

**A PHASE 1 ARCHAEOLOGICAL IMPACT ASSESSMENT: UPGRADE OF
N10 SECTION 3 FROM THE RIET RIVER (KM45.2) TO TARKA BRIDGE
(KM 68.5)**

**SPECIALIST REPORTS
VOLUME 2: ENVIRONMENTAL IMPACT ASSESSMENT REPORT**

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EXECUTIVE SUMMARY

Note: This report follows the minimum standard guidelines required by the South African Heritage Resources Agency for compiling a Phase 1 Archaeological Impact Assessment (AIA).

EXECUTIVE SUMMARY

Purpose of the Study

The purpose of the study was to conduct a phase 1 archaeological impact assessment (AIA) for the proposed upgrade of the national route N10 Section 3 from Riet River (KM 45.2) to Tarka Bridge (KM 68.5), south of Cradock, Eastern Cape Province. Three proposed borrow pit areas on the Farms Bonthoek Portion 554, Blaauwekrans 523, and Farm Portion 517 were also included in the archaeological investigation.

The survey was conducted to establish the range and importance of the exposed and *in situ* archaeological heritage materials and features, the potential impact of the development and, to make recommendations to minimize possible damage to these sites.

Brief Summary of Findings

The survey for the proposed rehabilitation of the national route N10 Section 3 from Riet River (KM 45.2) to Tarka Bridge (KM 68.5) was limited to the 23.30km stretch within the road reserve. Three main bridges occur along this stretch of road; however, they have been determined as younger than 60 years. A historically significant distance marker that marked the early route between Cradock and Grahamstown was encountered within the road reserve. No other archaeological material remains, sites, or features were documented within this area.

A few isolated occurrences of stone artefacts were encountered within the proposed Bonthoek Borrow Pit area on the Farm Bonthoek Portion 554. No other organic or cultural heritage remains were identified in association with the stone artefacts.

RECOMMENDATIONS

The proposed areas are of a low cultural sensitivity and development may proceed as planned, although the following recommendations must be considered:

1. The historical distance marker (Hist1) must be cordoned off to avoid any impact during the upgrade of the N10 (Section 3).
2. Although the recorded stone artefacts are disturbed and in secondary context, they should be collected and stored at the appropriate institution for future research purposes. A professional archaeologist should apply for a collection permit.

3. If concentrations of archaeological heritage material and human remains are uncovered during construction, all work must cease immediately and be reported to the Albany Museum (046 622 2312) and/or the South African Heritage Resources Agency (SAHRA) (021 642 4502) so that systematic and professional investigation/ excavation can be undertaken.

4. Construction managers/foremen should be informed before construction starts on the possible types of heritage sites and cultural material they may encounter and the procedures to follow when they find sites.

SPECIALIST PRACTITIONER DECLARATION OF INDEPENDENCE

TYPE OF ASSESSMENT: NAME OF PROJECT

Specialist

I Celeste Booth declare that I am an independent consultant and have no business, financial, personal or other interest in the proposed project, application or appeal in respect of which I was appointed other than fair remuneration for work performed in connection with the activity, application or appeal. There are no circumstances that compromise the objectivity of my performing such work.

SIGNATURE:

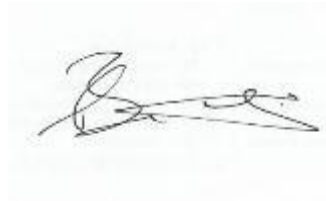
A handwritten signature in black ink, appearing to read 'Celeste Booth', is centered below the signature label. The signature is written in a cursive style with a large initial 'C'.

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1. INTRODUCTION

1.1 Background Information

The phase 1 archaeological impact assessment (AIA) report is required for the environmental impact assessment (EIA) process.

1.2 Terms of Reference

To establish the range and importance of the exposed and *in situ* archaeological heritage materials and features, the potential impact of the development and, to make recommendations to minimize possible damage to these sites.

1.3 The study team

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1.4 Relevant legislation

BRIEF LEGISLATIVE REQUIREMENTS

Parts of sections 34(1), 35(4), 36(3) and 38(1) (8) of the National Heritage Resources Act 25 of 1999 apply:

Structures

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.*

Archaeology, palaeontology and meteorites

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

Burial grounds and graves

36. (3) (a) No person may, without a permit issued by SAHRA or a provincial heritage resources authority—

- (a) destroy, damage, alter, exhume or remove from its original position or otherwise disturb the grave of a victim of conflict, or any burial ground or part thereof which contains such graves;*
- (b) 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*
- (c) 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 the detection or recovery of metals.*

Heritage resources management

38. (1) Subject to the provisions of subsections (7), (8) and (9), any person who intends to undertake a development categorized as –

- (a) the construction of a road, wall, power line, pipeline, canal or other similar form of linear development or barrier exceeding 300m in length;*
- (b) the construction of a bridge or similar structure exceeding 50m in length;*
- (c) any development or other activity which will change the character of the site –*
 - (i) exceeding 5000m² in extent, or*
 - (ii) involving three or more erven or subdivisions thereof; or*
 - (iii) involving three or more erven or divisions thereof which have been consolidated within the past five years; or*
 - (iv) the costs of which will exceed a sum set in terms of regulations by SAHRA, or a provincial resources authority;*
- (d) the re-zoning of a site exceeding 10 000m² in extent; or*
- (e) any other category of development provided for in regulations by SAHRA or a provincial heritage resources authority, must as the very earliest stages of initiating such a development, notify the responsible heritage resources authority and furnish it with details regarding the location, nature and extent of the proposed development.*

