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For attention: Mr Simon Charter

Job No QRS 185

Archaeological mitigation report on the Omitiomire project

Introduction:

The Omitiomire copper project is located 140 km northeast of Windhoek in central Namibia. Namibian-registered company Craton Mining and Exploration (Pty) Ltd, a wholly-owned subsidiary of Australian-registered International Base Metals Limited, is the holder of an Exclusive Prospecting Licence (EPL3589) which includes the Omitiomire project area. This deposit, which manifests near surface, is about 4km along its north-south axis and about 0.8km east-west. Craton is now considering a Phase 1 oxide mining and beneficiation operation at Omitiomire to mine near-surface areas of weathered copper oxide.

QRS has been commissioned at three earlier stages of the project to carry out an archaeological field survey and impact assessment¹. SLR (Namibia) has been appointed to carry out an environmental impact assessment (EIA) of the project as required under the Environmental Management Act (2007) and its Regulations (2012). SLR has commissioned QRS to prepare a final archaeological mitigation report to assess whether any further archaeological work might be required in order that the project is able to comply with the provisions of the National Heritage Act (2004).

A final site visit was carried out on 29th to 31st May, 2013. This report presents observations as required under a Scope of Work agreed on 1st March 2013. Appendices to the report include:

1 Archaeological desk assessment of proposed mining activity on EPL 3589, Groot Omitiomire 439, Omaheke Region (QRS Job 99 report 14 July 2008)
Archaeological field assessment of proposed mining activity on EPL 3589, Groot Omitiomire 439, Omaheke Region (QRS Job 99 report 28 January 2010)
Archaeological Impact Assessment for the Proposed Copper Mine at Omitiomire (QRS Job 145 report 19 February 2012)

1. Site Gazetteer
2. Significance and Vulnerability Ranking
3. Chance Finds Procedure

In summary, the archaeological assessment concluded that the Omitiomire project will have a negligible impact on the archaeology of the project area and that the project is therefore not expected to have any implications in terms of the National Heritage Act.

Scope of Work:

The specialist archaeological tasks reported here comprise:

- Task 1. Clearance survey of all proposed project infrastructure.
- Task 2. Test pitting of ground within the target areas south of the Swart Nossob River.
- Task 3. Preparation of final archaeological impact statement.

Baseline description and general approach:

The southern Omaheke Region is not well known archaeologically, but the available evidence suggested that archaeological site distributions in the project area could be efficiently sampled by focussing on specific terrain elements that are known to be archaeologically significant, and by employing transect sampling to test the potential of terrain that is believed to have low archaeological potential. This approach was therefore employed during the fieldwork carried out so far in the Omitiomire project area (see reports listed in Footnote 1, above).

In the Omitiomire project area there are three terrain elements that have known archaeological potential: the banks and terraces of the Black Nossob; the clusters of small sub-circular pans, and the courses of drainage lines known colloquially as *omuramba*. These features are best sampled by means of foot traverses to locate archaeological sites from surface indications such as erosion debris. During the surveys of Omitiomire, site locations were established in the field by hand-held GPS, and described according to established criteria (see Site Gazetteer, Annexure 1). The significance and vulnerability of the individual sites is assessed as described below. These data are combined in GIS format to indicate areas (rather than individual sites) of significance.

The importance of archaeological sites in Namibia is determined according to a ranking system that places the highest value (5) on sites that contain evidence of high regional significance. These sites usually form part of an integrated local distribution and may require extensive mitigation if threatened with disturbance or destruction such as through mining activity. The vulnerability of archaeological sites in Namibia is determined by a parallel, and therefore independent, ranking that considers only the risk of disturbance or destruction as a consequence of the project under consideration (see explanation of ranking in Annexure 2).

In the case of archaeological impact assessment, vulnerability ranking does not take into consideration other potential causes of damage to the site. Thus, a highly significant site is not necessarily vulnerable, and a highly vulnerable site is not necessarily so significant as to require mitigation of planned development activities.

