

PHASE 1 HIA REPORT CALVINIA BULK WATER NORTHERN CAPE ADDENDUM

PROPOSED ALTERNATIVE PIPELINE TRAJECTORY FOR THE BULK WATER SUPPLY
WITH BOREHOLE INFRASTRUCTURE DEVELOPMENTS ON PARCEL NO. 1459,
PARCEL NO. 1447, PARCEL NO. 300, CALVINIA, HANTAM LOCAL MUNICIPALITY,
NAMAKWA DISTRICT MUNICIPALITY, NORTHERN CAPE.

PREPARED FOR:
ENVIROAFRICA

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For this project, Jan Engelbrecht was responsible for the field survey of the development footprint, identification of heritage resources, and recommendations. Heidi Fivaz was responsible for research and report compilation. Sky-Lee Fairhurst conducted the desktop study, and Elize Butler completed the PIA.

Declaration of independence:

We, Jan Engelbrecht and Heidi Fivaz, partners of UBIQUE Heritage Consultants, hereby confirm our independence as heritage specialists and declare that:

- we are suitably qualified and accredited to act as independent specialists in this application;
- we do not have any vested interests (either business, financial, personal or other) in the proposed development project other than remuneration for the heritage assessment and heritage management services performed;
- the work was conducted in an objective and ethical manner, in accordance with a professional code of conduct and within the framework of South African heritage legislation.



Signed:
J.A.C. Engelbrecht & H. Fivaz
UBIQUE Heritage Consultants

Date: 2021-09-22

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JAN ENGELBRECHT

CRM ARCHAEOLOGIST

Jan Engelbrecht is accredited by the Cultural Resources Management section of the Association of Southern African Professional Archaeologists (ASAPA) to undertake Phase1 AIAs and HIAs in South Africa. He is also a member of the Association for Professional Archaeologists (ASAPA). Mr Engelbrecht holds an honours degree in archaeology (specialising in the history of early farmers in southern Africa (Iron Age) and Colonial period) from the University of South Africa. He has 12 years of experience in heritage management. He has worked on projects as diverse as the Zulti South HIA project of Richards Bay Minerals, research on the David Bruce heritage site at Ubombo in Kwa-Zulu Natal, and various archaeological excavations and historical projects. He has worked with many rural communities to establish integrated heritage and land use plans and speaks Zulu fluently. Mr Engelbrecht established Ubiqwe Heritage Consultants in 2012. The company moved from KZN to the Northern Cape and is currently based at Askham in the Northern Cape within the Dawid Kruiper Local Municipality in the Kgalagadi region. He had a significant military career as an officer, whereafter he qualified as an Animal Health Technician at Technikon RSA and UNISA. He is currently studying for his MA Degree in Archaeology.

HEIDI FIVAZ

ARCHAEOLOGIST & OBJECT CONSERVATOR

Heidi Fivaz has been a part of UBIQUE Heritage Consultants since 2016 and is responsible for research and report compilation. She holds a B.Tech. Fine Arts degree (2000) from Tshwane University of Technology, a BA Culture and Arts Historical Studies degree (2012) from UNISA and attained her BA (Hons) Archaeology in 2015 (UNISA). She has received extensive training in object conservation from the South African Institute of Object Conservation and specialises in glass and ceramics conservation. She is also a skilled artefact and archaeological illustrator. Ms Fivaz was awarded her MA in Archaeology at the University of South Africa (UNISA) (with distinction). The dissertation focused on historical and industrial archaeology. She is a professional member of the Association of South African Archaeologists and has worked on numerous archaeological excavation and surveying projects over the past ten years.



EXECUTIVE SUMMARY

Project description

UBIQUE Heritage Consultants were appointed by EnviroAfrica cc as independent heritage specialists in accordance with Section 38 of the NHRA and the National Environmental Management Act 107 of 1998 (NEMA) to conduct a cultural heritage assessment to determine the impact of the proposed bulk water supply project (seven boreholes infrastructure and pipeline trajectories) of Calvinia, Hantam Local Municipality, Namakwa District Municipality, Northern Cape, on any sites, features, or objects of cultural heritage significance.

This report is an addendum to the first Heritage Impact Assessment that covered the footprints of seven groundwater borehole (BH1-7) infrastructure developments, including the pipeline trajectories from the boreholes towards Calvinia. The addendum investigated the proposed alternative trajectory of pipeline 1 to link up with pipeline 2. After consultation with the community, an alternative pipeline route was proposed. The alternative route traverses Parcel No. 1459, Parcel No. 1447, Parcel No. 300, on the Calvinia "lande" between the R27 and the R355 to connect Pipeline 1 to Pipeline 2 at the R27.

Findings and Impact on Heritage Resources

On the route of the alternative pipeline trajectory, only two occurrences of historical-cultural material were found. At both locations, the surface scatters were small and without archaeological context and therefore deemed not conservation worthy.

Quaternary Sediments underlie the Jurassic dolerite, Tierberg and Whitehill Formation (Ecca Group; Karoo Supergroup). The Palaeontological Sensitivity of Quaternary sediments is low but locally high; the Jurassic dolerite is insignificant. At the same time, the Tierberg Formation has a Moderate and the Whitehill Formation a Very High Palaeontological Sensitivity. No fossiliferous outcrops were identified during the palaeontological field survey (Butler 2020: Appendix A). The scarcity of fossil heritage at the proposed development footprint indicates that the impact of the development footprint will be of low significance in palaeontological terms. Therefore, it is considered that the proposed development is deemed appropriate and feasible and will not lead to detrimental impacts on the palaeontological reserves of the area (Butler 2020).

Recommendations

Based on the assessment of the potential impact of the development on the identified heritage, the following recommendations are made, taking into consideration any existing or potential sustainable social and economic benefits:

1. No significant heritage sites or features were identified within the surveyed area of the proposed alternative pipeline trajectory. The historical glass and ceramic recorded is not conservation worthy. No further mitigation is recommended concerning these resources.
2. Due to the low palaeontological significance of the area, no further palaeontological heritage studies, ground-truthing and/or specialist mitigation are required. Therefore, it is considered that the development of the proposed development is deemed appropriate and feasible and will not lead to detrimental impacts on the palaeontological resources of the area (Butler 2020). However, if fossil remains or trace fossils are discovered during any construction phase, either on the surface or exposed by excavations, the Chance Find Protocol (Appendix A/11) must be implemented by the Environmental Control Officer (ECO) in charge of these developments. Therefore, these discoveries ought to be protected. The ECO must report to SAHRA (Contact details: SAHRA, 111 Harrington Street, Cape Town. PO Box 4637, Cape Town 8000, South Africa. Tel: 021 462 4502. Fax: +27 (0)21 462 4509. Web: www.sahra.org.za) so that mitigation can be carried out by a palaeontologist (Butler 2020).
3. Although all possible care has been taken to identify sites of cultural importance during the investigation of study areas, it is always possible that hidden or sub-surface sites could be overlooked during the assessment. If during construction, any evidence of archaeological sites or remains (e.g. remnants of stone-made structures, indigenous ceramics, bones, stone artefacts, ostrich eggshell fragments, charcoal and ash concentrations), fossils or other categories of heritage resources are found during the proposed development, SAHRA APM Unit (Natasha Higgitt/Phillip Hine 021 462 5402) must be alerted as per section 35(3) of the NHRA. If unmarked human burials are uncovered, the SAHRA Burial Grounds and Graves (BGG) Unit (Thingahangwi Tshivhase/Mimi Seetelo 012 320 8490) must be alerted immediately as per section 36(6) of the NHRA. Depending on the nature of the finds, a professional archaeologist or palaeontologist must be contacted as soon as possible to inspect the findings. If the newly discovered heritage resources prove to be of archaeological or palaeontological significance, a Phase 2 rescue operation may be required subject to permits issued by SAHRA. UBIQUE Heritage Consultants and its personnel will not be held liable for such oversights or costs incurred as a result of such oversights.

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ABBREVIATIONS

AIA:	Archaeological Impact Assessment
ASAPA:	Association of South African Professional Archaeologists
BIA:	Basic Impact Assessment
CRM:	Cultural Resource Management
ECO:	Environmental Control Officer
EIA:	Environmental Impact Assessment*
EIA:	Early Iron Age*
EMP:	Environmental Management Plan
ESA:	Earlier Stone Age
GPS:	Global Positioning System
HIA:	Heritage Impact Assessment
LIA:	Late Iron Age
LSA:	Later Stone Age
MEC:	Member of the Executive Council
MIA:	Middle Iron Age
MPRDA:	Mineral and Petroleum Resources Development Act
MSA:	Middle Stone Age
NEMA:	National Environmental Management Act
NHRA:	National Heritage Resources Act
OWC:	Orange River Wine Cellars
PRHA:	Provincial Heritage Resource Agency
SADC:	Southern African Development Community
SAHRA:	South African Heritage Resources Agency
SAHRIS:	South African Heritage Resources Information System

**Although EIA refers to both Environmental Impact Assessment and the Early Iron Age both are internationally accepted abbreviations it must be read and interpreted in the context it is used.*

GLOSSARY

Archaeological:	<p>material remains resulting from human activity which are in a state of disuse and are in or on land and are older than 100 years, including artefacts, human and hominid remains and artificial features and structures;</p> <ul style="list-style-type: none"> – rock art, being any form of painting, engraving or other graphic representation on a fixed rock surface or loose rock or stone, which was executed by human agency and is older than 100 years (as defined and protected by the National Heritage Resources Act (NHRA) (Act No. 25 of 1999) including any area within 10 m of such representation; – wrecks, being any vessel or aircraft, or any part thereof, which were wrecked in South Africa, whether on land, in the internal waters, the territorial waters or in the culture zone of the Republic, as defined respectively in sections 3, 4 and 6 of the Maritime Zones Act, 1994 (Act No. 15 of 1994), and any cargo, debris or artefacts found or associated therewith, which is older than 60 years or which SAHRA considers to be worthy of conservation; – features, structures and artefacts associated with military history, which are older than 75 years and the sites on which they are found.
Stone Age:	<p>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.</p>
Earlier Stone Age:	>2 000 000 - >200 000 years ago
Middle Stone Age:	<300 000 - >20 000 years ago
Later Stone Age:	<40 000 - until the historical period
Iron Age:	<p>(Early Farming Communities). Period covering the last 1800 years, when immigrant African farmer groups brought a new way of life to southern Africa. They established settled villages, cultivated domestic crops such as sorghum, millet and beans, and herded cattle as well as sheep and goats. As they produced their own iron tools, archaeologists call this the Iron Age.</p> <p>Early Iron Age: AD 200 - AD 900 Middle Iron Age: AD 900 - AD 1300 Later Iron Age: AD 1300 - AD 1850</p>
Historic:	<p>Period of arrival of white settlers and colonial contact. AD 1500 to 1950</p>
Historic building:	Structures 60 years and older.
Fossil:	<p>Mineralised bones of animals, shellfish, plants and marine animals. A trace fossil is the track or footprint of a fossil animal that is preserved in stone or consolidated sediment.</p>
Heritage:	<p>That which is inherited and forms part of the National Estate (historic places, objects, fossils as defined by the National Heritage Resources Act 25 of 1999).</p>

- Heritage resources:** These mean any place or object of cultural significance, tangible or intangible.
- Holocene:** The most recent geological period that commenced 10 000 years ago.
- Palaeontology:** Any fossilised remains or fossil trace of animals or plants which lived in the geological past, other than fossil fuels or fossiliferous rock intended for industrial use, and any site that contains such fossilised remains or traces
- 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 may not be significant, but may become significant when added to existing and reasonably foreseeable impacts eventuating from similar or diverse activities.
- Mitigation:** Anticipating and preventing negative impacts and risks, then to minimise them, rehabilitate or repair impacts to the extent feasible.
- A ‘place’:** a site, area or region;
- a building or other structure which may include equipment, furniture, fittings and articles associated with or connected with such building or other structure;
 - a group of buildings or other structures which may include equipment, furniture, fittings and articles associated with or connected with such group of buildings or other structures;
 - an open space, including a public square, street or park; and
 - in relation to the management of a place, includes the immediate surroundings of a place.
- ‘Public monuments and memorials’:** mean all monuments and memorials—
- erected on land belonging to any branch of central, provincial or local government, or on land belonging to any organisation funded by or established in terms of the legislation of such a branch of government; or
 - which were paid for by public subscription, government funds, or a public-spirited or military organisation, and are on land belonging to any private individual;
- ‘Structures’:** any building, works, device or other facility made by people and which are fixed to land, and include any fixtures, fittings and equipment associated therewith.

