

**FIRST PHASE CULTURAL HERITAGE IMPACT
ASSESSMENT OF THE PROPOSED BHILIYA ROAD
UPGRADE NEAR LADYSMITH, KWAZULU-NATAL.**



For: Hanslab (Pty) Ltd

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Declaration of Consultants independence

Frans Prins is an independent consultant to Hanslab (PTY) Lmt and has no business, financial, personal or other interest in the activity, application or appeal in respect of which he was appointed other than fair remuneration for work performed in connection with the activity, application or appeal. There are no circumstances whatsoever that compromise the objectivity of this specialist performing such work.



Frans Prins

LIST OF ABBREVIATIONS AND ACRONYMS

EIA	Early Iron Age
ESA	Early Stone Age
HISTORIC PERIOD	Since the arrival of the white settlers - c. AD 1836 in this part of the country
IRON AGE	Early Iron Age AD 200 - AD 1000 Late Iron Age AD 1000 - AD 1830
LIA	Late Iron Age
LSA	Late Stone Age
MSA	Middle Stone Age
NEMA	National Environmental Management Act, 1998 (Act No. 107 of 1998 and associated regulations (2006).
NHRA	National Heritage Resources Act, 1999 (Act No. 25 of 1999) and associated regulations (2000)
SAHRA	South African Heritage Resources Agency
STONE AGE	Early Stone Age 2 000 000 - 250 000 BP Middle Stone Age 250 000 - 25 000 BP Late Stone Age 30 000 - until c. AD 200

EXECUTIVE SUMMARY

A cultural heritage survey of the proposed upgrade of the Bhiliya mud track near Ladysmith, KwaZulu-Natal identified no heritage sites on the footprint. There is no reason from a heritage perspective why the development may not proceed as planned. The area is also not part of any known cultural landscape. However, attention is drawn to the South African National Heritage Resources Act, 1999 (Act No. 25 of 1999) (NHRA) and the KwaZulu-Natal Heritage Act (Act No. 4 of 2008) which requires that operations that expose archaeological or historical remains should cease immediately, pending evaluation by the provincial heritage agency.

1 BACKGROUND INFORMATION ON THE PROJECT

The consultant was approached by Hanslab (Pty) Ltd to conduct a heritage impact assessment (HIA) of the Bhiliya mud track near Ladysmith. According to the National Heritage Resources Act, 1999 (NHRA) (Act No. 25 of 1999), the heritage resources of South Africa include:

- a. places, buildings, structures and equipment of cultural significance;
- b. places to which oral traditions are attached or which are associated with living heritage;
- c. historical settlements and townscapes;
- d. landscapes and natural features of cultural significance;
- e. geological sites of scientific or cultural importance;
- f. archaeological and palaeontological sites;
- g. graves and burial grounds, including-
 - i. ancestral graves;
 - ii. royal graves and graves of traditional leaders;
 - iii. graves of victims of conflict;
 - iv. graves of individuals designated by the Minister by notice in the Gazette;
 - v. historical graves and cemeteries; and
 - vi. other human remains which are not covered in terms of the Human Tissue Act, 1983 (Act No. 65 of 1983);
- h. sites of significance relating to the history of slavery in South Africa;
- i. movable objects, including-
 - i. objects recovered from the soil or waters of South Africa, including archaeological and palaeontological objects and material, meteorites and rare geological specimens;

- ii. objects to which oral traditions are attached or which are associated with living heritage;
- iii. ethnographic art and objects;
- iv. military objects;
- v. objects of decorative or fine art;
- vi. objects of scientific or technological interest; and
- vii. books, records, documents, photographic positives and negatives, graphic, film or video material or sound recordings, excluding those that are public records as defined in section 1(xiv) of the National Archives of South Africa Act, 1996 (Act No. 43 of 1996).

The newly promulgated KwaZulu-Natal Heritage Act (Act No. 4 of 2008) also makes specific mention to rock art and archaeological sites.

It is furthermore stated that:

—(1) No person may destroy, damage, excavate, alter, write or draw upon, or otherwise disturb any battlefield site, archaeological site, rock art site, palaeontological site, historic fortification, meteorite or meteorite impact site without the prior written approval of the Council having been obtained on written application to the KwaZulu-Natal Heritage Council.

(2) Upon discovery of archaeological or palaeontological material or a meteorite by any person, all activity or operations in the general vicinity of such material or meteorite must cease forthwith and a person who made the discovery must submit a written report to the Council without delay.

