

Phase 1 Cultural Heritage Impact Assessment:

**THE PROPOSED REALIGNMENT OF NATIONAL ROUTE 11, SECTION 4, SOUTH OF O'NEILL'S COTTAGE
(KM 34.3) TO KWAGGASNEK (KM 39.0), AMAJUBA DISTRICT MUNICIPALITY,
KWAZULU-NATAL PROVINCE**

Prepared for:

Chameleon Environmental (Dr J Bothma)

- Postal Address: PO Box 11788, Silver Lakes, 0054; Tel: 082 571 6920; E-mail: ce.j@mwebbiz.co.za

Prepared by:

J A van Schalkwyk (D Litt et Phil),

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

Report No: 2020/JvS/051

- Status: Final
- Date: September 2020
- Revision No: -
- Date: -

Submission of the report:

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



Copyright:

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

Specialist competency:

Johan A van Schalkwyk, D Litt et Phil, heritage consultant, has been working in the field of heritage management for more than 40 years. Originally based at the National Museum of Cultural History, Pretoria, he has actively done research in the fields of anthropology, archaeology, museology, tourism and impact assessment. This work was done in Limpopo Province, Gauteng, Mpumalanga, North West Province, Eastern Cape Province, Northern Cape Province, Botswana, Zimbabwe, Malawi, Lesotho and Swaziland. Based on this work, he has curated various exhibitions at different museums and has published more than 70 papers, most in scientifically accredited journals. During this period, he has done more than 2000 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.



J A van Schalkwyk
Heritage Consultant
September 2020

--	--	--	--	--	--	--	--	--	--

**SPECIALIST DECLARATION**

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

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

Signature of the specialist

Handwritten signature of J A van Schalkwyk in black ink.

J A van Schalkwyk
September 2020

EXECUTIVE SUMMARY

**Phase 1 Cultural Heritage Impact Assessment:
THE PROPOSED REALIGNMENT OF NATIONAL ROUTE 11, SECTION 4, SOUTH OF O'NEILL'S
COTTAGE (KM 34.3) TO KWAGGASNEK (KM 39.0), AMAJUBA DISTRICT MUNICIPALITY,
KWAZULU-NATAL PROVINCE**

The Majuba Mountain Pass is located on National Route 11, Section 4 between Newcastle (25 km to the south) and Volksrust (10 km to the north), just south of the KZN border with Mpumalanga. National Route 11, is an important link between KwaZulu-Natal and Mpumalanga, carrying approximately 5 200 vehicles per day, with a large percentage of heavy vehicles (22%).

The main objective of the project is to realign the existing N11 – Majuba Pass, to improve the dangerous operating conditions of the existing route and to increase the traffic capacity. The proposed realignment design will include upgrading the section to a 4-lane divided / undivided dual carriageway, or a combination of the two where appropriate or necessary, to accommodate the existing and anticipated traffic loading and capacity requirements.

Based on the integrated environmental scoping exercise it was determined that the Eastern Alignment would be the preferred alignment. This report therefore deals only with the possible impact that this preferred alignment might have on sites, features and objects of cultural heritage significance.

Identified sites

During the survey a variety of sites, features or objects of cultural significance were identified. A full description of these sites can be found in Section 7 of this report. These possible impact of the proposed development on the sites and the recommended mitigation measures are addressed in full in Section 8. For convenience sake it is summarised below:

Site No.	Site type	KZN category	Field rating/Mitigation	Impact rating: Before/After mitigation
7.3.1.1	Battle fields	Section 36	General protection Grade 2: High significance - No alteration whatsoever without permit from the PHRA.	Low (24)
				Low (16)

Site No.	Site type	KZN category	Field rating/Mitigation	Impact rating: Before/After mitigation
7.3.1.2.a	Military cemeteries	Section 34	General protection Grade 2: High significance - No alteration whatsoever without permit from the PHRA.	Low (24)
				Low (16)

Site No.	Site type	KZN category	Field rating/Mitigation	Impact rating: Before/After mitigation
7.3.2.1	1891 Railway tunnel	Section 33	Provincial protection Grade 2: High significance - No alteration whatsoever without permit from the PHRA.	Medium (48)
				Low (16)

Site No.	Site type	KZN category	Field rating/Mitigation	Impact rating: Before/After mitigation
7.3.2.2.b – 7.3.2.2.c	1938 Railway tunnels	Section 33	General protection: Grade 4A High/medium significance - Should be mitigated before destruction.	Medium (48)
				Low (16)

Site No.	Site type	KZN category	Field rating/Mitigation	Impact rating: Before/After mitigation
7.3.2.3.a	1984 Railway tunnels	Section 33	General protection: Grade 4A High/medium significance - Should be mitigated before destruction.	Low (8)
				Low (8)

Site No.	Site type	KZN category	Field rating/Mitigation	Impact rating: Before/After mitigation
7.3.4.c	Traditional burial places	Section 35	General protection: Grade 4A High/medium significance – Should be mitigated before destruction.	Low (24)
				Low (8)

Site No.	Site type	KZN category	Field rating/Mitigation	Impact rating: Before/After mitigation
7.3.5.d	Built structures older than 60 years - farmsteads	Section 33	General protection 4A: High/medium significance – Should be mitigated before destruction.	Medium (48)
				Low (16)

Site No.	Site type	KZN category	Field rating/Mitigation	Impact rating: Before/After mitigation
7.3.6 (No. 7, 9, 10, 12)	Built structures older than 60 years - culverts	Section 33	General protection Grade 2: High significance - No alteration whatsoever without permit from the PHRA.	Medium (48)
				Low (16)

The various heritage sites in relation to the Eastern Alignment

Site	No	Relation to alignment
Battlefield (Deane's Hill)	7.3.1.1	Approximately 400m east of alignment
Military burial site (Brownlow's Kop)	7.3.1.2.a	Approximately 400m east of alignment
NGR Tunnel 1891	7.3.2.1	Will directly be crossed by the alignment
Railway Tunnel 1938b	7.3.2.2.b	Will directly be crossed by the alignment
Railway Tunnel 1938c	7.3.2.2.c	Will directly be crossed by the alignment
Railway Tunnel 1984a	7.3.2.3.a	Will directly be crossed by the alignment
Burial site	7.3.4.c	Approximately 200m west of alignment
Farmstead	7.3.5.d	Approximately 190m west of alignment
Culvert 7	7.3.6.1.a	Approximately 120m west of alignment
Culvert 9	7.3.6.1.b	Approximately 120m east of alignment
Culvert 10	7.3.6.1.c	Approximately 245m west of alignment
Culvert 12	7.3.6.1.d	Approximately 230m east of alignment

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 project 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.

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

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

Conditions for inclusion in the environmental authorisation:

- The Palaeontological Sensitivity Map (SAHRIS) indicate that the project area has a complex sensitivity. However, this issue is addressed in a separate palaeontological study by Dr Heidi Fourie for inclusion in the EIA report.
- Should archaeological sites or graves be exposed 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
September 2020

TECHNICAL SUMMARY

Project description	
Description	Upgrade of Section 4 of the N11, KwaZulu-Natal
Project name	N11, Section 4, KwaZulu-Natal Upgrade

Applicant
SANRAL

Environmental assessment practitioner
Chameleon Environmental
Dr J Bothma

Property details													
Province	KwaZulu-Natal												
Magisterial district	Newcastle												
Local municipality	Newcastle												
Topo-cadastral map	2729BD & 2729DB												
Farm name	Various												
Closest town	Charlestown												
Coordinates	End points (approximate)												
	<table border="1"> <thead> <tr> <th>No</th> <th>Latitude</th> <th>Longitude</th> <th>No</th> <th>Latitude</th> <th>Longitude</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>S 27,45491</td> <td>E 29,86684</td> <td>2</td> <td>S 27,57271</td> <td>E 29,89681</td> </tr> </tbody> </table>	No	Latitude	Longitude	No	Latitude	Longitude	1	S 27,45491	E 29,86684	2	S 27,57271	E 29,89681
No	Latitude	Longitude	No	Latitude	Longitude								
1	S 27,45491	E 29,86684	2	S 27,57271	E 29,89681								
	.kml files ¹ 												

Development criteria in terms of Section 38(1) of the NHR Act	Yes/No
Construction of road, wall, power line, pipeline, canal or other linear form of development or barrier exceeding 300m in length	Yes
Construction of bridge or similar structure exceeding 50m in length	Yes
Development exceeding 5000 sq m	No
Development involving three or more existing erven or subdivisions	No
Development involving three or more erven or divisions that have been consolidated within past five years	No
Rezoning of site exceeding 10 000 sq m	No
Any other development category, public open space, squares, parks, recreation grounds	No

Land use	
Previous land use	Farming
Current land use	Farming

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

TABLE OF CONTENTS

	Page
SPECIALIST DECLARATION	II
EXECUTIVE SUMMARY.....	III
TECHNICAL SUMMARY	VI
GLOSSARY OF TERMS AND ABBREVIATIONS	IX
COMPLIANCE WITH APPENDIX 6 OF THE 2014 EIA REGULATIONS (AS AMENDED)	XI
1. INTRODUCTION	1
2. LEGISLATIVE FRAMEWORK.....	2
3. HERITAGE RESOURCES.....	4
4. PROJECT DESCRIPTION	5
5. STUDY APPROACH AND METHODOLOGY	9
6. DESCRIPTION OF THE AFFECTED ENVIRONMENT.....	13
7. SURVEY RESULTS	28
8. IMPACT ASSESSMENT AND MITIGATION MEASURES.....	34
9. MANAGEMENT MEASURES	40
10. CONCLUSIONS AND RECOMMENDATIONS	42
11. REFERENCES	45
12. ADDENDUM.....	47
1. Indemnity and terms of use of this report.....	47
2. Assessing the significance of heritage resources and potential impacts	48
3. Mitigation measures	51
4. Relocation of graves.....	53
5. Curriculum vitae	54

LIST OF FIGURES

	Page
Figure 1. Location of the proposed road upgrade alternatives in regional context.....	6
Figure 2. Layout of the four proposed road upgrade alternatives	8
Figure 3. Layout of the Eastern Concept (Eastern, preferred alignment)	9
Figure 4. Location of known heritage sites and features in relation to the project area	11
Figure 5. Vegetation cover encountered on the site.....	12
Figure 6. The Palaeontological sensitivity of the project area	14
Figure 7. Large panel showing antelope and humans.....	15
Figure 8. Swalu bridge near Harrismith.....	17
Figure 9. Satirical comment on the endeavours of the Natal Government's efforts	18
Figure 10. Opening of the railway tunnel at Lang's Nek and reconstruction after being blown up	18
Figure 11. The railway bridge across the Ngogo River, destroyed by the retreating Republican forces	19
Figure 12. The workings of the 'reverses' at Ingogo Heights, Van Reenen's Pass and Langs Nek	20
Figure 13. Some of the old railway lines indicated on the 1964 version of the topographic map.....	21
Figure 14. Track-beds of the old railway – line and reverses still to be seen in the landscape.....	21
Figure 15. Track-beds and cuttings of the old railway line.....	22
Figure 16. The development of the N11 National Route (1936 & 1982)	23
Figure 17. Two abandoned bridges and the current railway line behind them	24
Figure 18. Map indicating the identified heritage sites and features in the larger project area	25
Figure 19. Copy of the Deed of Transfer for the farm Jordaans Stroom 3310	26
Figure 20. Imperial Map of South Africa, 1900	27
Figure 21. Aerial photographs showing how the cultural landscape has changed over time.....	27
Figure 22. Images showing how the vegetation cover changes over time – Armagh farmstead.....	28
Figure 23. Map showing the heritage sites in relation to the preferred alternative.....	29

LIST OF TABLES

	Page
Table 1: Pre-Feasibility Assessment	10
Table 2: The various heritage sites in relation to the Eastern Alignment	35
Table 3A: Construction Phase: Environmental Management Programme for the project	41
Table 3B: Operation Phase: Environmental Management Programme for the project	42

GLOSSARY OF TERMS AND ABBREVIATIONS

TERMS

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

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

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

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

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

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

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

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

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

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

National Estate: The collective heritage assets of the Nation.

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

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

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

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

ACRONYMS and ABBREVIATIONS

AD	Anno Domini (the year 0)
ASAPA	Association of Southern African Professional Archaeologists

BC	Before the Birth of Christ (the year 0)
BCE	Before the Common Era (the year 0)
BP	Before Present (calculated from 1950 when radio-carbon dating was established)
CE	Common Era (the year 0)
CRM	Cultural Resources Management
CS-G	Chief Surveyor-General
EAP	Environmental Assessment Practitioner
ECO	Environmental Control Officer
EIA	Early Iron Age
EMPr	Environmental Management Programme
ESA	Early Stone Age
HIA	Heritage Impact Assessment
I & AP's	Interested and Affected Parties
ICOMOS	International Council on Monuments and Sites
LIA	Late Iron Age
LSA	Later Stone Age
MIA	Middle Iron Age
MSA	Middle Stone Age
NASA	National Archives of South Africa
NEMA	National Environmental Management Act 107 of 1998
NHRA	National Heritage Resources Act
PHRA	Provincial Heritage Resources Agency
SAHRA	South African Heritage Resources Agency
SAHRIS	South African Heritage Resources Information System
WUL	Water Use Licence

COMPLIANCE WITH 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 ii. the expertise of that specialist to compile a specialist report including a curriculum vitae;	Front page Page i Addendum Section 5
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
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;	Section 7; Figure 23
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 23 Section 7
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 8
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; (iA) 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 10 Section 8, 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.	-

**Phase 1 Cultural Heritage Impact Assessment:
THE PROPOSED REALIGNMENT OF NATIONAL ROUTE 11, SECTION 4, SOUTH OF O'NEILL'S
COTTAGE (KM 34.3) TO KWAGGASNEK (KM 39.0), AMAJUBA DISTRICT MUNICIPALITY,
KWAZULU-NATAL PROVINCE**

1. INTRODUCTION

1.1 Background

The Majuba Mountain Pass is located on National Route 11, Section 4 between Newcastle (25 km to the south) and Volksrust (10 km to the north), just south of the KZN border with Mpumalanga. National Route 11 is an important link between KwaZulu-Natal and Mpumalanga, carrying approximately 5 200 vehicles per day, with a large percentage of heavy vehicles (22%). The Majuba Pass is a 2-lane single carriageway road with climbing and passing lanes with direct minor at-grade accesses. It traverses the mountainous terrain of the Amajuba hills and forest and is characterised by rolling sub-standard vertical and horizontal alignments, resulting in unsafe conditions with a large number of accidents.

The Majuba Pass pavement was rehabilitated in April 2010, with only minor improvements to the horizontal and vertical alignments and the provision of formalised surface drainage.

