. *Heritage impact assessment for the proposed Payneville Extension 1 development, Springs magisterial district, Gauteng Province*. Pretoria: Unpublished report 2010/JvS/014.

Van Schalkwyk, J.A. 2010b. *Heritage impact assessment for the proposed upgrade of three areas in Kwa-Thema Township, Springs area, Gauteng Province*. Pretoria: Unpublished report 2010/JvS/057.

Van Schalkwyk, J.A. 2013. *Heritage impact assessment report for the proposed Langaville Extension 4 housing development, Ekurhuleni, Gauteng Province*. Pretoria: Unpublished report 2013KH008.

11.3 Archival sources, maps and aerial photographs

1: 50 000 Topographic maps

Google Earth

Aerial Photographs: Chief Surveyor-General

NASA: TAB, GNLB, Vol. 369, Ref. 152/26, Date 1926

www.historicalpapers.wits.ac.za/inventories/inv_pdf/A1138-211-1-001

www.historicalpapers.wits.ac.za/inventories/inv_pdf/A1138-211-9-001

12. 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. Relocation of graves

If the graves are younger than 60 years, an undertaker can be contracted to deal with the exhumation and reburial. This will include public participation, organising cemeteries, coffins, etc. They need permits and have their own requirements that must be adhered to.

If the graves are older than 60 years old or of undetermined age, an archaeologist must be in attendance to assist with the exhumation and documentation of the graves. This is a requirement by law.

Once it has been decided to relocate particular graves, the following steps should be taken:

- Notices of the intention to relocate the graves need to be put up at the burial site for a period of 60 days. This should contain information where communities and family members can contact the developer/archaeologist/public-relations officer/undertaker. All information pertaining to the identification of the graves needs to be documented for the application of a SAHRA permit. The notices need to be in at least 3 languages, English, and two other languages. This is a requirement by law.
- Notices of the intention needs to be placed in at least two local newspapers and have the same information as the above point. This is a requirement by law.
- Local radio stations can also be used to try contact family members. This is not required by law, but is helpful in trying to contact family members.
- During this time (60 days) a suitable cemetery need to be identified close to the development area or otherwise one specified by the family of the deceased.
- An open day for family members should be arranged after the period of 60 days so that they can gather to discuss the way forward, and to sort out any problems. The developer needs to take the families requirements into account. This is a requirement by law.
- Once the 60 days has passed and all the information from the family members have been received, a permit can be requested from SAHRA. This is a requirement by law.
- Once the permit has been received, the graves may be exhumed and relocated.
- All headstones must be relocated with the graves as well as any items found in the grave.

Information needed for the SAHRA permit application

- The permit application needs to be done by an archaeologist.
- A map of the area where the graves have been located.
- A survey report of the area prepared by an archaeologist.
- All the information on the families that have identified graves.
- If graves have not been identified and there are no headstones to indicate the grave, these are then unknown graves and should be handled as if they are older than 60 years. This information also needs to be given to SAHRA.
- A letter from the landowner giving permission to the developer to exhume and relocate the graves.
- A letter from the new cemetery confirming that the graves will be reburied there.
- Details of the farm name and number, magisterial district and GPS coordinates of the gravesite.

5. Inventory of identified cultural heritage site

NHRA Category	Structures older than 60 years - Section 34
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7.3.1. Type: Built structures. **Farm:** Grootfontein 165-IR. **Coordinates:** S 26,35394; E 28,42805

Description

Old substation that supplied electricity to the mine. It probably dates to the early development of the mine. Although some power lines are still running up to the station, it is doubtful if it is still in use. All the power generation and electrical equipment has been removed and even some of the fitting such as doors and window frames are also gone. However, the main structures are still sound, and it would be possible to re-use it.



Significance of site/feature

Generally protected: High significance - Grade 4-A

Reasoned opinion: This site represents the remains of a technology that became redundant due to the cessation in demand of its original purpose. Such sites representing industrial heritage are usually few and far between and therefore the destruction of a single such site would have a proportionate high impact on the occurrences of similar features in the larger landscape.

Impact assessment

This site is located inside the development area and therefore there is a high possibility that it might be impacted on by the establishment of the township.

Mitigation

(1) Avoidance/Preserve: Because of its location within the larger project development area, it would be possible to avoid this site as it actually occupies a small footprint;
 (2) Archaeological investigation: If the former is not possible, the site should be documented in full before destruction.

Significance of impact: before/after mitigation

Extent	Duration	Intensity	Probability	Significance	Weight
3	5	4	5	60	Medium
1	5	3	3	27	Low

Requirements

Conservation by local authority. Sites should be mitigated before impact. Permit required from provincial heritage authority, as well as other institutions – see Section 4 of the Addendum.

References

7.3.2. Type: Built structures. Farm: Grootfontein 165-IR. Coordinates: S 26,35576; E 28,43365
Description
What has been identified as part of an old school that is now used as a nursery. It consists 8 structures of equal size and layout, a large hall like structure and a few smaller structures. IT seems as if the reset of the school that was located on the western side has been demolished. Its proximity of the mine seems to indicate that it was managed by the mine.



Significance of site/feature	Generally protected: High significance - Grade 4-A
Reasoned opinion: This site represents the remains of an era that became redundant due to cessation of the mining activities. Such sites representing industrial heritage are usually few and far between and therefore the destruction of a single such site would have a proportionate high impact on the occurrences of similar features in the larger landscape.	

Impact assessment
This site is located inside the development area and therefore there is a high possibility that it might be impacted on by the diamond prospecting activities.

Mitigation
(1) Avoidance/Preserve: Because of its location within the larger project development area, it would be possible to avoid this site as it actually occupies a small footprint;

(2) Archaeological investigation: If the former is not possible, the site should be documented in full before destruction.

Significance of impact: before/after mitigation					
Extent	Duration	Intensity	Probability	Significance	Weight
3	5	4	5	60	Medium
1	5	3	3	27	Low

Requirements

Conservation by local authority. Sites should be mitigated before impact. Permit required from provincial heritage authority, as well as other institutions – see Section 4 of the Addendum.

References

NHRA Category	Graves, Cemeteries and Burial Grounds - Section 36
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7.3.3 Type: Burial site. **Farm:** Grootfontein 165-IR **Coordinates:** S 26,36075; E 28,43305

Description

Informal burial site with fifty or more graves. These graves probably originated from people that stayed in the larger region, probably in the era predating the development of the gold mines. These graves seem to be very old and have not been visited or cleared of vegetation in a very long time. It is difficult to establish a definite number as all of them are marked only with stone cairns and is currently overgrown with grass.



General overview of the burial site



Typical grave

Significance of site/feature

Generally protected: High significance – Grade IV-A

Reasoned opinion: Burial sites are viewed as having high emotional and sentimental value. However, mitigation is possible if proper procedures have been followed.

Impact assessment

This site is located inside the proposed development area and therefore there is a high likelihood that it would be impacted on by the proposed development.

Mitigation

- (1) Avoidance/Preserve: Because of its location within the larger project development area, it would be possible to avoid this site as it actually occupies a small footprint;
- (2) Archaeological investigation: If the former is not possible, the site should be documented in full before destruction.

Significance of impact: before/after mitigation

Extent	Duration	Intensity	Probability	Significance	Weight
3	5	4	5	60	Medium
1	5	3	3	27	Low

Requirements

Conservation by local authority. Sites should be mitigated before impact. Permit required from provincial heritage authority, as well as other institutions – see Section 4 of the Addendum.

References

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6. 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.