(3) The Council may, after consultation with an owner or controlling authority, by way of written notice served on the owner or controlling authority, prohibit any activity considered by the Council to be inappropriate within 50 metres of a rock art site.

(4) No person may exhume, remove from its original position or otherwise disturb, damage, destroy, own or collect any object or material associated with any battlefield site, archaeological site, rock art site, palaeontological site, historic fortification, meteorite or meteorite impact site without the prior written approval of the Council having been obtained on written application to the Council.

(5) No person may bring any equipment which assists in the detection of metals and archaeological and palaeontological objects and material, or excavation equipment onto any battlefield site, archaeological site, rock art site, palaeontological site, historic fortification, or meteorite impact site, or use similar detection or excavation equipment

for the recovery of meteorites, without the prior written approval of the Council having been obtained on written application to the Council.

(6) (a) The ownership of any object or material associated with any battlefield site, archaeological site, rock art site, palaeontological site, historic fortification, meteorite or meteorite impact site, on discovery, vest in the Provincial Government and the Council is regarded as the custodian on behalf of the Provincial Government.

(b) The Council may establish and maintain a provincial repository or repositories for the safekeeping or display of—

(i)

archaeological objects;

(ii)

palaeontological material;

(iii)

ecofacts;

(iv)

objects related to battlefield sites;

(v)

material cultural artefacts; or

(vi)

meteorites.

(7) The Council may, subject to such conditions as the Council may determine, loan any object or material referred to in subsection (6) to a national or provincial museum or institution.

(8) No person may, without the prior written approval of the Council having been obtained on written application to the Council, trade in, export or attempt to export from the Province—

(a)

any category of archaeological object;

(b)

any palaeontological material;

(c)

any ecofact;

(d)

any object which may reasonably be regarded as having been recovered from a battlefield site;

(e)

any material cultural artefact; or

(f) any meteorite.

(9) (a) A person or institution in possession of an object or material referred to in paragraphs (a) – (f) of subsection (8), must submit full particulars of such object or material, including such information as may be prescribed, to the Council.

(b) An object or material referred to in paragraph (a) must, subject to paragraph (c) and the directives of the Council, remain under the control of the person or institution submitting the particulars thereof.

(c) The ownership of any object or material referred to in paragraph (a) vest in the Provincial Government and the Council is regarded as the custodian on behalf of the Provincial Government.

This study aims to identify and assess the significance of any heritage and archaeological resources occurring on the site. Based on the significance, the impact of the development on the heritage resources would be determined. Then appropriate actions to reduce the impact on the heritage resources would be put forward. In terms 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:

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

Table 1. Background information

Consultants:	Active Heritage cc for Hanslab (Pty) Ltd
Type of development:	The KZN Department of Transport (DOT) proposes to upgrade the existing Bhiliya mud track to a type 7A gravel road. The upgraded local road will be approximately 3.2km in length, 6 m width and 20 m road reserve which conforms to DOT standards for a local road upgrades. The upgrade will take place in the Doornhoek area in Ladysmith under the Alfred Duma Local Municipality, administered by the UThukela District Municipality. The upgrade of the track will allow for improved access to dwellings, while minimizing erosion and surface run-off along the track as a result of poor storm water management. The mud track transverses numerous water crossings/drainage lines, therefore the applicant proposes to construct a causeway structure (portal culvert structure) at the major crossing point, and pipe culvert structures within each minor crossing point to allow for the natural flow of water within the channel.
Rezoning or subdivision:	Rezoning
Terms of reference	To carry out a Heritage Impact Assessment
Legislative requirements:	The Heritage Impact Assessment was carried out in terms of the National Environmental Management Act, 1998 (Act No. 107 of 1998) (NEMA) and following the requirements of the National Heritage Resources Act, 1999 (Act No. 25 of 1999) (NHRA) and the KwaZulu Natal Heritage Act (Act No. 4 of 2008)

1.1. Details of the area surveyed:

The upgrade will take place in the Doornhoek area in Ladysmith under the Alfred Duma Local Municipality, administered by the UThukela District Municipality (Fig 1). The GPS coordinates for the proposed road upgrade are:

Start: S 29°19'30.81" E 29°45'19.78"

End: S 28°19'15.28" E 29°46'46.73"

The upgrade of the track will allow for improved access to dwellings, while minimizing erosion and surface run-off along the track as a result of poor storm water management. The mud track transverses numerous water crossings/drainage lines (Fig 3) , therefore the applicant proposes to construct a causeway structure (portal culvert structure) at the major crossing point, and pipe culvert structures within each minor crossing point to allow for the natural flow of water within the channel. The upgraded local road will be

approximately 3.2km in length, 6 m width and 20 m road reserve which conforms to DOT standards for a local road upgrades.