The following is from the Terms of Reference (Royal HaskoningDHV (Pty) Ltd 2017) :

The Service Provider is to carry out a route determination exercise to establish the most feasible realignment route that conforms to the design standards of a rural high mobility road. In accomplishing this, the Service Provider is to take cognisance of, inter alia, topography, geologic (sic), land, environmental and social restrictions.

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.

An independent heritage consultant was appointed by *Chameleon Environmental* to conduct a cultural heritage screening to assess the heritage component of the larger project area.

- Based on the integrated environmental scoping exercise it was determined that the Eastern Alignment would be the preferred alignment. In accordance with Section 38 of the NHRA, an independent heritage consultant was appointed by *Chameleon Environmental* to conduct a cultural heritage assessment to determine if the development of the road, defined as the Eastern Alignment 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) as well as the relevant Provincial Heritage Resources Agency (PHRA).

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 HIA 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 may 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 proposed road development/upgrades is to take place. This included:

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

The project area includes the following:

- The proposed route alignment referred to as the Eastern Alignment.

The objectives were to:

- Determine the status of the identified heritage resources;
- Document any possible newly discovered archaeological, cultural and historic sites within the proposed project areas.
- Identify any potential 'fatal flaws' related to the proposed development;
- 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;
- Provide guideline measures to manage any impacts that might occur during the construction phase as well as the implementation phase.

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
 - KwaZulu-Natal Heritage Act (Act 4 of 2008)
 - National Heritage Resources Act, 1999 (Act No. 25 of 1999) (NHRA);
 - National Environmental Management Act 1998 (Act No. 107 of 1998) (NEMA).
- 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 KwaZulu-Natal Heritage Act, No. 4 of 2008, defines a heritage resource as any place or object of cultural significance i.e. of aesthetic, architectural, historical, scientific, social, spiritual, linguistic or technological value or significance. This includes, but is not limited to, the following wide range of places and objects:

- living heritage as defined in the National Heritage Council Act 11 of 1999 (cultural tradition; oral history; performance; ritual; popular memory; skills and techniques; indigenous knowledge systems; and the holistic approach to nature, society and social relationships);
- ecofacts (non-artefactual organic or environmental remains that may reveal aspects of past human activity; definition used in KwaZulu-Natal Heritage Act 2008);
- places, buildings, structures and equipment;
- places to which oral traditions are attached or which are associated with living heritage;
- historical settlements and townscapes;
- landscapes and natural features;
- geological sites of scientific or cultural importance;
- archaeological and palaeontological sites;
- graves and burial grounds;
- public monuments and memorials;
- sites of significance relating to the history of slavery in South Africa;
- movable objects, but excluding any object made by a living person; and
- battlefields.

3.2 Cultural significance

In the KwaZulu-Natal Heritage Act, Act No. 4 of 2008, “cultural significance” means of aesthetic, architectural, historical, scientific, social, spiritual 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.

3.3 Grading of heritage sites and features

The South African heritage resources management system is based on grading, which provides for assigning the appropriate level of management responsibility to a heritage resource. Heritage resources are assessed according to criteria specified in the NHRA.

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 Grade 4A: High/medium significance - Should be mitigated before destruction
6.	Generally protected Grade 4B: Medium significance - Should be recorded before destruction
7.	Generally protected Grade 4C: Low significance - Requires no further recording before destruction

4. PROJECT DESCRIPTION

4.1 Site location

The Majuba Mountain Pass is located on National Route 11, Section 4 between Newcastle (25 km to the south) and Volksrust (10 km to the north), just south of the KZN border with Mpumalanga (Fig. 1). For more information, see the Technical Summary on p. V above.

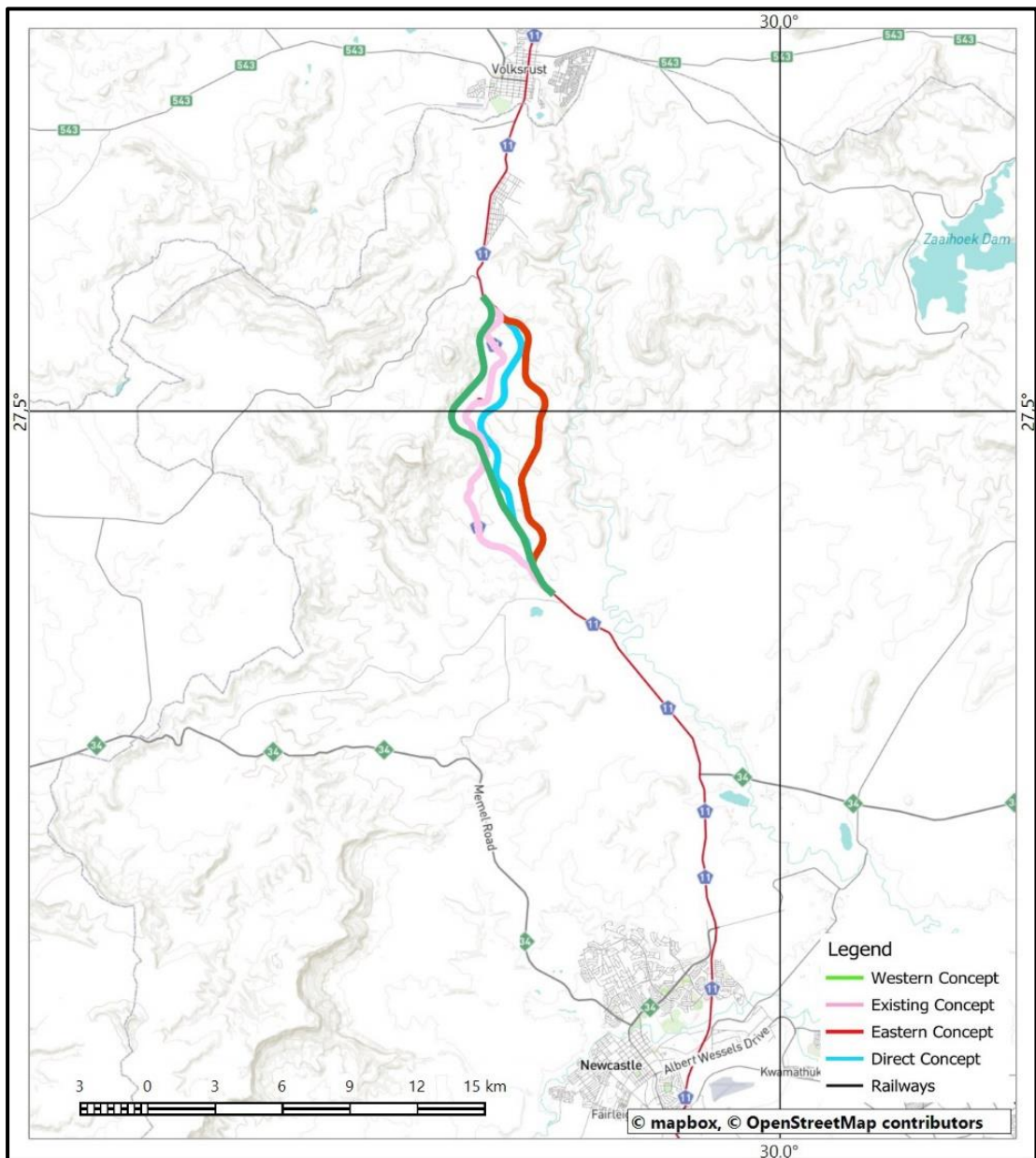


Figure 1. Location of the proposed road upgrade alternatives in regional context

4.2 Development proposal

The following is from the Terms of Reference (Royal HaskoningDHV (Pty) Ltd 2017) :

The Service Provider is to carry out a route determination exercise to establish the most feasible realignment route that conforms to the design standards of a rural high mobility road. In accomplishing this, the Service Provider is to take cognisance of, inter alia, topography, geologic (sic), land, environmental and social restrictions.

The main objective of the project is to realign the existing N11 – Majuba Pass, to improve the dangerous operating conditions of the existing route and to increase the traffic capacity. The proposed realignment design will include upgrading the section to a 4-lane divided / undivided dual

carriageway, or a combination of the two where appropriate or necessary, to accommodate the existing and anticipated traffic loading and capacity requirements.

Concept designs of various alignment proposals will be considered to establish the most feasible realignment route that conforms to the design standards of a rural high mobility road. Four alternatives have been identified.

The following section contain information obtained from the project assessment report submitted to Sanral by Royal HaskoningDHV (Pty) Ltd (2017) and is presented here *ad verbum* – also see Fig. 2.

- **Option 1 – Eastern Bypass Route**

This route leaves the N11 at O’Neill’s Cottage² and loops around in an easterly direction along the adjacent ridge, before re-joining the N11 at the top of Majuba Pass.

- **Option 2 – Direct Route**

This route leaves the N11 at O’Neill’s Cottage but maintains a more direct route to the top, overlapping the existing road several times before re-joining the N11 at the top of Majuba Pass.

- **Option 3 – Western Route**

This route leaves the N11 at the bottom of Majuba Pass (km 22.0) and follows a route which enables the gradients to be kept to a minimum. The route stays on the eastern side of the existing road then crosses at km 29,82 to remain on the western side of the existing road and railway line before re-joining the N11 at the top of Majuba Pass.

- **Option 4 – Upgrade of Existing Route**

With only two alterations, this route would follow the current alignment of the road.

² It should be noted that this statement is take over directly from the information supplied by Royal HaskoningDHV (Pty) Ltd (2017). In actual fact, O’Neill’s Cottage is located approximately midway between the starting and ending points of the project.

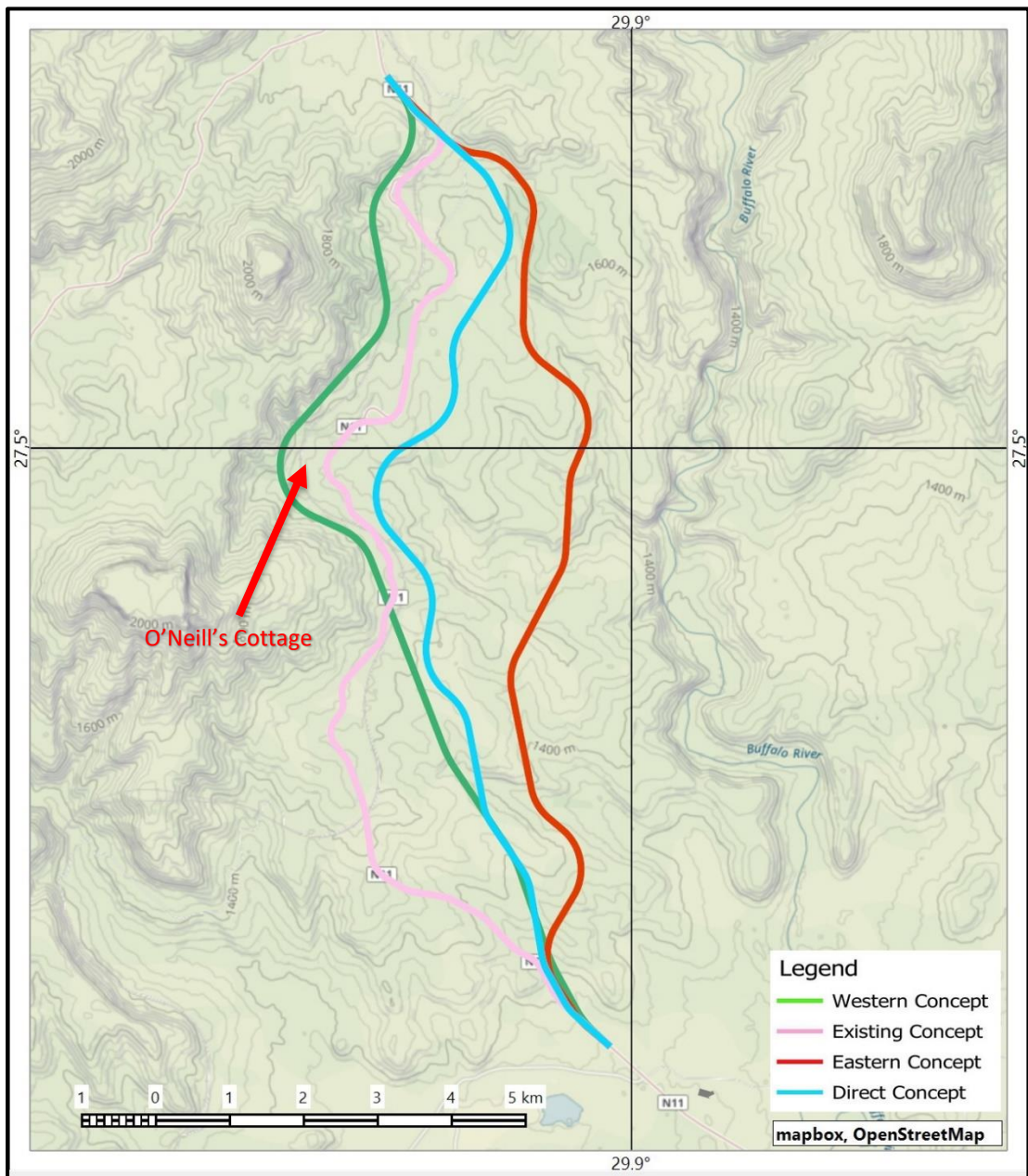


Figure 2. Layout of the four proposed road upgrade alternatives

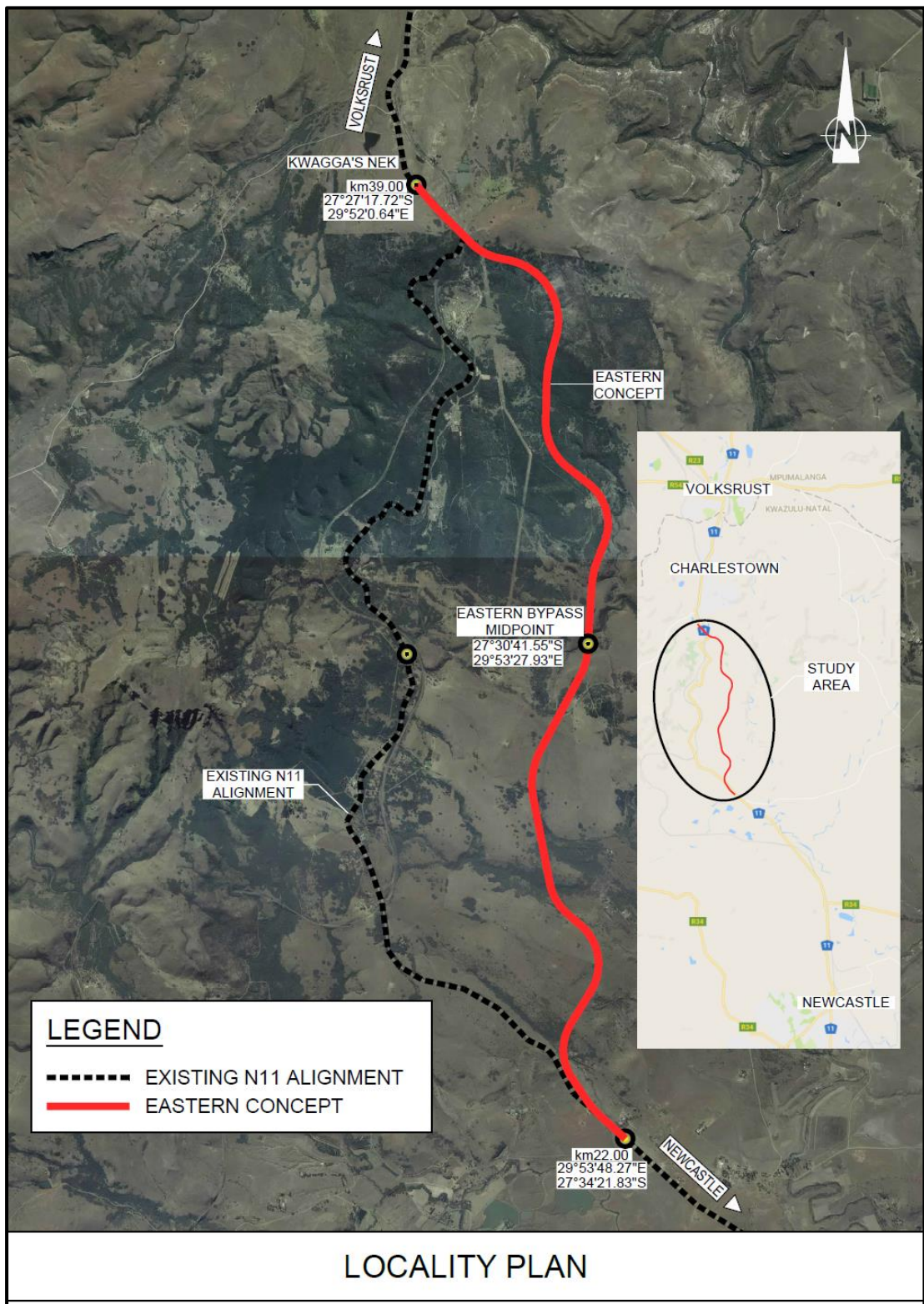


Figure 3. Layout of the Eastern Concept (Eastern, preferred alignment)

