Phase I Heritage Assessment National Route R40 and R527 at Hoedspruit Development Project

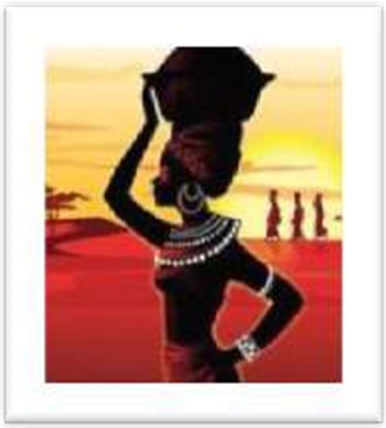
Province: Limpopo Province

District Municipality: The Mopane District Municipality

Local Municipality: Maruleng Local Municipality

Implementing Agent: SANRAL

For: Delta Environmetal Services



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Executive Summary

This report addresses the Proposed New Grade-Separated Interchange on National Route R40 and R527 at Hoedspruit in the Maruleng Local Municipality within the Mopani District, in the Limpopo Province of South Africa. The seat of the municipality is Hoedspruit.

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The main sources of information are a literature review and the SAHRIS database supplemented by a field survey entailing a vehicle and pedestrian reconnaissance.

The New Grade-Separated Interchange on National Route R40 and R527 project is restricted to a receiving environment that has been severely impacted and modified in the past by the existing roads as well as township developments along the road.

No significant heritage resources were recorded. As a result of the assessment, no specific recommendation for mitigation is proposed.

However, should a chance discovery be made of any archaeological or significant heritage remains, the heritage authority or the archaeologist must be informed and measures be taken to safeguard such remains until the necessary action is implemented.

From a heritage resources management perspective, it is unlikely that any fatal flaw exists and there is no reason why the development should not continue.

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1. INTRODUCTION AND LOCALITY DESCRIPTION

The author was appointed by Ancient Places Pty, who was appointed by Delta Built Environment Consultants, to undertake a heritage impact assessment for the proposed construction for the New Grade-Separated Interchange on National Route R40 and R527 at Hoedspruit. It is located within the boundary of the Maruleng Local Municipality, forming part the Mopani District Municipality in the Limpopo Province.

The project is located on National Road R40 Sections 5 and 6. The road sections traverse urban and rural areas within and on the outskirts of Hoedspruit. The project includes the R40 from km 92.8 on section 5 to km 1.316 on section 6, traveling in a north-westerly direction. The R40 is intersected by the R527 from a south-westerly direction and the D5012 from a north-easterly direction, at km 0.22 on section 6. The project includes 400 m of the R527 and D5012 on either side of the R40.

The aim of the proposed project is to alleviate congestion and improve mobility on the R40 at the two main intersections and to allow the traffic to flow through the area. R40, R527 and D5012 interchange at km 0.22 on the R40-6 has the highest levels of congestion, hence a grade-separated interchange will be implemented at this intersection.

Summary of scope of work

- Environmental Authorisation (Basic Assessment) and General Authorisation
- Upgrade the existing at-grade crossing of Road R40 and Road R527
- Replacement of all minor culverts
- Construction of additional bridge
- Construct a new grade-separated interchange(s)
- Close off existing access for public roads on the R40 between km 93.0 on section 5 and km 0.6 on section 6 for safety reasons.
- Environmental Authorisation (Basic Assessment) for a Mining Permit for two proposed Borrow Pit.

Although not yet finalised, it is proposed that material for the infill be obtained from two previously used borrow pits and an existing Quarry. These sites were not surveyed as the details were not known to the heritage practitioner at the time of the survey.

The locations of the sites are:

Borrow pit 1 (coordinates: 24°20'45.92"S, 30°57'21.39"E)
Borrow pit 2 (coordinates: 24°20'24.56"S, 30°57'2.99"E)

Quarry coordinates: 24°19'14.69"S, 30°57'53.00"E

2. TERMS OF REFERENCE

Undertake a Heritage Impact Assessment and submit a specialist report, which addresses the following:

- A desktop and field assessment to gather information on heritage resources within the proposed development site;
- Identify possible archaeological, cultural and historic sites within the proposed development area;
- 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; and
- Identifying key uncertainties and risks.

3. LEGAL REQUIREMENTS

3.1 The National Heritage Resources Act (25 of 1999) (NHRA)

This Act established the South African Heritage Resources Agency (SAHRA) and makes provision for the establishment of Provincial Heritage Resources Authorities (PHRA). The Act makes provision for the undertaking of heritage resources impact assessments for various categories of development as determined by Section 38. It also provides for the grading of heritage resources (Section 7) and the implementation of a three-tier level of responsibilities and functions for heritage resources to be undertaken by the State, Provincial authorities and Local authorities, depending on the grade of the Heritage resources (Section 8).

In terms of the National Heritage Resources Act (1999) the following is of relevance:

Historical remains

Section 34(1) No person may alter or demolish any structure or part of a structure, which is older than 60 years without a permit issued by the relevant provincial heritage resources authority.

Archaeological remains

Section 35(3) Any person who discovers archaeological or palaeontological objects or material or a meteorite in the course of development or agricultural activity must immediately report the find to the responsible heritage resources authority or to the nearest local authority or museum, which must immediately notify such heritage resources authority.