The alternative route to the upgrade of the Bhiliya mud track transverses along an added water crossing (Channel 9) as opposed to the preferred route (red line on Fig 2). This alternative route was proposed by the applicant because the route already contained a path and only small amounts of vegetation would need to be cleared along the way as opposed to the preferred route, where more vegetation will have to be cleared. Given these attributes, the alternate route would pose more environmental impacts as it transverses over an added water crossing. In this regard, the option with the least amount of environmental impacts would be given the preferred option.

2 BACKGROUND TO ARCHAEOLOGICAL HISTORY OF AREA

Portions of the greater Ladysmith area have been systematically surveyed for archaeological heritage sites in the past. These were mostly conducted by archaeologists attached to the KwaZulu-Natal Museum as well as by Amafa staff. Sixty one sites are recorded in the data base of the KwaZulu-Natal Museum. These include five Early Stone Age sites, five Middle Stone Age sites, six Later Stone Age sites, three rock art sites (two rock paintings and one rock engraving), and eleven Later Iron Age sites and twenty historical period Nguni homesteads. The majority of the Later Iron Age and historical period Nguni homesteads are demarcated by characteristic stone walling. Stone walling and graves related to the Anglo-Boer War period of 1899-1901 are also abundant in the area. Ten sites are recorded in the Natal Museum data base but many more sites belonging to this period should occur in the greater Ladysmith area. The project area has not been systematically surveyed in the past and no heritage sites are known from the footprint. However, various Later Iron Age sites occur approximately 10km to the east, west and south of the study area.

The San were the owners of the land for almost 30 000 years but the local demography started to change soon after 2000 years ago when the first Bantu-speaking farmers crossed the Limpopo River and arrived in South Africa. Around 800 years ago, if not earlier, Bantu-speaking farmers also settled in the greater Ladysmith area. Although some of the sites constructed by these African farmers consisted of stone walling not all of them were made from stone. Sites located elsewhere in the KwaZulu-Natal Midlands

show that many settlements just consisted of wattle and daub structures. These Later Iron Age sites were most probably inhabited by Nguni-speaking groups such as the amaBhele and others (Bryant 1965). However, by 1820 the original African farmers were dispersed from this area due to the expansionistic policies of the Zulu Kingdom of King Shaka. Many individuals of former chiefdoms in the area became bandits and oral tradition suggests that cannibalism may also have been practised by some of these groups. African refugee groups and individuals were given permission to settle in the area by the British colonial authorities after 1845 where most of them became farm labourers. After the Anglo-Zulu war of 1879 and the Bambatha Rebellion of 1911 many of the African people in the study area adopted a Zulu ethnic identity.

European settlement of the area started soon after 1838 when the first Voortrekker settlers marked out large farms in the area. However, most of these farms were abandoned in the 1840's when Natal became a British colony only to be reoccupied again by British immigrants. Nevertheless, a group of Dutch farmers declared an independent republic in 1847 on the banks of the Klip River and called it the Klip River Republic with Andries Spies as commandant. This pocket republic only survived for a few months before British authority over the area was declared. The British planned a town as an administrative centre for the Klip River District, proclaiming it on 20 June 1850 and called it Ladysmith. Ladysmith became world famous during the Anglo-Boer War of 1899-1901 when it was besieged by Boers from 2 November 1899 until 28 February 1900. Ghandi, Smuts and Churchill are figures of international significance who were also present during the siege of Ladysmith. During the 118 day long siege the stone Town Hall sustained considerable damage. It has since been restored to the original vision of the architects. Located next to the Town Hall the building housing the Siege Museum was erected in 1884. It was used as a rations post for civilians. The Museum displays relics from the time of the siege, including documents, uniforms and firearms. Several of the most celebrated battles of the war were fought around Ladysmith. These include the Battles of Elandslaagte, Spionkop, Wagon Hill, Caesars Camp, Lombards Kop and Umbulwana Hill. These battle field sites as well as associated graves and buildings of the era are proclaimed heritage sites and are protected by provincial heritage legislation (Derwent 2006).