5. STUDY APPROACH AND METHODOLOGY

5.1 Extent of the Study

This survey and impact assessment cover all facets of cultural heritage located in the project area as presented in Section 4 above and illustrated in Figures 1 - 3.

5.2 Methodology

5.2.1.1 Desktop survey

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 12.

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

5.2.1.2 Survey of heritage impact assessments (HIAs)

A survey of HIAs done for projects in the region by various heritage consultants was conducted with the aim of determining the heritage potential of the area – see list of references in Section 12.

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

5.2.1.3 Data bases

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

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

5.2.1.4 Other sources

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

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

The results of the above investigation are presented in Table 1 and Figure 4 below – see list of references in Section 12 – and can be summarised as follows:

- Rock paintings dating to the Later Stone Age are known to exist west of the project area. In all probability, other sites containing stone tools, dating to the LSA and even the Middle Stone Age would be revealed by intensive surveys to occur as low-density scatters on some outcrops in the larger region;
- Historic structures, inclusive of buildings, monuments and bridges, occur sporadically on farms in the region;
- Battlefields dating to the two South African War's – 1880-1881 and 1898-1902 – occur in the project area as well as in the later landscape;
- Formal as well as informal burial sites occur sporadically throughout the larger region.

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

Table 1: Pre-Feasibility Assessment

Category	Period	Probability	Reference
Landscapes			

Natural/Cultural		None	Aerial photographs; Historic maps
Early hominin	Pliocene – Lower Pleistocene		
	Early hominin	None	-
Stone Age	Lower Pleistocene – Holocene		
	Early Stone Age	Low	
	Middle Stone Age	Low	
	Later Stone Age	Medium	Wright & Mazel (2007)
	Rock Art	Medium	Natal Museum Database
Iron age	Holocene		
	Early Iron Age	Low	Huffman (2007)
	Middle Iron Age	None	
	Late Iron Age	Low	Huffman (2007)
Colonial period	Holocene		
	Contact period/Early historic	High	Von der Hyde (2013)
	Recent history	High	Creswicke (1901); Von der Hyde (2013)
	Industrial heritage	High	Floor (1985); Heydenreych & Martin (1992); Joubert (1955), Van Schalkwyk (2015)

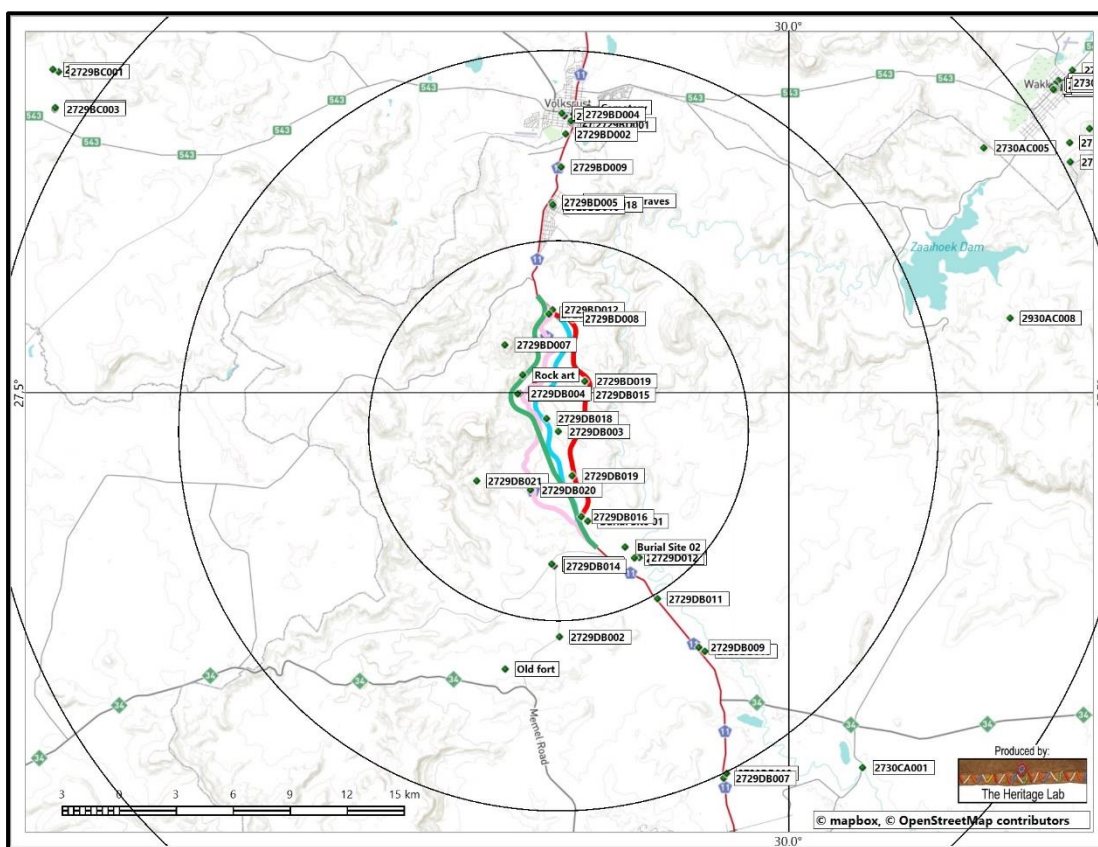


Figure 4. Location of known heritage sites and features in relation to the project area (Circles spaced at a distance of 10km: heritage sites = coded green dots)

5.2.2 Field survey

The field survey was done according to generally accepted archaeological practices, and was aimed at locating all known sites, features and objects. The area that had to be investigated was identified by

the *Chameleon Consulting* by means of maps and .kml files indicating the mining areas. This, as well as the sites and features that were previously identified, was loaded onto a Samsung digital device and used in Google Earth during the field survey to access the area.

The project area was visited on 30 and 31 July 2020 and again on 5 and 6 October 2020. During the site visit, archaeological visibility was much limited as most of the area was covered by tall grass, black wattle plantations and dense shrub growth – see Fig. 5 below.

- Due to the dense vegetation cover encountered, use was made of internal roads to access the area, after which the various sites and features identified in the pre-feasibility study were investigated on foot.

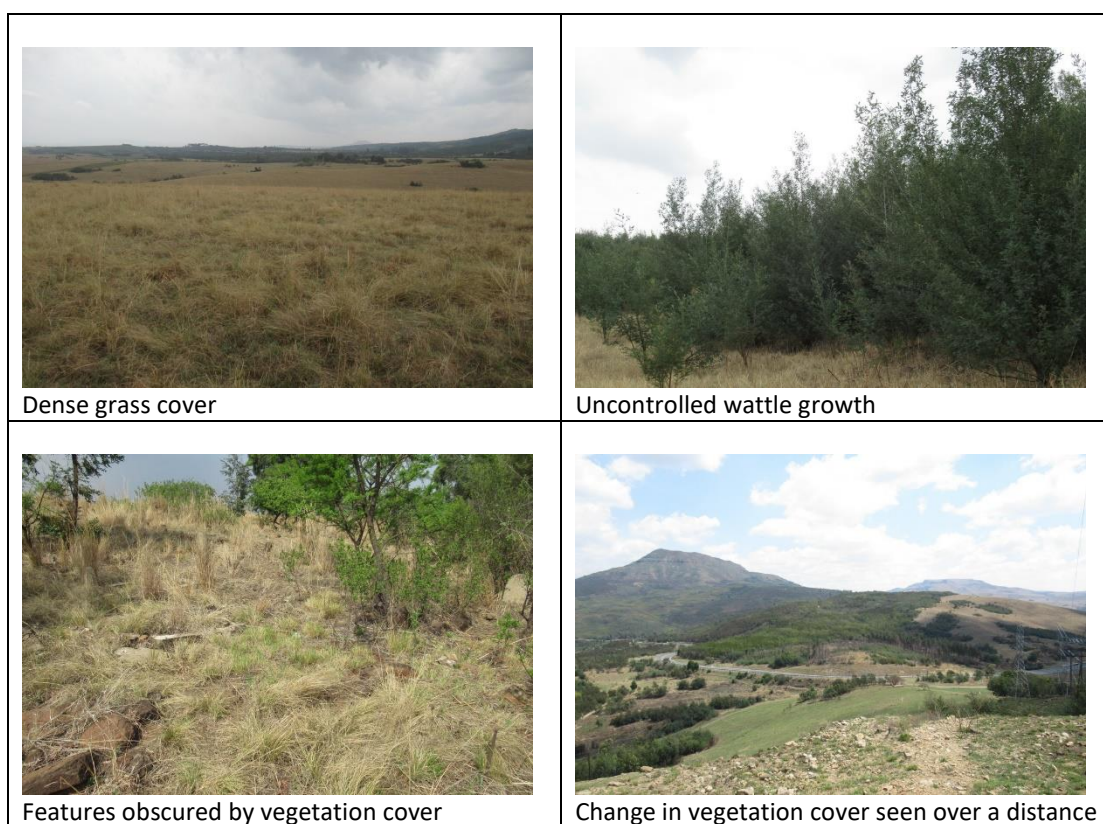


Figure 5. Vegetation cover encountered on the site

5.2.3 Consultation

On a number of occasions, people living in the project area were consulted as to the location of heritage sites. These include local farmers, farm labourers and chance passer-by's.

5.2.4 Documentation

All sites, objects and structures that are identified are documented according to the general minimum standards accepted by the archaeological profession. Coordinates of individual localities are determined by means of the *Global Positioning System* (GPS) and plotted on a map. This information

is added to the description in order to facilitate the identification of each locality. Map datum used: Hartebeeshoek 94 (WGS84).

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. Geo-rectifying of the aerial photographs and historic maps was done by means of a professional software package: ExpertGPS.

6. DESCRIPTION OF THE AFFECTED ENVIRONMENT

6.1 Natural Environment

The project area lies in a highly transformed environment, which was much impacted on by agricultural and forestry activities. The original vegetation of the northern section of the project area is classified as Low Escarpment Moist Grassland, a grassland biome forming part of the Sub-Escarpment Grassland Bioregion. In the southern section of the project area, the original vegetation is classified as KwaZulu-Natal Highland Thornveld, which is also a grassland biome, but falling in the Sub-Escarpment Grassland Bioregion (Muncina & Rutherford 2006).

The topography of the region is classified as low mountains. A number of rivers and streams criss-cross the area, draining mostly in a south-eastern direction towards the Buffelsrivier.

The geology of the northern part of the project area is made up of mudrock dating to the Volksrust Formation of the Ecca Group of the Karoo Supergroup and as such has a high potential for fossil remains to be found. In contrast, the southern section consists of a network of dolerite sills, sheets and dykes, mainly intrusive into the Karoo Supergroup

- The Palaeontological Sensitivity Map (SAHRIS) indicate that the project area (Fig. 6) has a complex sensitivity. However, this issue is addressed in a separate palaeontological study by Dr Heidi Fourie for inclusion in the EIA report.

