# Appendix 5:

# Archaeological Impact Assessment

# PHASE 1 ARCHAEOLOGICAL IMPACT ASSESSMENT OF MINING AREAS IN THE OENA MINE, RICHTERSVELD, NAMAKWALAND MAGISTERIAL DISTRICT, NORTHERN CAPE

(Assessment conducted under Section 38 (8) of the National Heritage Resources Act (No. 25 of 1999) at the request of the Dept of Minerals and Energy)

Prepared for

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# EXECUTIVE SUMMARY

ACO Associates was requested by Surf Zone Diamonds (Pty) Ltd to conduct a Phase 1 Archaeological Impact Assessment on mining areas in the Oena Diamond Mine in the northern Richtersveld, Namakwaland Magisterial District. Five areas exist: Oena Proper, Sandberg, Blokwerf, Visrivier and Kabies. The first three were subjected to exhaustive surveys, while only a preliminary survey was conducted on the latter two. The survey was conducted under Section 38(8) at the request of the Department of Minerals and Energy and the South African Heritage Resources Agency are required to provide comment to facilitate decision making.

The mining areas lie on extensive river terraces, large areas of which are covered with round cobbles. The terraces occur at different heights indicating different ages. The margins of the river are more sandy, while numerous fragments of rock litter the base and slopes of the mountains.

The distribution of finds was found to be strongly linked to the nature of the substrate with numerous artefacts belonging to the Early and Middle Stone Age scattered over the cobble terraces. The density of some of these scatters merits mitigation as little is known of these time periods in the Richtersveld. Later Stone Age artefacts appear to be concentrated along the foot of the mountains in certain areas. No *in situ* deposits were located, but many scatters of stone artefacts and/or pottery were recorded. The foot of the mountains, while not subjected to mining, is vulnerable as mine dumps are routinely placed there to facilitate easy rehabilitation. The appropriate mitigation will be fairly easy to accomplish and will involve collection from grid squares laid out over the artefact scatters as appropriate.

It is recommended that mining be allowed to proceed at Oena Proper, Sandberg and Blokwerf once archaeological mitigation has taken place. Visrivier and Kabies may not be mined until further survey and subsequent mitigation (as may be required) have taken place.

# Contents

# 1. INTRODUCTION

ACO Associates was requested by Surf Zone Diamonds (Pty) Ltd to conduct a Phase 1 Archaeological Impact Assessment on several mining areas in the Oena Diamond Mine. The mine is located in the northern Richtersveld along the Orange River in the Namakwaland Magisterial District (Figure 1). The five mining areas are Oena Proper, Sandberg, Blokwerf, Visrivier and Kabies (from west to east) but the latter two are considered a low priority as they will not be mined for several years to come. To date limited mining and prospecting has occurred on the first three sites with mining focused on Oena Proper; Visrivier and Kabies remain largely undisturbed with only limited evidence of early prospecting activities.