2.1 Short History of the Siege of Ladysmith

As war with the Boer republics appeared likely in June 1899, the War Office in Britain dispatched a total of 15,000 troops to Natal, expecting that if war broke out they would

be capable of defending the colony until reinforcements could be mobilized and sent to South Africa by steamship. Some of these troops were diverted while returning to Britain from India, others were sent from garrisons in the Mediterranean and elsewhere. Lieutenant General Sir George White was appointed to command this enlarged force. White was 64 years old and suffered from a leg injury incurred in a riding accident. Having served mainly in India, he had little previous experience of South Africa.

Contrary to the advice of several British officials such as Sir Alfred Milner, the High Commissioner for Southern Africa, the Boer governments were not over-awed by the despatch of British troops to Natal. Instead, they regarded it as evidence of Britain's determination to seize control of the Boer republics. The Transvaal government under President Paul Kruger considered launching an attack in September, but President Steyn of the Orange Free State, who would later become the spiritual heart of the Boer resistance, dissuaded them for several weeks while he tried to act as intermediary. With the complete breakdown in negotiations, both republics declared war and attacked on 12 October.

A total of 21,000 Boers advanced into Natal from all sides. White had been advised to deploy his force far back, well clear of the area of northern Natal known as the "Natal Triangle", a wedge of land lying between the two Boer republics. Instead, White deployed his forces around the garrison town of Ladysmith, with a detachment even further forward at Dundee. The entire British force could concentrate only after fighting two battles at Talana Hill and Elandslaagte. As the Boers surrounded Ladysmith, White ordered a sortie by his entire force to capture the Boer artillery. The result was the disastrous Battle of Ladysmith, in which the British were driven back into the town having lost 1,200 men killed, wounded or captured.

The Boers then proceeded to surround Ladysmith and cut the railway link to Durban. Major General French and his Chief of Staff, Major Douglas Haig escaped on the last train to leave, which was riddled with bullets. The town was then besieged for 118 days. White knew that large reinforcements were arriving, and could communicate with British units south of the Tugela River by searchlight and heliograph. He expected relief soon. Meanwhile, his troops carried out several raids and sorties to sabotage Boer artillery.

Louis Botha commanded the Boer detachment which first raided Southern Natal, and then dug in north of the Tugela to hold off the relief force. On 15 December, the first

relief attempt was defeated at the Battle of Colenso. Temporarily unnerved, the relief force commander, General Redvers Henry Buller, suggested that White either break out or destroy his stores and ammunition and surrender. White could not break out because his horses and draught animals were weak from lack of grazing and forage, but also refused to surrender.

On Christmas Day 1899, the Boers fired into Ladysmith a carrier shell without fuse, which contained a Christmas pudding, two Union Flags and the message "compliments of the season". The shell is still kept in the museum at Ladysmith. A drive around Ladysmith and the surrounding hills will reveal many gravesites and memorials to the fallen soldiers on both sides (Lewis 1999).

3 BACKGROUND INFORMATION OF THE SURVEY

3.1 Methodology

A desktop study was conducted of the SAHRA inventory of heritage sites as reflected on the SAHRIS website. In addition, the archaeological database of the KwaZulu-Natal Museum was consulted. Although the greater Ladysmith area is rich in archaeological and heritage sites none are listed for the footprint.

The study area was visited on the 11 May 2017. A ground survey following standard and accepted archaeological procedures was conducted. A transect of 50m on either side of the centre of the existing mud track was surveyed.

3.2 Restrictions encountered during the survey

3.2.1 Visibility

Visibility during the site visit was good.

3.2.2 Disturbance.

No disturbance of any heritage sites have been observed.

3.3 Details of equipment used in the survey

GPS: Garmin Etrek

Digital cameras: Canon Powershot A460

All readings were taken using the GPS. Accuracy was to a level of 5 m.

4 DESCRIPTION OF SITES AND MATERIAL OBSERVED

4.1 Locational data

Province: KwaZulu-Natal

Town: Ladysmith

4.2 Description of the general area surveyed

Although the greater Ladysmith area is rich in archaeological and other heritage sites none were recorded on the actual footprint. Historical period sites relating to the Voortrekker era (1830's), Anglo-Zulu War (1879) and the Anglo-Boer War period of 1899-1901 do occur abundantly in the greater Ladysmith area but none of those listed on national and provincial data bases occur less than 10km from the footprint. Particular care was taken to locate grave sites but none are situated closer than 50m to the proposed road upgrade. Erosion scars and dongas occur adjacent to the existing mud track but no artefacts or archaeological material was observed as eroding out of these (Fig 4). The proposed road upgrade is also not part of any known cultural landscape (Table 2).