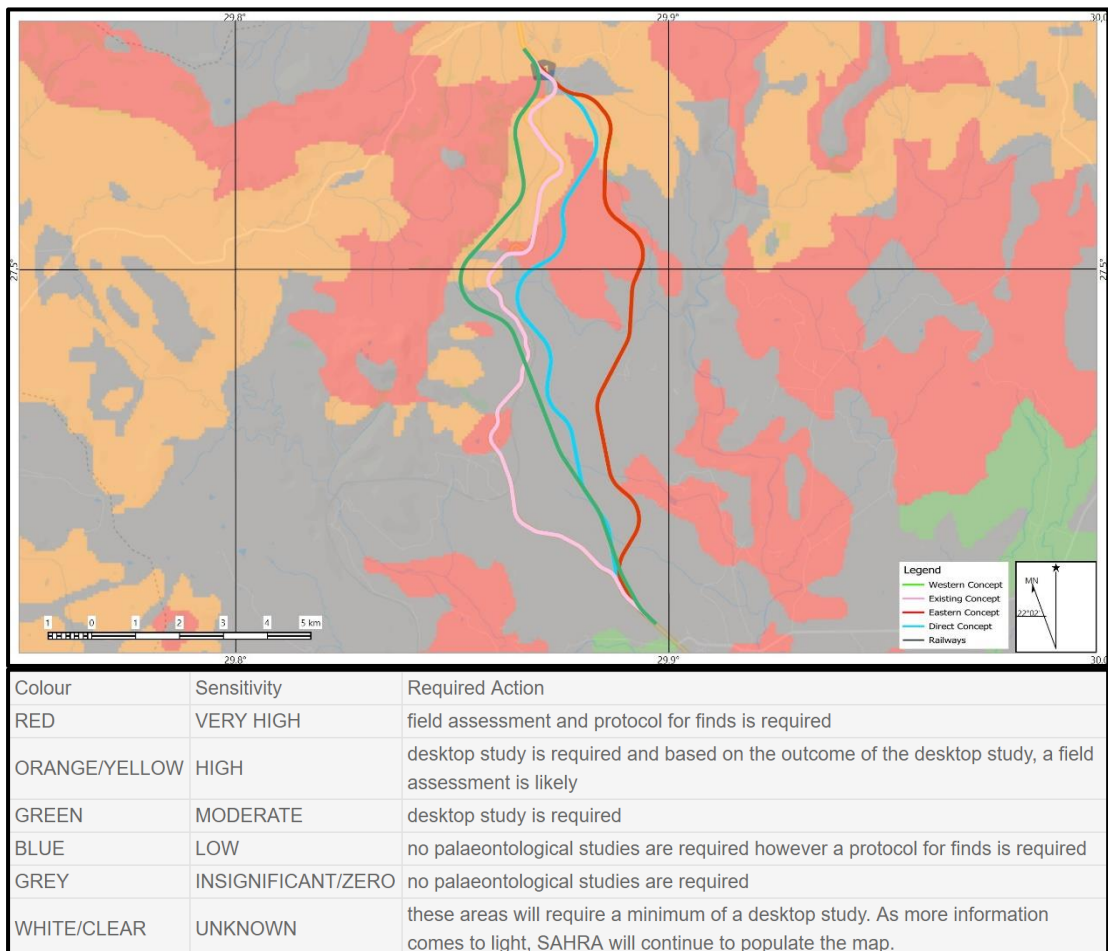


Figure 6. The Palaeontological sensitivity of the project area

6.2 Cultural Landscape

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

6.2.1 Pre-colonial and early history

Little is known about the Stone Age in this particular region. In contrast, much research has been done in the Drakensberg region more to the southeast (e.g. Wright & Mazel 2007).

In general, the following can be said. Later Stone Age hunter-gatherer traversed the region on a seasonal basis, in search of plants for staple food and following migratory game and birds for the hunt. Archaeological evidence of these practices is usually found in rock shelters and overhangs throughout the larger region. Deposits in such sites also include food residues and stone tool, charcoal and ash from hearth fires and bedding material. These shelters sometimes contain rock paintings which is evidence of their social relations and cosmology. One such site is known to exist a short distance to the north of O'Neill's Cottage (Fig. 7).



Figure 7. Large panel showing antelope and humans

Shortly after the change of the millennium, new people moved into the region. The coastal plains of KwaZulu-Natal were first occupied by Early Iron Age communities belonging to the Msulenzi Facies of the Early Iron Age. These sites have been dated to the range AD 650 to 750. They were followed, at a slightly later date, AD 750 to 950 by the people of the Ndongondwane Facies. In turn, they were replaced by the Ntshekane facies, ranging in date between AD 950 to 1050 (Huffman 2007).

People gradually moved inland, occupying large sections of the interior below the escarpment. These Iron Age communities belonged to the Ngabeni Facies of the Urewe Tradition and the date range for this settlement spans the period AD 1700 to 1820, thereby equating them with modern communities found in the region today. At the same time, the highveld region on the top of the escarpment, was settled by communities identified as belonging to the Makgwareng Facies of the Urewe Tradition (Huffman 2007).

By the 16th century things changed, with the climate becoming warmer and wetter, creating condition that allowed Late Iron Age (LIA) farmers to occupy areas previously unsuitable, for example the Witwatersrand and the treeless, windswept plains of the Free State and the Mpumalanga escarpment. This period of consistently high rainfall started in about AD 1780. At the same time, maize was introduced from Maputo and grown extensively. Given good rains, maize crops yield far more than sorghum and millets. This increase in food production probably led to increased populations in coastal area as well as the central highveld interior by the beginning of the 19th century. This wet period came to a sudden end sometime between 1800 and 1820 by a major drought lasting 3 to 5 years. The drought must have caused an agricultural collapse on a large, subcontinent scale (Huffman 2004).

This was also a period of great military tension, sometimes referred to as the *difaqane*. Armed Qriqua and Korana raiders on horseback were active in the northern Cape and Orange Free State by about 1790.

The Xhosa were raiding across the Orange River about 1805. Military pressure from Zululand spilled onto the highveld by at least 1821. Various marauding groups of displaced Sotho-Tswana moved across the plateau in the 1820s. Mzilikazi raided the plateau extensively between 1825 and 1837. The white settlers trekked into this area in the 1830s (Huffman 2004).

Adaptation to these two disparate ecological niches, the wetter region below the escarpment and the higher, drier inland areas, required specific adaptations in order to best survive (Sansom 1974). This, for example, is expressed in housing style and settlement layout and theoretically, it would be possible to find both settlement expressions in the project area.

White settlers moved into the region, claiming farms and establishing small villages, actions that over time gave rise to much conflict between them and the local population. The British, in their endeavour to expand their colonial possessions, soon became involved in these conflicts. This gave rise to the so-called Anglo-Zulu Wars, which eventually led to large-scale change in the political landscape of the larger region.

Charlestown was established in 1889 and proclaimed a township in 1906. It was named after Sir Charles Mitchell, Governor of Natal 1889 (Raper 2004). The town of Newcastle was established in 1864 and proclaimed a township in 1882. It was named in March 1854 after the Duke of Newcastle, Secretary of State for the Colonies in 1852 and 1859 (Raper 2004). According to some sources, Laing's Nek was named after Henry Laing, owner of the farm at the foot of the pass. According to other sources, the pass was named after William Timothy Lang, who in 1874 purchased the farm at the base (Raper 2004).

6.2.2 The First War of Independence

The history of the First War of Independence is well-known and need not be repeated here in full. Suffice it to say that, after the annexation of Pretoria by the British, the ZAR burghers decided to free their territory of British occupation. They laid siege to Pretoria and the British authorities decided to send reinforcements to support the besieged troops.

One battle after the other followed and one of the first setbacks the British suffered was at the Battle of Bronkhorstspuit. This prompted the British authorities to send more troops to Pretoria. It was here, at Laing's Nek (later renamed Langs Nek), and later at Majuba, where they were decisively beaten by Gen. Piet Joubert. The peace treaty was eventually concluded at what has become known as O'Neil's Cottage, approximately halfway up modern Langs Nek Pass.

6.2.3 History of the railway line

Transport of people, goods and equipment, all going to the gold mines on the Witwatersrand, was done by transport wagons. The normal route was from Durban, via Pietermaritzburg, Harrismith and then on to Johannesburg. The rutting caused by hundreds of heavy, overloaded transport wagons crossing the Swalu toll bridge outside of Harrismith can still be seen today.



Figure 8. Swalu bridge near Harrismith

However, this was a time consuming and therefore an expensive endeavour. At about the same time, railway transport started to take off in southern Africa. One of the first things the Cape as well as the Natal governments did, in order to get into this lucrative business, was to petitioned President Paul Kruger of the Transvaal for a concession to build railway lines from Cape Town, via Kimberley and also from Durban to the Witwatersrand. However, Kruger was reluctant to entertain any requests for the construction of either of these two lines as he wanted to have the Delagoa Bay (Maputo) line completed first. This would ensure the Zuid-Afrikaansche Republiek (ZAR) infrastructural independence from British-ruled territories (Van Schalkwyk 2015).

However, without permission being granted, both Colonial governments proceeded with the construction of their respective railway lines. The Natal Government Railway (NGR) proceeded as far as Harrismith, where it linked up with the Cape line, in an effort to by-pass Kruger (Heydenrych & Martin 1992: 69).

A second line, branching off at Ladysmith, passing through Glencoe and Newcastle was constructed as a more direct route. However, it was stopped at the border at Charlestown as Kruger was reluctant to give permission for entering the ZAR. This line was completed in stages – 1888 up to Wasbank, 1889 to Glencoe, 1890 to New Castle and 1891 to Charlestown (Van Schalkwyk 2015).

However, the pressure for goods and people to reach the gold fields was high. Because of the slow progress being made on the Delagoa Bay line, a number of concessions and assurances were negotiated between the ZAR and the two British colonies and both lines were eventually finished (Heydenrych & Martin 1992: 67).

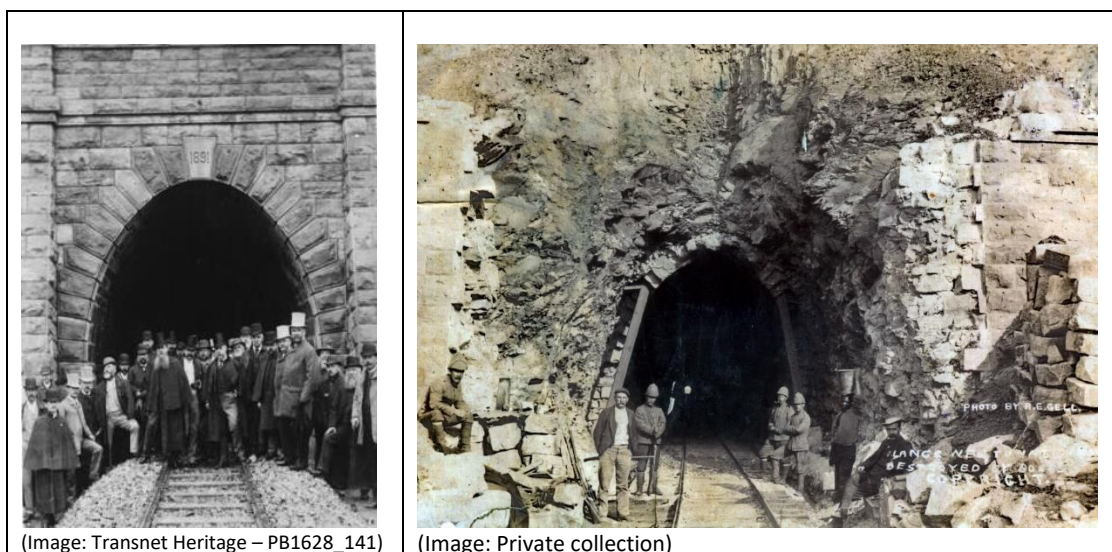
The pleading of the British colonies with their requests for permission the complete their various lines received much attention in the social media of the time. William H. Schröder, a cartoonist working for various newspapers in the ZAR, and a big supporter of Pres Kruger, took much delight in depicting the endeavours by the Natal Government Railways (NGR) in their effort to convince Kruger to allow them to complete their line from Durban to Johannesburg. Some of his drawings (Fig. 9) shows the Natal Government Railways, depicted as a young woman, wooing Kruger, ensconced in his high tower. The next drawing, a few months later, shows Kruger, at an open door, presumably of the same tower,

beckoning the young girl to come inside. She is dragging a toy train on a piece of rope on which the name Natal is written (Cowan 1894).



Figure 9. Satirical comment on the endeavours of the Natal Government's efforts (Images by W Schröder, from Cowan 1894)

The line was eventually completed and one of the moments of celebration was the opening, in 1891, of the tunnel at Lang's Nek. A few years later, during the Second South African War (1899-1902) both portals of the tunnel were blown up by the retreating republican forces. Similarly, a number of railway bridges were also destroyed, all in an effort to slow the British forces down (Fig. 10 & Fig. 11).



(Image: Transnet Heritage – PB1628_141)

(Image: Private collection)

Figure 10. Opening of the railway tunnel at Lang's Nek and reconstruction after being blown up



Figure 11. The railway bridge across the Ngogo River, destroyed by the retreating Republican forces (Image: Private collection)

Over time, this railway line was upgraded and its alignment changed in different sections at least two times – during the 1930s and finally in 1984.

One problem encountered, which prompted these changes, was the steep inclines that had to be overcome in the region of Lang's Nek – this was similar to problems encountered on the other line at Van Reenen's Pass. With the original development of the railway line, this was achieved by means of a number of "reverses" by which the locomotives had to reverse direction to overcome the steep inclines (Fig. 12). This was very time-consuming and required locomotives always to be on standby. In order to overcome this, some additional tunnels were constructed on the newer alignment.

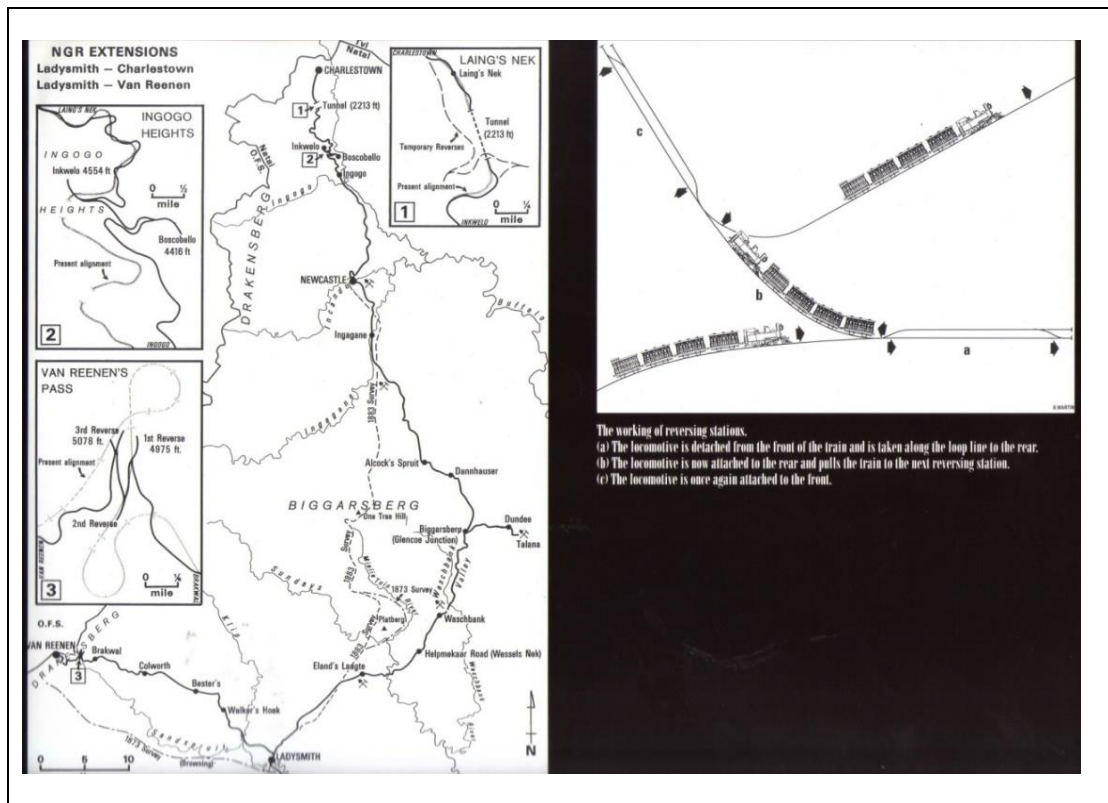


Figure 12. The workings of the ‘reverses’ at Ingogo Heights, Van Reenen’s Pass and Langs Nek (After Heydenrych & Martin 1992)

The outline of some of these old roadbeds can still be seen to the south of Langs Nek and is also indicated on the older versions of the topocadastral maps, e.g. dating to 1964 presented below (Fig. 13). In almost all sections, the sleepers and rails were removed, and it is only the gravel beds, tunnels and culverts that remains (Fig. 14 & 15).