1. INTRODUCTION

1.1 Scope of study

The project involves the bulk water supply initiative in Calvinia, in the Hantam Local Municipality, Namakwa District Municipality, Northern Cape. UBIQUE Heritage Consultants were appointed by EnviroAfrica cc as independent heritage specialists in accordance with the National Environmental Management Act 107 of 1998 (NEMA), and in compliance with Section 38 of the National Heritage Resources Act 25 of 1999 (NHRA), to conduct a cultural heritage assessment (AIA/HIA) of the development area.

The assessment aims to identify and report any heritage resources that may fall within the development footprint; to determine the impact of the proposed development on any sites, features, or objects of cultural heritage significance; to assess the significance of any identified resources; and to assist the developer in managing the documented heritage resources in an accountable manner, within the framework provided by the National Heritage Resources Act (Act 25 of 1999) (NHRA).

South Africa's heritage resources are rich and widely diverse, encompassing sites from all periods of human history. Resources may be tangible, such as buildings and archaeological artefacts, or intangible, such as landscapes and living heritage. Their significance is based on their aesthetic, architectural, historical, scientific, social, spiritual, linguistic, economic or technological values; their representation of a time or group; their rarity; and sphere of influence.

Natural (e.g. erosion) and human (e.g. development) activities can jeopardise the integrity and significance of heritage resources. In the case of human activities, a range of legislation exists to ensure the timely and accurate identification and effective management of heritage resources for present and future generations.

The result of this investigation is presented within this heritage impact assessment report. It comprises the recording of heritage resources present/ absent and offers recommendations for managing these resources within the context of the proposed development.

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

1.2 Assumptions and limitations

It is assumed that the description of the proposed project, as provided by the client, is accurate. Furthermore, it is assumed that the public consultation process undertaken as part of the Environmental Impact Assessment (EIA) is comprehensive and does not have to be repeated as part of the heritage impact assessment.

The significance of the sites, structures and artefacts is determined by means of their historical, social, aesthetic, technological and scientific value in relation to their uniqueness, condition of preservation and research potential. The various aspects are not mutually exclusive, and the evaluation of any site is done with reference to any number of these aspects. Cultural significance is site-specific and relates to the content and context of the site.

All possible care has been taken during the comprehensive field survey and intensive desktop study to identify sites of cultural importance within the development areas. However, it is essential to note that some heritage sites may have been missed due to their subterranean nature or dense vegetation cover. No subsurface investigation (i.e. excavations or sampling) was undertaken since a SAHRA permit is required for such activities. Therefore, should any heritage features and/or objects such as architectural features, stone tool scatters, artefacts, human remains, or fossils be uncovered or observed during construction, operations must be stopped, and a qualified archaeologist contacted for an assessment of the find. Observed or located heritage features and/or objects may not be disturbed or removed in any way until such time that the heritage specialist has been able to assess the significance of the site (or material) in question.

2. STUDY APPROACH AND METHODOLOGY

2.1 Desktop study

A desktop study and literature review of the area was conducted for the initial report and not repeated for the addendum as the area was covered in full HIA.

2.2 Field study

Phase 1 (AIA/HIA) requires the completion of a field study to establish and ensure the following:

2.2.1 Systematic survey

A systematic survey of the proposed pipeline trajectory to locate, identify, record, photograph, and describe archaeological, historical or cultural interest sites were completed.

UBIQUE Heritage Consultants inspected the proposed development and surrounding areas from the 25th and 26th of August 2021 and completed a controlled-exclusive, pre-planned pedestrian and vehicular survey. We conducted an inspection of the surface of the ground, wherever the surface was visible. This was done with no substantial attempt to clear brush, sand, deadfall, leaves or other material that may cover the surface and with no effort to look beneath the surface beyond the inspection of rodent burrows, cut banks and other exposures fortuitously observed.

The survey was tracked with a handheld Garmin global positioning unit (Garmin eTrex 10) and Locus application on Samsung Galaxy A5 Smartphone.

2.2.2 Recording significant areas

A handheld Garmin global positioning unit recorded GPS points of significant areas (Garmin eTrex 10). Photographs were taken with a Canon IXUS 185 20-megapixel camera. Detailed field notes were taken to describe observations. The layout of the area and plotted GPS points, tracks and coordinates, were transferred to Google Earth, and QGIS and maps were created.

2.2.3 Determining significance

Levels of significance of the various types of heritage resources observed and recorded in the project area will be determined to the following criteria:

CULTURAL & HERITAGE SIGNIFICANCE	
LOW	A cultural object found out of context, not part of a site or without any related feature/structure in its surroundings.
MEDIUM	Any site, structure or feature is regarded as less important due to several factors, such as date, frequency and uniqueness. Likewise, any important object found out of context.
HIGH	Any site, structure or feature is regarded as important because of its age or uniqueness. Graves are always categorised as of a high importance. Likewise, any important object found within a specific context.

Field Ratings or Gradings are assigned to indicate the level of protection required and who is responsible for national, provincial, or local protection.

FIELD RATINGS & GRADINGS	
National Grade I	Heritage resources with exceptional qualities to the extent that they are of national significance and should therefore be managed as part of the national estate.
Provincial Grade II	Heritage resources with qualities provincial or regional importance, although it may form part of the national estate, it should be managed as part of the provincial estate.
Local Grade IIIA	Heritage resources are of local importance and worthy of conservation. Therefore, it should be included in the heritage register and not be mitigated (high significance).
Local Grade IIIB	Heritage resources are of local importance and worthy of conservation. Therefore, it should be included in the heritage register and mitigated (high/ medium significance).
General Protection Grade IVA	The site/resource should be mitigated before destruction (high/ medium significance).
General protection Grade IVB	The site/resource should be recorded before destruction (medium significance).
General protection Grade IVC	Phase 1 is considered as sufficient recording, and it may be demolished (low significance).

FIELD RATINGS & GRADINGS

NCW	After appropriate investigation, a resource has been determined not to have enough heritage significance to be retained as part of the National Estate. It has no research potential or other cultural significance and is thus Not Conservation Worthy.
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Heritage resources are considered of value if the following criteria apply:

- a. It is important in the community or pattern of South Africa's history;
- b. It has uncommon, rare or endangered aspects of South Africa's natural or cultural heritage;
- c. It has the potential to yield information that will contribute to an understanding of South Africa's natural or cultural heritage;
- d. It is vital in demonstrating the principal characteristics of a particular class of South Africa's natural or cultural places or objects;
- e. It exhibits particular aesthetic characteristics valued by a community or cultural group;
- f. It is essential in demonstrating a high degree of creative or technical achievement at a particular period;
- g. It has a strong or unique association with a particular community or cultural group for social, cultural or spiritual reasons;
- h. It has a strong or special association with the life or work of a person, group or organisation of importance in the history of South Africa;
- i. It is of significance relating to the history of slavery in South Africa.

3. PROJECT OVERVIEW

UBIQUE Heritage Consultants were appointed by EnviroAfrica cc as independent heritage specialists in accordance with Section 38 of the NHRA and the National Environmental Management Act 107 of 1998 (NEMA) to conduct a cultural heritage assessment to determine the impact of the proposed bulk water supply initiative in Calvinia, in the Hantam Local Municipality, on any sites, features, or objects of cultural heritage significance.

The proposed project aims to augment the current water supply to the community of Calvinia through piped groundwater. The endeavour aims to provide a sustainable system for supplying water suitable for human consumption for at least 15 to 20 years. The Heritage Impact Assessment covered the footprints of seven groundwater borehole (BH1-7) infrastructure developments, including the pipeline trajectories from the boreholes towards Calvinia. Initially, approximately 25 km of pipeline (P1-4) will be laid, predominantly along existing primary, secondary, and service road servitudes, with minimal crossover onto private property.

After consultation with the community, an alternative pipeline route was proposed. The alternative route traverses the Calvinia "lande" between the R27 and the R355 to connect Pipeline 1 to Pipeline 2 at the R27.

3.1 Technical information

Project description	
Project name	Calvinia Bulk Water Supply
Description	Proposed alternative pipeline trajectory as part of the bulk water supply with seven boreholes, infrastructure and pipeline trajectory developments, Calvinia, Hantam Local Municipality, Namakwa District Municipality, Northern Cape.
Developer	
Hantam Local Municipality	
Contact information	Email: vanwykrj@hantam.gov.za
Development type	Municipal infrastructure: water supply
Landowner	
Private	
Consultants	
Environmental	EnviroAfrica cc.
Heritage and archaeological	UBIQUE Heritage Consultants
Paleontological	Banzai Environmental
Property details	
Province	Northern Cape
District municipality	Namakwa
Local municipality	Hantam
Topo-cadastral map	1:50 000 3119BD, 3119BC

Farm name	Calvinia “Die Lande” Parcel No. 1459, Parcel No. 1447, Parcel No. 300	
Closest town	Calvinia	
GPS Co-ordinates	31° 29'17,3" S ; 19° 44'37,7" E 31° 28'36,7" S ; 19° 44'37,6" E	
Property size	N/A	
Development footprint size	Pipeline 2.7 km 25 ha	
Land use		
Previous	Agriculture and servitude area	
Current	Agriculture and servitude area	
Rezoning required	No	
Sub-division of land	No	
Development criteria in terms of Section 38(1) NHRA		Yes/No
Construction of a 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.		No
Construction exceeding 5000m ² .		Yes
Development involving three or more existing erven or subdivisions.		No
Development involving three or more erven or divisions that have been consolidated within the past five years.		No
Rezoning of site exceeding 10 000m ² .		No
Any other development category, public open space, squares, parks, recreation grounds.		No