Table 2. Evaluation and statement of significance.

Significance criteria in terms of Section 3(3) of the NHRA		
	Significance	Rating
1.	Historic and political significance - The importance of the cultural heritage in the community or pattern of South Africa's history.	None on footprint but greater area contains many sites
2.	Scientific significance – Possession of uncommon, rare or endangered aspects of South Africa's cultural heritage.	None.
3.	Research/scientific significance – Potential to yield information that will contribute to an understanding of South Africa's natural or cultural heritage.	None.
4.	Scientific significance – Importance in demonstrating the principal characteristics of a particular class of South Africa's cultural places/objects.	None.
5.	Aesthetic significance – Importance in exhibiting particular aesthetic characteristics valued by a community or cultural group.	None.
6.	Scientific significance – Importance in demonstrating a high degree of creative or technical achievement at a particular period.	None.
7.	Social significance – Strong or special association with a particular community or cultural group for social, cultural or spiritual reasons.	None.
8.	Historic significance – Strong or special association with the life and work of a person, group or organization of importance in the history of South Africa.	None.
9.	The significance of the site relating to the history of slavery in South Africa.	None.

4.3 Dating the findings

Not applicable, as no heritage sites occur on the footprint.

5 STATEMENT OF SIGNIFICANCE (HERITAGE VALUE)

5.1 Field Rating

The SAHRA system of field rating (Table 3) does not apply in this study as no heritage sites occur on the footprint.

Table 3. Field rating and recommended grading of sites (SAHRA 2005)

Level	Details	Action
National (Grade I)	The site is considered to be of National Significance	Nominated to be declared by SAHRA
Provincial (Grade II)	This site is considered to be of Provincial significance	Nominated to be declared by Provincial Heritage Authority
Local Grade IIIA	This site is considered to be of HIGH significance locally	The site should be retained as a heritage site
Local Grade IIIB	This site is considered to be of HIGH significance locally	The site should be mitigated, and part retained as a heritage site
Generally Protected A	High to medium significance	Mitigation necessary before destruction
Generally Protected B	Medium significance	The site needs to be recorded before destruction
Generally Protected C	Low significance	No further recording is required before destruction

6 RECOMMENDATIONS

The proposed upgrade of the Bhiliya mud track may proceed from a heritage perspective as no heritage and/or archaeological sites are threatened by the proposed development. The footprint is also not part of any known cultural landscape. It should, however, be pointed out that the KwaZulu-Natal Heritage Act requires that operations exposing archaeological and historical residues should cease immediately pending an evaluation by the heritage authorities.