Subsection 35(4) No person may, without a permit issued by the responsible heritage resources authority-

(a) destroy, damage, excavate, alter, deface or otherwise disturb any archaeological or palaeontological site or any meteorite;
(b) destroy, damage, excavate, remove from its original position, collect or own any archaeological or palaeontological material or object or any meteorite;
(c) trade in, sell for private gain, export or attempt to export from the republic any category of archaeological or palaeontological material or object, or any meteorite; or

(d) bring onto or use at an archaeological or palaeontological site any excavation equipment or any equipment which assist with the detection or recovery of metals or archaeological material or objects, or use such equipment for the recovery of meteorites.

Subsection 35(5) When the responsible heritage resources authority has reasonable cause to believe that any activity or development which will destroy, damage or alter any archaeological or palaeontological site is under way, and where no application for a permit has been submitted and no heritage resources management procedures in terms of section 38 has been followed, it may-

(a) serve on the owner or occupier of the site or on the person undertaking such development an order for the development to cease immediately for such period as is specified in the order;
(b) carry out an investigation for the purpose of obtaining information on whether or not an archaeological or palaeontological site exists and whether mitigation is necessary;
(c) if mitigation is deemed by the heritage resources authority to be necessary, assist the person on whom the order has been served under paragraph (a) to apply for a permit as required in subsection (4); and
(d) recover the costs of such investigation form the owner or occupier of the land on which it is believed an archaeological or palaeontological site is located or from the person proposing to undertake the development if no application for a permit is received within two weeks of the order being served.

Subsection 35(6) The responsible heritage resources authority may, after consultation with the owner of the land on which an archaeological or palaeontological site or meteorite is situated; serve a notice on the owner or any other controlling authority, to prevent activities within a specified distance from such site or meteorite.

Burial grounds and graves

Subsection 36(3)

(a) No person may, without a permit issued by SAHRA or a provincial heritage resources authority-

I destroy, damage, alter, exhume, remove from its original position or otherwise disturb any grave or burial ground older than 60 years which is situated outside a formal cemetery administered by a local authority; or

(d) bring onto or use at a burial ground or grave referred to in paragraph (a) or (b) any excavation equipment, or any equipment which assists in detection or recovery of metals.

Subsection 36(6) Subject to the provision of any law, any person who in the course of development or any other activity discovers the location of a grave, the existence of which was previously unknown, must immediately cease such activity and report the discovery to the responsible heritage resources authority which must, in co-operation with the South African

Police Service and in accordance with regulations of the responsible heritage resources authority-

carry out an investigation for the purpose of obtaining information on whether or not such grave is protected in terms of this Act or is of significance to any community; and

(b) if such grave is protected or is of significance, assist any person who or community which is a direct descendant to make arrangements for the exhumation and re-interment of the content of such grave or, in the absence of such person or community, make any such arrangement as it deems fit.

Public monuments and memorials

Subsection 37. Public monuments and memorials must, without the need to publish a notice to this effect, be protected in the same manner as places which are entered in a heritage register referred to in section 30.

Culture Resource Management

Subsection 38(1) Subject to the provisions of subsection (7), (8) and (9), any person who intends to undertake a development***** …

must at the very earliest stages of initiating such development notify the responsible heritage resources authority and furnish it with details regarding the location, nature and extent of the proposed development.

***'development'** means any physical intervention, excavation, or action, other than those caused by natural forces, which may in the opinion of the heritage authority in any way result in a change to the nature, appearance or physical nature of a place, or influence its stability and future well-being, including-

(a) construction, alteration, demolition, removal or change of use of a place or a structure at a place;

(b) carry out any works on or over or under a place*****;

(e) any change to the natural or existing condition or topography of land, and

(f) any removal or destruction of trees, or removal of vegetation or topsoil;

"place** means a site, area or region, a building or other structure** ..."

***"structure** means any building, works, device or other facility made by people and which is fixed to the ground …"

3.2 The Human Tissues Act (65 of 1983) and Ordinance on the Removal of Graves and Dead Bodies (Ordinance 7 of 1925)

This Act and Ordinance protects graves younger than 60 years. These fall under the jurisdiction of the National Department of Health and the Provincial Health Departments. Approval for the exhumation and re-burial must be obtained from the relevant Provincial MEC as well as the relevant Local Authorities.

4. METHODOLOGY

4.1 Sources of information

The main sources of information are a literature review and the SAHRIS database, supplemented by a field survey entailing a vehicle and pedestrian reconnaissance. In addition, Google earth and the Topographical map 2430 BD was consulted.

Consulted heritage resource impact assessments that are relevant to the study area and cover at least a radius of 15km are listed in the **references** below. Some of these reports contain references to significant heritage remains in the immediate vicinity of the project as discussed under point 5.2 below.

4.2 Limitations

No limitations were experienced. The road reserve is generally well cut and clear of vegetation. Visibility was good.

4.3 Categories of significance

The significance of heritage sites is ranked into the following categories.

No significance: sites that do not require mitigation.
Low significance: sites, which *may* require mitigation.
Medium significance: sites, which require mitigation.
High significance: sites, which must not be disturbed at all.