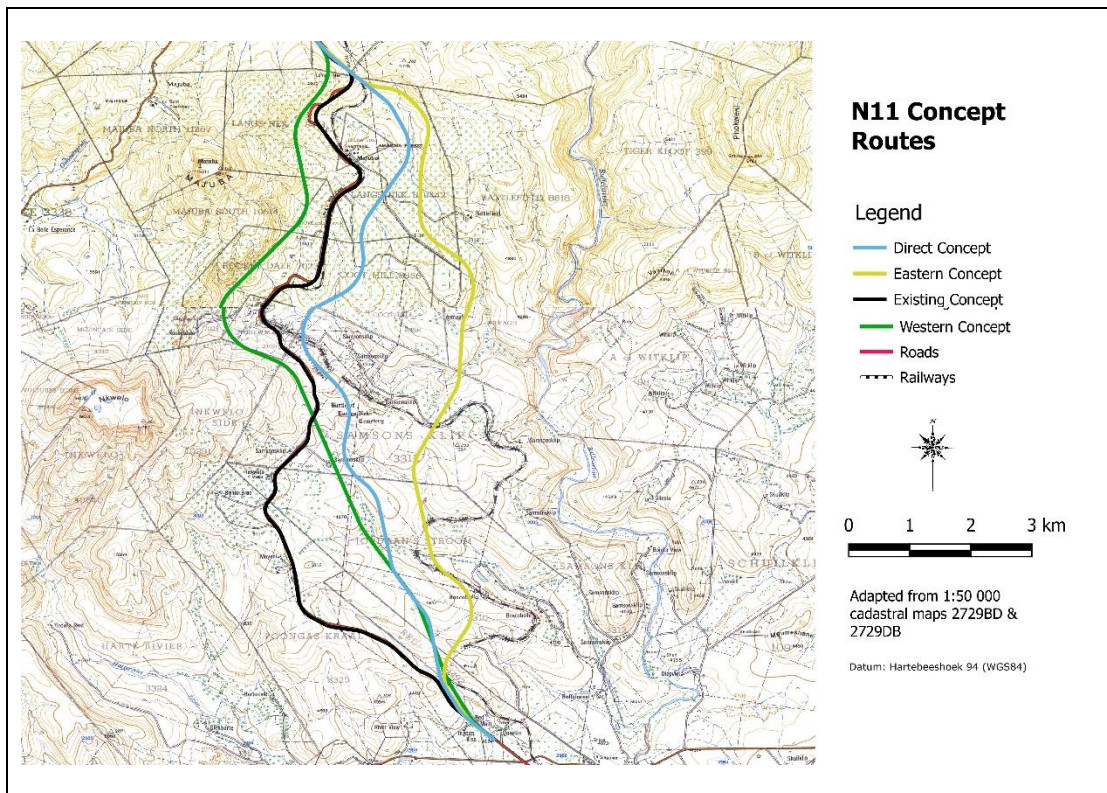


Figure 13. Some of the old railway lines indicated on the 1964 version of the topographic map



Figure 14. Track-beds of the old railway – line and reverses still to be seen in the landscape (Image: Google Earth)



Figure 15. Track-beds and cuttings of the old railway line

6.2.4 *The Second South African War (1899-1902)*

Most of the action during the so-called Anglo-Boer War took place to the south and west of the project area. It can be summarised as follows.

Gen. Buller advanced with his forces from Helpmekaar to Dundee, and from there via Dannhauser and Newcastle to Inkwelo. On arrival of transport at the latter place, he left a portion of his forces under the command of Gen. Clery. Buller deviated from Lang's Nek to the junction of the roads to Botha's Pass and main northern road, where he was reinforced by Gen. Hildyard, who was returning from Utrecht. They then advanced towards Botha's Pass and occupied Van Wyk's Hill on 6th June 1900. They seized Spitz Kop and won entry of Botha's Pass on the 8th June, from where they made a detour, returning to Alleman's Nek, where they carried the position on 12th June 1900. Buller and Clery's forces met at Volksrust on 13 June 1900, having finally cleared the Republican forces from Natal Colony (Kruger 1977).

One action resulting from this conflict which have a bearing on the project area, was the fact that the Republicans blew up the railway tunnel at Lang's Nek (Fig. 9 above) in July 1900, as well as a number of railway bridges, thereby preventing the British from using the railway line for a considerable period of time.

6.2.5 *The N11 National Route*

The main road between Durban and the Witwatersrand (Johannesburg and Pretoria) for years was what was to become the N11. Already in the 1930s it was proposed that the route from Johannesburg, via Standerton, Volksrust and Newcastle to Durban should be a National Route. By 1946 sections of this route, then still referred to as Route 3, were already completed as part of the proposed National Roads network. It was only during the late 1970s, early 1980s that the more direct route via Harrismith was completed (Floor 1985) (Fig. 16).

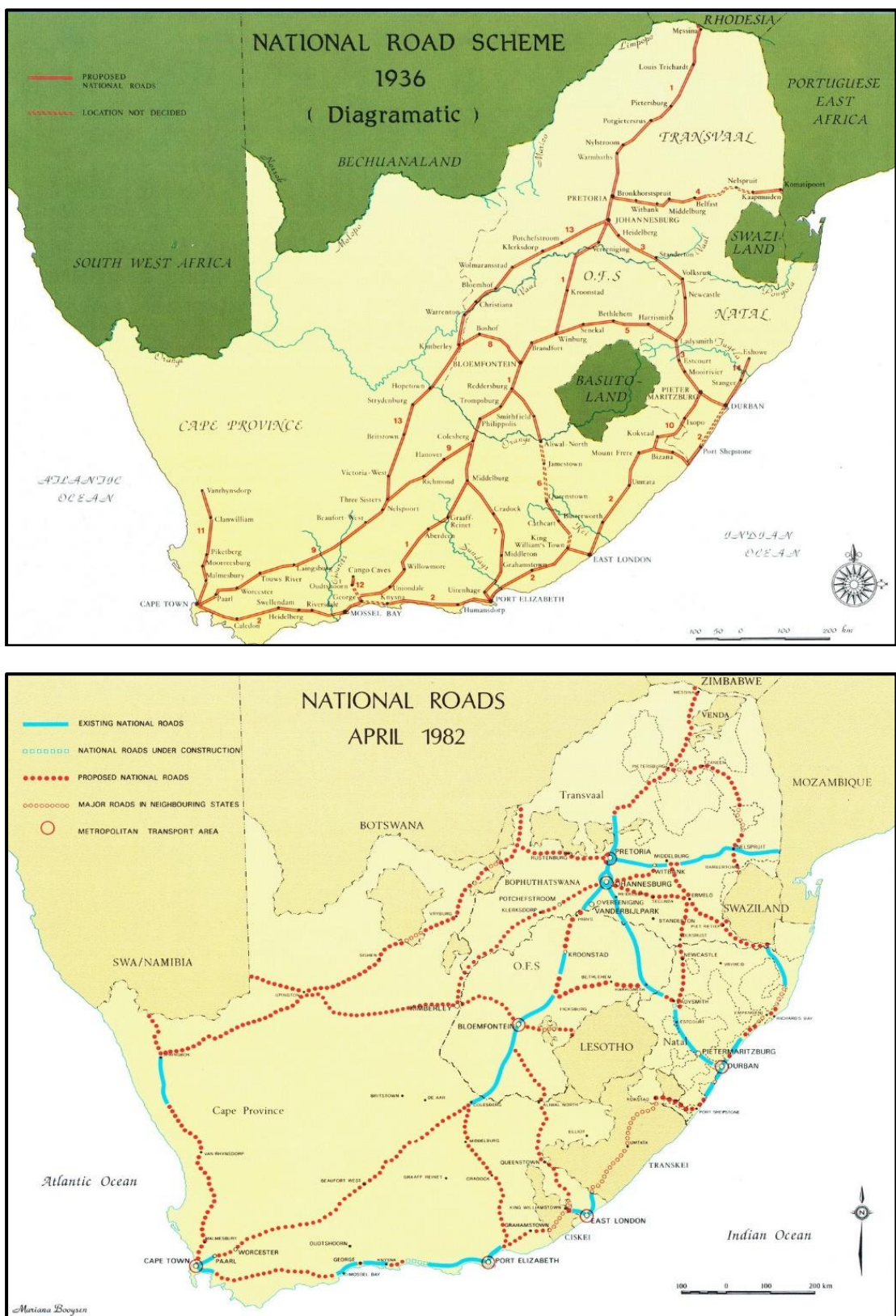


Figure 16. The development of the N11 National Route (1936 & 1982)
(From: Floor 1982)

Many of the older culverts and bridges that formed part of the older road alignment can still be seen today (Fig. 17). They are mostly built with concrete, in contrast to the railway bridges and culverts that were constructed of dressed sandstone.



Figure 17. Two abandoned bridges and the current railway line behind them (These two bridges are at the bottom of the pass, south of the project area)

6.2.6 Burial sites

As can be expected, formal and informal burial sites occur sporadically all across the countryside. These can be classified into at least three different categories:

- Graves of victims of conflict, e.g. the First War of Independence. These are well-known and maintained from time to time;
- Formal burial sites (i.e. fenced/wall off), mostly of former landowners. The graves usually have headstones indicating names and dates;
- Informal burial sites of what can loosely be classified as former farm labourers. In most cases the graves are only marked with stone cairns, although some might have headstones. In most cases these burial sites are not documented, largely because they are difficult to locate.

6.2.7 Summary

The results of the initial survey is best presented in visual format in Fig. 18 below.

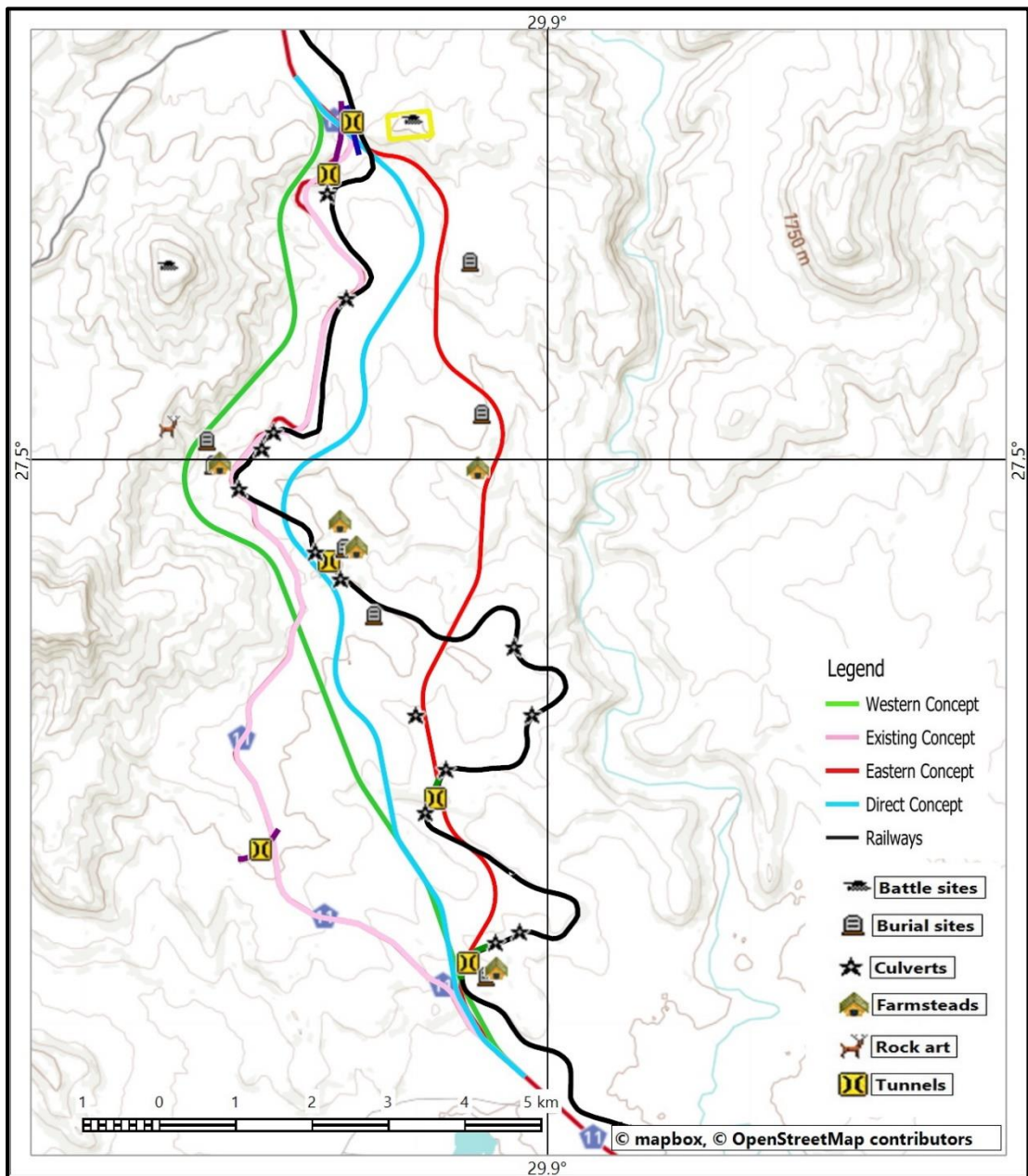


Figure 18. Map indicating the identified heritage sites and features in the larger project area

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 townscape” 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.