7 MAPS AND PHOTOGRAPHS

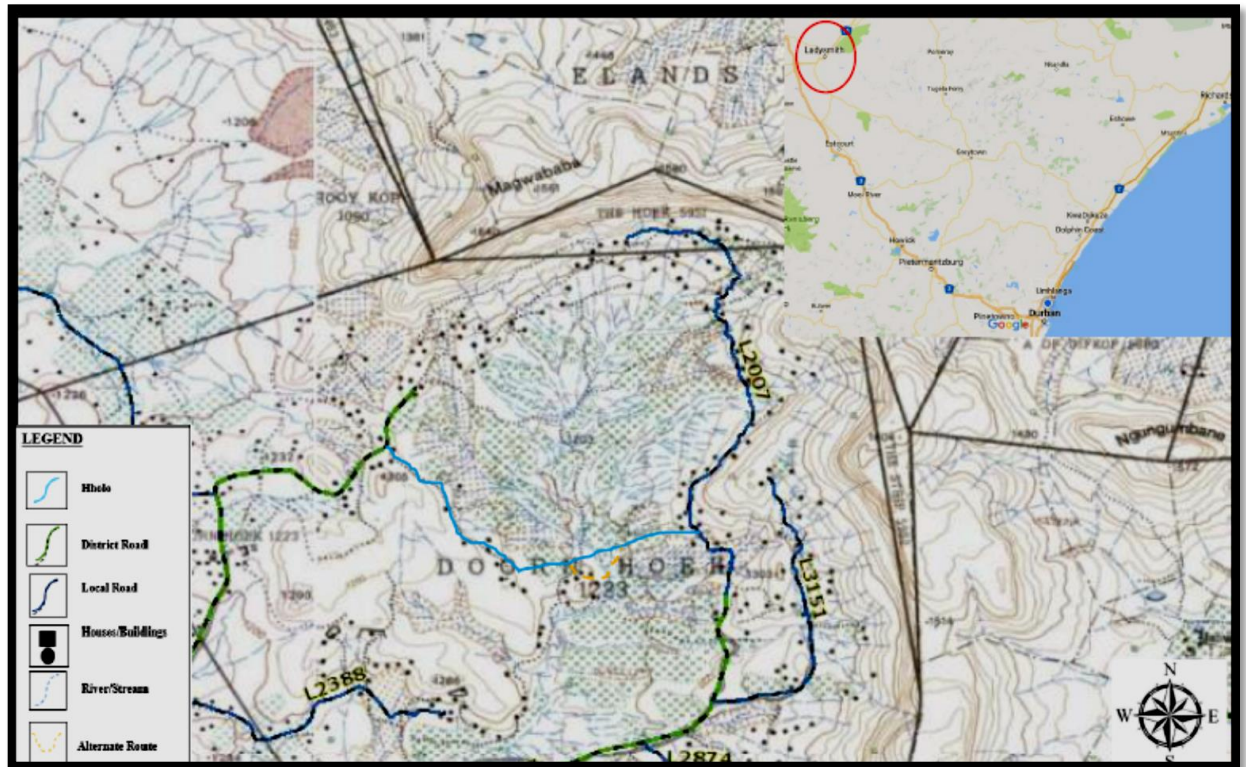


Figure 1. Locality Map of the Project Area (Source: Hanslab).

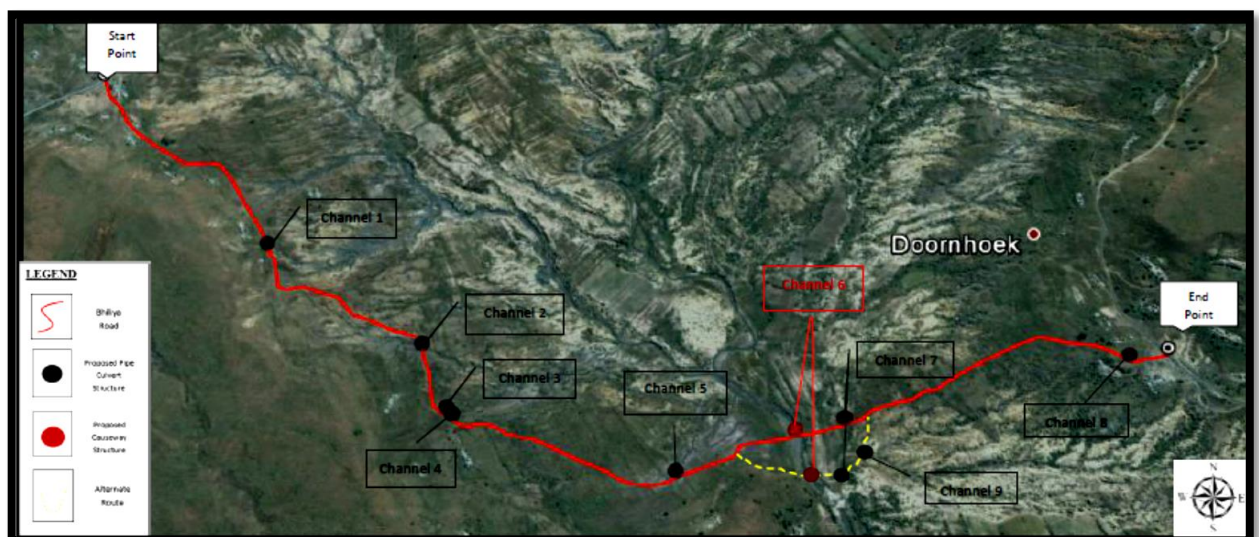


Figure 2. Map of the proposed route (Source: Hanslab).



Figure 3. View of the existing Bhiliya mud track at a river crossing. No heritage sites occur adjacent to the track.



Figure 4. Erosion scars adjacent to the existing Bhiliya mud track.