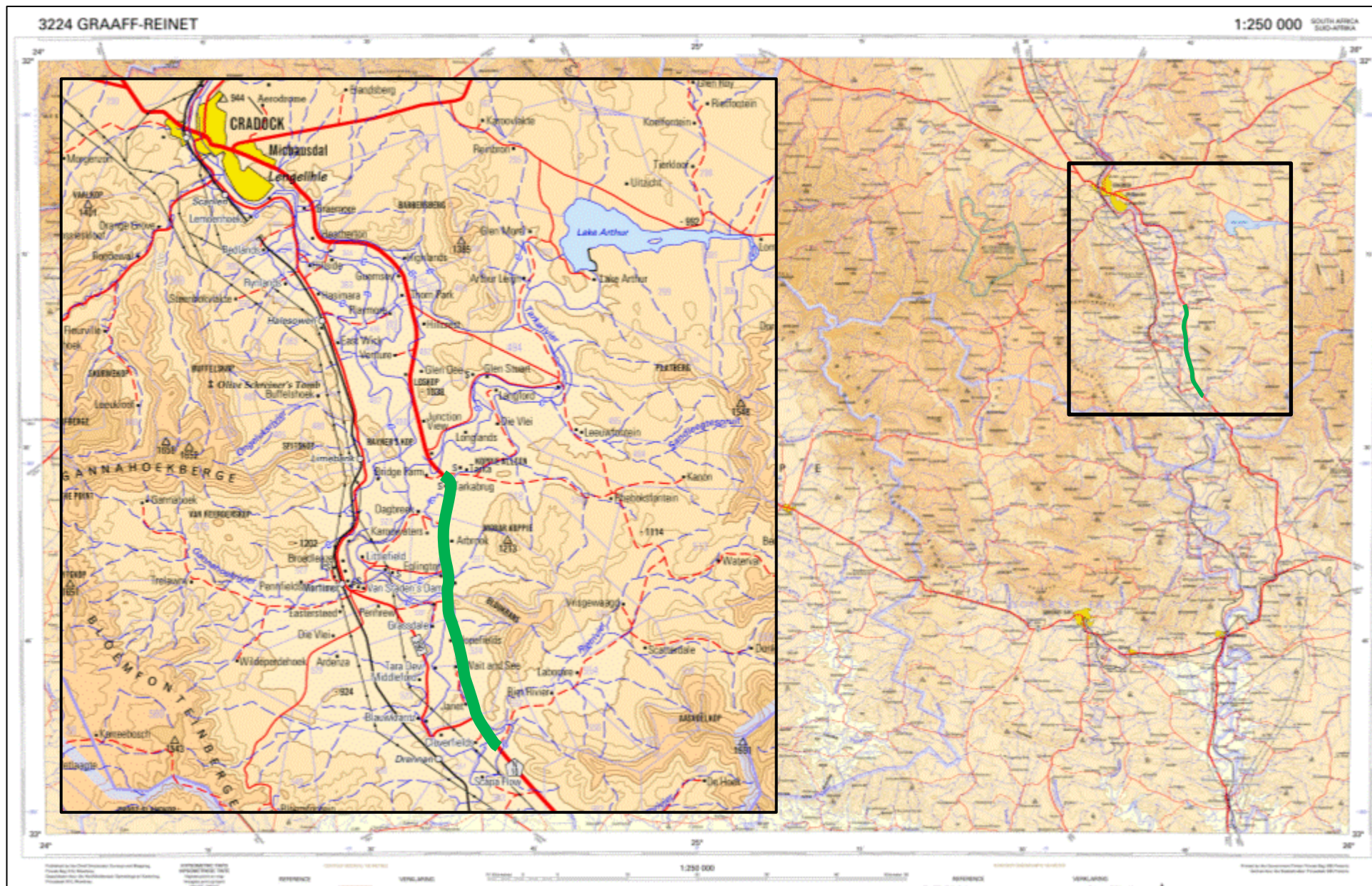


Figure 1-1: 1:250 000 topographic map (3224 GRAAFF REINET) showing the locality of the proposed upgrade of the national route N10 Section 3 (Green line).



Figure 1-2. Aerial view showing the locality of the proposed upgrade of the national route N10 Section 3 (red line).

1.5. Approach to Study

A brief archaeological literature review was undertaken to establish the possible archaeological as well as other heritage resources that may have been encountered during the survey. Previous heritage and archaeological impact assessments conducted within the surrounding area were also considered before the survey was conducted.

The survey for the proposed road upgrade was limited to within the 23.30km road reserve and was carried out by conducting spot checks from a vehicle. Disturbed and exposed areas were investigated for possible archaeological material remains, sites, and features. Rocky outcrops that occurred within the road reserve and extended away from the road reserve were also investigated. The proposed areas for the borrow pits were investigated by two people on foot. GPS co-ordinates were recorded by using a Garmin Oregon 550 unit.

1.5.1. Impact rating methodology

To ensure a balanced and fair means of assessing the significance of potential impacts a standardised rating scale was adopted in the EIA phase. This rating scale will also be used to allow the direct comparison of specialist studies.