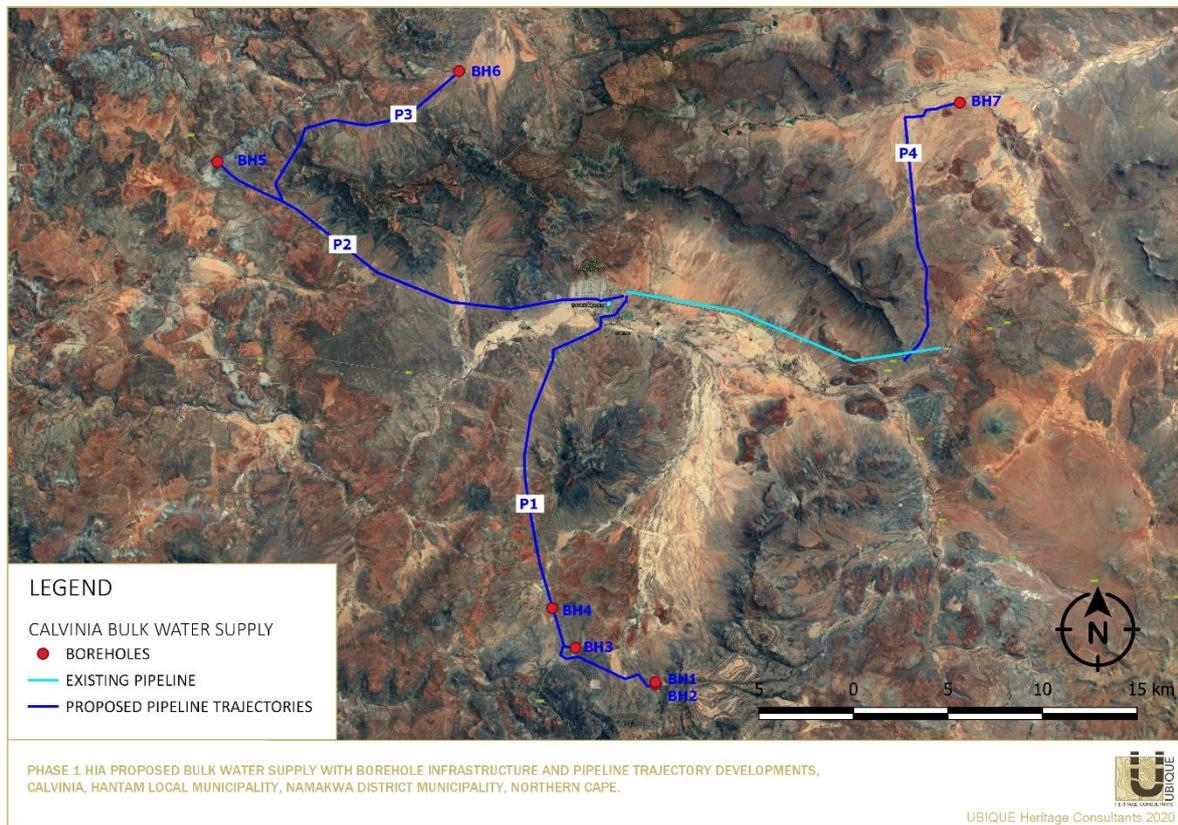


Figure 1 Regional locality of the development footprint, Calvinia, Hantam Local Municipality indicated on Google Earth Satellite imagery.

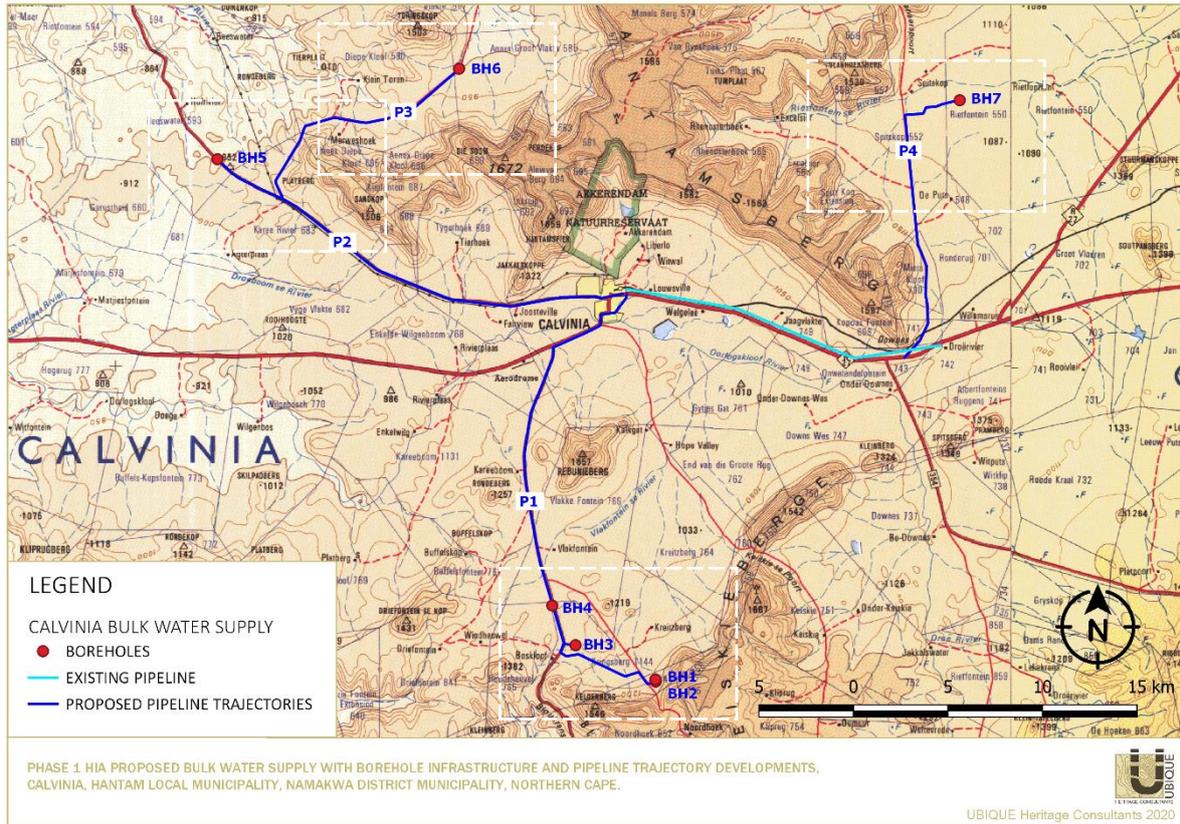


Figure 2 Regional locality of the development footprint, Calvinia, Hantam Local Municipality indicated on 1: 250 000 WGS3118.



Figure 3 Alternative pipeline trajectory, Calvinia Bulkwater Supply, Google Earth Satellite imagery.

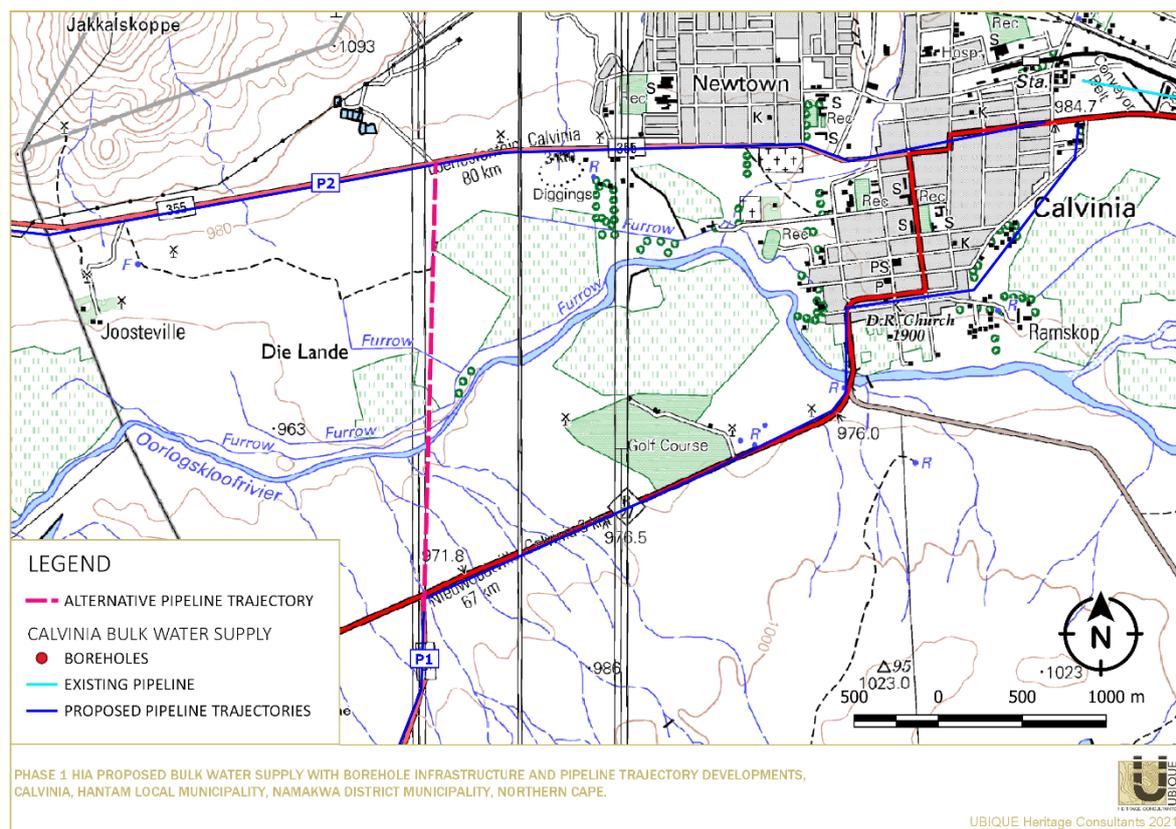


Figure 4 Alternative pipeline trajectory, Calvinia Bulkwater Supply, 1: 50 000 3119BC and 3119BD maps.

3.2 Description of the affected environment

The borehole and pipeline developments fall predominantly within the Bokkeveld Sandstone Fynbos area, with intermittent crossover into Hantam Plateau Dolerite Renosterveld and Hantam Karoo vegetation areas (SANBI 2020). The landscape is characterised by typical Fynbos shrubland, its diversity dependent on differences in soil depth and moisture. Large areas of weathered rock and rocky pavements support dwarf succulents and shrubs, lichens and mosses. At the same time, annuals and bulbs are particularly common in more open areas where Graminoids (restios and grasses), proteoids and shrubby Asteraceae are often dominant (Mucina & Rutherford 2006).

The terrain around the proposed development area on Parcel No. 1459 and Parcel No. 1447 is very disturbed due to previous agricultural crop production. The area slightly slopes down towards the Oorlogskloof River towards the south of the terrain. Furthermore, the area is flat, sandy with rocky minor rocky areas and disturbed. The area is also underlain with irrigation pipelines and irrigation systems, as well as a furrow system.

The terrain of Parcel No. 300 (Farm Ramskop) is primarily undisturbed and slopes towards the north towards the Oorlogskloof River. The area is covered with vegetation and is flat with several

rocky outcrops. It is currently used as grazing for sheep. The current temporary pipeline runs through both properties from southwest to northeast and is visible on the ground surface.

Figure 5 Views of the affected development area.





4. IDENTIFIED RESOURCES AND HERITAGE ASSESSMENT

4.1 Surveyed area

The area surveyed for the impact assessment was dictated by the Google Earth map of the development footprints provided by the client.

The pipeline trajectories were surveyed on foot. The survey extended beyond the development footprints to consider the full impact of the development by investigating probable areas on the landscape adjacent to the development footprints that may contain heritage.