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APPENDIX 1

Palaeontological impact assessment report for the proposed upgrade of the Bhiliya mud track to type 7A gravel road, situated in the Doornhoek area, Ladysmith district, KwaZulu-Natal

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12 May 2017

Declaration of Consultants independence

Gary Trower is an independent consultant to Hanslab (PTY) Ltd. and has no business, financial, personal or other interest in the activity, application or appeal in respect of which he was appointed other than fair remuneration for work performed in connection with the activity, application or appeal. There are no circumstances whatsoever that compromise the objectivity of this specialist performing such work.



Gary Trower

12 MAY 2017

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Figure 1: Geological map of the region showing the lithology in the vicinity of development

Figure 2: Satellite image of the site showing pathway the road will follow

Figure 3: Satellite image showing bedrock close to the surface

Introduction

In terms of the National Environmental Management Act 107 of 1998, Section 38 (8) of the National Heritage Resources Act 25 of 1999, and the KwaZulu-Natal Heritage Act 4 of 2008, all aspects of cultural heritage are protected and proposed developments that are likely to impact on facets of heritage (i.e. historical, archaeological, palaeontological & cosmological,) require a field assessment in order to gauge the nature of potential heritage resources and to ensure that such resources are not damaged or destroyed through the activity which threatens them.

The KwaZulu-Natal Department of transport proposes to upgrade the existing Bhiliya mud track to a gravel road (type 7A), approximately 3.2km in length and 6m wide. This area has a high palaeosensitivity rating as the surrounding geology is known to be fossiliferous, therefore a desktop PIA was required to assess the possibility of fossil occurrences in the landscape.

Geology

The geology of the broader landscape surrounding the site is dominated by late Permian argillaceous deposits of the Ecca and Beaufort Groups (Figure 1). The Ecca shales are representative of the Volksrust Formation and are blue-grey to dark-grey in colour. This rock type was observed within the drainage lines of the Google Earth image of the proposed road, (file: Bhiliya Road.kml, Figures 2 & 3), as well as being the recognisable rock type within the centre of the green circle of Figure 1. Within this region, the Beaufort is represented by the Adelaide Subgroup and comprises of dark-grey shales which are carbonaceous in places, as well as grey mudstones, siltstone and sandstone. There are also several outcrops of dolerite in the region, representing Jurassic lava intrusions which

gave rise to the dolerite dykes in the landscape. Considerably younger alluvial deposits occur alongside many of the drainage lines within the valleys and are Quaternary in age (Figure 1).