This rating scale adopts four key factors that are generally recommended as best practice around the world that include:

- 1. Temporal Scale:** This scale defines the duration of any given impact over time. This may extend from the short- term (less than 5 years or the construction phase) to permanent. Generally the longer the impact occurs the more significance it is.
- 2. Spatial Scale:** This scale defines the spatial extent of any given impact. This may extend from the local area to an impact that crosses international boundaries. The wider the impact extends the more significant it is considered.
- 3. Severity/Benefits Scale:** This scale defines how severe negative impacts would be, or how beneficial positive impacts would be. This negative/positive scale is critical in determining the overall significance of any impacts.
The Severity/Benefits Scale is used to assess the potential significance of impacts prior to and after mitigation in order to determine the overall effectiveness of any mitigations measures.
- 4. Likelihood Scale:** This scale defines the risk or chance of any given impact occurring. While many impacts generally do occur, there is considerable uncertainty in terms of others. The scale varies from unlikely to definite, with the overall impact significance increasing as the likelihood increases.

These four scales are ranked and assigned a score, as presented in Table 1-1 to determine the overall impact significance. The total score is combined and considered against Table 1-2 to determine the overall impact significance.

1.6. Assumptions and Limitations

It must be emphasized that the conclusions and recommendations expressed in this archaeological heritage sensitivity investigation are based on the visibility of archaeological sites/features and may not therefore, reflect the true state of affairs. Many sites/features may be covered by soil and vegetation and will only be located once this has been removed. In the event of such finds being uncovered, (such as during any phase of construction work), archaeologists must be informed immediately so that they can investigate the importance of the sites and

excavate or collect material before it is destroyed. The onus is on the developer to ensure that this agreement is honoured in accordance with the National Heritage Act No. 25 of 1999.

The following limitations are inherent in the rating methodology:

Value Judgements

This scale attempts to provide a balance and rigor to assessing the significance of impacts. However, the evaluation of the significance of an impact relies heavily on the values of the person making the judgment. For this reason, impacts of especially a social nature need to reflect the values of the affected society.

Cumulative Impacts

Cumulative impacts affect the significance ranking of an impact because it considers the impact in terms of both on-site and off-site sources. This is particularly problematic in terms of impacts beyond the scope of the proposed development and the EIA. For this reason it is important to consider impacts in terms of their cumulative nature.

Seasonality

Certain impacts will vary in significance based on seasonal change thus it is difficult to provide a static assessment. Seasonality will need to be implicit in the temporal scale and, with management measures being imposed accordingly (i.e. dust suppression measures being implemented during the dry season).

Table 1-1: Ranking of Evaluation Criteria

EFFECT	Temporal scale		Score
	Short term	Less than 5 years	1
	Medium term	Between 5 and 20 years	2
	Long term	Between 20 and 40 years (a generation) and from a human perspective almost permanent.	3
	Permanent	Over 40 years and resulting in a permanent and lasting change that will always be there	4
	Spatial Scale		
	Localised	At localised scale and a few hectares in extent	1
	Study area	The proposed site and its immediate environs	2
	Regional	District and Provincial level	3
	National	Country	3
	International	Internationally	4
	*	Severity	Benefit
	Slight / Slight Beneficial	Slight impacts on the affected system(s) or party(ies).	Slightly beneficial to the affected system(s) or party(ies).
Moderate / Moderate Beneficial	Moderate impacts on the affected system(s) or party (ies).	An impact of real benefit to the affected system(s) or party(ies).	2
Severe / Beneficial	Severe impacts on the affected system(s) or party(ies).	A substantial benefit to the affected system(s) or party(ies).	4
Very Severe / Very Beneficial	Very severe change to the affected system(s) or party (ies).	A very substantial benefit to the affected system(s) or party(ies).	8
LIKELIHOOD	Likelihood		
	Unlikely	The likelihood of these impacts occurring is slight	1
	May Occur	The likelihood of these impacts occurring is possible	2
	Probable	The likelihood of these impacts occurring is probable	3
	Definite	The likelihood is that this impact will definitely occur	4

* In certain cases it may not be possible to determine the severity of an impact thus it may be determined: Don't know/Can't know

Table 1-2: Ranking matrix to provide an Environmental Significance

Environmental Significance		Positive	Negative
LOW	An acceptable impact for which mitigation is desirable but not essential. The impact by itself is insufficient even in combination with other low impacts to prevent development. These impacts will result in either positive or negative medium to short term effects on the social and/or natural environment	4-7	4-7
MODERATE	An important impact which requires mitigation. The impact is insufficient by itself to prevent the implementation of the project but which, in conjunction with other impacts may prevent its implementation. These impacts will usually result in either positive or negative medium to long term effect on the social and/or natural environment.	8-11	8-11
HIGH	A serious impact which, if not mitigated, may prevent the implementation of the project. These impacts would be considered by society as constituting a major and usually long term change to the natural and/or social environment and result in severe negative or beneficial effects.	12-15	12-15
VERY HIGH	A very serious impact which may be sufficient by itself to prevent the implementation of the project. The impact may result in permanent change. Very often these impacts are unmitigable and usually result in very severe effects or very beneficial effects.	16-20	16-20

Example of an Impact Significance Statement - Impact 1: Impact of noise on human health

Cause and Comment

The noise associated with Heavy Goods Vehicles (HGVs) has the potential to impact on human health. A recommendation for the movement of large vehicles at night may impact on the sleep patterns of local communities.