Field observations:

The field survey on Omitiomire located a total of thirteen archaeological sites (Figure 1) representing sporadic human occupation of the area from the late Pleistocene (probably about 150 000 years BP) until the recent Holocene (i.e. within the last 5 000 years), with some evidence of occupation in the immediate pre-colonial period. Details of the sites are presented in the

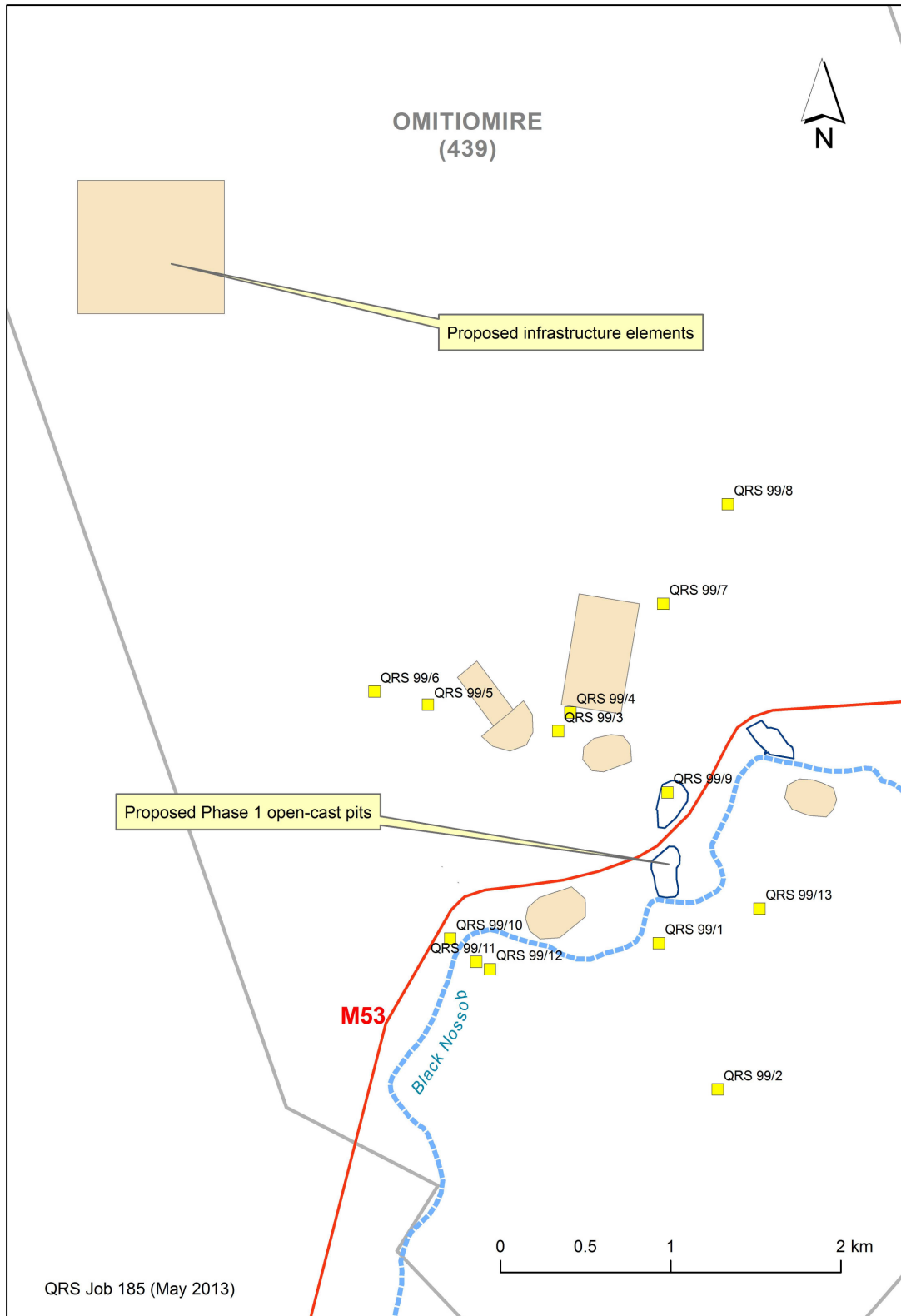


Figure 1: The distribution of archaeological sites (yellow squares) in relation to proposed infrastructure elements and Phase 1 open pits on Omitiomire.