The significance of specifically an archaeological site is based on the amount of deposit, the integrity of the context, the kind of deposit and the potential to help answer present research questions. Historical structures are defined by Section 34 of the National Heritage Resources Act, 1999, while other historical and cultural significant sites, places and features, are generally determined by community preferences.

4.4 Terminology

Early Stone Age: Predominantly the Oldowan artefacts and Acheulian hand axe industry complex dating to + 1Myr yrs – 250 000 yrs. before present.

Middle Stone Age: Various lithic industries in SA dating from ± 250 000 yrs. - 22 000 yrs. before present.

Late Stone Age: The period from ± 22 000-yrs. to contact period with either Iron Age farmers or European colonists.

Early Iron Age: Most of the first millennium AD

Middle Iron Age: 10th to 13th centuries AD

Late Iron Age: 14th century to colonial period. *The entire Iron Age represents the spread of Bantu speaking peoples.*

Phase 1 assessments: Scoping surveys to establish the presence of and to evaluate heritage resources in a given area

Phase 2 assessments:	In depth culture resources management studies which could include major archaeological excavations, detailed site surveys and mapping / plans of sites, including historical / architectural structures and features. Alternatively, the sampling of sites by collecting material, small test pit excavations or auger sampling could be undertaken.
Sensitive:	Often refers to graves and burial sites, as well as ideologically significant sites such as ritual / religious places. *Sensitive* may also refer to an entire landscape / area known for its significant heritage remains.
NHRA	National Heritage Resources Act (Act no. 25 of 1999)
SAHRA	South African Heritage Resources Agency
SAHRIS	South African Heritage Resources Information System

5. BASELINE INFORMATION

5.1 The Stone Age

The Stone Age covers most of southern Africa and the earliest consist of the Oldowan and Acheul artefacts assemblages. Oldowan tools are regularly referred to as “choppers”. Oldowan artefacts are associated with Homo *habilis*, the first true humans. In South Africa definite occurrences have been found at the sites of Sterkfontein and Swartkrans. Here they are dated to between 1.7 and 2 million years old. Bearing in mind the proximity of the Makapans Valley palaeontological site about 30km south-east of the project area it is possible that they may occur here. This was followed by the Acheulian technology from about 1.4 million years ago which introduced a new level of complexity. The large tools that dominate the Acheulian artefact assemblages range in length from 100 to 200 mm or more. Collectively they are called bifaces because they are normally shaped by flaking on both faces. In plan view they tend to be pear-shape and are broad relative to their thickness. Most bifaces are pointed and are classified as handaxes, but others have a wide cutting end and are termed cleavers. The Acheulian design persisted for more than a million years and only disappeared about 250 000 years ago.

The change from Acheulian with their characteristic bifaces, handaxes and cleavers to Middle Stone Age (MSA), which are characterized by flake industries, occurred about 250 000 years ago and ended about 30 000 – 22 000 years ago. For the most part the MSA is associated with modern humans; Homo sapiens. MSA remains are found in open spaces where they are regularly exposed by erosion as well as in caves. Characteristics of the MSA are flake blanks in the 40 – 100 mm size range struck from prepared cores, the striking platforms of the flakes reveal one or more facets, indicating the preparation of the platform before flake removal (the prepared core technique), flakes show dorsal preparation – one or more ridges or arise down the length of the flake – as a result of previous removals from the core, flakes with convergent sides (laterals) and a pointed shape, and flakes with parallel laterals and a rectangular or

quadrilateral shape: these can be termed pointed and flake blades respectively. Other flakes in MSA assemblages are irregular in form.

The change from Middle Stone Age to Later Stone Age (LSA) took place in most parts of southern Africa little more than about 20 000 years ago. It is marked by a series of technological innovations or new tools that, initially at least, were used to do much the same jobs as had been done before, but in a different way. Their introduction was associated with changes in the nature of hunter-gatherer material culture. The innovations associated with the Later Stone Age "package" of tools include rock art – both paintings and engravings, smaller stone tools, so small that the formal tools less that 25mm long are called microliths (sometimes found in the final MSA) and bows and arrows. Rock art is an important feature of the LSA and is found in the Kruger National Park and Drakensberg.

5.2 The Iron Age

In pre-colonial times, various Eastern Bantu-speaking people inhabited South Africa, including Nguni, Sotho-Tswana, and Tsonga. However, they were not the first groups to occupy southern Africa. About 1800 years ago their predecessors brought a new way of life to the region replacing the Stone Age hunter-gatherers. For the first time, people lived in settled communities, cultivating such crops as sorghum, millets, ground beans and cowpeas, and they herded cattle as well as sheep and goats. Because these early farming people also made their own iron tools, many archaeologists call this block of time the Iron Age. They also represent the spread of the Eastern Bantu language into southern Africa. For convenience and to mark widespread events, it is divided into three periods: the Early Iron Age (AD 200-900), the Middle Iron Age (AD 900-1300) and the Late Iron Age (AD 1300-1820) to which the ancestors of the present-day Nguni and Sotho-Tswana belonged.

Archaeologists of the Iron Age use ceramic style to establish culture-history sequences. Ceramic sequences are thus the framework for all other domains of Iron Age research, be it life ways (incorporating technology, subsistence and settlement patterns), or the explanation of cultural change.