Mitigation and Management

There are standard mitigation measures to ensure that vehicle noise is kept within acceptable limits. Vehicles should be kept in good repair; they should use standard exhaust and silencing equipment. Drivers should stick to designated speed limits. Roads should be kept in good condition.

Significance Statement

RATING		Temporal Scale		Spatial Scale		Severity of Impact		Risk or Likelihood		Total
	Without Mitigation	Short term	1	Localised	1	Moderate	2	Definite	4	8
With Mitigation	Short term	1	Localised	1	Slight	1	Unlikely	1	5	
Overall Significance without mitigation									MODERATE	
Overall Significance with mitigation									LOW	

2. DESCRIPTION OF THE AFFECTED ENVIRONMENT

2.1. BRIEF ARCHAEOLOGICAL BACKGROUND

Literature review

The Early Stone Age spans a period of between 1.5 million and 250 000 years ago and refers to the earliest that *Homo sapiens sapiens* predecessors began making stone artefacts. The Acheulian Industry which replaced the Olduvan Industry approximately 1.5 million years ago is attested to in diverse environments and over wide geographical areas. The hallmark of the Acheulian Industry is its large cutting tools (LCTs or bifaces), primarily handaxes and cleavers. The end products were astonishingly similar across the geographical and chronological distribution of the Acheulian techno-complex: large flakes that were suitable in size and morphology for the production of handaxes and cleavers perfectly suited to the available raw materials (Sharon 2009). Early Stone Age stone artefacts endure for long periods and generally occur as open air surface scatters either as isolated occurrences or in large quantities and very rarely in association with other archaeological heritage, plant and material remains.

The Albany Museum database includes records of occurrences of Acheulian handaxes between Middelburg and the Camdeboo National Park near Graaff Reinet, Sampson (1985) located a large number of sites and there is also a collection in the Albany Museum from the Cradock area. The large Early Stone Age handaxes and cleavers were replaced by smaller stone tools called the Middle Stone Age flake and blade industries. The Middle Stone Age spans a period from 250 000-30 000 years ago and focuses on the emergence of modern humans through the change in technology, behaviour, physical appearance, art, and symbolism. Various stone artefact industries occur during this time period, although less is known about the time prior to 120 000 years ago, extensive systemic archaeological research is being conducted on sites across southern Africa dating within the last 120 000 years (Thompson & Marean 2008). Surface scatters of these flake and blade industries occur widespread across southern Africa although rarely with any associated botanical and faunal remains. It is also common for these stone artefacts to be found between the surface and approximately 50-80cm below ground. Fossil bone may be associated with MSA occurrences. These stone artefacts, like the Earlier Stone Age handaxes are usually observed in secondary context with no other associated archaeological material.

The Albany Museum database holds records of the occurrence of Middle Stone Age stone artefacts around the Cradock area and the Department of Archaeology has curated Middle Stone Age stone artefacts in its collection from the Cradock area including Highlands Rock Shelter excavated by H.J. Deacon during the 1970's. Relevant archaeological impact assessments conducted by the Archaeology Contracts Office of the National Bloemfontein Museum in 2006 (Van Ryneveld & Koortzen 2006) and the Albany Museum in 2008 have recorded surface scatters of Middle Stone Age stone artefacts in the Cradock vicinity (Binneman & Booth 2008). Middle Stone Age stone artefacts (long blades and points) are found throughout the region, but because these are found in the open areas it is difficult to know where they fit into the cultural time sequence. At

Highlands Rock Shelter MSA stone artefacts, possibly a Howieson's Poort Industry, was dated older than 30 000 years (Deacon 1976). Sampson on the other hand reported many open-air MSA sites which he assigned to the Orangian Industry (dating between 128 000 - 75 000 years old), Florisbad and Zeekoegat Industries dating between 64 000 and 32 000 years old.

The Later Stone Age spans a period from 30 000 years ago to the historical period (the last 500 years) until 100 years ago and is associated with the archaeology of San hunter-gatherers. The majority of archaeological sites date from the past 10 000 years where San hunter-gatherers inhabited the landscape living in rock shelters and caves as well as on the open landscape, inland and along the coast. The open sites are difficult to locate because they are in the open veld and often covered by vegetation and sand and those along the coast are sometimes opened and closed by the movement of the dunes. Sometimes these sites are only represented by a few stone artefacts and fragments of bone. The preservation of these sites is poor and it is not always possible to date them (Deacon & Deacon 1999). Caves and rock shelters, however, in most cases, provide a more substantial preservation record of pre-colonial human occupation.

Some 2 000 years ago Khoekhoen pastoralists entered into the region and lived mainly in small settlements. They were the first food producers in South Africa and introduced domesticated animals (sheep, goats and cattle) and ceramic vessels to southern Africa. Often, these archaeological sites are found close to the banks of large streams and rivers and along the coast. Large piles of freshwater mussel shell (called freshwater middens) usually mark the large stream and river sites and large piles of marine shellfish middens mark the coastal sites. Precolonial groups collected the freshwater mussel from the muddy banks of the rivers as a source of food. Mixed with the shell and other riverine and terrestrial food waste are also cultural materials. Human remains are often found buried in the middens along the coast (Deacon and Deacon 1999).