Appendix 1 Site Gazetteer. All but one of the sites located in the survey were surface scatters of stone artefact debris, varying in extent, density and age. The exception, QRS 99/7 which is also the youngest site, is suspected to be a pre-colonial Herero well. The site has a round depression approximately 25m in diameter, with large spoil heaps on the northern and southern edges. It is possible that this artificial earthwork is of more recent date, but there are no indications that it was excavated by mechanical means, and the late farm owner, Mr Steyn stated that the earthworks definitely predated his arrival, about 25 years ago. All of these areas have been subject to detailed search and assessment (Scope of Work, Task 1).

Most of the sites were localized surface scatters of artefact debris (Figure 2 & 3) which are of low archaeological significance. However, these scatters do provide evidence of the likely span of the archaeological sequence, in the form of technological characteristics, raw material preferences and artefact abrasion conditions. One site, QRS 99/12 was considered to have some potential although this could not be determined during the January 2010 field survey due to extremely wet soil conditions. The site forms part of a discontinuous, patchy distribution of mixed late Pleistocene to recent Holocene surface scatters concentrated along the south bank terrace of the Black Nossob River. The terrace has evidently been subject to extensive sheet erosion which has exposed a dense concentration of archaeological material. The extent of QRS 99/12 was estimated as in excess of 20 000m², with artefact densities generally in excess of 50 objects/m². Possibly related sites are QRS 99/1, 10, 11 and 13.

In view of the possible canalization or diversion of the Black Nossob River in a later stage of the Omitiomire project some archaeological mitigation of the river terrace sites was recommended, including some surface mapping and systematic collection, as well as shovel-testing and test pit excavation. Surface mapping and systematic collection was carried out in earlier fieldwork (see reports listed Footnote 1). A series of shovel-tests were carried out during the present fieldwork, (Scope of Work, Task 2) with the following results:

Wpt. 371 -21.83519 17.93167

Alluvial sand, with one vein quartz artefact at 0.25 m below surface.

Wpt. 372 -21.83483 17.93252

Compact silty sand, with no archaeological material.

Wpt. 373 -21.8342 17.93328

Compact silty sand, sparse gravel, with no archaeological material.

Wpt. 374 -21.8337 17.93474

Compact silty sand, with no archaeological material.

Wpt. 375 -21.83267 17.93452

Compact silty sand, with no archaeological material.

Wpt. 376 -21.83217 17.93589

Compact silty sand, with lag containing quartz artefact debris, estimated recent Holocene age.

Wpt. 377 -21.83057 17.93565

Compact silty sand, with no archaeological material.

Wpt. 378 -21.83447 17.9369



Figure 2: Sheet eroded surface of river terrace site QRS 99/12.



Figure 3: Quartzite core, probably late Pleistocene, in surface association with suspected Holocene quartz artefact debris, QRS 99/12.

Compact silty sand, with no archaeological material.

Wpt. 379 -21.83443 17.93583

Sheet eroded clayey sand with lag containing quartz artefact debris, estimated recent Holocene age.

Wpt. 380 -21.83605 17.93298

Sheet eroded clayey sand with lag containing quartz artefact debris, estimated recent Holocene age.

Wpt. 381 -21.83676 17.93212

Sheet eroded clayey sand with lag containing quartz artefact debris, estimated recent Holocene age.

Wpt. 382 -21.83712 17.93127

Sandy clay with recent Holocene artefact debris at surface, mixed with calcareous root casts, indicating possible standing or artesian water pre-dating present incision of drainage (approximately 5 m below this level).

Wpt. 383 -21.83679 17.93087

Silty sand with small river pebbles, and no archaeological material.

Wpt. 384 -21.83581 17.93088

Silty sand with small river pebbles, and no archaeological material.

Wpt. 385 -21.83461 17.93116

Silty sand with small river pebbles, slope talus fragments, and no archaeological material.

Wpt. 386 -21.83828 17.92924

Clayey sand, and no archaeological material

Wpt. 387 -21.83735 17.92967

Clayey sand with calcrete gravel layer exposed in gully wall, and lag containing quartz artefact debris, estimated recent Holocene age.

Wpt. 388 -21.83805 17.92807

Clayey sand with calcrete gravel layer exposed in gully wall, and lag containing quartz artefact debris, estimated recent Holocene age.

Wpt. 389 -21.83858 17.92746

Clayey sand with calcrete gravel layer exposed in gully wall, and lag containing quartz artefact debris, estimated recent Holocene age.