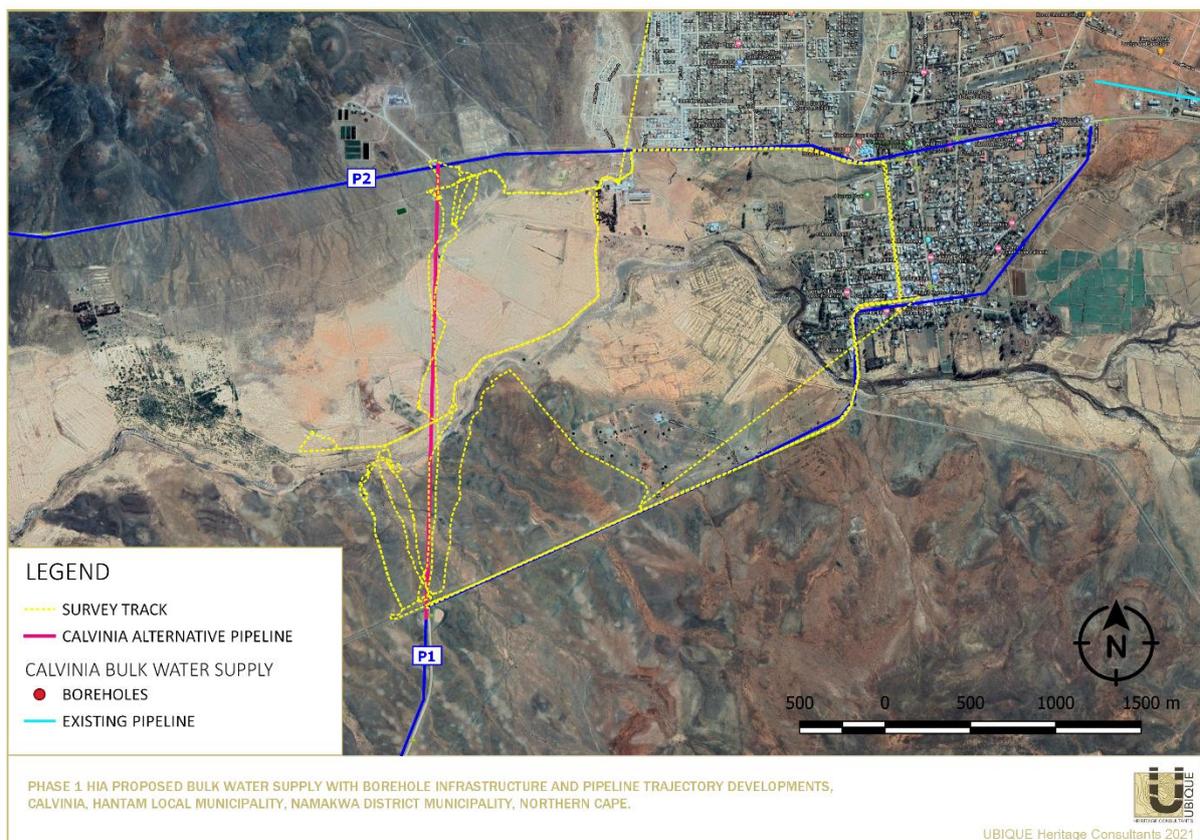


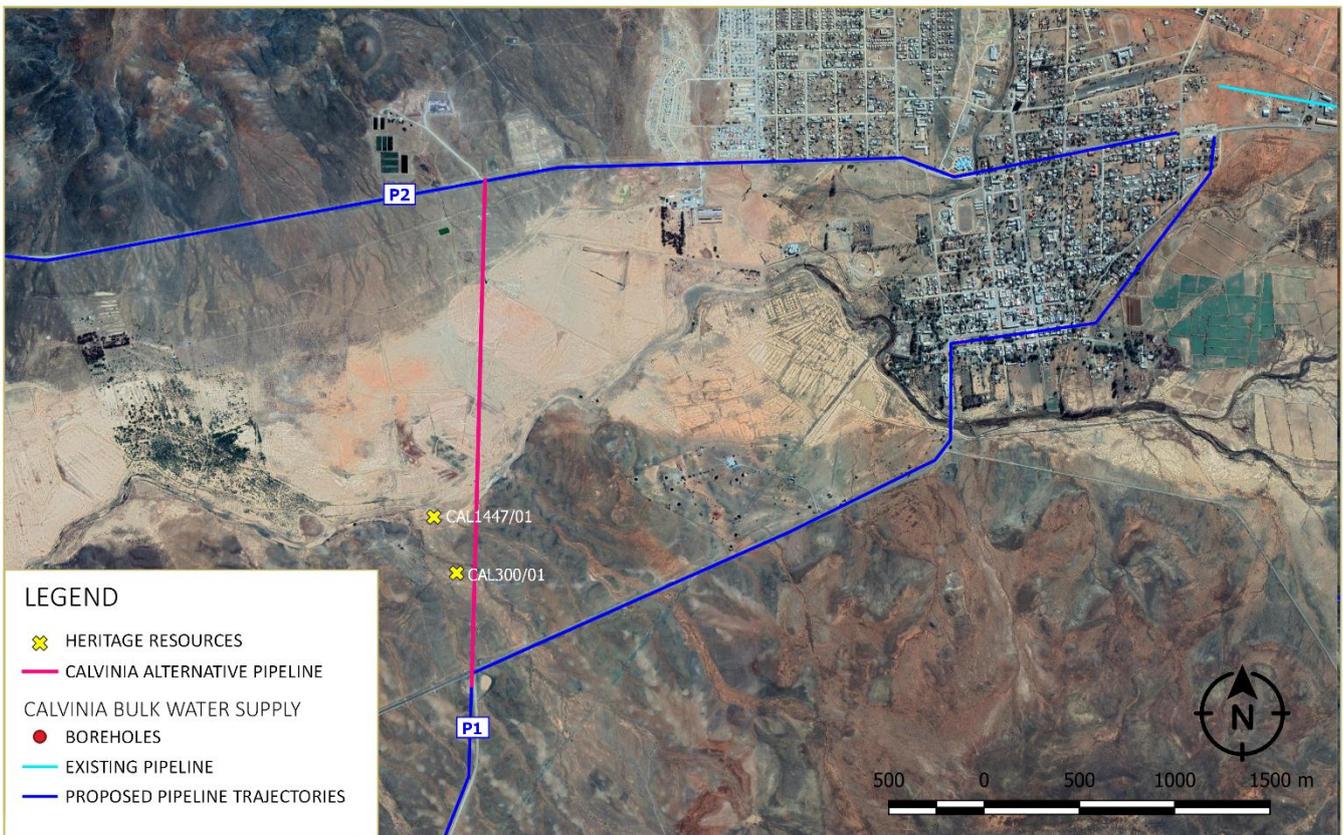
Figure 6 Survey tracks across the development footprint.

4.2 Identified heritage resources

HERITAGE RESOURCES RECORDING

Historical Period Resources Identified

Point ID & Site Name	Description	Period	Location	Field rating/ Significance/ Recommended Mitigation	
CAL1447/01	Type of feature	Ca. 1880-1930	31° 29' 11,18" S 19° 44' 35,45" E	Field Rating IV C Low significance No Mitigation Required	
	Material				Surface scatter . Probably alluvial deposited by water from another location.
	N in m².				Black glass
	Context				3 in 5 ha
	Additional				No context
CAL300/01	Type of feature	Ca. 1890's or later	31° 29' 01" S 19° 44' 31" E	Field Rating IV C Low significance No Mitigation Required	
	Material				Surface scatter. Aluvial deposit in the Oorlogskloof river bed, possibly from Calvinia town in the east.
	N in m².				Porcelain
	Context				1 in 5ha
	Additional				No context
	Additional	Not historical confirmed			



PHASE 1 HIA PROPOSED BULK WATER SUPPLY WITH BOREHOLE INFRASTRUCTURE AND PIPELINE TRAJECTORY DEVELOPMENTS, CALVINIA, HANTAM LOCAL MUNICIPALITY, NAMAKWA DISTRICT MUNICIPALITY, NORTHERN CAPE.



UBIQUE Heritage Consultants 2021

Figure 7 Distribution of identified heritage resources around BH1 and BH2, on the Farm Aurets Kloof No. 854, Calvinia.

4.3 Discussion

4.3.1 Archaeological features

4.3.1.2 Historical

Only two occurrences of historical, cultural material were found. None of these had any archaeological context. The glass shards found on Parcel 1447 (CAL1447/01) is a liquor bottle with an almost complete base and a body fragment. Black/ Dark Green glass was typically used for bottling liquor since the early 1800s.

One fragment of undecorated porcelain, either a saucer, teapot or cup base, were recorded on Parcel 300 (CAL300/01). The piece was found on the dry river bed and with no archaeological context.

The material is given a Field Rating IV C. Phase 1 is considered sufficient recording, and it may be demolished (low significance). Therefore, the material is not conservation worthy.



CAL1447/01



CAL300/01

Figure 8 Photographic selection of the historical material recorded.

4.3.2 Graves

No graves were identified on the site. Interviews were conducted with both owners of the farms, and they confirmed that there are no graves on the site, especially no graves on the site footprint.

4.3.3 Palaeontological resources

Quaternary Sediments, Jurassic dolerite, Tierberg and Whitehill Formation (Ecca Group; Karoo Supergroup), underlies the development footprint. According to the PalaeoMap of the South African Heritage Resources Information System, the Palaeontological Sensitivity of Quaternary sediments is low but locally high; the Jurassic dolerite is insignificant. At the same time, the Tierberg Formation has a Moderate and the Whitehill Formation a Very High Palaeontological Sensitivity (Butler 2020; 2021).

Elize Butler from Banzai Environmental conducted a site-specific field survey of the development footprint (see Appendix 1). During the site visit, no fossiliferous outcrops were identified. The scarcity of fossil heritage at the proposed development footprint indicates that the impact of the development footprint will be of a low significance in palaeontological terms. It is therefore considered that the proposed development is deemed appropriate and feasible and will not lead to detrimental impacts on the palaeontological reserves of the area (Butler 2020; 2021).