.In general little systematic archaeological research and regional surveys/recordings have been conducted in the Cradock area. The only systematic survey and recording in the immediate vicinity was conducted in the Mountain Zebra National Park (Brooker 1974) and H.J. Deacon (1976) excavated Highlands Rock Shelter some 50-60 km to the north-east. Sampson's, Brooker's, and Deacon's research and surveys, together with records/collections of the Albany Museum, provide the background information for compiling an archaeological time sequence for the region. The LSA deposits at Highlands Rock Shelter date to 4 500 years old (Deacon 1976). Better preservation of organic material at Highlands Rock Shelter provides some insight into hunter-gatherer subsistence in the area. Collecting of underground plant remains such as *Cyperus usitatus* and *Freeziacorymbrosa* would appear to have been an important food source together with the hunting of mountain zebra/quagga, mountain reedbuck, warthog and various small antelope such as duiker, klipspringer and steenbok. The survey of the Mountain Zebra National Park (Brooker 1974) confirmed that the area is rich in archaeological remains and that some of the LSA time sequence for the region was present, as well as rock art. Unfortunately no rock engravings were found to compare with that of Samekoms, but there is another engraved and painted site listed in the Albany Museum records, only a few kilometres away. Unfortunately, apart from the stone tools, little else is preserved and it is not possible to reconstruct subsistence patterns. Also listed in the museum records are freshwater shell middens along the banks of the Great Fish River and small

quantities of crab and freshwater mussel were also found in the excavations. Many stock enclosures with stone walls and fragments of sand-tempered ceramic vessels are found throughout the Seacow River area and are most probably associated with Khoi pastoralists who settled in the area during the past 1 000 years.

Rock art is generally associated with the Later Stone Age period mostly dating from the last 5000 years to the historical period. It is difficult to accurately date the rock art without destructive practices. The southern African landscape is exceptionally rich in the distribution of rock art which is determined between paintings and engravings. Rock paintings occur on the walls of caves and rock shelters across southern Africa. Rock engravings, however, are generally distributed on the semi-arid central plateau, with most of the engravings found in the Orange-Vaal basin, the Karoo stretching from the Eastern Cape (Cradock area) into the Northern Cape as well as the Western Cape, and Namibia. At some sites both paintings and engravings occur in close proximity to one another especially in the Karoo and Northern Cape. The greatest concentrations of engravings occur on the andesite basement rocks and the intrusive Karoo dolerites, but sites are also found on about nine other rock types including dolomite, granite, gneiss, and in a few cases on sandstone (Morris 1988).

2.2. ARCHAEOLOGICAL INVESTIGATION

UPGRADE OF THE NATIONAL ROUTE N10 SECTION 3 FROM THE RIET RIVER (KM 45.2) TO TARKA BRIDGE (KM 68.5):



Figure 2-1: Close-up aerial view of the proposed N10 Section 3 and associated borrow pits.

The area within the road reserve has been heavily disturbed by the construction and continued maintenance of the road as well as the construction of associated road infrastructure such as water

channels, bridges, and picnic spots. Scatters and piles of the gravels remain within the road reserve. Vegetation cover comprises relatively dense grass vegetation in some areas, however, relatively exposed and disturbed areas were investigated for the possibility of encountering archaeological heritage remains (Figures 2-2 – 2-4). Three main bridges, Riet River Bridge (B1965, constructed 1955), Blaauwkrantz River Bridge (B1866, constructed 1955) and Tarka Bridge (B1867, constructed 1960), occur within this stretch of road that will be affected by the proposed roadupgrade. The bridges have been established as being younger than 60 years old and range between 52 and 57 years old.

One structure (GPS Point S1 marked on Figure 2-1); situated about 5km north of the Riet River Bridge was encountered during the survey (Figure 2-5). The structure is possibly associated with the construction of the N10 during the middle to late 1950's.

An historical distance marker that marked the early route between Cradock and Grahamstown is situated north of the Blaauwkrantz River Bridge (GPS point Hist1, Figure 2-1; photograph Figure 2-6). These markers are still evident along the Bedford-Grahamstown road and are considered older than 60 years and should be protected. Currently the distance marker along the N10 has a fence around it.

No other archaeological material remains, sites, or features were observed within the road reserve.



Figure 2-2: View of the dense grass vegetation and disturbances within the road reserve.



Figure 2-3: Various disturbances including water channels built within the road reserve and built-up, bulldozed sides.



Figure 2-4: Various types of water flow channels occur along the route.



Figure 2-5: Structure situated at S1 5km north of the Riet River Bridge.



Figure 2-6: The historical distance marker situated north of the Blaauwkrans River Bridge.

BONTHOEK BORROW PIT ON THE FARM BONTHOEK PORTION 554.