The earliest cultural expression of the first black farmers that moved into South Africa belonged to the Uruwe Tradition originating from the Great Lakes area of Central Africa, was a secondary dispersal centre for eastern Bantu speakers. East Africa and migrated southwards as part of the Kwale Branch, i.e., the **Eastern stream** of migration and settled in the Tzaneen area in the 3rd century AD. This stream moved onto the escarpment in the Lydenberg area and as far south as Durban in KwaZulu-Natal. From the escarpment it moved to Broederstroom near Hartbeespoort Dam. During the 5th century onwards, the **Western stream** of migration, namely the Kalundu Tradition originating in the far North of Angola, was another secondary dispersal centre for eastern Bantu speakers. The Happy Rest Branch represents this stream and has been found in the Zoutpansberg area. It too moved onto the escarpment and further on to KwaZulu-Natal. On the escarpment it developed into the *Doornkop* and later the *Klingbeil* facies. In the western Bushveld of Limpopo, Happy Rest developed into the Diamant facies from which the *Eiland* facies derived (Middle Iron Age). *Eiland* represents the last phase of the Kalundu Ceramic Tradition in the South African interior dating to the 10th – 13th century AD.

The Middle Iron Age also represents Mapungubwe and the origins of Great Zimbabwe. They are descendants of the Early Iron Age Kalundu Tradition. The Shona of Zimbabwe and the royal families of the Venda descend from the Zimbabwe culture.

The earliest recorded facies of Sotho-Tswana Moloko Branch is *Icon*. *Icon* pottery first appears in the Phalaborwa area and spread to other parts of the Limpopo Province, Mpumalanga and perhaps Botswana, dating to between about AD 1300 and 1500. According to the ceramic evidence, in some places *Icon* incorporated earlier *Eiland* elements. This phase predates the oral record.

In terms of Huffman's (2007) distribution sequences of the Iron Age, the project area may contain the remains of the under-mentioned ceramic (pottery) units which form distinct cultural groups:

Urewe Tradition: Kwale Branch –
Silver Leaves facies AD 280 – 450 (Early Iron Age)
Mzonjani facies - AD 450 – 750 (Early Iron Age)
Garonga facies – AD 750 – 900 (Early Iron Age)

Moloko Branch
Icon facies AD 1300 - 1500 (Late Iron Age)

Kalundu Tradition: Happy Rest sub-branch –
Doornkop facies AD 750 – 1000 (Early Iron Age)
Eiland facies AD 1000 – 1300 Middle Iron Age
Kgopolwe facies AD 1030 - 1350
Letaba facies AD 1600 - 1840 (Late Iron Age - Venda)

Heritage Impact Assessments undertaken in the area since 1997 confirms that Iron Age sites exists in the immediate area of Hoedspruit. Huffman & Calabrese (1997) recorded an Early Iron Age Siver Leaves facies salt working site on the farm Vienna to the north of Hoedspruit. Roodt (2002) recorded Doornkop sites at Moditlo Estate about 10km south of Hoedspruit. Gaigher (2007) recorded Early Iron Age sites on the farm Happyland about 4km south-west of Hoedspruit. Archaetnos (2008) excavated this site on Happyland and the finding was that it is a multicomponent site with Mzonjani and Doornkop occupation.

Celliers (Kudzala Antiquity. 2003) recorded a Late Iron Age site, while van der Walt (Matakoma Heritage Consultants 2006), Coetzee (2003) and Küsel (2006) recorded no Iron Age archaeological sites during their surveys in the area.

From the late 18th century, the area was under the influence of the Tsonga who controlled the area from Kosi Bay to the Zambesi River under various ethnic groupings. A map by Merensky in 1875 clearly shows that this part of the Lowveld was controlled by the "Knopnosed" Tsonga (called that because of the practice of scarification of the nose) also known as the "Makwamba".

Since the late 19th century, a large number of Shangaan people moved into the area after their defeat by the Portuguese in Mozambique. They are descendants of the Gaza empire created by Soshangane during the early 18th century.

5.3 The historical period

The very first official landowner of the farm Hoedspruit was Dawid Johannes Joubert. He arrived in the lowveld in 1844 and settled in the area between the Blyde River and what is now known as the Zandspruit River. In 1848 on the 5th May, he took the opportunity to register the farm for the first time at Ohrigstad. Joubert's original farm had no name until the day in 1844 when the heavens opened over Mariepskop, the highest peak in the Drakensberg escarpment which towers over the area, causing widespread flash flooding. The creek which ran across Joubert's farm quickly became a raging torrent and in trying to cross it, he slipped and lost his hat which was quickly borne away by the fast-flowing waters, never to be seen again. Thus Hoedspruit (meaning *hat creek* in English) was born.

In the 1850's, Ohrigstad was expanding and becoming the central town in the greater region, however, at the time, it was decided that only the older settlers should be allowed to settle in and around the immediate area of Ohrigstad and anyone younger than 45 was encouraged to move further away from the town and settle elsewhere. As a result, a group of young men – all under 45 – made their way down the escarpment and settled in the area between the mountain and the Blyde River on a farm that they then called Jonkmanspruit (meaning "*young men's river/stream/creek*"). A few of the other young men settled a little further on, on the farm they called Welverdiend (meaning "well deserved") and yet another on a farm that was called Driehoek (meaning triangle). Surveyors were brought in from Europe under the supervision of surveyor general, Gideon R von Wielligh and most of the farms were then given European names of cities, states and countries that they were obviously familiar with. Thus, official farm names in the area include names such as Essex, Madrid, Berlin, Vienna, Amsterdam, Richmond, Chester, Moscow, Dublin, Dundee, Fife etc.