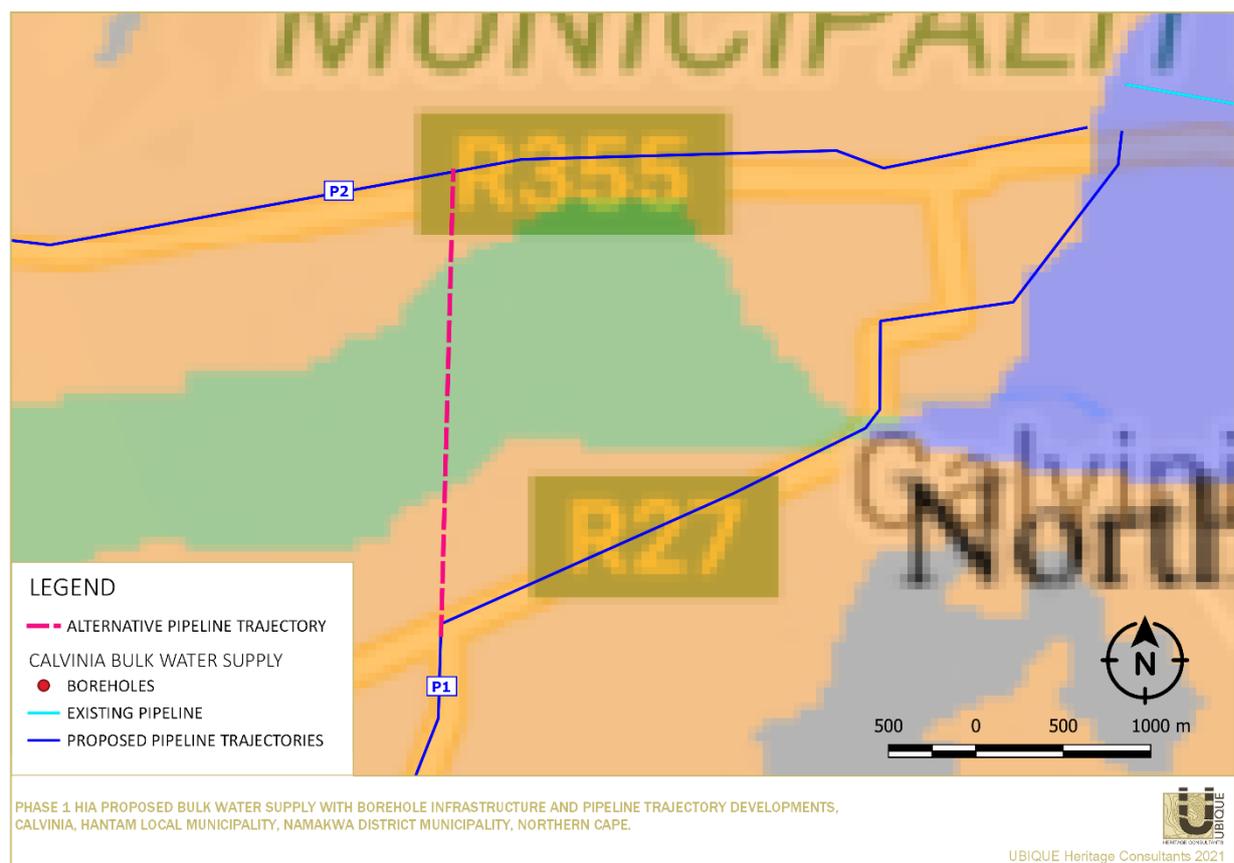


Figure 9 SAHRIS PalaeoSensitivity Map, indicating Moderate (green), Low (blue), Insignificant/Zero (grey), and Unknown (clear) as well as High (orange) and Very High (red) palaeontological significance in the study area, (<https://sahris.sahra.org.za/map/palaeo>).

5. ASSESSMENT OF THE IMPACT OF THE DEVELOPMENT

Description	Development Impact	Mitigation	Field rating/ Significance
Archaeological			
1. The two occurrences of historical material identified on Parcels 1447 and 300.	Nature	Neutral	Field Rating IV C Low significance NCW
	Extent	Low	
	Duration	Low	
	Intensity	Low	
	Potential of impact on irreplaceable resource	Low	
	Consequence	Low	
	Probability of impact	Low	
	Significance	Low	
Paleontological			
2. The Palaeontological Sensitivity of Quaternary sediments is low but locally high; the Jurassic dolerite is insignificant; the Tierberg Formation has a Moderate and the Whitehill Formation a Very High Palaeontological Sensitivity.	Nature	Negative	N/A No mitigation required. Chance Finds Protocol provided in original report.
	Extent	High	
	Duration	High	
	Intensity	High	
	Potential of impact on irreplaceable resource	Low	
	Consequence	Low	
	Probability of impact	High	
	Significance	Low	

The historical material recorded at Cal1447/01 and CAL300/01 is not conservation worthy, and therefore, in the unlikely event that impact should occur, the negative impact is negligible.

With regards to the impact on palaeontological resources, fossil heritage will be negatively impacted; however, only the site will be affected by the proposed development. The expected duration of the impact is assessed as potentially permanent to long term. In the absence of mitigation procedures, the damage or destruction of any palaeontological materials will be permanent. Impacts on palaeontological heritage during the construction phase could potentially occur and are regarded as having a high probability. The magnitude of the impact on fossil heritage will be low. The significance of the impact occurring will be low (Butler 2020).

6. RECOMMENDATIONS

Based on the assessment of the potential impact of the development on the identified heritage, the following recommendations are made, taking into consideration any existing or potential sustainable social and economic benefits:

1. No significant heritage sites or features were identified within the surveyed area of the proposed alternative pipeline trajectory. The historical glass and ceramic recorded is not conservation worthy. No further mitigation is recommended concerning these resources.

2. Due to the low palaeontological significance of the area, no further palaeontological heritage studies, ground-truthing and/or specialist mitigation are required. Therefore, it is considered that the development of the proposed development is deemed appropriate and feasible and will not lead to detrimental impacts on the palaeontological resources of the area (Butler 2020). However, if fossil remains or trace fossils are discovered during any construction phase, either on the surface or exposed by excavations, the Chance Find Protocol (Appendix A/11) must be implemented by the Environmental Control Officer (ECO) in charge of these developments. Therefore, these discoveries ought to be protected. The ECO must report to SAHRA (Contact details: SAHRA, 111 Harrington Street, Cape Town. PO Box 4637, Cape Town 8000, South Africa. Tel: 021 462 4502. Fax: +27 (0)21 462 4509. Web: www.sahra.org.za) so that mitigation can be carried out by a palaeontologist (Butler 2020).
3. Although all possible care has been taken to identify sites of cultural importance during the investigation of study areas, it is always possible that hidden or sub-surface sites could be overlooked during the assessment. If during construction, any evidence of archaeological sites or remains (e.g. remnants of stone-made structures, indigenous ceramics, bones, stone artefacts, ostrich eggshell fragments, charcoal and ash concentrations), fossils or other categories of heritage resources are found during the proposed development, SAHRA APM Unit (Natasha Higgitt/Phillip Hine 021 462 5402) must be alerted as per section 35(3) of the NHRA. If unmarked human burials are uncovered, the SAHRA Burial Grounds and Graves (BGG) Unit (Thingahangwi Tshivhase/Mimi Seetelo 012 320 8490) must be alerted immediately as per section 36(6) of the NHRA. Depending on the nature of the finds, a professional archaeologist or palaeontologist must be contacted as soon as possible to inspect the findings. If the newly discovered heritage resources prove to be of archaeological or palaeontological significance, a Phase 2 rescue operation may be required subject to permits issued by SAHRA. UBIQUE Heritage Consultants and its personnel will not be held liable for such oversights or costs incurred as a result of such oversights.

7. CONCLUSION

This HIA addendum has identified no significant heritage resources, and the proposed alternative pipeline trajectory is acceptable from a heritage point of view.

8. BIBLIOGRAPHY

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ACTS

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APPENDIX A

PALAEONTOLOGICAL AMENDMENT FOR THE PROPOSED ADJUSTMENT OF THE CALVINIA BWS PIPELINE IN THE NAMAKWA DISTRICT MUNICIPALITY, WITHIN THE HANTAM LOCAL MUNICIPALITY IN THE NORTHERN CAPE PROVINCE

14 Eddie de Beer Street

Dan Pienaar

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PALAEONTOLOGICAL AMENDMENT FOR THE PROPOSED ADJUSTMENT OF THE CALVINIA BWS PIPELINE IN THE NAMAKWA DISTRICT MUNICIPALITY, WITHIN THE HANTAM LOCAL MUNICIPALITY IN THE NORTHERN CAPE PROVINCE

BACKGROUND

The author (E. Butler) conducted a “Palaeontological Field Assessment to assess the proposed Calvinia Bulk Water Supply, Hantam Local Municipality in the Northern Cape” in December 2020. It was found that the Quaternary Sediments underlie the development footprint; Jurassic dolerite, Tierberg and Whitehill Formation (Ecca Group; Karoo Supergroup) (**Figure 1-2**). According to the PalaeoMap of the South African Heritage Resources Information System, the Palaeontological Sensitivity Quaternary sediments is low, but local high, that of the Jurassic dolerite is insignificant, while the Tierberg Formation has a Moderate and the Whitehill Formation a Very High Palaeontological Sensitivity (**Figure 3**). During a site-specific field survey of the development footprint, no fossiliferous outcrops were identified. It was concluded that due to the scarcity of fossil heritage in the proposed development, the impact of the development footprint will be of low significance in palaeontological terms. Therefore, it was recommended that the project proceed as the proposed development will not lead to detrimental impacts on the palaeontological reserves of the area. A Chance find Protocol was included in the report.

Butler, E., 2020. Palaeontological Field Assessment for the Proposed Calvinia Bulk Water Supply, Hantam Local Municipality, Northern Cape.

The present amendment letter must be read in conjunction with the original PIA report by Elize Butler.

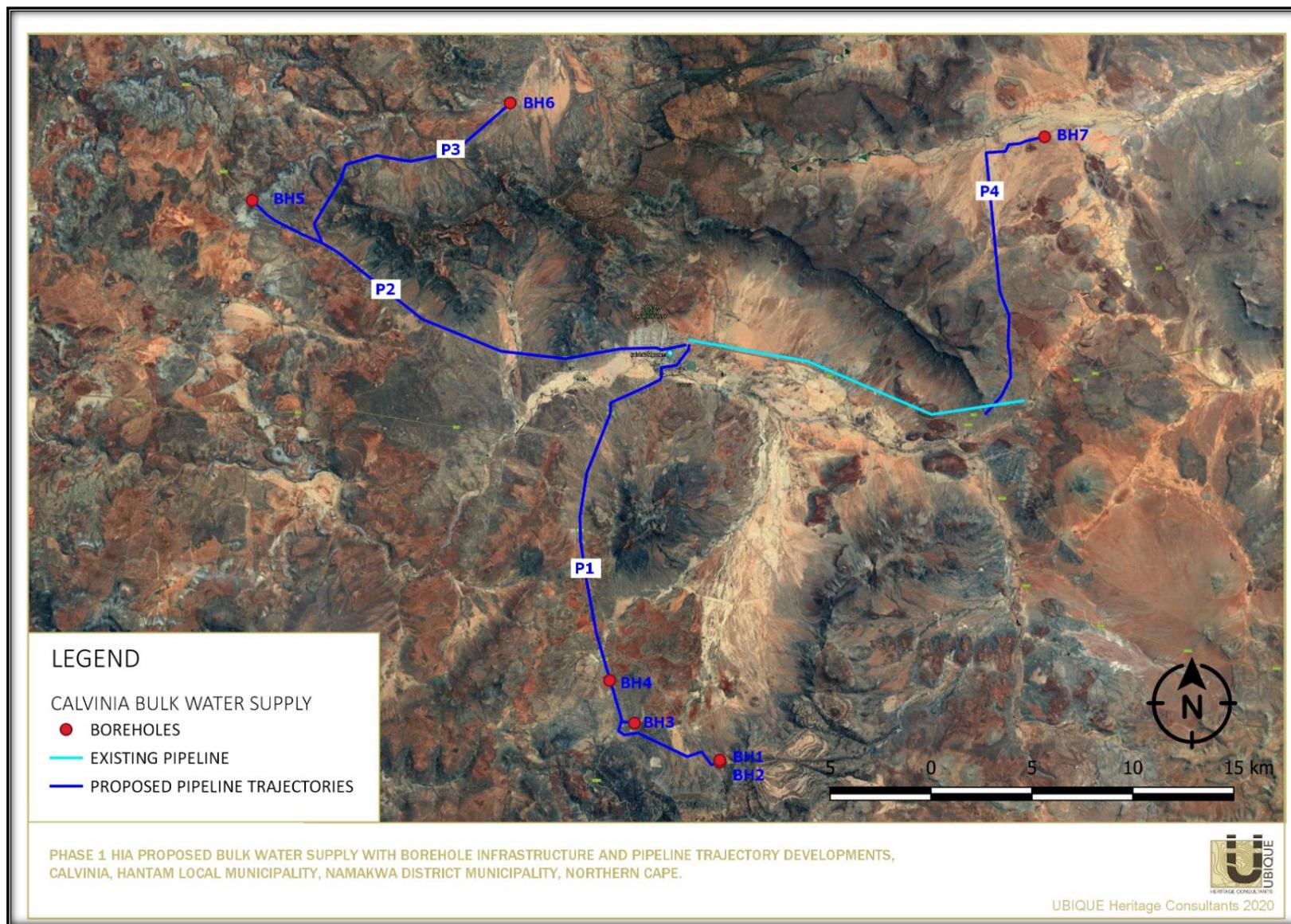


Figure 10: Google Earth (2020) locality map of the Calvinia Bulk Water Supply.