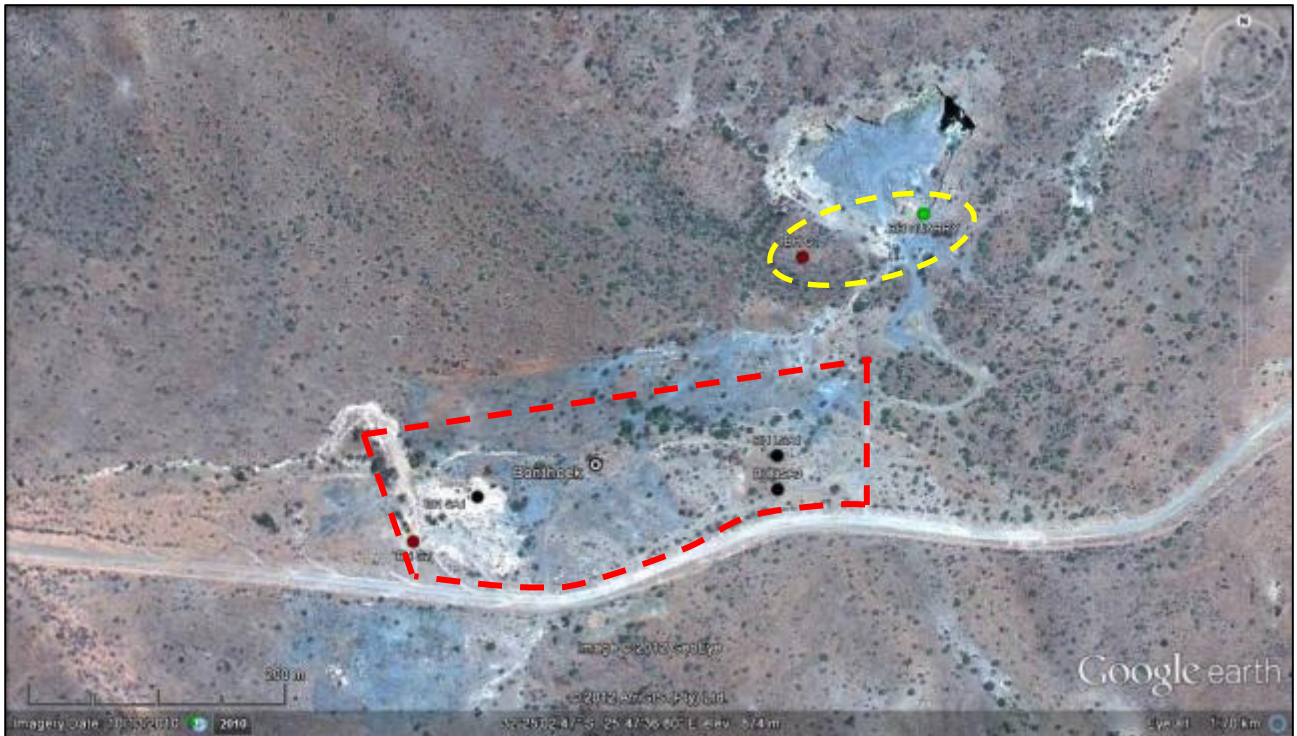


Figure 2-7: Close-up aerial view of the proposed Bonthoek Borrow Pit and area surveyed (yellow and red areas) with stone artefact occurrences plotted (black dots).

The proposed area for the Bonthoek Borrow Pit is situated on the Farm Bonthoek Portion 554, approximately 2.5km east of the N10 and south of the Riet River, to allow for easy access during the road rehabilitation. The vegetation cover comprised mainly short and sparse grass vegetation making archaeological visibility relatively good (Figures 2-8 – 2-9). The exposed and disturbed areas including area dug as test pits were investigated for possible archaeological heritage remains (Figure 2-10).

An area of approximately 400m x 300m was surveyed on foot for the proposed borrow pit (red area, Figure 2-7). In addition, the southern area of the existing quarry (yellow area, Figure 2-7; photograph, Figure 2-11) was investigated for possible archaeological remains as it is situated on a hill with rocky outcrops. No archaeological heritage remains were found within this vicinity of the existing quarry.

A few isolated stone artefacts were recorded within the proposed area (red area, Figure 2-7). These include specimens of both Middle Stone Age and Later Stone Age origins that include flakes with a faceted platform manufactured on quartzite raw material as well as a core and retouched and edge-damaged stone tool manufactured on a fine-grained raw material (hornfels) showing some patination (Figures 2-12 – 2-13). It is unlikely that the stone artefact surface scatter is positioned *in situ* and are therefore considered to be in a secondary and disturbed context. No other organic or cultural archaeological heritage remains were observed in association with the stone artefact occurrences.



Figure 2-8:Overlooking the proposed borrow pit area.



Figure 2-9:View of the landscape and sparse vegetation cover.



Figure 2-10:Example of test pit disturbance.



Figure 2-11:View of the existing quarry.



Figure 2-12: Example of stone artefacts encountered.



Figure 2-13: Example of stone artefacts encountered.

TARKA TRAINING FARM BORROW PIT ON THE FARM BLAAUWEKRANS 523.



Figure 2-14: Close-up aerial view of the proposed borrow pit area surveyed (red area).

The proposed area for the Tarka Training Farm Borrow Pit is situated on the Farm Blaauwekrans 523, immediately east of the N10, to allow for easy access during the road rehabilitation. The vegetation cover comprised mainly short and sparse grass vegetation making archaeological visibility relatively good (Figure 2-15). The exposed and disturbed areas, including dug up test pit areas, fence lines, and roads, were investigated for possible archaeological heritage remains (Figure 2-16). An area of approximately 550m x 600m, including the surrounding area of the existing borrow pit, was surveyed on foot.

No archaeological heritage remains, sites, or features were observed within the area surveyed for the proposed Tarka Training Farm Borrow Pit. However, calcrete that may sometimes contain Middle Stone Age archaeological remains was observed around the existing borrow pit (Figures 2-17 – 2-18). Although no stone artefacts or organic and cultural remains were observed on the surface, often stone artefacts may occur between the surface and 50-80cm below ground.



Figure 2-15: View of the landscape and sparse vegetation cover.



Figure 2-16: Example of test pit disturbance.