6.3.1 A Changing landscape

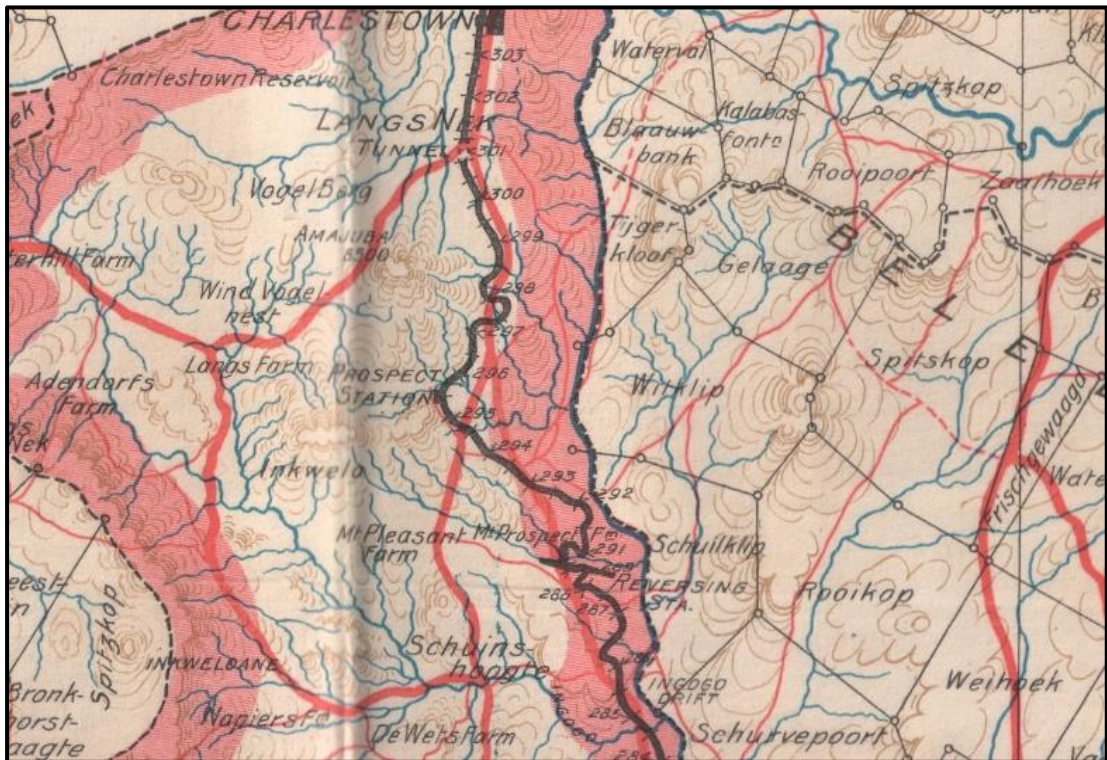


Figure 20. Imperial Map of South Africa, 1900

Studying aerial image of various sections of the route, some interesting observations were made. In the image on the left-hand side below (Fig. 21), dating to 1935, it can be seen that a whole village, formally laid out in a grid pattern was located adjacent to the road. However, in the image on the right, dating to 1964, this village has disappeared. It is taken that this village had to do either with the upgrading of the railway line. On completion of the construction work the village was dismantled.



Figure 21. Aerial photographs showing how the cultural landscape has changed over time (Image 107_003_38604 (1935) on left; Image 516_018_01738 (1964) on right)

Another factor that makes a study such as this difficult is the amount of afforestation that has taken place over time. This tree cover, when originally planted, could have resulted in the destruction of heritage sites. Alternatively, it now effectively hides heritage sites that might have been identified on aerial images (Fig. 22).

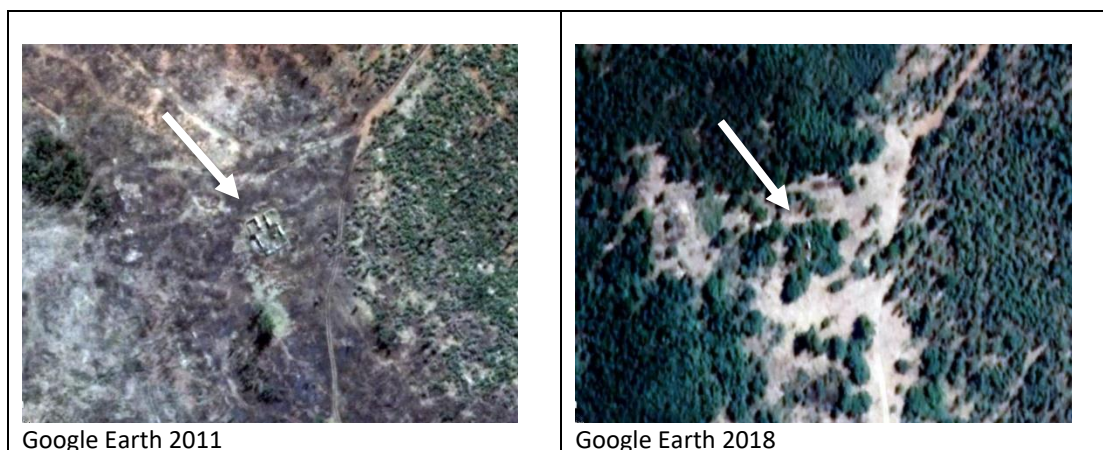


Figure 22. Images showing how the vegetation cover changes over time – Armagh farmstead (Images: Google Earth)

7. SURVEY RESULTS

During the survey a number of sites, features and objects of cultural significance were identified in the project area. However, as this report deals only with the Preferred Alignment, i.e. Eastern Alignment only the sites and feature that are viewed to be in close proximity to this alignment will be evaluated here (Fig. 23).

The above, short overview of the history would now be used to inform the significance and grading of the sites and features in the project area.

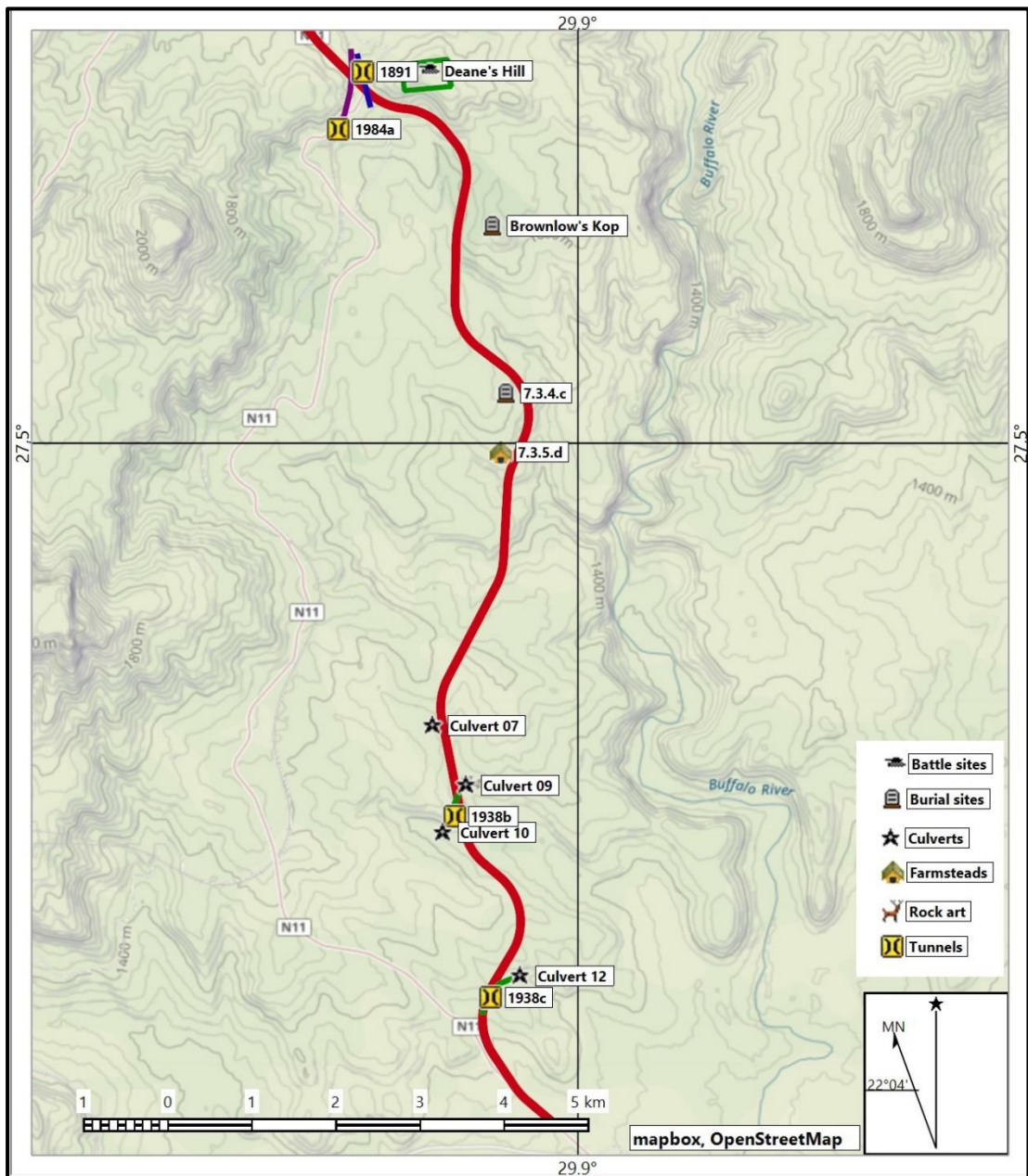


Figure 23. Map showing the heritage sites in relation to the preferred alternative

7.3 Historic period

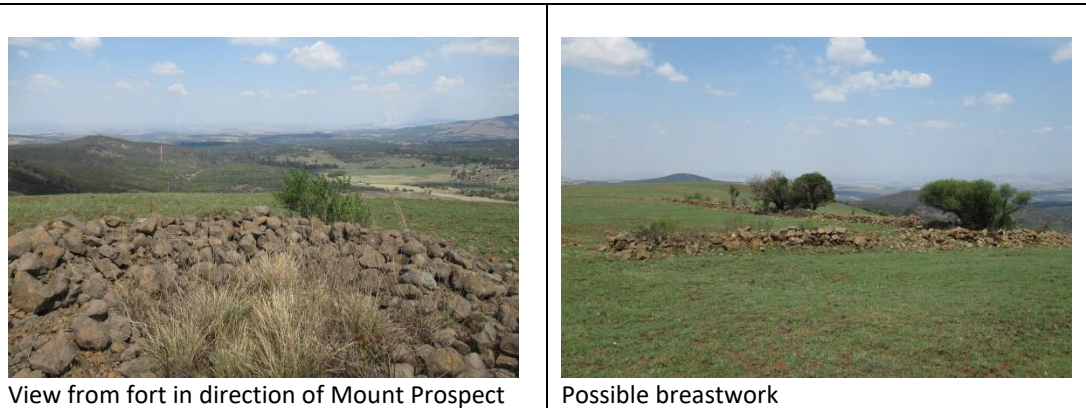
7.3.1 First War of Independence

KZN Act Category	Battlefields, archaeological sites, rock art sites, palaeontological sites or meteorite sites - Section 36
-------------------------	---

7.3.1.1 Type: Battle fields. Farm: Lang's Nek B. Coordinates: S 27,46015; E 29,88184
Description
The various battlefield relating to the First War of Independence (1880 – 1881) are difficult to

define as it was not a trenched warfare. The various battles took place only over a short period of time, lasting at most a day or two. However, they are to some extent defined by the various military cemeteries – see below. Apart from that, the only structures that were visible, are some stone walls, breastworks and trenchments constructed by the Republican forces from what was to become known as Deane’s Hill westwards across Laings Nek (now Langsnek).

Due to the extensive plant cover (wattle trees) it is unknown what the situation is on the western side of the current road alignment.



View from fort in direction of Mount Prospect

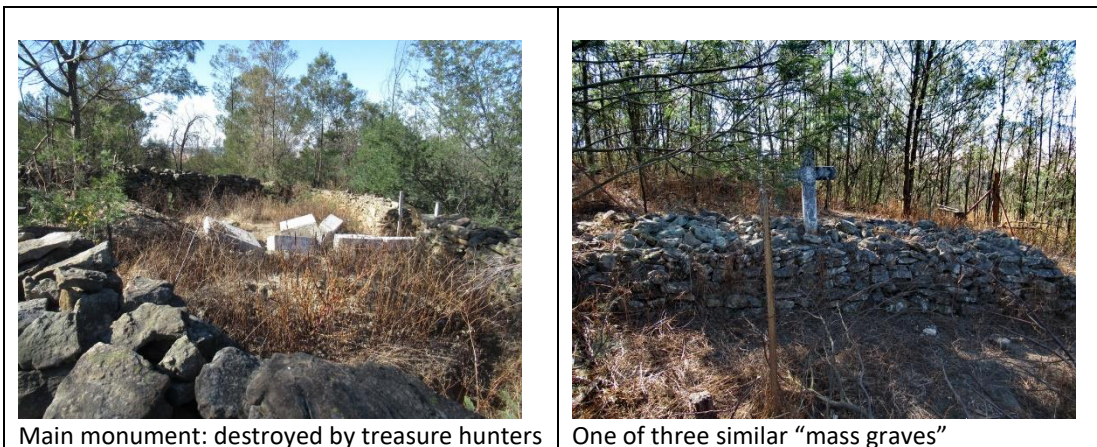
Possible breastwork

Significance of site/feature	Provincial protection Grade 2: High significance - No alteration whatsoever without permit from provincial heritage authority.
Reasoned opinion: The various battle sites and cemeteries, inclusive of the O’Neil Cottage where the peace treaty was signed, representing the First War of Independence, can be considered as having importance not only locally, but internationally as well.	
References: Duxbury (1981), Von der Heyde (2013); Laband (2017)	

KZN Act Category	Graves of victims of conflict - Section 34
-------------------------	---

7.3.1.2.a Type: Burial site. **Farm:** Lang’s Nek B. **Coordinates:** S 27,46489, E 29,88516 – centre point for the four various structures making up this site.

Description
 Military cemetery and monument, consisting of four separate burial sites fenced off with stone walling. The highest, western burial also contains a monument, that was toppled over some time in the past, probably by treasure hunters.



Main monument: destroyed by treasure hunters

One of three similar “mass graves”

7.3.2 Railway development

KZN Act Category	Structures older than 60 years – Section 33
-------------------------	--

Railway tunnels, dating to three different periods of construction have been identified in the project area.

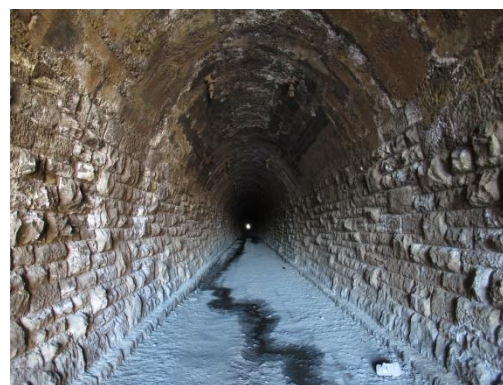
7.3.2.1 Type: Natal Government Railway Tunnel 1891. **Farm:** Kreiger Holm 3340/Langs Nek B 8442 **Coordinates:** S 27.45846, E 29.87356; S 27.46375, E 29.87497

Description

Laing's Nek Tunnel, opened 1891, abandoned 1984. Built with dressed stone. Destroyed by retreating Republican Forces in 1900 and later rebuilt by the British Engineers.