Mining began to play a major role in the region's economy. This was when Abel Erasmus and his partner, Org Basson, ran a successful transport company, running teams of oxen between the Mozambican capital and port of Lourenço Marques and the mines at Gravelotte. The early 1900s also saw the safe and effective transportation of ore, mining equipment and supplies to the area become a matter of prime importance and thus the Selati railway line was laid, traversing the farm of Hoedspruit in the process. The railway brought people with it, and with the growth in passenger trains, the need for stations became apparent. Hoedspruit station, actually built accidentally on the neighbouring farm Berlin, fast became a hub around which businesses began to spring up. However, the gold fields petered out before the line was completed and work on it was abandoned. Work began again on it in 1909 and it was finally completed in 1912. The Selati Line ran from Komatipoort on the Mozambican border to Tzaneen and helped to open up the area to tourism.

The Selati Line was eventually abandoned when, in 1963, work began on a new railway line west of the Kruger National Park. This is the railway line which runs through Hoedspruit to this day. By the 1950s the bustling little outpost that had originally sprung up around Hoedspruit station had yet to be formally registered as a town, but when, in 1952, the Roos family bought Berlin and established a general dealers and motor repair shop alongside the railway line, Hoedspruit, the town, had finally arrived. The town continued to attract farmers and in the 1950s there was a boom in cattle farming in the area.

In the late 1970s the pace in Hoedspruit was stepped up with the opening of the South African Air Force's base there. Surrounded by 25 square kilometres of game reserve, the base quickly found itself having to deal with the almost constant presence of wildlife on the runway. Working with the HESC it introduced three cheetahs onto the property to help keep the wildlife off the runway and things improved dramatically. During the1990s an unused portion of Air Force Base Hoedspruit was converted into what is now Eastgate Airport, opening up the region to global tourists by providing daily flights from Johannesburg's OR Tambo International Airport, enabling them to quickly and easily connect to surrounding game reserves and safari lodges in the area.

6. RESULTS OF THE SURVEY

6.1 Palaeontology

The study area falls within the grey colour code of the SAHRA PalaeoSensitivity Map; no palaeontological assessment is required.

6.2 Stone Age remains

No Stone Age remains were noted within the project area.

6.3 Iron Age

No Iron Age remains were noted within the project area.

6.4 Graves and burial sites

No graves or burial sites were noted within the project area.

6.5 The built environment

No historical structures were recorded within the project area. The original railway station buildings are well away from the development.

7. DISCUSSION

The New Grade-Separated Interchange on National Route R40 and R527 project is restricted to a receiving environment that has been severely impacted and modified in the past by the existing roads as well as township developments along the road.

Had there been any archaeological remains or burials in the project area, these are obscured by past activities and not visible in the present conditions.

In our view, there exists no fatal flaw from a heritage management perspective with regard to the project.

8. EVALUATION AND STATEMENT OF SIGNIFICANCE

The proposed New Grade-Separated Interchange on National Route R40 and R527 does not directly impact on any known heritage resources.

8.1 Significance criteria in terms of Section 3(3) of the National Heritage Resources Act.

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

8.2 Section 38(3) (c) An assessment of the impact of the development on such heritage resources.

The development will have a negligible impact on heritage remains.

8.3 ***Section 38(3) (d) An evaluation of the impact of the development on heritage resources relative to the sustainable economic benefits to be derived from the development***.

No significant heritage remains were recorded. The sustainable economic benefits outweigh possible conservation benefits.

8.4 ***Section 38(3) (e) The results of consultation with the communities affected by the proposed development and other interested parties regarding the impact of the development on heritage resources***.
No impact on heritage resources is foreseen.

8.5 Section 38(3)(f) If heritage resources will be adversely affected by the proposed development the consideration of alternatives.
No know heritage resources will be adversely affected.

8.6 Section 38(3)(g) Plans for mitigation of any adverse effects during and after the completion of the proposed development.
No specific recommendations for mitigation measures are proposed.

9. RECOMMENDATIONS AND MITIGATION MEASURES

9.1 No specific recommendation for mitigation is proposed for the intended New Grade-Separated Interchange on National Route R40 and R527 upgrade.

9.2 However, bearing in mind that the general area is rich in archaeological sites, should a chance discovery be made of any archaeological or significant heritage remains, the heritage authority or the archaeologist must be informed and measures be taken to safeguard such remains until the necessary action is implemented.