Wpt. 390 -21.83746 17.92605

Silty sand, with no archaeological material

Wpt. 391 -21.83869 17.92464

Sandy clay, with no archaeological material

Wpt. 392 -21.83833 17.92446

Silty sand, sheet-eroded surface, with quartz artefact debris, estimated recent Holocene age.

Wpt. 393 -21.83768 17.92386

Silty sand, sheet-eroded surface, with quartz artefact debris apparently a primary accumulation, estimated recent Holocene age.

Wpt. 394 -21.83667 17.92333

Silty sand, with no archaeological material

Wpt. 395 -21.83758 17.92185

Silty sand, toe of dune, with no archaeological material

Wpt. 396 -21.83635 17.92036

Silty sand, downslope of small rocky outcrop, dense scatter quartz artefact debris

Wpt. 397 -21.83562 17.92082

Silty sand, downslope of small rocky outcrop, dense scatter quartz artefact debris

Wpt. 398 -21.83581 17.92225

Coarse sand with gravel lag, and quartz artefact debris, estimated recent Holocene age.

Wpt. 399 -21.83615 17.92401

Steep rocky slope with outcropping ?gneiss, surface lag and dense scatter quartz artefact debris

Wpt. 400 -21.83676 17.9259

Silty sand, with no archaeological material

In general, the shovel tests reveal a large and relatively superficial recent Holocene artefact scatter associated with the south bank terraces of the Black Nossob River. However, the shovel tests also allow at least some limited discrimination among the scatters, identifying several possible foci of activity, some associated with specific natural features. These are as follows:

- a. Wpts 376 to 379 suggest a sheet eroded scatter associated with the southern edge of the river terrace.
- b. Wpt 380 to 382 suggests a small dense scatter associated with a pocket of vegetation (possibly a reedbed) at a water source.
- c. Wpt 393 suggests a similar setting to Site c, above, located on the edge of the river terrace, possibly at the foot of a dune.
- d. Wpt 396 & 397 suggests a focus of activity between the river and a small gneiss outcrop.

The inferred position and extent of these activity foci is shown in Figure 4. Unfortunately none of the sites show any evidence of stratification and it appears that they are mainly deflation surfaces with little archaeological material in primary context.