Exterior view: northern portal



Interior view

Significance of site/feature	General protection Grade 2: High significance - No alteration whatsoever without permit from the PHRA.
Reasoned opinion:	Applying the theoretical viewpoints of economic historians such as Arjun Appadurai and Emilé Wallerstein, the development of the railway systems in South Africa during the late 19 th century can be cast in the light of world economic development and rising Imperialism (Van Schalkwyk 2015). It represents the remains of a technology that became redundant due to technological development. 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.
References:	Heydenrych & Martin (1992); Van Schalkwyk (2015)

7.3.2.2.b Type: 1938 Railway Tunnel b. **Farm:** Jordaan's Stroom 3310 **Coordinates:** S 27.53779, E 29.88556; S 27.54122, E 29.88392

Description

Boscobello Tunnel, completed 1938, abandoned 1984. One of three later tunnels, built in the early 1930s to overcome the need for the various 'reverse' as well as to accommodate larger trains

7.3.2.2.c Type: 1938 Railway Tunnel c. **Farm:** Jordaan's Stroom 3310/Redmain 14492. **Coordinates:** S 27.55754, E 29.89184; S 27.56107, E 29.88855

Description

Ingogo Tunnel completed 1938, abandoned 1984. One of three later tunnels, built in the early 1930s to overcome the need for the various 'reverse' as well as to accommodate larger trains

--	--

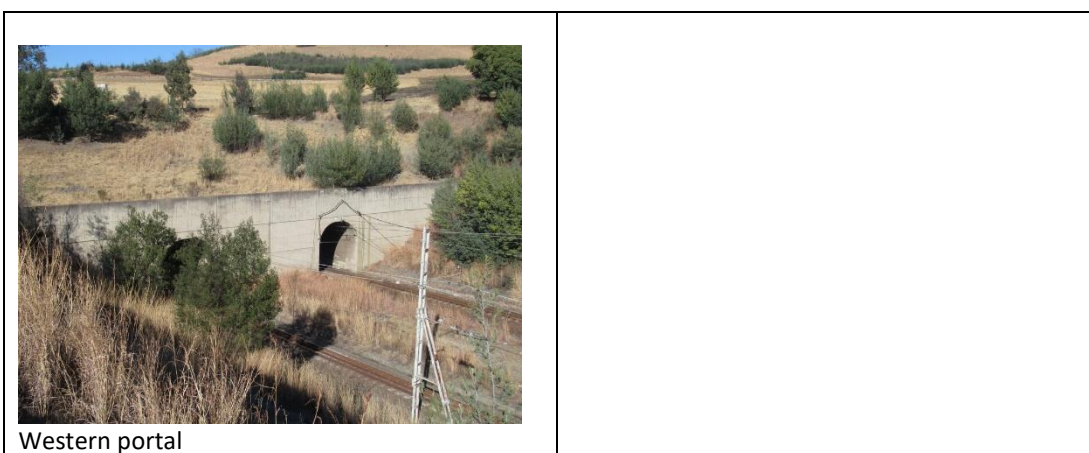


Exterior view: southern portal

Interior view

Significance of site/feature	General protection: Grade 4A High/medium significance - Should be mitigated before destruction.
Reasoned opinion: It represents the remains of a technology that became redundant due to technological development. 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.	
References: Heydenrych & Martin (1992)	

7.3.2.3.a Type: 1984 Railway Tunnel a. Farm: Kreiger Holm 3340/Langs Nek B 8442 Coordinates: S 27.45825, E 29.87246; S 27.46736, E 29.87051
Description
Current tunnel, opened 1984. One of two later tunnels, built in the early 1980s to straighten out the route and to accommodate even longer trains.



Western portal

7.3.4 Burial Sites

KZN Act Category	Traditional burial places - Section 35
-------------------------	---

These are mostly informal burial sites which can be linked to settlement in the larger region. The military burial sites – see Section 7.3.1 above – are excluded from these as they would have different significance rating and are included in a different category of sites according to the KZN Heritage Act.

7.3.4.c Type: Burial site. Farm: Armagh 8555. Coordinates: S 27,49465; E 29,89141
Description

Approximately 10 graves marked only with stone cairns.
--

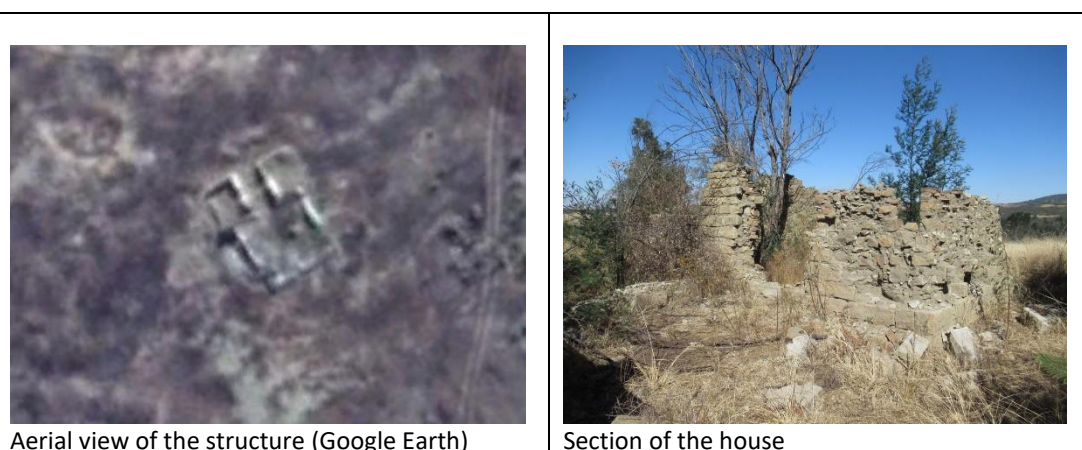
Images not allowed

Significance of site/feature	General protection: Grade 4A High/medium significance – Should be mitigated before destruction.
Reasoned opinion: Burial sites are viewed as having high emotional and sentimental value. However, mitigation is possible if proper procedures have been followed.	
References: -	

7.3.5 Built environment

KZN Act Category	Structures older than 60 years – Section 33
-------------------------	--

7.3.5.d. Type: Farmstead Farm: Armagh 8555. Coordinates: S 27,50099; E 29,89077
Description
Ruins of the old Armagh farmstead. Built with stone. Consisting of the main structure as well as some outbuildings.



Significance of site/feature	General protection 4A: High/medium significance – Should be mitigated before destruction.
Reasoned opinion: Farmsteads represents a particular way of life and as there are usually only a limited number of them in any given region, they represent an invaluable resource for understanding this type of life.	
References:	

7.3.6 Culverts

KZN Act Category	Structures older than 60 years – Section 33
-------------------------	--

Railway lines dating to three different periods of construction have been identified in the project area. This still serves as the main railway link between Durban and the Witwatersrand.

What was to become the N11 national route originally served as the main route between Durban and the Witwatersrand. It was only much later that the N3 national route, being a more direct route between Durban and the Witwatersrand, was completed and largely replaced the N11 in importance.

7.3.6.1.a-c. Type: Railways and roads culverts. **Farm:** All farms were railway lines and road crosses

Description

Based on the field survey and analysis of topographic maps and aerial photographs, a number of culverts have been identified. Due to the deep ravines and dense vegetation that occurs in the riverine areas where these features occur, it was not possible to visit all of them or record their condition.

Two types of culverts have been identified. The older, dressed stone built culverts dating to the original railway line completed in 1891. The second category are built with cast concrete and date to the second period of railway construction, from 1934 to 1938. It is presumed that some older culverts would also occur on the current N11 road, although it is difficult to determine if any of them have been upgraded since the original construction of the road.



<p>Significance of site/feature</p>	<p>General protection Grade 2: High significance - No alteration whatsoever without permit from the PHRA.</p>
<p>Reasoned opinion: Applying the theoretical viewpoints of economic historians such as Arjun Appadurai and Emilé Wallerstein, the development of the railway systems in South Africa during the late 19th century can be cast in the light of world economic development and rising Imperialism (Van Schalkwyk 2015). It represents the remains of a technology that became redundant due to technological development. 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.</p>	
<p>References: Floor (1985); Heydenreych & Martin (1992); Van Schalkwyk (2015)</p>	

8. IMPACT ASSESSMENT AND MITIGATION MEASURES

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 project. This is expressed in its distance from the proposed development in Table 2 below – also refer to Fig. 23 above.

Table 2: The various heritage sites in relation to the Eastern Alignment

Site	No	Relation to alignment
Battlefield (Deane's Hill)	7.3.1.1	Approximately 400m east of alignment
Military burial site (Brownlow's Kop)	7.3.1.2.a	Approximately 400m east of alignment
NGR Tunnel 1891	7.3.2.1	Will directly be crossed by the alignment
Railway Tunnel 1938b	7.3.2.2.b	Will directly be crossed by the alignment
Railway Tunnel 1938c	7.3.2.2.c	Will directly be crossed by the alignment
Railway Tunnel 1984a	7.3.2.3.a	Will directly be crossed by the alignment
Burial site	7.4.3.c	Approximately 200m west of alignment
Farmstead	7.3.5.d	Approximately 190m west of alignment
Culvert 7	7.3.6.1.a	Approximately 120m west of alignment
Culvert 9	7.3.6.1.b	Approximately 120m east of alignment
Culvert 10	7.3.6.1.c	Approximately 245m west of alignment
Culvert 12	7.3.6.1.d	Approximately 230m east of alignment

8.2 Mitigation measures

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

See Section 3 of Addendum 12 below for a detailed description of the various categories of mitigation measures.

8.3 Descriptions for different categories of sites

KZN Act Category	Battlefields, archaeological sites, rock art sites, palaeontological sites or meteorite sites - Section 36	Battle fields
------------------	--	---------------

7.3.1.1 Battle fields.

Impact assessment: The Republican defences are located on the highest point of the hill now referred to as Deane's Hill. The region in the nek where the road currently passes through has extensively been impacted on by road development, quarries and cellular base-stations. Due to the extensive plant cover (wattle trees) it is unknown what the situation is on the western side of the current road alignment.

- According to current understanding, the Eastern Alignment would pass approximately 400m west of this area.

	Without mitigation	With mitigation
--	--------------------	-----------------

Extent	Local area (1)	Local area (1)
Duration	Permanent (5)	Permanent (5)
Intensity	Moderate (6)	Minor (2)
Probability	Improbable (2)	Very improbable (1)
Significance	Low (24)	Low (16)
Status (positive or negative)	Negative	Neutral
Reversibility	Non-reversible	Non-reversible
Irreplaceable loss of resources?	Yes	No
Can impacts be mitigated	Yes	
Mitigation: (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 <i>in situ</i> and a buffer zone should be created around it by temporary means with danger tape during construction activities.		
Cumulative impact: Loss of limited number of similar features in the larger landscape.		
Requirements: If impacted on, permit from PHRA (Amafa), followed by full documentation.		



KZN Act Category	Graves of victims of conflict - Section 34	Military cemeteries
7.3.1.2.a Military Burial sites.		
Impact assessment: Although these sites are located inside the larger project area, it is unlikely that they would be impacted on by the proposed road development activities as they are well-known and already fenced off with stone walling.		
<ul style="list-style-type: none"> According to current understanding, the Eastern Alignment would pass approximately 400m west of this area. 		
	Without mitigation	With mitigation
Extent	Local area (1)	Local area (1)
Duration	Permanent (5)	Permanent (5)
Intensity	Moderate (6)	Minor (2)
Probability	Improbable (2)	Improbable (2)
Significance	Low (24)	Low (16)

Status (positive or negative)	Negative	Neutral
Reversibility	Non-reversible	Non-reversible
Irreplaceable loss of resources?	Yes	No
Can impacts be mitigated	Yes	
Mitigation: (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 <i>in situ</i> and a buffer zone should be created around it, either temporary (by means of danger tape) or permanently (wire fence or built wall).		
Cumulative impact: Loss of limited number of similar features in the larger landscape.		
Requirements: If impacted on, permit from PHRA (Amafa), followed by full documentation.		

KZN Act Category	Structures older than 60 years – Section 33	Railway tunnels
-------------------------	--	------------------------

7.3.2.1 Natal Government Railway Tunnel 1891.

Impact assessment: According to current understanding, the 1891 NGR tunnel will be crossed by Eastern Alignment.

A request for more information regarding the possible impact by the proposed the Eastern Alignment on this structure was put to the engineers at RoyalHaskoningDHV (Pty) Ltd via the lead EAP (Chameleon Environmental Consultants). The following response was received (12 October 2020):

- “The Eastern Route will cross over the Railway Tunnel at the top of the pass, however it is where we are tie-ing into the existing alignment. There will be widening of the cuts and some drainage constructed in the area but there should be no impact on the railway tunnel as it is much lower than the existing road.

The only scientific study of tunnels that could be traced was that by Thako (2019). Unfortunately, he does not discuss this kind of impact on tunnels, rather “focusing on the concrete structural elements and their related defects due to the harsh environments.”

	Without mitigation	With mitigation
Extent	Local area (1)	Local area (1)
Duration	Permanent (5)	Permanent (5)
Intensity	Moderate (6)	Minor (2)
Probability	Highly probable (4)	Improbable (2)
Significance	Medium (48)	Low (16)
Status (positive or negative)	Negative	Neutral
Reversibility	Non-reversible	Non-reversible
Irreplaceable loss of resources?	Yes	No
Can impacts be mitigated	Yes	
Mitigation: (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 <i>in situ</i> and a buffer zone should be created around it, either temporary (by means of danger tape) or permanently (wire fence or built wall).		
Cumulative impact: Loss of limited number of similar features in the larger landscape.		
Requirements: If impacted on, permit from PHRA (Amafa), followed by full documentation.		

