McGregor Museum
Department of Archaeology

Heritage Impact Assessment for proposed drilling site at Biessie Laagte 96, near Hopetown, Northern Cape

David Morris
August 2020

Heritage Impact Assessment for proposed drilling site at Biessie Laagte 96, near Hopetown, Northern Cape.

David Morris, McGregor Museum, Kimberley
P.O. Box 316 Kimberley 8300
Tel 082 2224777 email dmorriskby@gmail.com
August 2020

Executive Summary

A Phase 1 Heritage Impact Assessment is presented.

Precise co-ordinates for one proposed drilling site was presented and De Beers Exploration personnel took the author directly to the specific sites in question. This report describes the archaeological/heritage traces that were observed at the surface.

It is possible, though not likely, that archaeological material of significance may occur subsurface. If encountered this should be brought to the attention of heritage authorities for further assessment, and mitigation if necessary.

In terms of this report, no significant heritage traces were found at the particular locale of proposed drilling, nor in the immediate vicinity, that are considered to require further mitigation.

The loss of heritage resources is assessed to be of ***low*** significance with and without the implementation of mitigation.

Background

The McGregor Museum Archaeology Department was appointed by The De Beers Group of Companies: Exploration Office – DBGS in order to conduct a Phase 1 Heritage Impact Assessment at a proposed drilling site at Biessie Laagte 96, near Hopetown, Northern Cape. This report addresses the possible impacts on heritage resources (archaeological and cultural) of this operation. It excludes palaeontological assessment.

The site was inspected on 20 August 2020 and relevant observations are indicated in this report.

Fieldnotes and photographs are lodged with the McGregor Museum, Kimberley.

Specialist

The author is a professional archaeologist (PhD) accredited as a Principal Investigator by the Association of Southern African Professional Archaeologists. He has worked as a museum archaeologist and has carried out specialist research and surveys in the Northern Cape since 1985.

The author is independent of the organization commissioning this specialist input, and provides this heritage assessment (archaeology and colonial history but not palaeontology) within the framework of the National Heritage Resources Act (No 25 of 1999).

The National Heritage Resources Act no. 25 of 1999 (NHRA) protects heritage resources which include archaeological and palaeontological objects/sites older than 100 years, graves older than 60 years, structures older than 60 years, as well as intangible values attached to places. The Act requires that anyone intending to disturb, destroy or damage such sites/places, objects and/or structures may not do so without a permit from the relevant heritage resources authority.

Heritage is assessed in terms of a NEMA application, and must comply with section 38(3) of the NHRA. SAHRA would then comment and make recommendations on the potential impacts.

(Where archaeological sites and palaeontological remains are concerned, the South African Heritage Resources Agency (SAHRA) at national level acts on an agency basis for the Provincial Heritage Resources Agency (PHRA) in the Northern Cape. The Northern Cape Heritage Resources Authority (formerly called Ngwao Bošwa ya Kapa Bokone) is responsible for the built environment and other colonial era heritage and contemporary cultural values).

Description of environment and potential impacts

The environment in question consists of essentially flat terrain about 12 km south of the Orange (Gariep) River at Hopetown.

A subsurface anomaly, potentially an underlying kimberlite body, is mantled by a shallow unconsolidated Karoo clayey topsoil overlying calcrete, supporting low grass and karroid scrub on a wide featureless plain south of the Orange River. The superficial unconsolidated sediment may mask underlying archaeological material, as occurs at other sites in the region (e.g. Beaumont & Morris 1990), although sporadic Pleistocene artefacts at the surface were an indication relatively high archaeological visibility and probably limited density.

Figure 1. Landscape and vegetation in the vicinity of the Biessie Laagte 96 drill site.

The proposed drilling locality is indicated in the following maps.

Figure 2. Location of site (white square labelled 1) south of Hopetown.