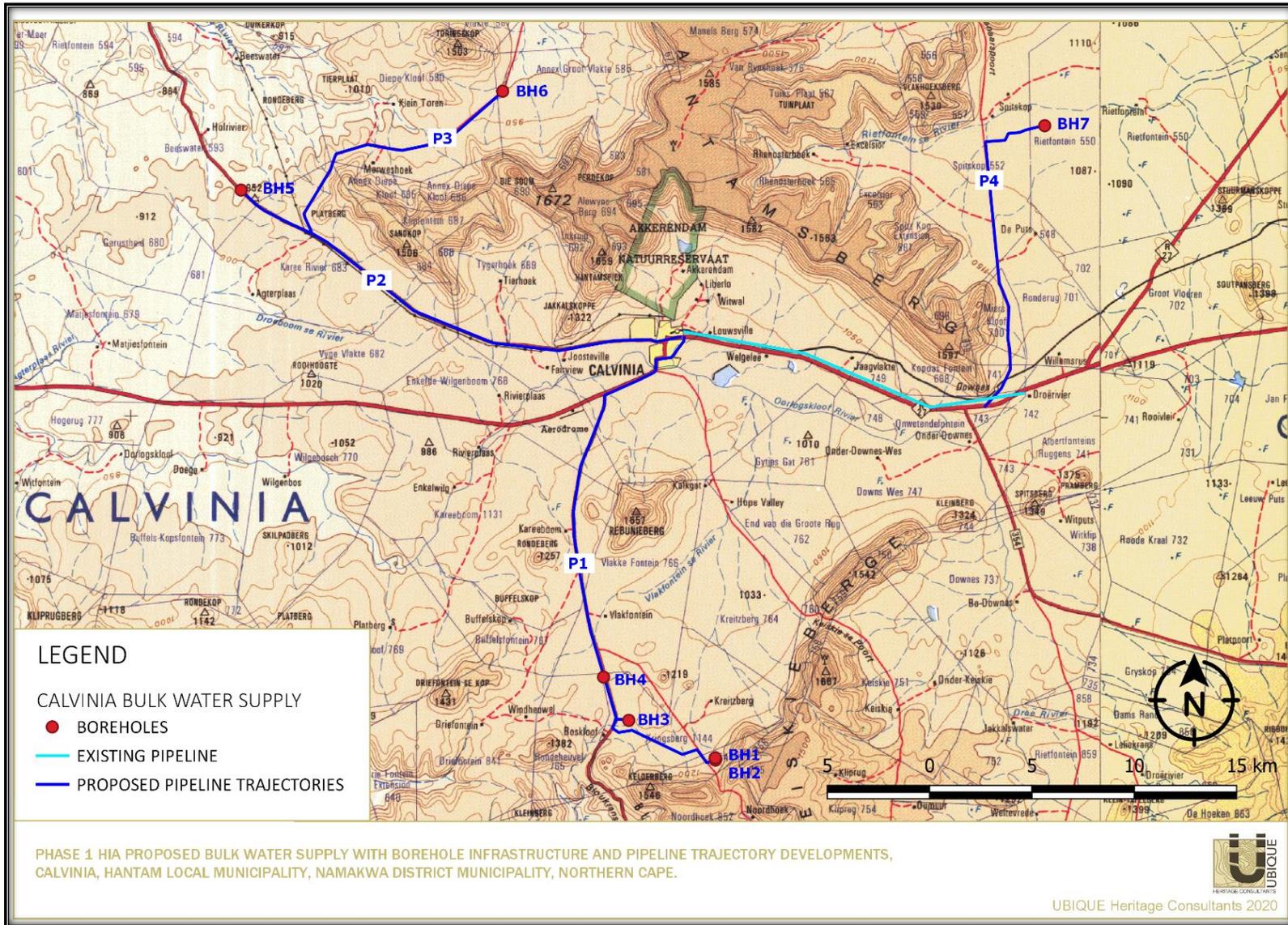


Figure 11: Locality map of the Calvinia Bulk Water Supply.

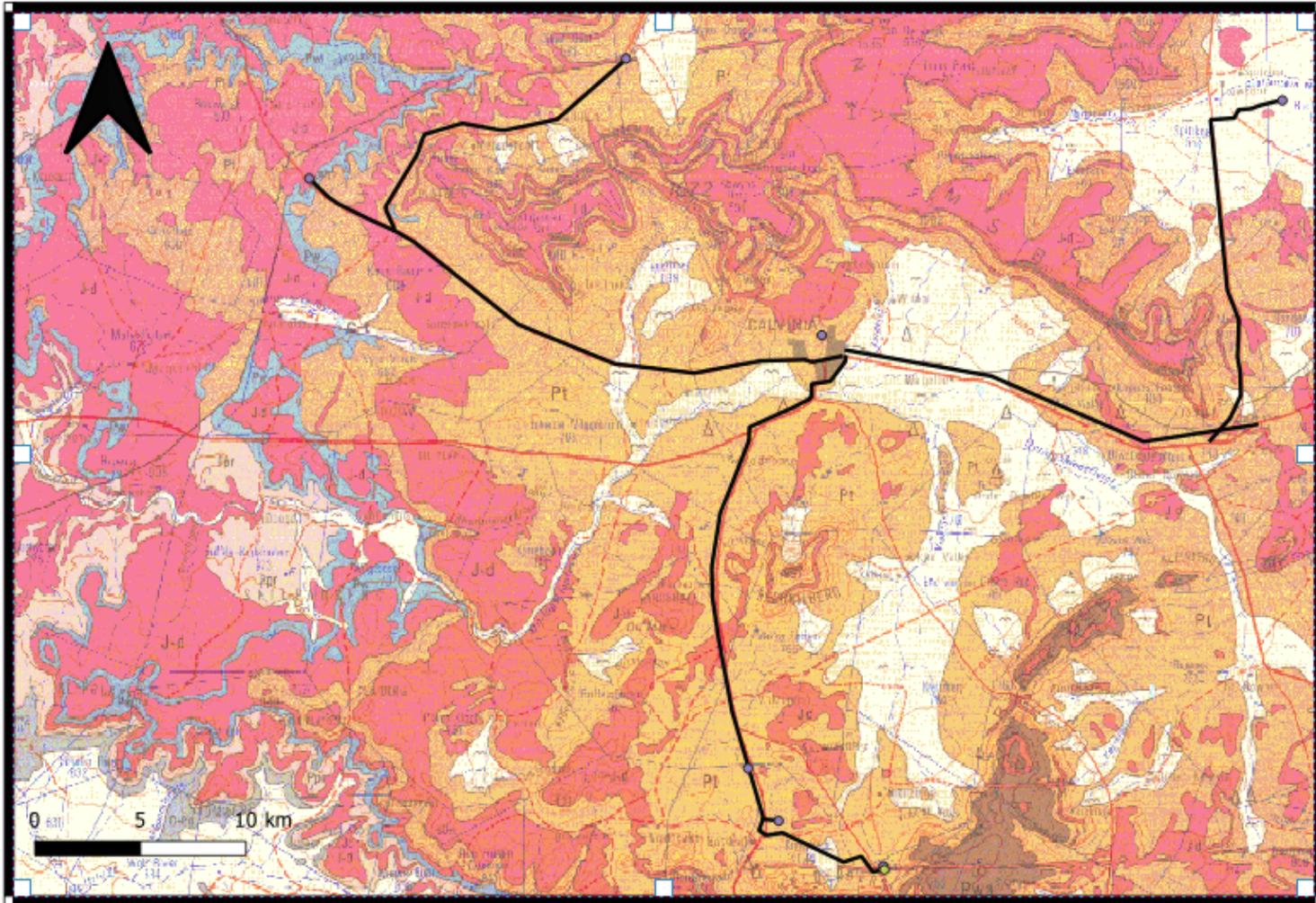


Figure 12: Extract of the 1:250 000 3118 Calvinia Geological Map (Council of Geoscience, Pretoria) indicating the original locality of the proposed Calvinia Bulk Water Supply and Bore Holes in the Northern Cape. Legend: White with single bird sigh-Quaternary sediments; J-D- Jurassic dolerite; Pt- Tierberg Formation and Pw-Whitehill Formation (Ecca Group, Karoo Supergroup). Map drawn by QGIS 2.18.28.

According to the:250 000 3118 Calvinia Geological Map (Council of Geoscience, Pretoria), the development footprint is underlain by Quaternary sediments; Jurassic dolerite; Tierberg Formation and Whitehill Formation (Ecca Group; Karoo Supergroup) (**Figure 3**).

The **Cenozoic Kalahari Group** is the most widespread body of terrestrial sediments in southern Africa. The Cenozoic sands and calcretes of the Kalahari Group range in thickness from a few metres to more than 180m (Partridge et al., 2006). The youngest formation of the Kalahari group is the Gordonia Formation, which is generally termed Kalahari sand and comprises red aeolian sands that cover most of the Kalahari Group sediments. The pan sediments of the area originated from the Gordonia Formation and contain white to brown fine-grained silts, sands and clays. Some of the pans consist of clayey material mixed with evaporates that shows seasonal effects of shallow saline groundwaters. Quaternary alluvium, aeolian sands, surface limestone, silcrete, and terrace gravels are also included in the Kalahari Group (Kent 1980).

Partridge *et al.* (2006) describe numerous types of superficial deposits of Late Cenozoic (Miocene to Pliocene to Recent) age throughout the Karoo Basin. Sands and gravel in the development footprint have a possible fluvial origin. These fossils represent terrestrial plants and animals with a close resemblance to living forms. Fossil assemblages include bivalves, diatoms, gastropod shells, ostracods and trace fossils. The palaeontology of the Quaternary superficial deposits has been relatively neglected in the past. Late Cenozoic calcrete may comprise of bones, horn cores as well as mammalian teeth. Tortoise remains have also been uncovered, as well as trace fossils which include termite and insect's burrows and mammalian trackways. Amphibian and crocodile remains have been uncovered where the depositional settings in the past were wetter.

Almond and Pether 2008 allocated a low significance to the Kalahari Group because fossil assemblages are generally rare and low in diversity and occur over a wide-ranging geographic area. In the past, palaeontologists did not focus on Cenozoic superficial deposits, although they sometimes comprise significant fossil biotas. However, Groenewald and Groenewald (2014) allocated a high palaeontological sensitivity to the Cenozoic aged terrestrial organisms, which are important indicators of palaeo-environmental conditions.

The **dolerite** (Jd) present in the development belongs to the Karoo Igneous Province that is a classic continental flood basalt province formed during the Early Jurassic. This province occurs over a large area in southern Africa and comprises a widespread system well developed igneous bodies (dykes, sills) that invaded the sediments of the Main Karoo Basin. Flood basalts do not typically form any visible volcanic structures, but with a series of outbursts form a suite of fissures of sub-horizontal lava flows that may vary in thickness. The Karoo is an old flood basalt province and is preserved today as erosional remnants of a more extensive lava cap that covered much of southern Africa in the geological past. As this Suite consist of igneous rocks, it is unfossiliferous.