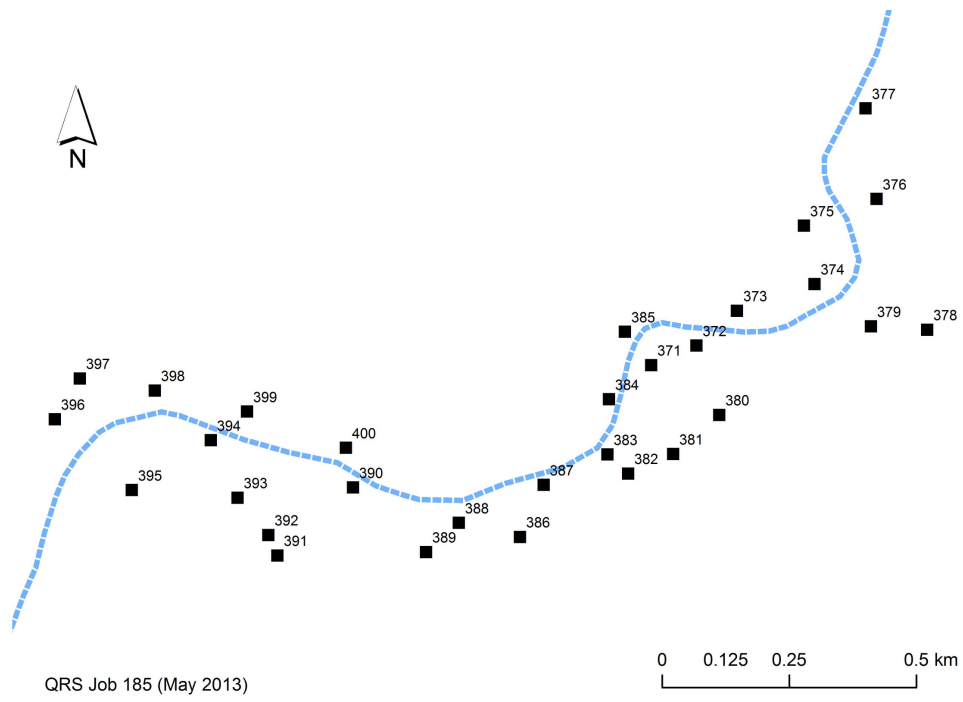


Figure 4a.: Distribution of archaeological shovel test sites on Omitiomire

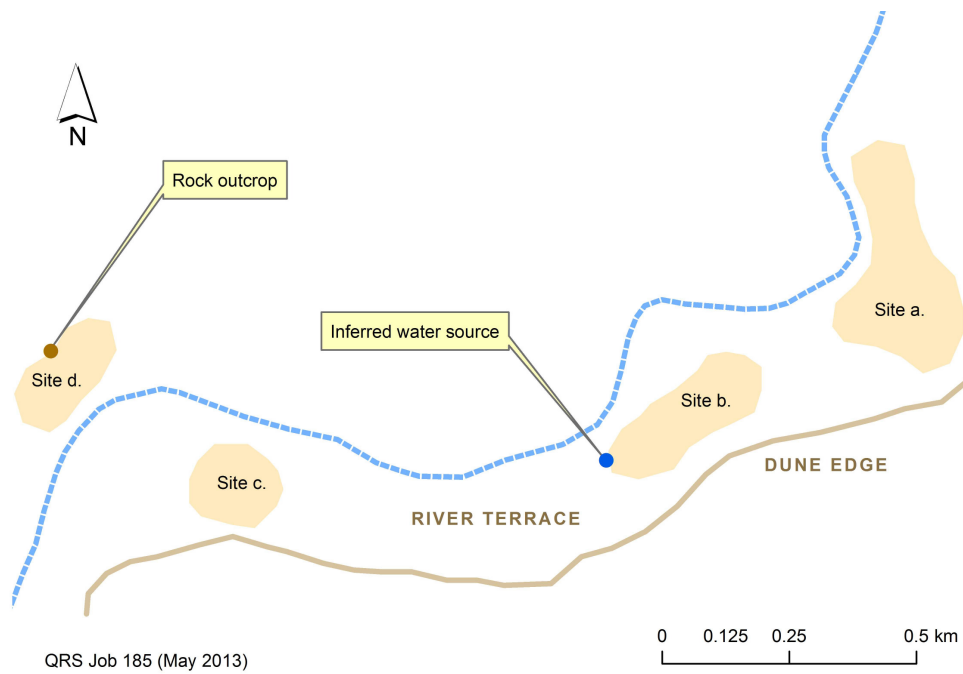


Figure 4b.: Inferred positions of archaeological sites on Black Nossob River based on shovel tests

Impact assessment:

On the basis of the field assessment reported here the Omitiomire project will have a small to negligible impact on the archaeology of the project area. Surface works, especially in the area to the north of the proposed pit have some impacts, although these would be highly localized in extent and probably of low to medium magnitude. All impacts on archaeological sites are permanent in nature.

In terms of the Scope of Work, Task 3, the archaeological impact of the Omitiomire Phase 1 infrastructure is considered to be low to negligible. This, however, excludes the possible impact of roads, power-lines and pipelines, as no data on the positioning of these elements was available at the time of this assessment. The archaeological impact of Omitiomire Phase 2, as regards the banks of the Black Nossob River, is also considered to be low because the sites identified during this investigation proved to be unstratified as well as dispersed due to sheet erosion. The sites are therefore of low archaeological significance.

Recommendations & Conclusions:

It is recommended that the Omitiomire project proceed with an **acceptably impact** on known archaeological sites and an acceptable low risk of impact on unknown archaeological sites such as may be found in the course of development. For these reasons it is not considered necessary to refer to archaeological assessment for approval by the National Heritage Council, unless the Environment Commissioner decides otherwise.

The project management should therefore be made aware of the provisions of the National Heritage Act regarding the prompt reporting of archaeological finds. In the event of such finds, the project management or contractors should adopt the “chance finds” procedure set out as below as part of the project EMP, with the explicit understanding that any archaeological remains discovered during site works should be brought to the immediate attention of the National Heritage Council.

I trust you will find this report satisfactory, and adequate to the requirements of the environmental impact assessment process.