Figure 2-17: View of the existing borrow pit.



Figure 2-18: Calcrete associated with the borrow pit.

LOWLANDS BORROW PIT ON THE FARM 517.



Figure 2-19: Close-up aerial view of the proposed borrow pit area (red area) and existing borrow pit (yellow area).

The proposed area for the LowlandsBorrow Pit is situated on the Farm 517 about 500m east of the N10, to allow for easy access during the road rehabilitation. The vegetation cover comprised mainly dense grass vegetation that made archaeological visibility relative difficult (Figure 2-20–2-21). There is an existing borrow pit, 300m x 125m in extent, situated 500m south of the proposed borrow pit area (yellow area, Figure 2-19; photograph, Figure 2-23), that is not associated with the current development proposal. This area was investigated in addition to the proposed borrow pit area, for possible archaeological remains and to possibly establish whether any archaeological materials may occur below the surface. No archaeological remains, site, or features were identified within this area surveyed.

The areas were surveyed on foot. An area of about 475m x 350m was surveyed for the proposed borrow pit (red area, Figure 2-19). No archaeological heritage remains, sites, or features were observed within the area surveyed for the proposed Lowlands Borrow Pit. However, exposed calcrete was noticed on the surface and in the areas dug up for test pits. Calcrete may sometimes contain Middle Stone Age archaeological remains (Figure 2-23). A stone packed feature was identified in the middle of the area surveyed (LL F1, Figure 2-19, photograph, Figure 2-25). Although no stone artefacts or organic and cultural remains were observed on the surface, often stone artefacts may occur between the surface and 50-80cm below ground.



Figure 2-20: View of the landscape and dense grass vegetation.



Figure 2-21: View of the landscape and example of the exposed areas investigated.



Figure 2-23: View of the existing borrow pit investigated.



Figure 2-24: Exposed calcrete from the test pit.



Figure 2-25: Stone packed feature in the middle of the area surveyed.

3. KEY FINDINGS OF THE SPECIALIST STUDY

The archaeological heritage remains are of a low cultural significance, however, the appropriate recommendations for protection, conservation, and mitigation must be considered.

UPGRADE OF THE NATIONAL ROUTE N10 SECTION FROM RIET RIVER (KM 45.2) TO TARKA BRIDGE (KM 68.5), EASTERN CAPE PROVINCE

Three main bridge structures are situated on the N10 Section 3 that include the Riet River, Blaauwkrans, and Tarka River Bridges. The bridges were constructed between 1955 and 1960 and therefore are younger than 60 years. A distance road marker associated with the original road between Cradock and Grahamstown is also situated along this route and is of historical value. The structure currently has a fence around it and should be clearly demarcated and cordoned off during the road upgrade development activities.

Isolated occurrences of Later Stone Age (LSA) and Middle Stone Age (MSA) stone artefacts were recorded within the proposed Bonthoek Borrow Pit area. No other archaeological remains or depth of deposit was observed in association with stone artefact scatters. It is, therefore, unlikely that the stone artefacts occur *in situ* and are considered to be in a secondary context.

4. IMPACTS IDENTIFIED AND ASSESSED

The proposed developments will inevitably have low negative impact if the appropriate recommendations for the protection and conservation of the historical features and isolated stone artefact occurrences are considered and implemented, as is detailed in the section below. Importantly, every effort should be made to avoid the heritage resources of special concern.

4.1 Construction Phase

Impact 1: The destruction of the historical road distance marker (N10 Section 3)

Cause and Comment

These historically significant road markers occur between Cradock and Grahamstown along the original route that would have been used to travel between the two towns and can still be observed along the Bedford-Grahamstown road. This feature has been fenced, however, must clearly be cordoned off and avoided during the upgrade of the road. The feature is protected under Section 34 of the National Heritage Resources Act 25 of 1999.

Mitigation and management

Without mitigation: Negative

With mitigation: Positive

Significance statement

Impact	Effect					Risk or Likelihood	Total Score	Overall Significance		
	Temporal Scale	Spatial Scale		Severity of Impact						
Construction phase										
Without mitigation										
With mitigation										
No-Go										
Without mitigation	Short term	1	Regional	3	Very severe	8	Definite	4	16	Very High
With mitigation	Short term	1	Regional	3	Slight	1	Unlikely	1	5	Low

Impact 2: The destruction of Stone Artefact Scatters (Bonthoek Borrow Pit)

Cause and Comment

Isolated occurrences of stone artefacts occur within the areas proposed for Bonthoek Borrow Pit. The development would inevitably destroy these stone artefacts.

Although these are isolated occurrences, it is suggested that they be collected.

Mitigation and management

Without mitigation: Negative

With mitigation: Negative

5. CONCLUSIONS AND RECOMMENDATIONS

The archaeological investigation of the proposed area for the upgrade of the national route N10 Section 3 from the Riet River (KM 45.2) to Tarka Bridge (KM 68.5) and the three borrow pits established that a low range of archaeological heritage remains were encountered during the survey. However, according to impact rating and significance tables, it is essential that the archaeological and historical heritage resources that were encountered should be mitigated. These include the historical distance marker situated along the N10 that should be treated as a no-go area, and the isolated stone artefacts surface occurrences within the proposed Bonthoek Borrow Pit area on the Farm Bonthoek 554.