The majority of the **Tierberg Formation** (Pt) (Ecca Group) comprises of well-laminated, dark grey to black shale (Johnson et al 2006). Some yellowish tuffaceous beds up to 10cm thick occur in the lower part of the succession along the western and northern margins of the Basin. Calcareous

concretions are common towards the top of the formation. Clastic rhythmites occur at various levels in the sequence (Cole, 2005). This formation is a deep-water deposit associated with event beds. The Tierberg formation is known for its rare trace fossils assemblages. Vascular plants (including petrified wood) and palynomorphs of *Glossopteris* flora have been found while fish fossils, crustaceans, shelly marine invertebrates, insects and as well as microfossils have been identified.

The **Whitehill Formation** of the Ecca Group is a comparatively thin succession of well-laminated carbon-rich mudrocks. The mudstone weathers to a characteristic pale grey to creamy white colour (Johnson et al, 2006). The Permian aged Whitehill Formation (high Palaeontological Sensitivity) is renowned for an abundance of body fossils as well as trace fossils. Almond (2011) described the main groups of Early Permian fossils found within the Whitehill Formation include as follows:

- A low diversity of trace fossils (possible shark coprolites / faeces and king crab trackways)
- Aquatic mesosaurid reptiles (the earliest known sea-going reptiles)
- Insects (preserved as isolated wings, although some intact specimens has also been recovered)
- Occasional cephalochordates (ancient relatives of the living lancets)
- Other rare vascular plant remains (*Glossopteris* leaves, lycopods *etc*)".
- Palynomorphs (organic-walled spores and pollens)
- Petrified wood (mostly of primitive gymnosperms, silicified or calcified)
- Several palaeoniscoid fish species (primitive bony fish)
- Small eocarid crustaceans are very common (bottom-living shrimp-like forms).

PROJECT DESCRIPTION

The current project involves a slight deviation to the original project which entail the establishment of a new pipeline route from the T-junction of the R27 and Ceres gravel road (R355) to connect with the pipeline at the Loeriesfontein (R355) road within the outskirts of Calvinia (**Figure 4-5**). The proposed pipeline alternative is located on the farm Ramskop and Die Calvinia Lande.

FARM	GPS coordinate	Terrain
Ramskop	31°29'17,3" S 19°44'37,7" E	Mostly undisturbed with slopes towards the north to the Oorlogskloof River. Covered with vegetation, topography is flat with several rocky outcrops. Currently utilized for grazing for sheep. The current temporary pipeline runs through both properties from southwest to northeast and is visible on the surface of the ground
Die Calvinia Lande	31°28'36,7" S 19°44'37,6" E	The terrain is very disturbed due to previous agricultural crop production. The area slightly slopes down towards the Oorlogskloof River towards the south of the terrain. Topography is flat, sandy with rocky areas underlain with irrigation pipelines and irrigation systems, as well as a furrow system.

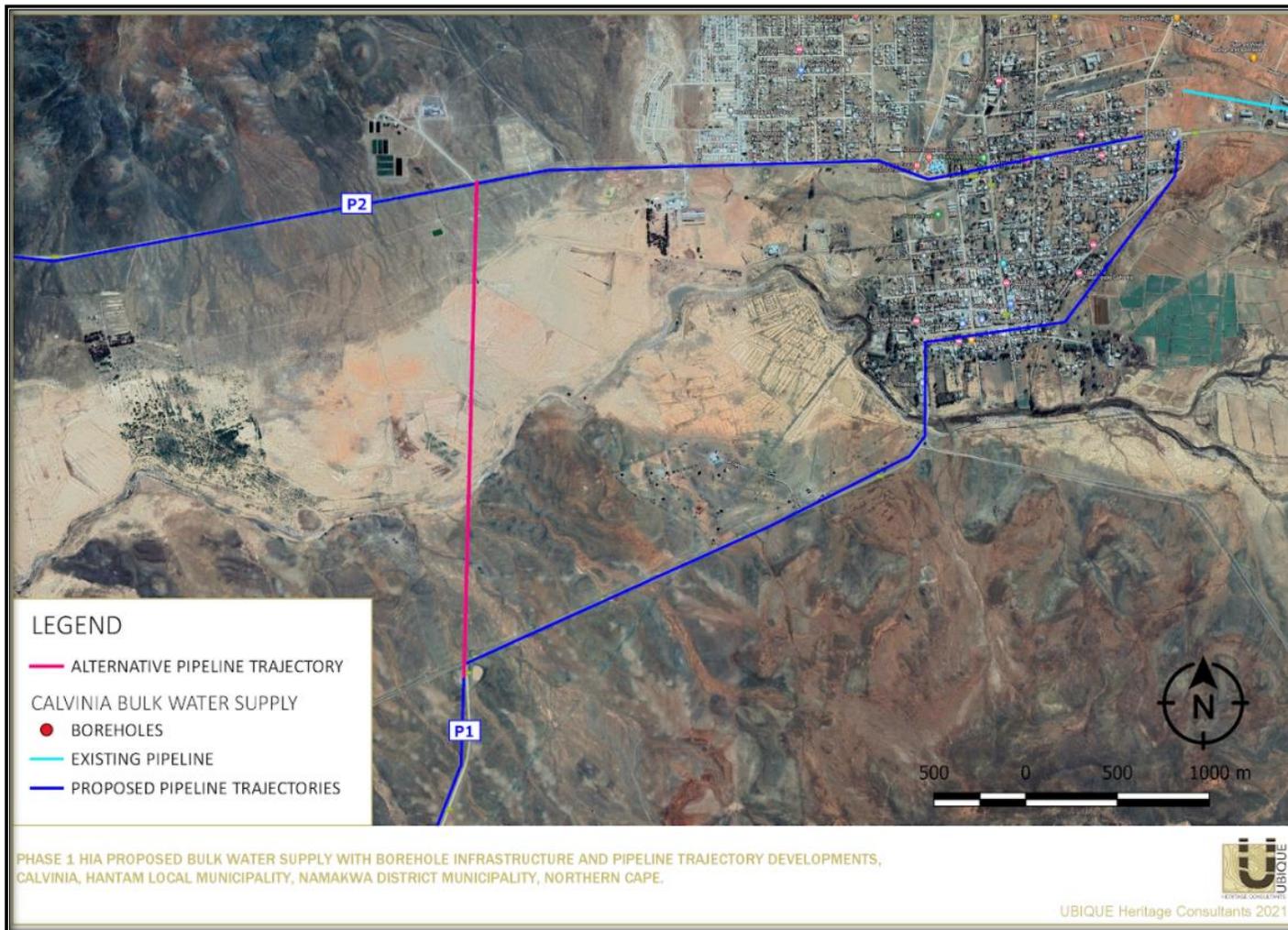


Figure 13: Google Earth (2021) locality map of the original and alternative pipeline trajectory.

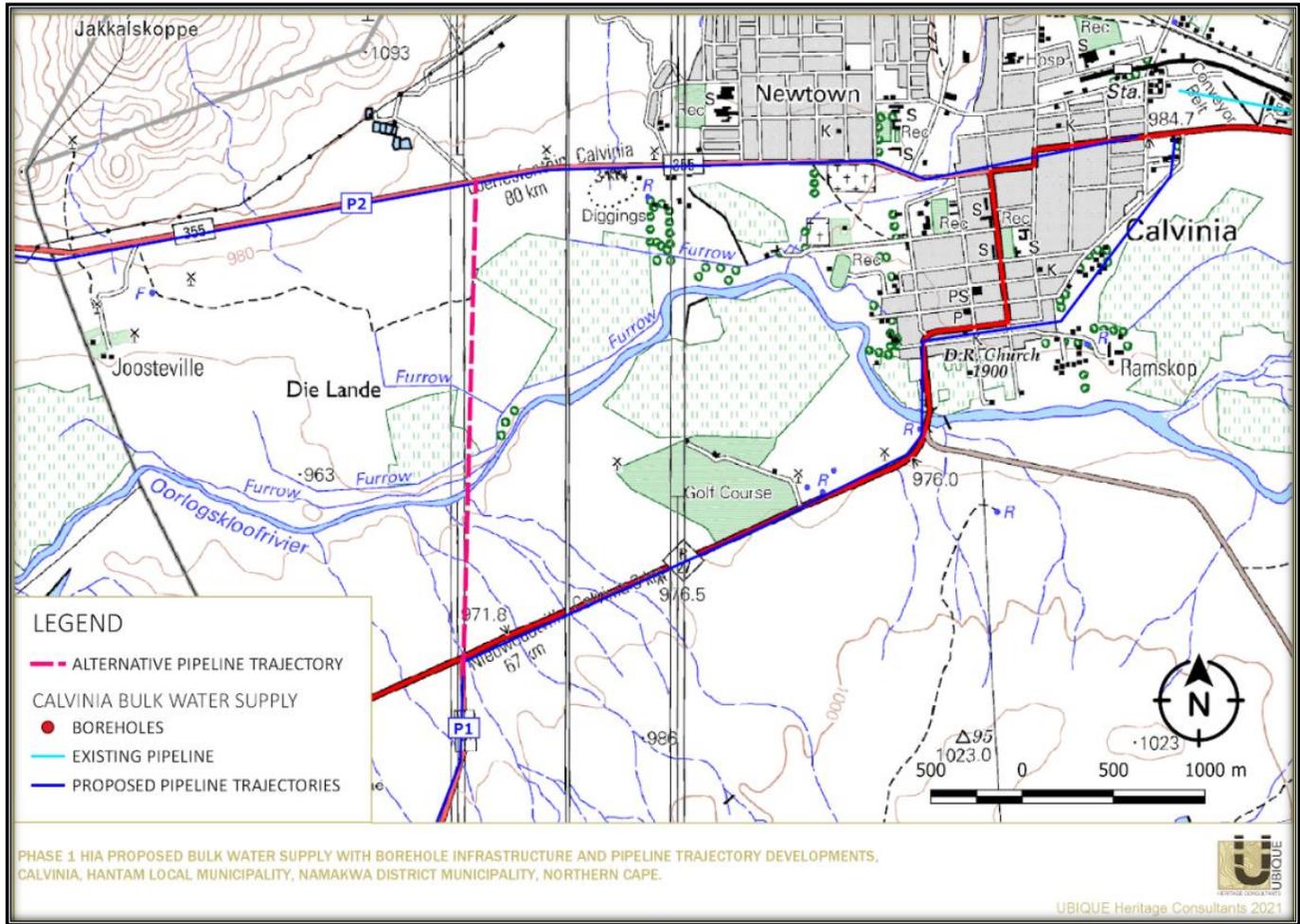


Figure 14: Locality map of the original and alternative pipeline trajectory.