7.3.2.2.b – 7.3.2.2.c South African Railway tunnels 1938

Impact assessment

According to current understanding, the following tunnels will be crossed by “Eastern Concept”

alignment:		
<ul style="list-style-type: none"> Tunnel 1938b will be crossed by the proposed alignment Tunnel 1938c will be crossed by the proposed alignment <p>These two tunnels are much younger than the old NGR tunnel, but still older than 60 years. It is taken that the same comment as was given for the latter tunnel would be applicable in the case of these two.</p>		
	Without mitigation	With mitigation
Extent	Local area (1)	Local area (1)
Duration	Permanent (5)	Permanent (5)
Intensity	Moderate (6)	Minor (2)
Probability	Highly probable (4)	Improbable (2)
Significance	Medium (48)	Low (16)
Status (positive or negative)	Negative	Neutral
Reversibility	Non-reversible	Non-reversible
Irreplaceable loss of resources?	Yes	No
Can impacts be mitigated	Yes	
<p>Mitigation: (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 <i>in situ</i> and a buffer zone should be created around it, either temporary (by means of danger tape) or permanently (wire fence or built wall).</p>		
<p>Cumulative impact: Loss of limited number of similar features in the larger landscape.</p>		
<p>Requirements: If impacted on, permit from PHRA (Amafa), followed by full documentation.</p>		

7.3.2.3.a South African Railway tunnels 1984		
<p>Impact assessment: Tunnel 1984a is currently crossed by the existing alignment and will also be crossed by the Eastern Alignment.</p>		
	Without mitigation	With mitigation
Extent	Local area (1)	Local area (1)
Duration	Permanent (5)	Permanent (5)
Intensity	Moderate (6)	Minor (2)
Probability	Very improbable (1)	Very Improbable (1)
Significance	Low (8)	Low (8)
Status (positive or negative)	Negative	Neutral
Reversibility	Non-reversible	Non-reversible
Irreplaceable loss of resources?	Yes	No
Can impacts be mitigated	Yes	
<p>Mitigation: None required as these structures are younger than 60 years, not unique and still in use. It is included here due to its close proximity of the 1891 NGR Tunnel</p>		
<p>Cumulative impact: None</p>		
<p>Requirements: None</p>		

KZN Act Category	Traditional burial places – Section 35	Burial sites
-------------------------	---	---------------------

7.3.4.c Burial sites		
<p>Impact assessment: These are small, informal sites that can easily be damaged as they are not readily identifiable. According to current understanding, the following burial site is in close proximity of the Eastern Alignment:</p> <ul style="list-style-type: none"> Burial site 7.3.4.c = 200m west of the alignment 		
	Without mitigation	With mitigation

Extent	Local area (1)	Local area (1)
Duration	Permanent (5)	Permanent (5)
Intensity	Moderate (6)	Minor (2)
Probability	Improbable (2)	Very Improbable (1)
Significance	Low (24)	Low (8)
Status (positive or negative)	Negative	Neutral
Reversibility	Non-reversible	Non-reversible
Irreplaceable loss of resources?	Yes	No
Can impacts be mitigated	Yes	
<p>Mitigation: (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 <i>in situ</i> and a buffer zone should be created around it, either temporary (by means of danger tape) or permanently (wire fence or built wall).</p> <p>(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.</p>		
Cumulative impact: Loss of limited number of similar features in the larger landscape.		
Requirements: If impacted on, permit from PHRA (Amafa), followed by full documentation. See Addendum Section 4 for full process.		

KZN Act Category	Built structures older than 60 years – Section 33	Farmsteads
-------------------------	--	-------------------

7.3.5.d Various farmsteads		
<p>Impact assessment: These are, ruined structures that can easily be damaged as they are not readily identifiable. According to current understanding, the following farmstead is in close proximity of the Eastern Alignment:</p> <ul style="list-style-type: none"> • Farmstead 7.3.5.d = 190m west of the alignment 		
	Without mitigation	With mitigation
Extent	Local area (1)	Local area (1)
Duration	Permanent (5)	Permanent (5)
Intensity	Moderate (6)	Minor (2)
Probability	Probable (3)	Improbable (2)
Significance	Medium (36)	Low (16)
Status (positive or negative)	Negative	Neutral
Reversibility	Non-reversible	Non-reversible
Irreplaceable loss of resources?	Yes	No
Can impacts be mitigated	Yes	
<p>Mitigation: (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 <i>in situ</i> and a buffer zone should be created around it, either temporary (by means of danger tape) or permanently (wire fence or built wall).</p> <p>(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.</p>		

qualified archaeologist.
Cumulative impact: Loss of limited number of similar features in the larger landscape.
Requirements: If impacted on, permit from PHRA (Amafa), followed by full documentation.

KZN Act Category	Built structures older than 60 years – Section 33	Culverts
------------------	---	----------

7.3.6.1.a-c Railways and roads culverts.		
Impact assessment: These are usually small structures that can easily be damaged as they are not readily identifiable. According to current understanding, the following culverts are in close proximity of the Eastern Alignment:		
<ul style="list-style-type: none"> • Culvert 1.a = 120m west of the alignment • Culvert 1.b = 120m east of the alignment • Culvert 1.c = 245m west of the alignment • Culvert 1.d = 230m east of the alignment 		
	Without mitigation	With mitigation
Extent	Local area (1)	Local area (1)
Duration	Permanent (5)	Permanent (5)
Intensity	Moderate (6)	Minor (2)
Probability	Highly probable (4)	Improbable (2)
Significance	Medium (48)	Low (16)
Status (positive or negative)	Negative	Neutral
Reversibility	Non-reversible	Non-reversible
Irreplaceable loss of resources?	Yes	No
Can impacts be mitigated	Yes	
Mitigation: (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 <i>in situ</i> and a buffer zone should be created around it, either temporary (by means of danger tape) or permanently (wire fence or built wall).		
(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.		
Cumulative impact: Loss of limited number of similar features in the larger landscape.		
Requirements: If impacted on, permit from PHRA (Amafa), followed by full documentation.		

9. MANAGEMENT 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 3A: Construction Phase: Environmental Management Programme for the project

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

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

Table 3B: Operation Phase: Environmental Management Programme for the project

Action required	Protection of heritage sites, features and objects		
Potential Impact	It is unlikely that the negative impacts identified for pre-mitigation will occur if the recommendations are followed.		
Risk if impact is not mitigated	Loss or damage to sites, features or objects of cultural heritage significance		
Activity / issue	Mitigation: Action/control	Responsibility	Timeframe
1. 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		

10. CONCLUSIONS AND RECOMMENDATIONS

The Majuba Mountain Pass is located on National Route 11, Section 4 between Newcastle (25 km to the south) and Volksrust (10 km to the north), just south of the KZN border with Mpumalanga. National Route 11, is an important link between KwaZulu-Natal and Mpumalanga, carrying approximately 5 200 vehicles per day, with a large percentage of heavy vehicles (22%).

The main objective of the project is to realign the existing N11 – Majuba Pass, to improve the dangerous operating conditions of the existing route and to increase the traffic capacity. The proposed realignment design will include upgrading the section to a 4-lane divided / undivided dual carriageway, or a combination of the two where appropriate or necessary, to accommodate the existing and anticipated traffic loading and capacity requirements.

Based on the integrated environmental scoping exercise it was determined that the Eastern Alignment would be the preferred alignment. This report therefore deals only with the possible impact that this preferred alignment might have on sites, features and objects of cultural heritage significance.

Identified sites

During the survey a variety of sites, features or objects of cultural significance were identified. These include:

Site No.	Site type	KZN category	Field rating/Mitigation	Impact rating: Before/After mitigation
7.3.1.1	Battle fields	Section 36	General protection Grade 2: High significance - No alteration whatsoever without permit from the PHRA.	Low (24)
				Low (16)

Site No.	Site type	KZN category	Field rating/Mitigation	Impact rating: Before/After mitigation
7.3.1.2.a	Military cemeteries	Section 34	General protection Grade 2: High significance - No alteration whatsoever without permit from the PHRA.	Low (24)
				Low (16)

Site	Site type	KZN category	Field rating/Mitigation	Impact rating:
------	-----------	--------------	-------------------------	----------------

No.				Before/After mitigation
7.3.2.1	1891 Railway tunnel	Section 33	Provincial protection Grade 2: High significance - No alteration whatsoever without permit from the PHRA.	Medium (48)
				Low (16)

Site No.	Site type	KZN category	Field rating/Mitigation	Impact rating: Before/After mitigation
7.3.2.2.b – 7.3.2.2.c	1938 Railway tunnels	Section 33	General protection: Grade 4A High/medium significance - Should be mitigated before destruction.	Medium (48)
				Low (16)

Site No.	Site type	KZN category	Field rating/Mitigation	Impact rating: Before/After mitigation
7.3.2.3.a	1984 Railway tunnels	Section 33	General protection: Grade 4A High/medium significance - Should be mitigated before destruction.	Low (8)
				Low (8)

Site No.	Site type	KZN category	Field rating/Mitigation	Impact rating: Before/After mitigation
7.3.4.c	Traditional burial places	Section 35	General protection: Grade 4A High/medium significance – Should be mitigated before destruction.	Low (24)
				Low (8)

Site No.	Site type	KZN category	Field rating/Mitigation	Impact rating: Before/After mitigation
7.3.5.d	Built structures older than 60 years - farmsteads	Section 33	General protection 4A: High/medium significance – Should be mitigated before destruction.	Medium (48)
				Low (16)

Site No.	Site type	KZN category	Field rating/Mitigation	Impact rating: Before/After mitigation
7.3.6 .1 (No. a - c)	Built structures older than 60 years - culverts	Section 33	General protection Grade 2: High significance - No alteration whatsoever without permit from the PHRA.	Medium (48)
				Low (16)

The various heritage sites in relation to the Eastern Alignment

Site	No	Relation to alignment
Battlefield (Deane's Hill)	7.3.1.1	Approximately 400m east of alignment
Military burial site (Brownlow's Kop)	7.3.1.2.a	Approximately 400m east of alignment
NGR Tunnel 1891	7.3.2.1	Will directly be crossed by the alignment
Railway Tunnel 1938b	7.3.2.2.b	Will directly be crossed by the alignment
Railway Tunnel 1938c	7.3.3.2.c	Will directly be crossed by the alignment
Railway Tunnel 1984a	7.3.2.3.a	Will directly be crossed by the alignment
Burial site	7.4.3.c	Approximately 200m west of alignment
Farmstead	7.3.5.d	Approximately 190m west of alignment
Culvert 7	7.3.6.1.a	Approximately 120m west of alignment
Culvert 9	7.3.6.1.b	Approximately 120m east of alignment
Culvert 10	7.3.6.1.c	Approximately 245m west of alignment
Culvert 12	7.3.6.1.d	Approximately 230m east of alignment

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 project 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.

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

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

Conditions for inclusion in the environmental authorisation:

- The Palaeontological Sensitivity Map (SAHRIS) indicate that the project area has a complex sensitivity. However, this issue is addressed in a separate palaeontological study by Dr Heidi Fourie for inclusion in the EIA report.
- Should archaeological sites or graves be exposed during construction work, it must immediately be reported to a heritage practitioner so that an investigation and evaluation of the finds can be made.

ACKNOWLEDGEMENTS

I would like to thank Dr Gavin Whitelaw of the KwaZulu-Natal Museum, Pietermaritzburg, for granting me access to the Museum's database for information relating to the project area. Thanks is also due to Mr Bongani Mtambo for showing me the shelter containing the rock art and Mr Prinsloo of the farm Samsons Klip for sharing his extensive knowledge of the region with me.

11. REFERENCES

11.1 Data bases

Amafa KZN Heritage
Chief Surveyor General
Environmental Potential Atlas, Department of Environmental Affairs and Tourism.
Heritage Atlas Database, Pretoria
KwaZulu-Natal Museum, Pietermaritzburg
National Archives of South Africa
SAHRA Archaeology and Palaeontology Report Mapping Project (2009)
SAHRIS Database
Transnet Heritage

11.2 Literature

- Bakker, K.A., Clarke, N.J. & Fisher, R.C. 2014. *Eclectic ZA Wilhelmiens : A shared Dutch built heritage in South Africa*. Pretoria: Visual Books.
- Bergh, J.S. (red.). 1998. *Geskiedenisatlas van Suid-Afrika: die vier noordelike provinsies*. Pretoria: J.L. Schaik.
- Cowan, C. 1894. *The Schröder Art Memento. A Volume of Pictorial Satire*. Pretoria: The Press Printing and Publishing Works.
- Creswicke, L. 1901. *South African and the Transvaal War*. Edinburgh: T.C. & E.C. Jack.
- Duxbury, G.R. 1981. *David and Goliath: The First War of Independence, 1880-1881*. Johannesburg: SA National Museum of Military History.
- Floor, B.C. 1985. *The history of National Roads in South Africa*. Cape Town: CTP Printers.
- Harrison, C.W.F. (ed.) 1903. *Natal: an Illustrated Official Railway Guide and Handbook of General Information*. London: Payne Jennings.
- Heydenreych, H. & Martin, B. 1992. *The Natal Mainline Story*. Pretoria: HSRC Publishers.
- Huffman, T.N. 2004. The archaeology of the Nguni past. *Southern African Humanities* 16:79-111.
- Huffman, T.N. 2007. *Handbook to the Iron Age*. Scottsville: University of KwaZulu-Natal Press.
- Joubert, E. 1955. *Road transport in South Africa during the 19th century*. School of Librarianship. Cape Town: University of Cape Town.
- Kruger, R. 1977. *Good-bye Dolly Gray: the story of the Boer War*. London: Pan Books.
- Laband, J. 2005. *The Transvaal Rebellion: The First Boer War, 1880-1881*. London: Routledge.
- Laband, J. 2017. *The Battle of Majuba: The Transvaal Campaign, 1880-1881*. Solihull: Helion & Company.
- Maggs, T.M.O'C. 1976. *Iron Age communities of the southern Highveld*. Pietermaritzburg: Natal Museum.

Oberholster, J.J. 1972. The historical monuments of South Africa. Cape Town: Rembrand van Rijn Foundation.

Royal HaskoningDHV (Pty) Ltd (2017). *Consulting Engineering Services for the Preliminary Design of the Realignment of National Route 11, Section 4, from O'Neill's Cottage (km 34.3) to Kwaggasnek (km 39.0)*.

Sansom, B. 1974. Traditional economic systems. In Hammond-Tooke, W.D. (ed.) *The Bantu-Speaking Peoples of Southern Africa*. London: Routledge & Kegan Paul. Pp. 135-176.

Standard Encyclopaedia of Southern Africa (SESA) 1972. Cape Town: Nasou Limited.

Thako, L. 2019. *Railway Tunnels Management System in South Africa – Concrete Structural Elements*. Unpublished MSc dissertation. Cape Town: University of Cape Town.

Tomose, N. 2013. *A Phase 1 heritage impact assessment study for the proposed Charlestown housing development, KwaZulu-Natal, South Africa*. Unpublished report: NGT Projects & Heritage Consultants (Pty) Ltd.

Van Riet Lowe, C. 1941. *Prehistoric Rock Art in South Africa*. Bureau of Archaeological, Archaeological Series No. V.

Van Schalkwyk, J.A. 2015. Bridging the Country: a brief history of bridges in South African. *South African Archaeological Bulletin* 70(202):193–200.

Von der Heyde, N. 2013. *Field Guide to the Battlefields of South Africa*. Cape Town: Struik.

Wright, J. & Mazel, A. 2007. *Tracks in a Mountain Range*. Johannesburg: Wits University Press.

11.3 Maps and aerial photographs

1: 50 000 Topocadastral maps
Imperial Map of South Africa, 1900
Intelligence Division War Office, No. 1367, 1899
Aerial Photographs - Chief Directorate: Surveys and Mapping
Google Earth

11.4 Websites

<https://grahamlesliemccallum.wordpress.com/2014/08/04/langs-neck-tunnel/>

<https://sites.google.com/site/soulorailway/home/system-6-1/the-natal-main-line-cont-d-ladysmith-to-volksrust-incl-the-utrecht-colliery-branch>

<https://www.mountainpassessouthafrica.co.za/find-a-pass/kwazulu-natal/itemlist/tag/N11.html>

(<https://screening.environment.gov.za/screeningtool>)

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 project 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 its 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				
Is it 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. 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.