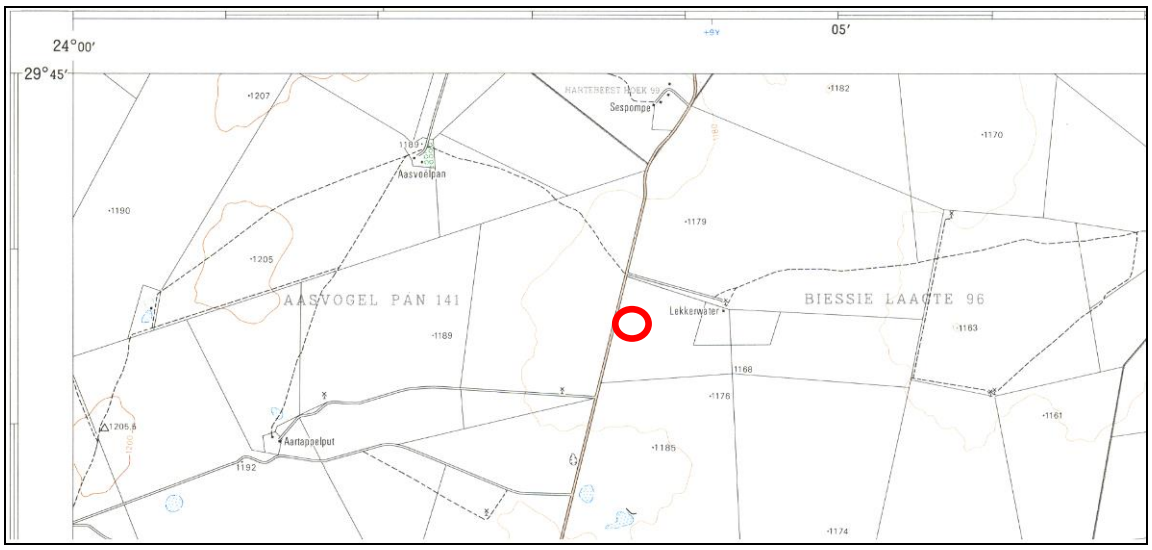

Figure 3. Portion of 1:50 000 sheet 2924CC showing Biessie Laagte 96 and the location of the drill site.

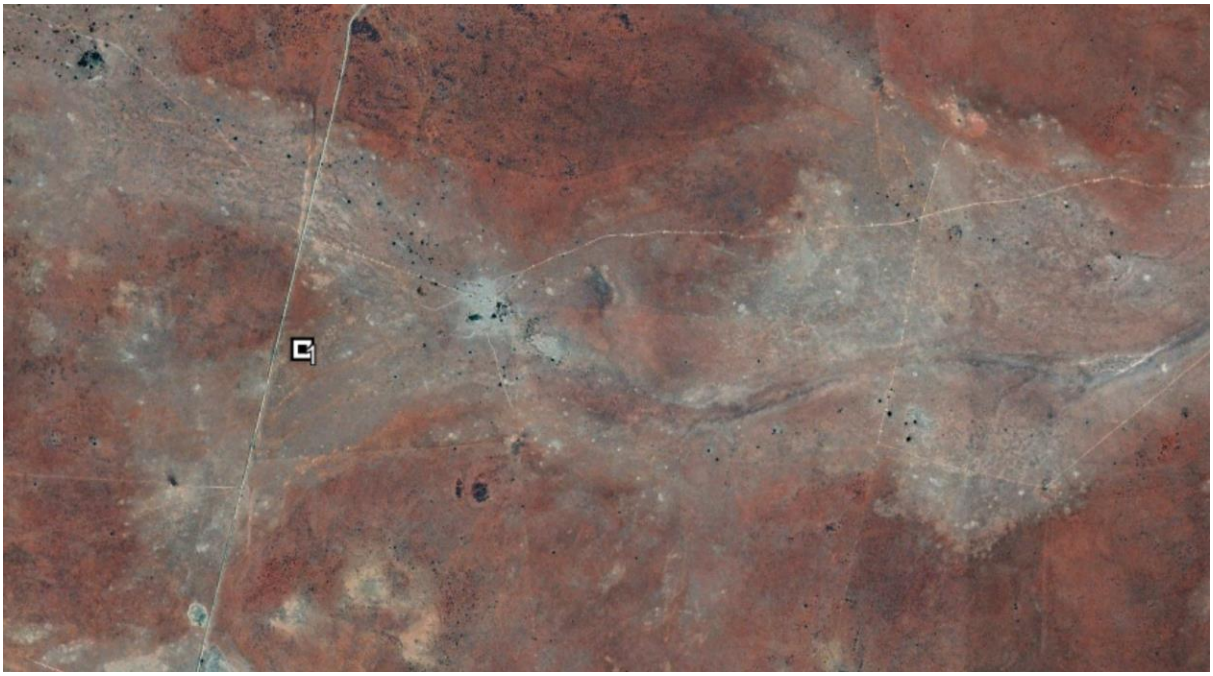
Figure 4. Google Earth image showing location of drill site (white square).