10. REFERENCES

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11. IMAGES AND MAPS

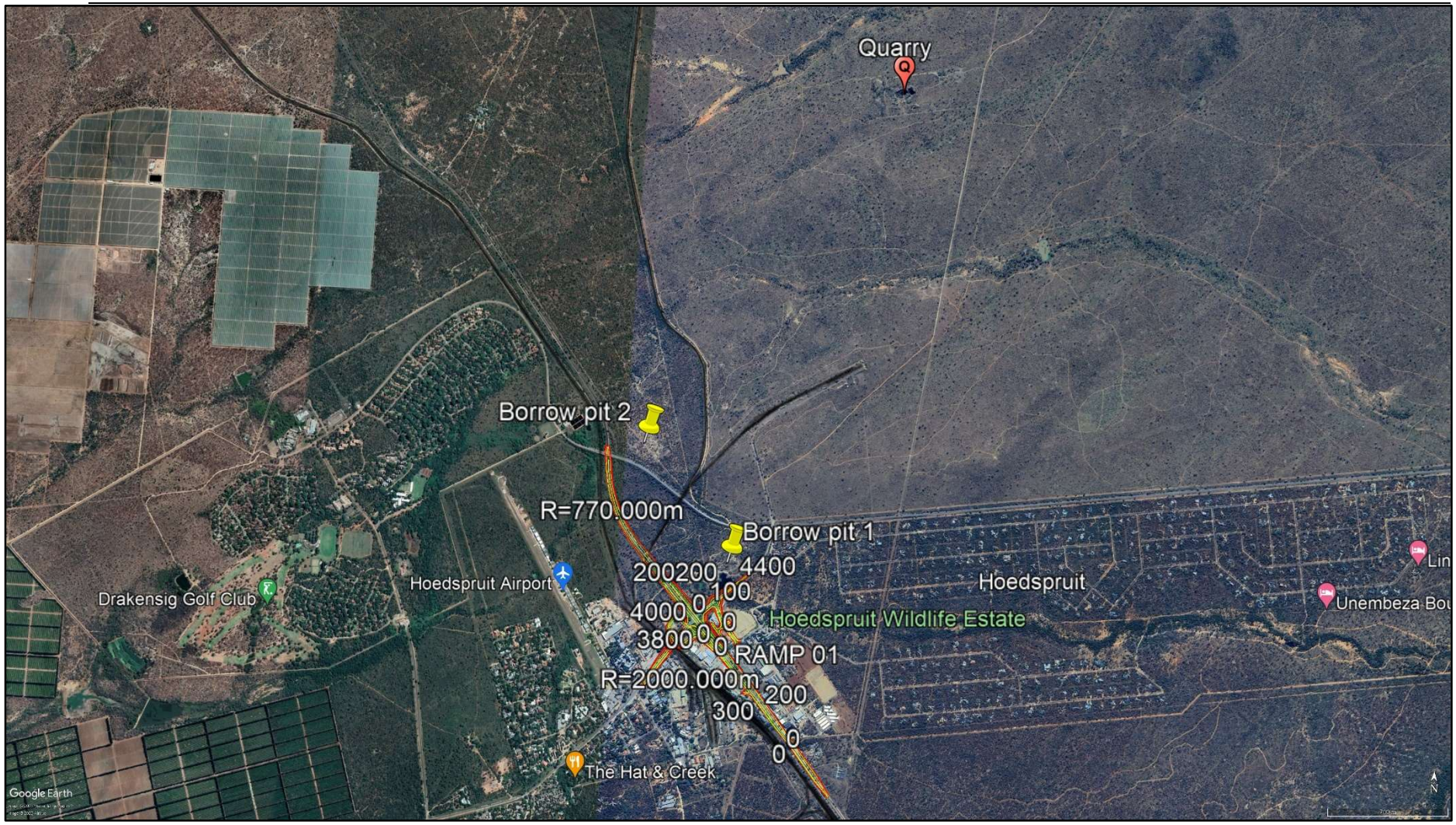

Figure 1. *Google earth image of the location of the project at Hoedspruit. The proposed borrow pits 1&2 and quarry are included.*

Figure 2. *Google earth image showing the intersection of road R40 and R527/ D5012.*