Yours sincerely



J. Kinahan PhD MSAIE & ES

Partner

APPENDIX 1

Site gazetteer:**QRS 99/1**

Site coordinates: Lat. -21.83674 Long. 17.93198
 Elevation: 1666 masl
 Setting: south bank terrace of Black Nossob River, eroded sandy clay surface
 Description: extensive low density stone artefact scatter >0.5km², <10 objects/m²,
 Records: site notes, locality data
 Significance rating: 3
 Vulnerability rating: 5 (revised from 3)

QRS 99/2

Site coordinates: Lat. -21.84442 Long. 17.93547
 Elevation: 1672 masl
 Setting: south margin of small isolated pan
 Description: isolated finds of flaked hydrothermal quartz
 Records: site notes, locality data
 Significance rating: 2
 Vulnerability rating: 4 (revised from 2)

QRS 99/3

Site coordinates: Lat. -21.82563 Long. 17.92605
 Elevation: 1667 masl
 Setting: on southwestern margin of small pan
 Description: minor occurrences of flaked quartz in pebble bed
 Records: site notes, locality data
 Significance rating: 2
 Vulnerability rating: 4 (revised from 2)

QRS 99/4

Site coordinates: Lat. -21.82463 Long. 17.92672
 Elevation: 1670 masl
 Setting: margins of small pan
 Description: isolated find of quartz polyhedral
 Records: site notes, locality data, artifact collected
 Significance rating: 2
 Vulnerability rating: 4 (revised from 2)

QRS 99/5

Site coordinates: Lat. -21.82436 Long. 17.91864
 Elevation: 1671 masl
 Setting: northern margin of pan
 Description: isolated quartz flaking debris
 Records: site notes, locality data
 Significance rating: 2
 Vulnerability rating: 3 (revised from 2)

QRS 99/6

Site coordinates: Lat. -21.82372 Long.17.91559
 Elevation: 1675 masl
 Setting: eastern slope of Tertiary dune
 Description: localized scatter flaked quartz
 Records: site notes, locality data
 Significance rating: 2
 Vulnerability rating: 3 (revised from 2)

QRS 99/7

Site coordinates: Lat. -21.81878 Long.17.93186
 Elevation: 1671 masl
 Setting: suspected precolonial well excavation
 Description: depression approx 25m diameter with marginal spoil heaps
 Records: site notes, locality data
 Significance rating: 3
 Vulnerability rating: 5 (revised from 2)

QRS 99/8

Site coordinates: Lat. -21.81345 Long.17.93542
 Elevation: 1665 masl
 Setting: southwestern bank of *omuramba*
 Description: isolated quartz artifact debris
 Records: site notes, locality data
 Significance rating: 2
 Vulnerability rating: 3 (revised from 2)

QRS 99/9

Site coordinates: Lat. -21.82876 Long.17.9323
 Elevation: 1662 masl
 Setting: northern margin of small pan
 Description: pebble horizon with late Pleistocene artefacts in chert and quartzite
 Records: site notes, locality data, some specimens collected
 Significance rating: 1
 Vulnerability rating: 5 (revised from 3)

QRS 99/10

Site coordinates: Lat. -21.83671 Long.17.92015
 Elevation: 1660 masl
 Setting: gneiss boulder outcrop on northwestern bank of Black Nossob River
 Description: general scatter of quartz polyhedral cores and artifact flaking debris
 Records: site notes, locality data
 Significance rating: 3
 Vulnerability rating: 3

QRS 99/11

Site coordinates: Lat. -21.83791 Long.17.92165
 Elevation: 1662 masl
 Setting: dune slope above southeastern bank of Black Nossob

Description: isolated microlithic core, quartz
 Records: site notes, locality data
 Significance rating: 2
 Vulnerability rating: 3

QRS 99/12

Site coordinates: Lat. -21.83829 Long.17.92244
 Elevation: 1660 masl
 Setting: river terrace, colluvial pebble horizon/erosion lag surface in sandy clay
 Description: extensive and fairly dense surface scatter ca 20 000m², >50 objects/m²
 Records: site notes, locality data, selective surface collection
 Significance rating: 3
 Vulnerability rating: 3

QRS 99/13

Site coordinates: Lat. -21.83481 Long.17.93765
 Elevation: 1672 masl
 Setting: Tertiary dune crest above Black Nossob River
 Description: isolated quartz polyhedral
 Records: site notes, locality data
 Significance rating: 2
 Vulnerability rating: 5 (revised from 2)

APPENDIX 2

Significance and Vulnerability Ranking of Archaeological Finds

The evaluation and ranking of site significance and vulnerability is an essential component of archaeological impact assessment. QRS has developed an approach to significance and vulnerability estimation that combines accepted international practice^α with the results of more than 80 field surveys we have carried out in Namibia and elsewhere.