In terms of heritage features of the region, the following introductory comments may be made:

Previous studies

SAHRIS provides no pertinent records for the immediate vicinity. Case ID 6642 refers to the proposed Biessie Laagte prospecting by De Beers as envisaged in the present report, and no heritage reports were undertaken for these cases.

Recent history

A diagram at the Chief Surveyor General's office (Fig. 5) shows Biessie Laagte as defined in 1864 and relating to a title deed of 1876, when Crown Land was increasingly being transferred into private hands (Kurtz 1988).

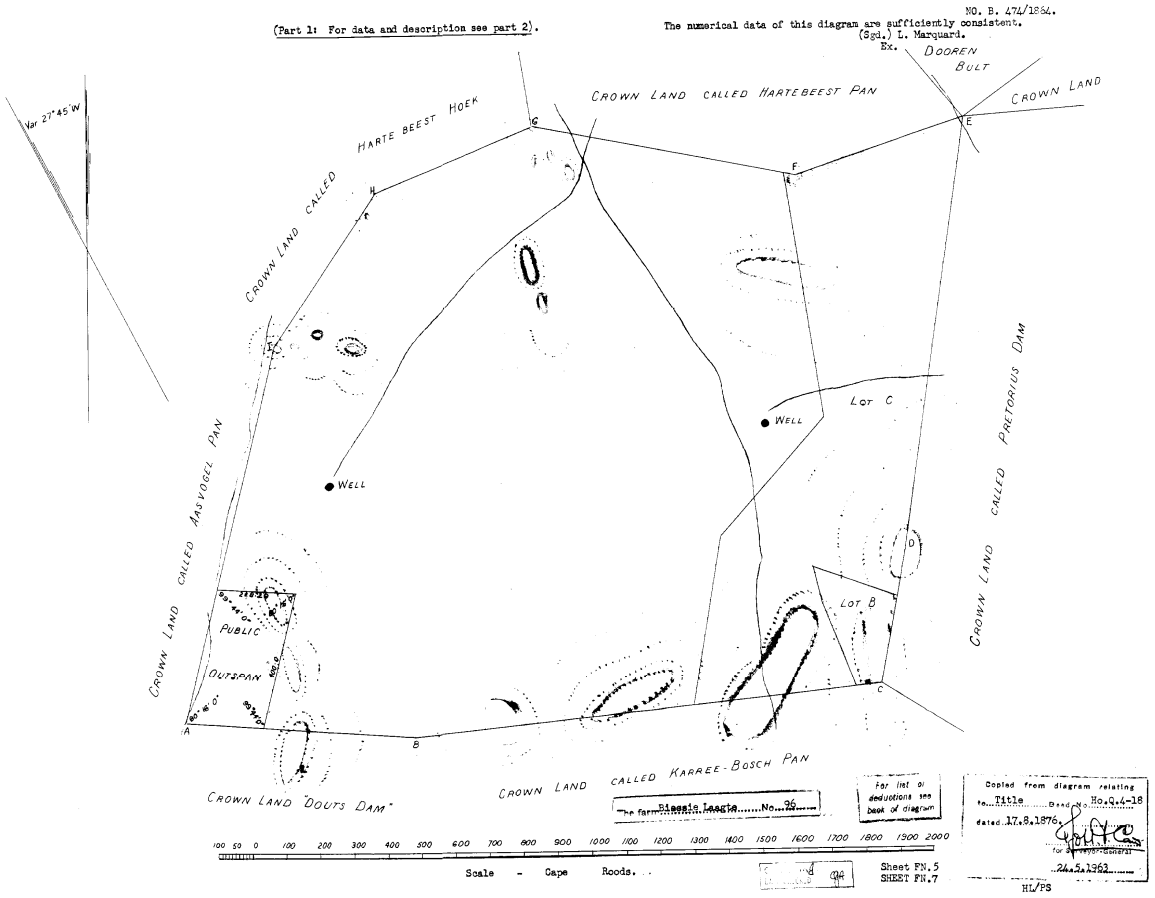

Figure 5. Copy of 1864/1876 survey diagram indicating Biessie Laagte. The well at the western side of the diagram appears to correspond with the depression some 900 m east of the proposed drill site.

Stone Age

Stone Age material found in the broader region spans the Earlier, Middle and Later Stone Ages through Pleistocene and Holocene times (Beaumont & Morris 1990). Later Stone Age rock engravings are known to occur on dolerite hills in the wider landscape (Fock & Fock 1989).