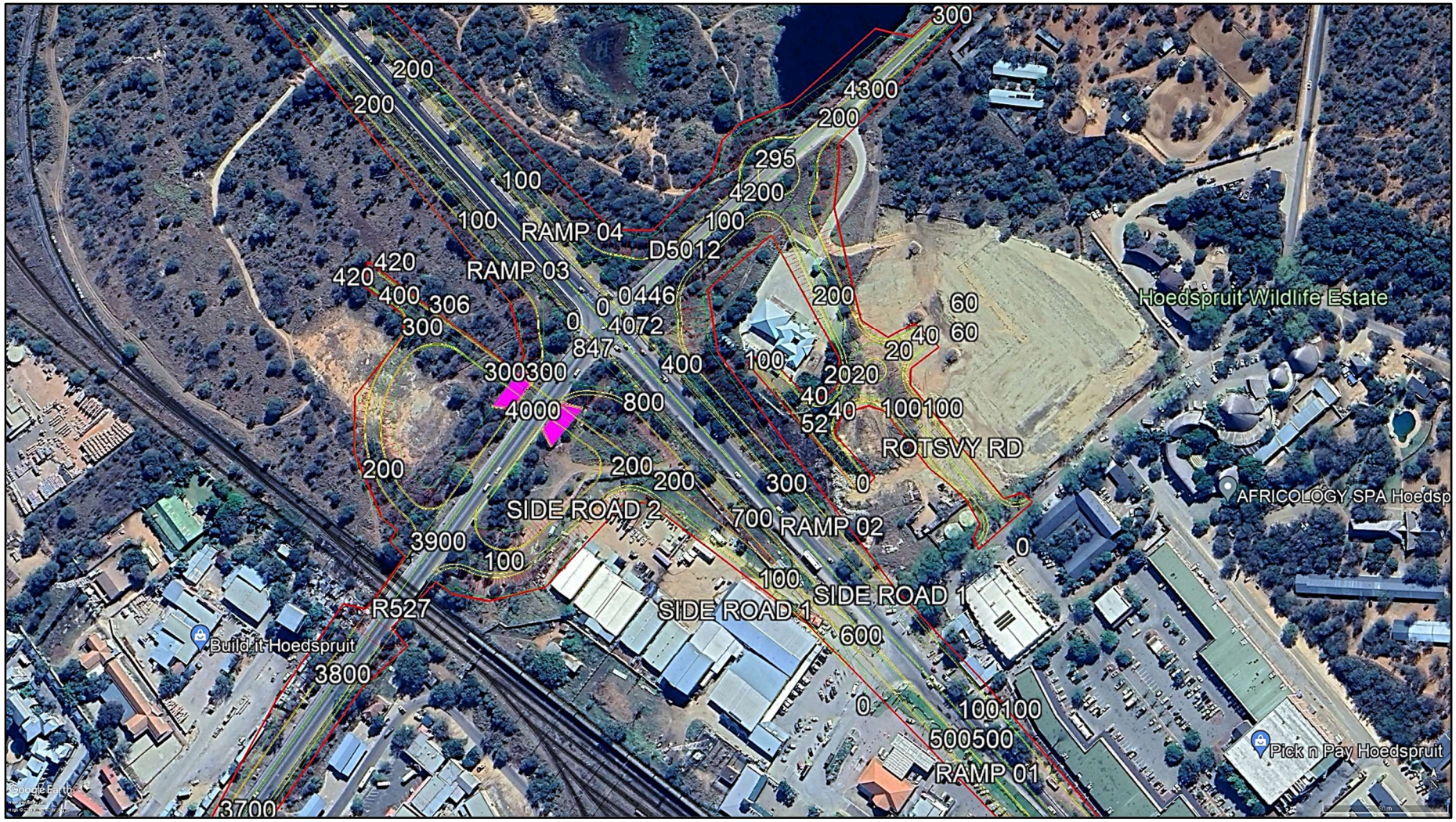

Figure 3. *Google earth closeup view of the intersection of road R40 and R527/ D5012.*