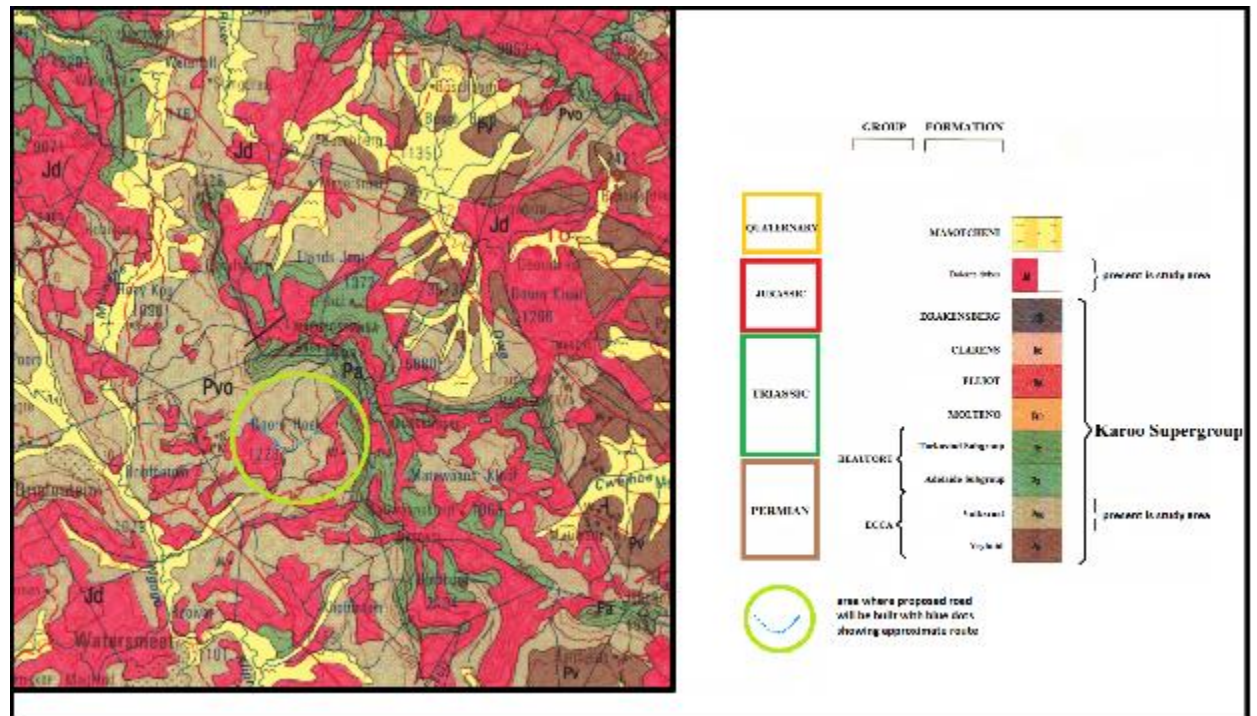


Figure 1: Geological map showing the lithology of the region where the proposed development will take place. Stratigraphic layers of palaeontological interest include Late Permian Ecca deposits comprising of blue-grey to dark-grey shale of the Volksrust Formation (**Pvo, light brown**) & predominantly argillaceous sediments (grey mudstone, dark-grey shale & siltstone) representing the Adelaide Subgroup of the Beaufort (**Pa, green**). Other common geological occurrences observed in the landscape include Jurassic intrusions giving rise to dolerite dykes (**Jd, pink**), as well as much younger Quaternary alluvial deposits (**yellow**). The green circle indicates the area where the proposed road will be built whereas the blue dotted line indicates the approximate pathway that it will follow.



Figure 2: Satellite image of the area where the proposed Bhiliya upgrade will take place. Most of the road snakes its way above the exposed Eccra bedrock up until it reaches Point A where the bedrock is close to the surface but not exposed. Point B represents reworked Eccra deposits within the main channel of the erosional gully, and is also the position where the portal culvert structure will be built. Image courtesy of Google Earth, DigitalGlobe (2016).



Figure 3: Looking south, the long blue arrow (A) indicates where the road will move over bedrock which is very close to the surface but not exposed. Although the underlying Ecca along this section of the route may contain fossils, a thin layer of soil lightly covers the bedrock along the mountain slope. The vertical arrow (B) represents reworked Ecca deposits and the position where the portal culvert structure will be placed. Image courtesy of Google Earth, DigitalGlobe (2016).

Palaeontology

The Karoo Basin is one of the richest fossil sites in the world, representing a phenomenal geological succession which preserves the evolution and development of several tetrapod lineages, including Synapsids (the ancestors of mammals), diapsids (the ancestors of dinosaurs and reptiles) and Anapsids (the ancestors of tortoises and turtles). For this precise reason, SAHRA has given this area a palaeontological sensitivity rating of high (indicated as orange/yellow, see www.sahra.org.za/sahris/map/palaeo) for the argillaceous sediments of the Volksrust Formation present in this region. These fine-

grained sediments represent the accumulations along the floor of a giant inland sea, fed by several rivers and representing a complex system of thriving palaeo-ecosystems.

Heritage resources in the landscape: palaeontological impact of Bhiliya Road

An aerial survey of the landscape surrounding the proposed development did not reveal any obvious stone-walled structures, usually common features in this region.

The geological map (Figure 1) indicates that the pathway of the road will sit on Eccabedrock. None of the bedrock is directly exposed along the proposed route of the road, except at point B and possibly approaching the surface along section A. An observed buffer varying in height and comprising of top soil and colluvial debris (e.g. dolerite boulders) may serve to protect potential fossils located in underlying bedrock from roadway construction above reducing possible damage to fossiliferous patches. Therefore the construction of this road is unlikely to pose any threat to palaeontological resources in the landscape as the pathway of the road mostly avoids the exposures of Eccabedrock and these are often partially shielded by overlying younger sediments.

Recommendations

Fossils may occur in the region and some of these may lay buried in the vicinity of the road (based on the SAHRA sensitivity map), but the proposed upgrade of the road can proceed as the possibility of encountering fossils during the construction process is unlikely. Furthermore, the bedrock at Point B is highly disturbed and out of context, so construction of the culvert at this point will not be disturbing “virgin” bedrock.

Development should exist in balance with environmental and heritage conservation, but this site has no (observable) criteria to warrant protection status. The community living

in this region will benefit from the upgraded road and it will ultimately have a positive impact on many families, whereas no heritage resources are likely to be damaged during the construction process.