Description and evaluation of environmental issues and potential impacts

Heritage resources including archaeological sites are in each instance unique and non-renewable resources. Area and linear developments can have a permanent destructive impact on these resources in cases where they are impacted. The objective of this study is to assess the significance of such resources, where present, and to recommend no-go or mitigation measures (where necessary) to facilitate or constrain the development.

Area impacts that would be spatially constrained within a few metres would occur in the area of the drilling sites under consideration. An existing farm road provides access close to the drill site; no scraping or other major modification of the surface is anticipated to maneuvre drilling equipment to the site.

Direct, indirect and cumulative impacts (in terms of nature and extent)

The destructive impacts that are possible in terms of heritage resources would be direct once-off events occurring during drilling.

Indirect and cumulative impacts could result from on-going use of the site should further developments ensue.

Statement of significance

In addition to guidelines provided by the National Heritage Resources Act, a set of criteria based on Deacon nd and Whitelaw 1997 for assessing archaeological significance has been developed for Northern Cape settings (Morris 2000a).

Estimating site potential

Table 1 is a classification of landforms and visible archaeological traces for estimating the potential for archaeological sites (after J. Deacon nd, National Monuments Council). Type 3 sites tend to be those with higher archaeological potential. There are notable exceptions, such as the renowned rock art site Driekopseiland, near

Kimberley, which is on landform L1 Type 1. Generally, moreover, the older a site the poorer the preservation. Estimation of potential, in the light of such variables, thus requires some interpretation.

Assessing site value by attribute

The second matrix (Table 2) is adapted from Whitelaw (1997), who developed an approach for selecting sites meriting heritage recognition status in KwaZulu-Natal. It is a means of judging a site's archaeological value by ranking the relative strengths of a range of attributes. While aspects of this matrix remain qualitative, attribute assessment is a good indicator of the general archaeological significance of a site, with Type 3 attributes being those of highest significance.

Table 1. Classification of landforms and visible archaeological traces for estimating the potential for archaeological sites (after J. Deacon, National Monuments Council).

Class	**Landform**	**Type 1**	**Type 2**	**Type 3**
L1	Rocky surface	Bedrock exposed	Some soil patches	Sandy/grassy patches
L2	Ploughed land	Far from water	In floodplain	On old river terrace
L3	Sandy ground, inland	Far from water	In floodplain or near feature such as hill	On old river terrace
L4	Sandy ground, Coastal	>1 km from sea	Inland of dune cordon	Near rocky shore
L5	Water-logged deposit	Heavily vegetated	Running water	Sedimentary basin
L6	Developed urban	Heavily built-up with no known record of early settlement	Known early settlement, but buildings have basements	Buildings without extensive basements over known historical sites
L7	Lime/dolomite	>5 myrs	<5000 yrs	Between 5000 yrs and 5 myrs
L8	Rock shelter	Rocky floor	Sloping floor or small area	Flat floor, high ceiling
Class	**Archaeo-logical traces**	**Type 1**	**Type 2**	**Type 3**
A1	Area previously excavated	Little deposit remaining	More than half deposit remaining	High profile site
A2	Shell or bones visible	Dispersed scatter	Deposit <0.5 m thick	Deposit >0.5 m thick; shell and bone dense
A3	Stone artefacts or stone walling or other feature visible	Dispersed scatter	Deposit <0.5 m thick	Deposit >0.5 m thick

Table 2. Site attributes and value assessment (adapted from Whitelaw 1997)

Class	**Attribute**	**Type 1**	**Type 2**	**Type 3**
1	Length of sequence/context	No sequence Poor context Dispersed	Limited sequence	Long sequence Favourable context

		distribution		High density of arte/ecofacts
2	Presence of exceptional items (incl regional rarity)	Absent	Present	Major element
3	Organic preservation	Absent	Present	Major element
4	Potential for future archaeological investigation	Low	Medium	High
5	Potential for public display	Low	Medium	High
6	Aesthetic appeal	Low	Medium	High
7	Potential for implementation of a long-term management plan	Low	Medium	High

Methodology for HIA assessment

A field visit to inspect the proposed drill site was undertaken on 20 August 2020 in the company of De Beers Exploration geologist Jacobus van den Heefer. An assessment was made of heritage traces at the proposed drilling locale.

Vegetation cover, karroid in nature, is sparse at the site with a mantling of shallow superficial unconsolidated deposit overlying a substantial calcrete body, rendering archaeological visibility fairly high.