Our standard procedure involves an estimate of the archaeological value and the risk of damage, using ordinal scales of zero to five. These separate values can be combined as a significance and vulnerability index, e.g. 3/2, 4/0. The same data are used in the preparation of archaeological sensitivity maps and predictive models which form the empirical basis of our time and cost estimates for archaeological field surveys.

It is important to realize however, that such estimates have a degree of subjectivity. For this reason, we estimate significance with specific reference to the value of the site as a component of the Namibian archaeological record, while our estimation of vulnerability refers primarily to the potential consequences of the development project under consideration.

SIGNIFICANCE RANKING

- 0 no archaeological significance
- 1 disturbed or secondary context, without diagnostic material
- 2 isolated minor find in undisturbed primary context, with diagnostic material
- 3 archaeological site forming part of an identifiable local distribution or group
- 4 multi-component site, or central site with high research potential
- 5 major archaeological site containing unique evidence of high regional significance

VULNERABILITY RANKING

- 0 not vulnerable
- 1 no threat posed by current or proposed development activities
- 2 low or indirect threat from possible consequences of development (e.g. soil erosion)
- 3 probable threat from inadvertent disturbance due to proximity of development
- 4 high likelihood of partial disturbance or destruction due to close proximity of development
- 5 direct and certain threat of major disturbance or total destruction

QRS has adopted the practice of identifying the specific research value of archaeological sites documented in the course of field surveys. This means that we evaluate the likely research benefits of more detailed investigations on sites of high significance, or local site clusters of potential research importance. We indicate the immediate benefits in terms of sequence resolution or yield of comparative material and present this in the form of an expected research dividend. Similarly, we evaluate the consequences of damage or destruction as an expected loss of research dividend. These estimates form part of our proposals for mitigation of impacts.

^α e.g. Banning, E. B. (2002) *Archaeological Survey. Manuals in Archaeological Method, Theory, and Technique*. Kluwer Academic, New York.

APPENDIX 3

Chance Finds procedure:

Areas of proposed development activity are subject to heritage survey and assessment at the planning stage. These surveys are based on surface indications alone, and it is therefore possible that sites or items of heritage significance will be found in the course of development work. The procedure set out here covers the reporting and management of such finds.

1. **Scope:** The “chance finds” procedure covers the actions to be taken from the discovery of a heritage site or item, to its investigation and assessment by a trained archaeologist or other appropriately qualified person.
2. **Compliance:** The “chance finds” procedure is intended to ensure compliance with relevant provisions of the National Heritage Act (27 of 2004), especially Section 55 (4): “ *a person who discovers any archaeological objectmust as soon as practicable report the discovery to the Council*”. The procedure of reporting set out below must be observed so that heritage remains reported to the NHC are correctly identified in the field.
3. **Responsibility:**

Operator	To exercise due caution if archaeological remains are found
Foreman	To secure site and advise management timeously
Superintendent	To determine safe working boundary and request inspection
Archaeologist	To inspect, identify, advise management, and recover remains

4. **Procedure:***Action by person identifying archaeological or heritage material*

- a) If operating machinery or equipment stop work
- b) Identify the site with flag tape
- c) Determine GPS position if possible
- d) Report findings to foreman

Action by foreman

- a) Report findings, site location and actions taken to superintendent
- b) Cease any works in immediate vicinity

Action by superintendent

- a) Visit site and determine whether work can proceed without damage to findings
- b) Determine and mark exclusion boundary
- c) Site location and details to be added to project GIS for field confirmation by archaeologist

Action by archaeologist

- a) Inspect site and confirm addition to project GIS
- b) Advise NHC and request written permission to remove findings from work area
- c) Recovery, packaging and labelling of findings for transfer to National Museum

In the event of discovering human remains

- a) Actions as above
- b) Field inspection by archaeologist to confirm that remains are human
- c) Advise and liaise with NHC and Police

d) Recovery of remains and removal to National Museum or National Forensic Laboratory, as directed.