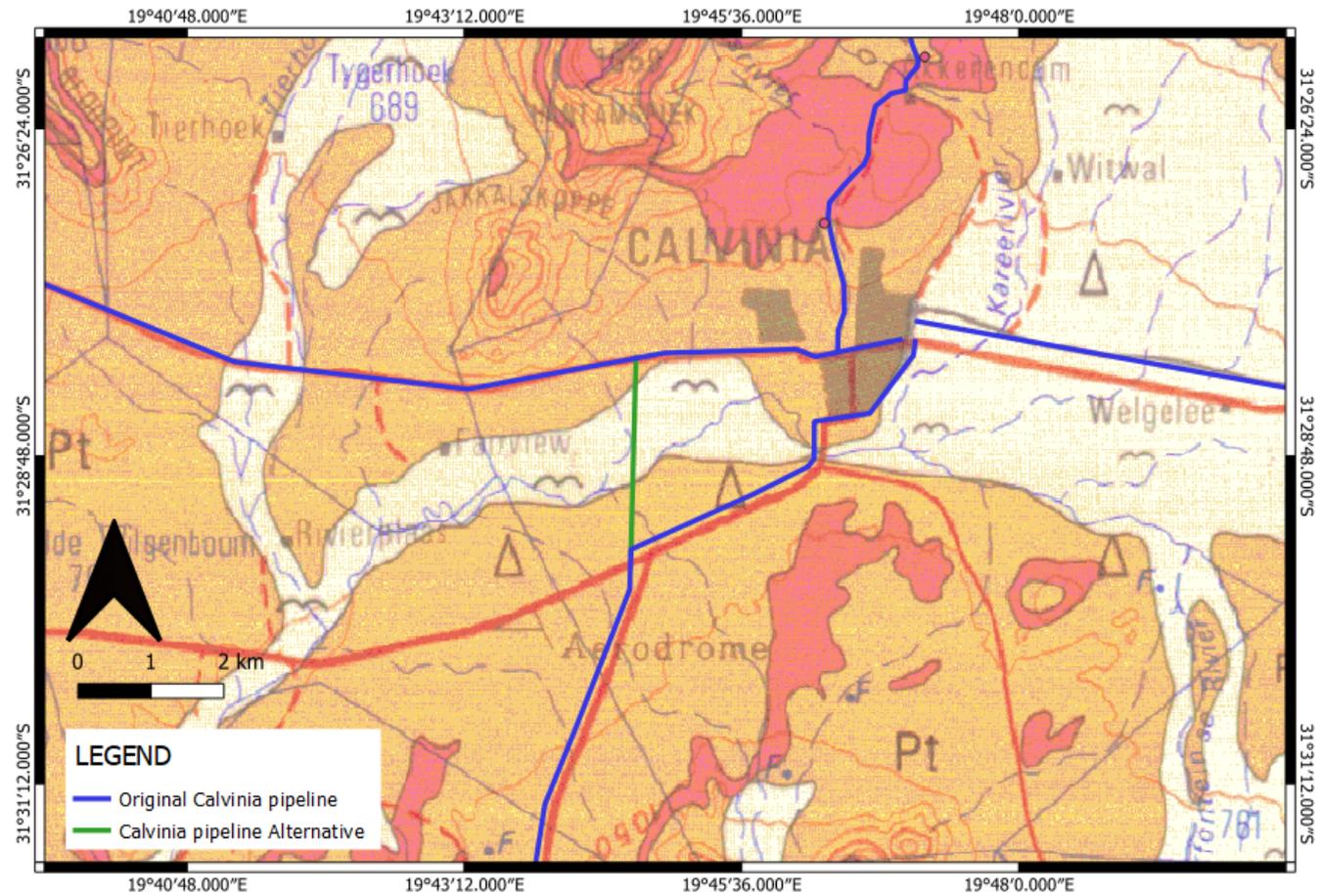


Figure 15: Extract of the 1:250 000 3118 Calvinia Geological Map (Council of Geoscience, Pretoria) indicating the original locality as well as the alternative pipeline of the proposed Calvinia Bulk Water Supply and Bore Holes in the Northern Cape. Legend: White with single bird sigh-Quaternary sediments; J-D- Jurassic dolerite; Pt- Tierberg Formation and Pw-Whitehill Formation (Ecca Group, Karoo Supergroup). Map drawn by QGIS 2.18.28

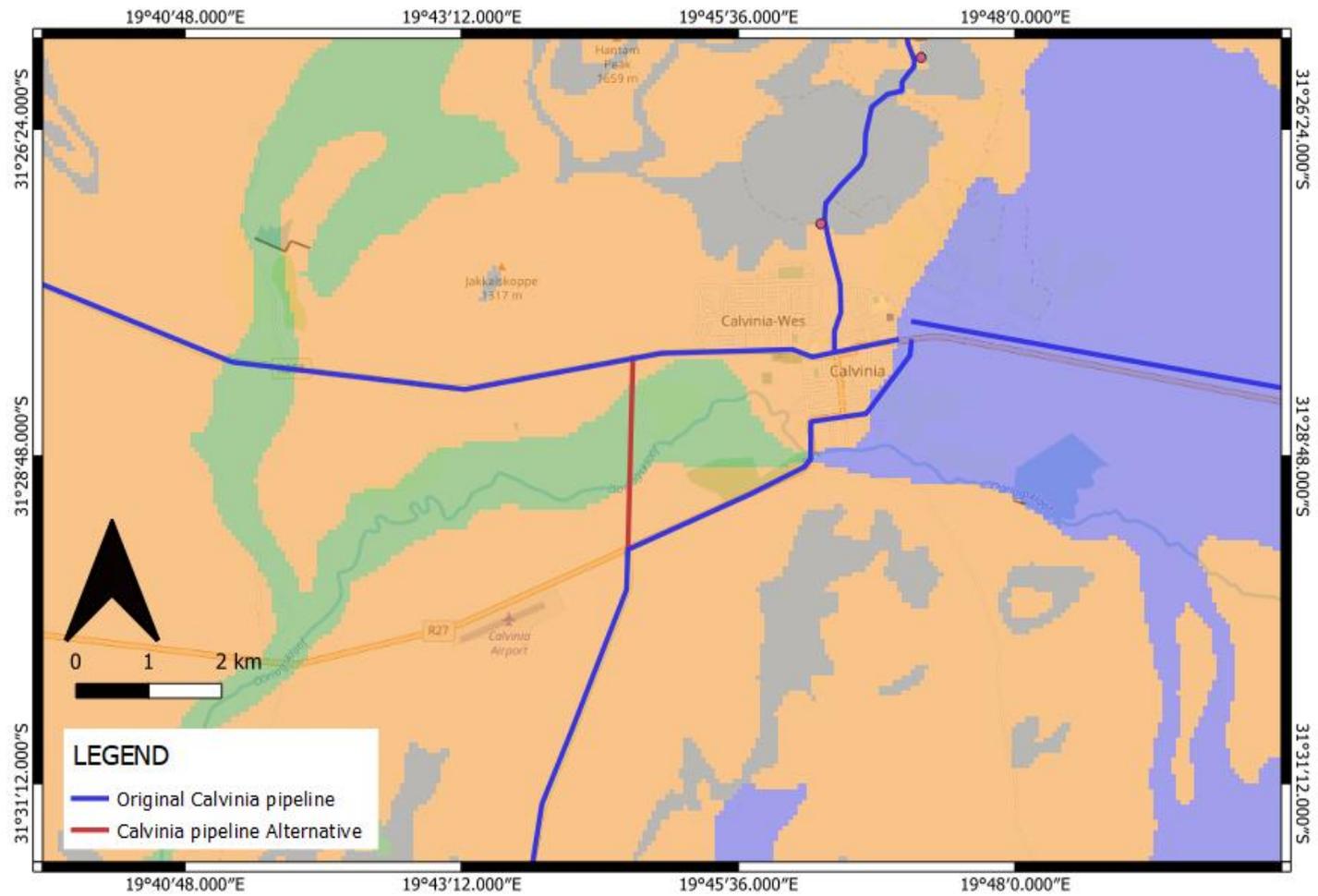


Figure 16: Extract of the 1 in 250 000 SAHRIS PalaeoMap map (Council of Geosciences) indicating the location of the proposed development

As indicated on the 1:250 000 3118 Calvinia Geological Map (Council of Geoscience, Pretoria, **Figure 6**) the proposed alternative pipeline is underlain by Quaternary sediments as well as the Tierberg Formation (Ecca Group, Karoo Supergroup). According to the PalaeoMap of the South African Heritage Resources Information System the Palaeontological Sensitivity Quaternary sediments is low, but local high, while the Tierberg Formation has a Moderate Palaeontological Sensitivity (**Figure 7**).

METHODOLOGY

The Methodology used for this letter is the same as was used for the original as well as the alternative Calvinia Bulk Water Supply pipeline and Bore Holes in the Northern Cape.

Summary

Loss of fossil heritage will be a negative impact. Only the site will be affected by the proposed development. The expected duration of the impact is assessed as potentially permanent to long term. In the absence of mitigation procedures, the damage or destruction of any palaeontological materials will be permanent. Impacts on palaeontological heritage during the construction phase could potentially occur and are regarded as having a high probability. The magnitude of the impact on the fossil heritage will be low. The significance of the impact occurring will be low.

1.1 National Heritage Resources Act (25 of 1999) (NHRA)

Cultural Heritage in South Africa, includes all heritage resources, is protected by the National Heritage Resources Act (Act 25 of 1999) (NHRA). Heritage resources as defined in Section 3 of the Act include **“all objects recovered from the soil or waters of South Africa, including archaeological and palaeontological objects and material, meteorites and rare geological specimens”**.

Palaeontological heritage is unique and non-renewable and is protected by the NHRA. Palaeontological resources may not be unearthed, broken moved, or destroyed by any development without prior assessment and without a permit from the relevant heritage resources authority as per section 35 of the NHRA.

This Palaeontological Impact Assessment was undertaken as part of this proposed amendment and adheres to the conditions of the Act. According to **Section 38 (1)** of the NHRA, a HIA is required to assess any potential impacts to palaeontological heritage within the development footprint where:

- the construction of a road, wall, power line, pipeline, canal or other similar form of linear development or barrier exceeding 300m in length;
- the construction of a bridge or similar structure exceeding 50m in length;
- any development or other activity which will change the character of a site—

- a. (exceeding 5 000 m² in extent; or
 - b. involving three or more existing erven or subdivisions thereof; or
 - c. involving three or more erven or divisions thereof which have been consolidated within the past five years; or
 - d. the costs of which will exceed a sum set in terms of regulations by SAHRA or a provincial heritage resources authority
 - e. the re-zoning of a site exceeding 10 000m² in extent;
- or any other category of development provided for in regulations by SAHRA or a Provincial heritage resources authority.

SPECIALIST COMMENT

As the geology of the original Calvinia Bulk Water Supply corresponds with that of the alternative pipeline, there will be no differences on the Impacts affecting these pipelines.

- The original Calvinia Bulk Water Supply is underlain by the Quaternary Sediments; Jurassic dolerite, Tierberg and Whitehill Formation (Ecca Group; Karoo Supergroup).
- The proposed alternative pipeline of the Calvinia Bulk Water Supply is underlain by the Quaternary Sediments as well as the Tierberg Formation (Ecca Group; Karoo Supergroup).

And thus, a low overall Palaeontological significance is allocated to the site. Please note that the present amendment letter must be read in conjunction with the original PIA report by Elize Butler.

From a Palaeontological perspective, there will be no advantages or disadvantages of the proposed pipeline deviation.

CONCLUSION

The overall impact rating reflected in the Palaeontological Impact Assessment report for the original Calvinia Bulk Water Supply corresponds with that of the alternative pipeline will not change as:

- 1) As the geology of the original Calvinia Bulk Water Supply corresponds with that of the alternative pipeline.

Yours sincerely



Elize Butler



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