Observations

Proposed Drillhole at X(E) 24° 03’ 35” Y(S) 29° 46’ 27” (Fig. 6). The present surface here, as noted, is a shallow clayey sediment overlying calcrete where archaeological visibility enables a good assessment of what may or may not be present in terms of the archaeology of this part of the landscape. Within some 20 x 20 around the proposed drill site isolated stone artefacts were found (Fig. 7), probably Middle Stone Age, part of a wider dispersed background scatter in the area.

Figure 6. Proposed Drillhole site at X(E) 24° 03’ 35” Y(S) 29° 46’ 27”.

Figure 7. Isolated cf. Middle Stone Age lithics from an area of about 20 x 20 m around the proposed drill site.

The likelihood of subsurface archaeological material of significance occurring here is considered to be LOW.

No colonial era traces were observed in the vicinity of the proposed drill site. However early colonial era features may occur near to the well as indicated in the 1876 map (Fig. 5).

There are no dolerite hills in close proximity to the drill site where rock engravings might occur.

Characterising the significance of heritage traces and contexts

In terms of Tables 1 and 2 (above), the classification of landforms and visible archaeological traces for estimating the potential for archaeological sites at the proposed drilling site (Table 1) suggests landscape L3 Type 1 (generally poor potential) and archaeological trace Class A3 Type 1 (likely to be insignificant). Table 2 site attribute and value assessment criteria suggest Type 1 for all of the Classes 1-7 (low significance).

Archaeological significance in terms of these criteria for the drilling site is thus consistently LOW.

Characterising the significance of impacts

The following criteria are used in this study to characterise the significance of direct, indirect and cumulative impacts:

- The **nature**, which shall include a description of what causes the effect, what will be affected, and how it will be affected.
- The **extent**, wherein it will be indicated whether the impact will be local (limited to the immediate area or site of development) or regional:
  - local extending only as far as the development site area – assigned a score of 1;
  - limited to the site and its immediate surroundings (up to 10 km) – assigned a score of 2;
  - will have an impact on the region – assigned a score of 3;
  - will have an impact on a national scale – assigned a score of 4; or
  - will have an impact across international borders – assigned a score of 5.
- The **duration**, wherein it will be indicated whether:
  - the lifetime of the impact will be of a very short duration (0–1 years) – assigned a score of 1;
  - the lifetime of the impact will be of a short duration (2-5 years) - assigned a score of 2;
  - medium-term (5–15 years) – assigned a score of 3;
  - long term (> 15 years) - assigned a score of 4; or

        - permanent - assigned a score of 5.
    - The **magnitude**, quantified on a scale from 0-10, where a score is assigned:
        - 0 is small and will have no effect on the environment;
        - 2 is minor and will not result in an impact on processes;
        - 4 is low and will cause a slight impact on processes;
        - 6 is moderate and will result in processes continuing but in a modified way;
        - 8 is high (processes are altered to the extent that they temporarily cease); and
        - 10 is very high and results in complete destruction of patterns and permanent cessation of processes.
    - The **probability** *of occurrence*, which shall describe the likelihood of the impact actually occurring. Probability will be estimated on a scale, and a score assigned:
        - Assigned a score of 1–5, where 1 is very improbable (probably will not happen);
        - Assigned a score of 2 is improbable (some possibility, but low likelihood);
        - Assigned a score of 3 is probable (distinct possibility);
        - Assigned a score of 4 is highly probable (most likely); and
        - Assigned a score of 5 is definite (impact will occur regardless of any prevention measures).
    - the **significance**, which shall be determined through a synthesis of the characteristics described above (refer formula below) and can be assessed as low, medium or high.
    - the **status**, which will be described as either positive, negative or neutral.
        - the degree to which the impact can be reversed.
        - the degree to which the impact may cause irreplaceable loss of resources.
        - the degree to which the impact can be *mitigated.*

The **significance** is determined by combining the criteria in the following formula:

S= (E+D+M) P; where

S = Significance weighting
E = Extent
D = Duration
M = Magnitude
P = Probability

The **significance weightings** for each potential impact are as follows:

- < 30 points: Low (i.e. where this impact would not have a direct influence on the decision to develop in the area),
- 30-60 points: Medium (i.e. where the impact could influence the decision to develop in the area unless it is effectively mitigated),
- > 60 points: High (i.e. where the impact must have an influence on the decision process to develop in the area).