No associated archaeological material and organic remains or any substantial depth of deposit was associated with the stone artefact surface scatters. It is, therefore, unlikely that the artefacts are *in situ* and occur in secondary context owing to the previous and present disturbances occurring with the area. However, it is possible that undisturbed *in situ* stone artefacts, between the surface and 50-80cm below ground, may be encountered within the areas covered in dense grass and bush vegetation.

RECOMMENDATIONS

The proposed areas are of a low cultural sensitivity and development may proceed as planned, although the following recommendations must be considered:

1. The historical distance marker (Hist1) should be treated as a no-go area and must be clearly demarcated and cordoned off to avoid any impact during the construction phase of upgrade of the N10 (Section 3).
2. Although the recorded stone artefacts are disturbed and in secondary context, they should be collected and stored at the appropriate institution for future research purposes. A professional archaeologist should apply for a collection permit.
3. If concentrations of archaeological heritage material and human remains are uncovered during construction, all work must cease immediately and be reported to the Albany Museum (046 622 2312) and/or the South African Heritage Resources Agency (SAHRA) (021 642 4502) so that systematic and professional investigation/ excavation can be undertaken.
4. Construction managers/foremen should be informed before construction starts on the possible types of heritage sites and cultural material they may encounter and the procedures to follow when they find sites.

GENERAL REMARKS AND CONDITIONS

Note: This report is a phase 1 archaeological heritage impact assessment/ investigation only and does not include or exempt other required heritage impact assessments (see below).

The National Heritage Resources Act (Act No. 25 of 1999, section 35) (Brief legislative requirements) requires a full Heritage Impact Assessment (HIA) in order that all heritage resources, that is, all places or objects of aesthetics, architectural, historic, scientific, social, spiritual linguistic or technological value or significance are protected. Thus any assessment should make provision for the protection of all these heritage components, including archaeology, shipwrecks, battlefields, graves, and structures older than 60 years, living heritage, historical settlements, landscapes, geological sites, palaeontological sites and objects.

It must also be clear that Archaeological Specialist Reports (AIAs) will be assessed by the relevant heritage resources authority. The final decision rests with the heritage resources authority, which may grant a permit or a formal letter of permission for the destruction of any cultural sites.

6. REFERENCES

References

- Binneman, J.N.F. & Booth, C. 2008. A Phase 1 Archaeological Heritage Impact Assessment for the proposed construction and operation of an ethanol production plant on Erven 31, 32, 33 and the remaining extent of Erf 1, Cradock, InxubaYethemba Local Municipality, Eastern Cape Province
- Brooker, M. 1977. The archaeology of the Mountain Zebra Park. *Koedoe* 20:77-93.
- Deacon, H. J., 1976. *Where hunters gathered: a study of Holocene Stone Age people in the Eastern Cape*. South African Archaeological Society Monograph Series No. 1.
- Deacon, H.J. & Deacon, J. 1999. *Human beginnings in South Africa*. Cape Town: David Phillips Publishers.
- Sampson, C. G. 1985. *Atlas of Stone Age Settlement in the Central and Upper Seacow Valley*. Memoirs van die Nasionale Museum Bloemfontein, Vol. 20:1-116.
- Sharon, G. 2009. Acheulian Giant-Core Technology. *Current Anthropology*, 50(3):335-367.
- Thompson, E. & Marean, C.W. 2008. The Mossel Bay lithic variant: 120 years of Middle Stone Age Research from Cape St. Blaize Cave to Pinnacle Point. *South Africa Archaeological Society Goodwin Series*, 10: 90-104.
- Van Ryneveld, K & Koortzen, C. 2006. Borrow Pit 76.0 Quarry impact on archaeological "Michausdal" deposits, Cradock District, Eastern Cape, South Africa.

APPENDIX A:

IDENTIFICATION OF ARCHAEOLOGICAL FEATURES AND MATERIAL FROM INLAND AREAS: guidelines and procedures for developers

1. Human Skeletal material

Human remains, whether the complete remains of an individual buried during the past, or scattered human remains resulting from disturbance of the grave, should be reported. In general the remains are buried in a flexed position on their sides, but are also found buried in a sitting position with a flat stone capping and developers are requested to be on the alert for this.

2. Freshwater mussel middens

Freshwater mussels are found in the muddy banks of rivers and streams and were collected by people in the past as a food resource. Freshwater mussel shell middens are accumulations of mussel shell and are usually found close to rivers and streams. These shell middens frequently contain stone tools, pottery, bone, and occasionally human remains. Shell middens may be of various sizes and depths, but an accumulation which exceeds 1 m² in extent, should be reported to an archaeologist.

3. Stone artefacts

These are difficult for the layman to identify. However, large accumulations of flaked stones which do not appear to have been distributed naturally should be reported. If the stone tools are associated with bone remains, development should be halted immediately and archaeologists notified

4. Fossil bone

Fossil bones may be found embedded in geological deposits. Any concentrations of bones, whether fossilized or not, should be reported.

5. Large stone features

They come in different forms and sizes, but are easy to identify. The most common are roughly circular stone walls (mostly collapsed) and may represent stock enclosures, remains of wind breaks or cooking shelters. Others consist of large piles of stones of different sizes and heights and are known as *isisivane*. They are usually near river and mountain crossings. Their purpose and meaning is not fully understood, however, some are thought to represent burial cairns while others may have symbolic value.

6. Historical artefacts or features

These are easy to identified and include foundations of buildings or other construction features and items from domestic and military activities.