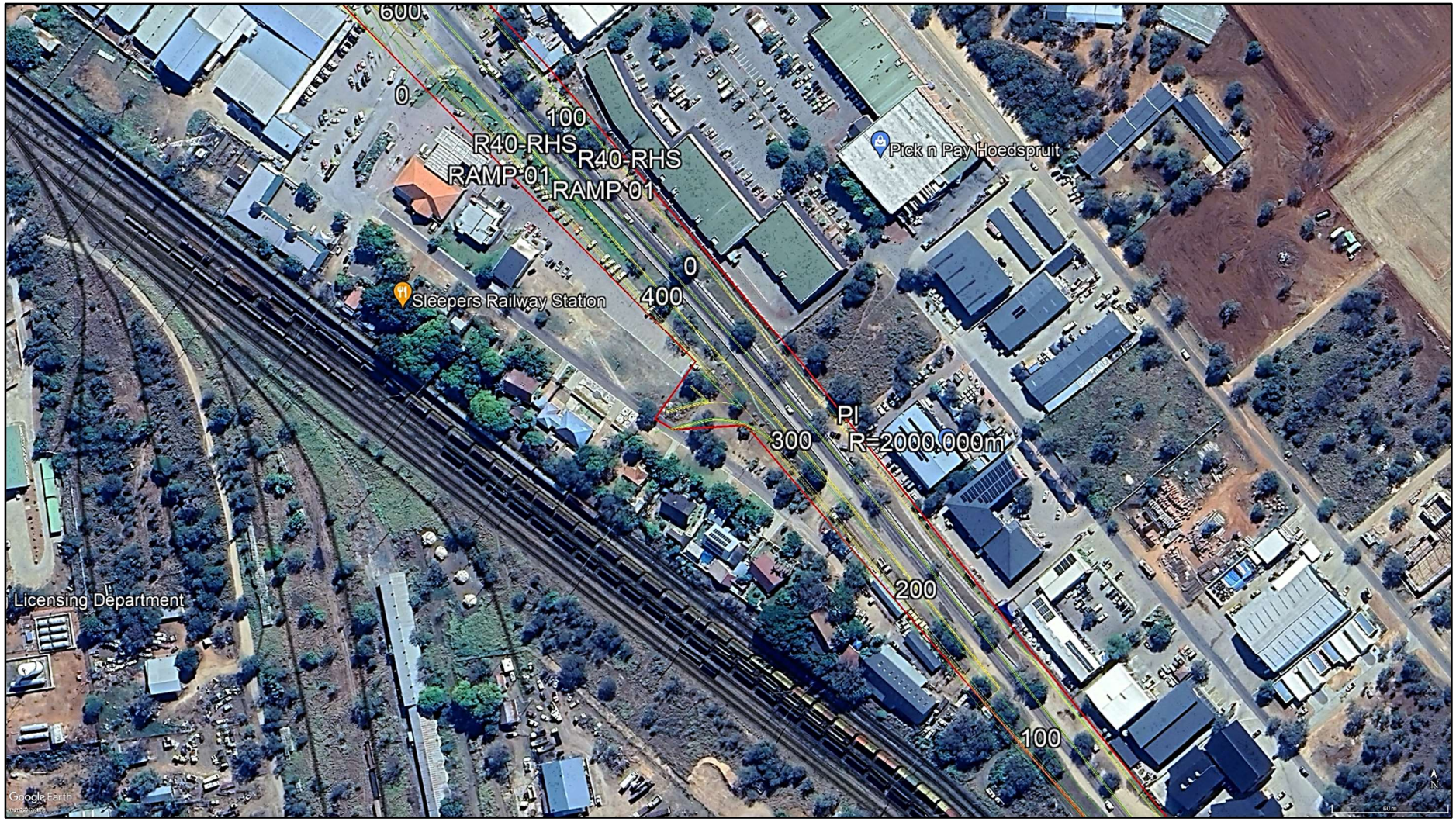

Figure 4. *Google earth image of the station area – not affected by the upgrading.*

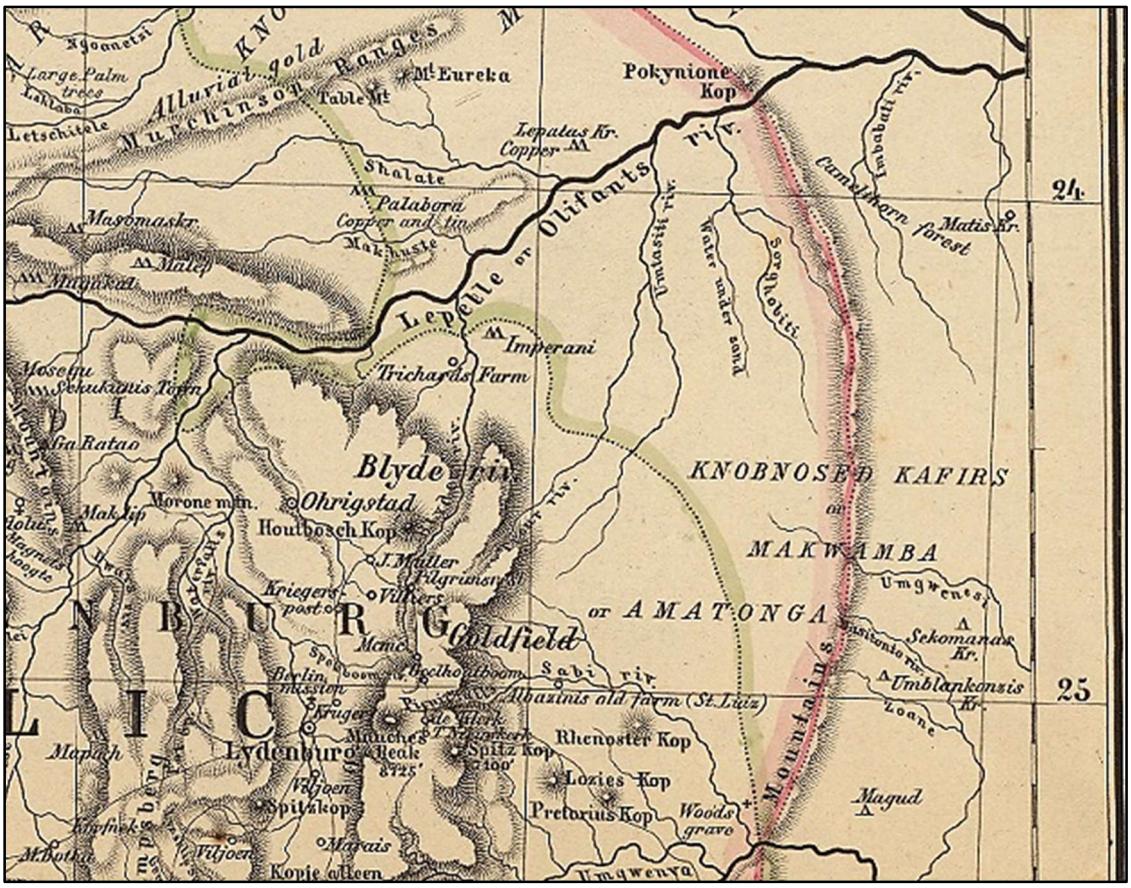

Figure 5. *Merensky's Map (1875) of the Transvaal showing the Lowveld area inhabited by the Tsonga.*

Figure 6. *A view of the disturbed area at Rotsvy Street.*

Figure 7. *A view of the proposed borrow pit 1 along road D5012.*

Figure 8. *A view of project area on road D5012 – westerly direction towards Hoedspruit.*

Figure 9. *A view of road R40 at the northerly starting point of the project – southerly direction.*

Figure 10. *A view of road R40 at the south-western end of the project towards Hoedspruit.*

Figure 11. *A view of road R40 about 150 meters into the built area towards the intersection from the south.*

Figure 12. *View of the location of sideroad 1 – northerly direction.*

Figure 13. *A view of road D5012 in a westerly direction.*

Figure 14. *A view of the bridge over the railway line road D5012 - easterly direction.*