Impact table summarising the significance of impacts the Biessie Laagte proposed drilling site

Nature Acts or activities resulting in disturbance of surfaces and/or sub-surfaces containing artefacts (causes) resulting in the destruction, damage, excavation, alteration, removal or collection from its original position (consequences), of any archaeological material or object (what affected).		
	Without mitigation	***With mitigation***
Extent	Local (1)	Local (1)
Duration	Permanent (5) where archaeological material is impacted – but this has been rated as insignificant and not requiring mitigation	Permanent – but no mitigation regarded as necessary (5)
Magnitude	Minor (2)	Minor (2)
Probability	Improbable (2)	Improbable (2)
Significance	**Low (16)**	**Low (16)**
Status (positive or negative)	Negative	Negative
Reversibility	No	No
Irreplaceable loss of resources?	Exceptionally low density of artefacts in the vicinity of the proposed drilling site. No irreplaceable loss expected.	
Can impacts be mitigated?	Minimal traces noted on the ground: Not regarded as necessary other than by way of on-going management as per EMP in case unexpected archaeological material is encountered sub-surface.	On-going management as per EMP
Mitigation:		

Specific mitigation measures at the drilling sites not regarded as necessary. Possible subsurface Stone Age archaeological traces including possible artefact occurrences. Report immediately to SAHRA if any major feature is found.
Cumulative Impacts: Where any archaeological contexts occur the impacts are once-off permanent destructive events. Future infrastructure development may lead to spatially extended impacts in the vicinity. EMP should provide for on-going monitoring.
Residual Impacts: Depleted archaeological record if/where present.

MEASURES FOR INCLUSION IN THE DRAFT ENVIRONMENTAL MANAGEMENT PLAN

OBJECTIVE: Archaeological or other heritage materials occurring in the path of any surface or sub-surface disturbances associated with any aspect of the development are highly likely to be subject to destruction, damage, excavation, alteration, or removal. The objective should be to limit such impacts to the primary activities associated with drilling and hence to limit secondary impacts during the medium and longer term if further development occurs.

Project component/s	Any road construction over and above what is necessary and any extension of other components.
Potential Impact	The potential impact if this objective is not met is that wider areas or extended linear developments may result in further destruction, damage, excavation, alteration, removal or collection of heritage objects from their current context in the area.
Activity/risk source	Activities which could impact on achieving this objective include deviation from the planned drilling site and of access road/s without taking heritage impacts into consideration.
Mitigation: Target/Objective	A drilling environmental management plan that takes cognizance of heritage resources in the event of any future expansion, access roads or other infrastructure.

Mitigation: Action/control	Responsibility	Timeframe
Provision for on-going heritage monitoring in a facility environmental management plan which also provides guidelines on what to do in the event of any major heritage feature being encountered during any phase of development or operation. Localize drilling activity and impacts in the immediate vicinity of the proposed drilling site.	Environmental management provider with on-going monitoring.	Environmental management plan to be in place before commencement of development.

Performance Indicator	Inclusion of further heritage impact consideration in any future expansion or infrastructural elements. Immediate reporting to relevant heritage authorities of any heritage

	feature discovered during drilling operations.
Monitoring	Officials from relevant heritage authorities (National and Provincial) to be permitted to inspect the operation at any time in relation to the heritage component of the management plan.

CONCLUSIONS

A 'background scatter' of widely dispersed Middle Stone Age artefacts was noted in the area around the proposed drilling site, a few occurring within an area of circa 20 x 20 m around the drill site. Archaeological significance was determined to be consistently low in terms of all criteria by which they were measured. There is limited potential for major occurrences of subsurface material, but steps for reporting in the event of such archaeological material being found are indicated.

At the specific drilling site reported on, it is not regarded as necessary to carry out mitigation.

Acknowledgements

I thank De Beers Exploration geologist geologist Cobus van den Heever who set up the site visit and took me to inspect the site.

References

Beaumont, P.B. & Morris, D. 1990. *Guide to archaeological sites in the Northern Cape*. Kimberley: McGregor Museum.

Deacon, J. nd. Archaeological Impact Assessment - specialist input to planning and design. Unpublished notes compiled for the National Monuments Council.

Fock, G.J. & Fock, D.M.L. 1989. *Felsbilder in Südafrika Teil III: Die Felsbilder im Vaal-Oranje-Becken*. Köln: Böhlau Verlag.

Kurtz, J.M. 1988. The Albania Settlement of Griqualand West, 1866-1878. Masters Thesis, Rhodes University.

Morris, D. 2000a. Gamsberg Zinc Project environmental impact assessment specialist report: archaeology. Unpublished report, McGregor Museum.