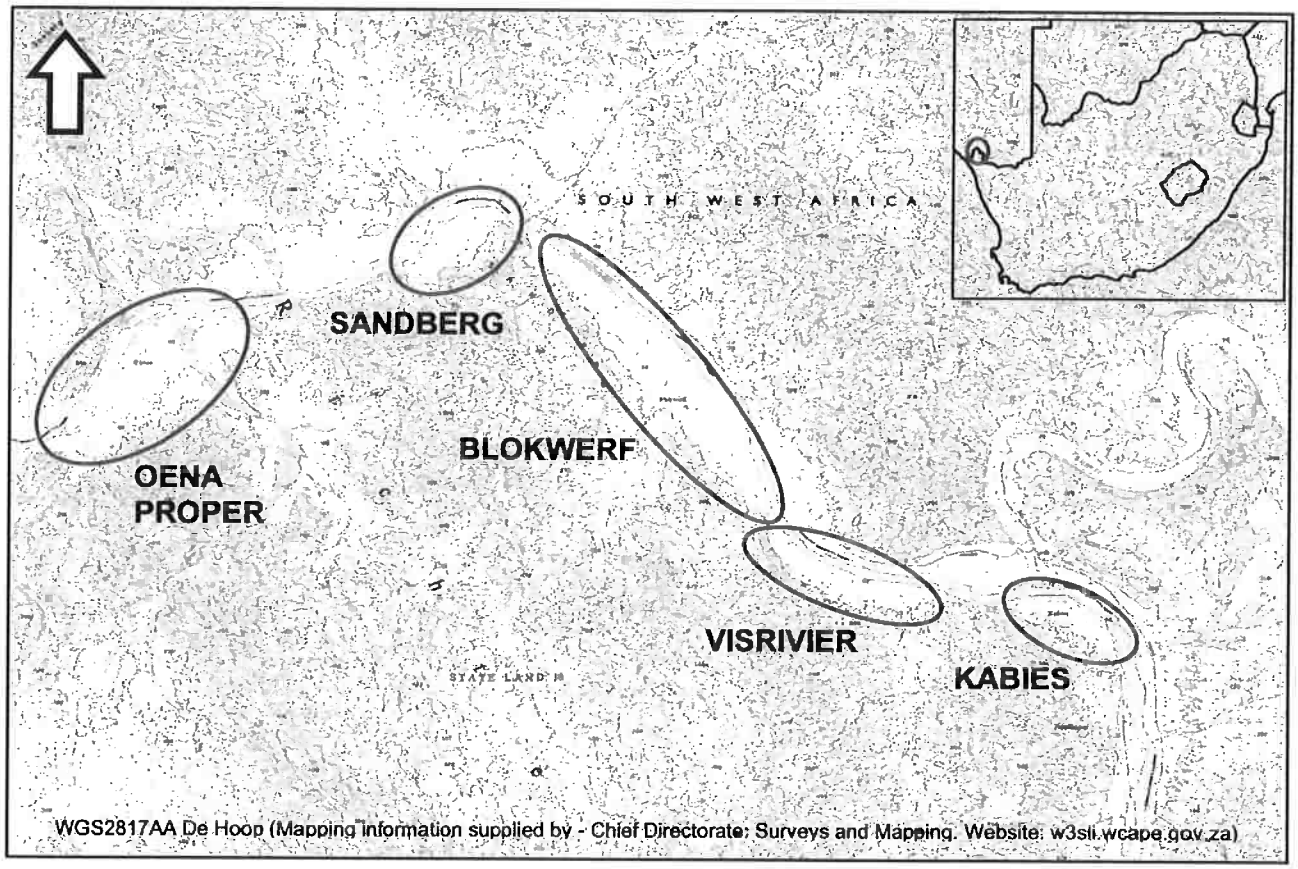


**Figure 1:** Map showing the approximate location of the survey areas in the northern Richtersveld. The five mining areas are indicated.

# 2. HERITAGE LEGISLATION

The National Heritage Resources Act (NHRA) No. 25 of 1999 protects a variety of heritage resources including palaeontological, prehistoric and historical material (including ruins) more than 100 years old (Section 35), human remains (Section 36) and non-ruined structures older than 60 years (Section 34). Landscapes with cultural significance are also protected under the definition of the National Estate (Section 3 (3.2d)). Under Section 38 (1) of the act the sites require heritage assessment based on their size of greater than 5000 $m^2$.

Since the project is subject to mining legislation, the South African Heritage Resources Agency is required to provide comment on the proposed project in order to facilitate final decision making by the Department of Minerals and Energy (DME).

# 3. DESCRIPTION OF THE AFFECTED ENVIRONMENT

The various types of environment identified within each of the five mining areas are discussed separately below. These types were found to be meaningful in terms of the distributions of archaeological resources across the landscape. In general, the landscape in all the areas is relatively flat and featureless, offering few attractive settlement locations. It should be noted that mining is not permitted within the 1:100 year flood zone; thus areas immediately adjacent to the river were not surveyed in any detail. They are largely sand-covered and have dense vegetation along the river's edge.

## 3.1. Oena

Figure 2 shows an aerial view of the Oena Proper mining area. The different environments encountered during the survey are labelled and described below. The two hills were mined several years ago by an earlier mining company but remnants of gravel still remain on them. 'Pothole Hill' contains many large pot holes relating to a far higher stand of the river. The other hill has been used as the site of the processing plant. In total the Oena area is 3.3 km in length.


**Figure 2:** Aerial photograph showing the various environments within the Oena Proper area.

A: An area of partially disturbed cobble terrace directly north of the mine complex and probably belonging with terrace "E".
B: A cobbled area on lower ground and possibly within the 1:100 year flood line (Figure 3).
C: Here the terrace opens out and becomes a flat boulder-strewn area (Figure 4).

**Figure 3:** View of Oena area B.

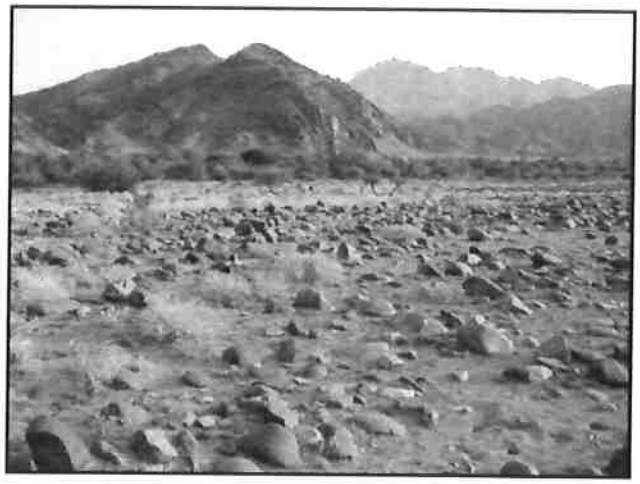

**Figure 4:** View of Oena area C.

**Figure 5:** View of Oena area D with bedrock outcrops on the left and a sandy bay between the cobbles.

D: Similar to "C" but includes some sandy bays between the cobbles and also occasional bedrock outcrops (Figure 5).
E: A large raised terrace of densely packed cobbles. The mine runway has been cleared on this very flat terrace (Figures 6 & 7).
F: An area with many rock outcrops and interspersed with sandy patches. Quite similar in character to area "D".
G: A zone of high sand dunes and trees that lies within the 1:100 year flood zone.
H: This area lies within a small river valley coming in from the south between small rocky hills (Figure 8).
I: A largely disturbed area with many mine dumps and occasional bedrock outcrops.
J: Quartz-covered hills alongside the large river valley that comes in from the south. All the lower-lying areas below these hills are highly disturbed.
K: The upper edge of terrace "E" where it merges with the hill slopes.
L: A rocky valley floor between the mine dumps and the mountain (Figure 9).
M: The sandy river terrace at the far west end of the Oena Proper area. It lies within the 1:100 year flood zone and will thus not be mined.

Figure 10 shows a schematic cross-section through the Oena area.

**Figure 6:** View of Oena area E with the river at left.

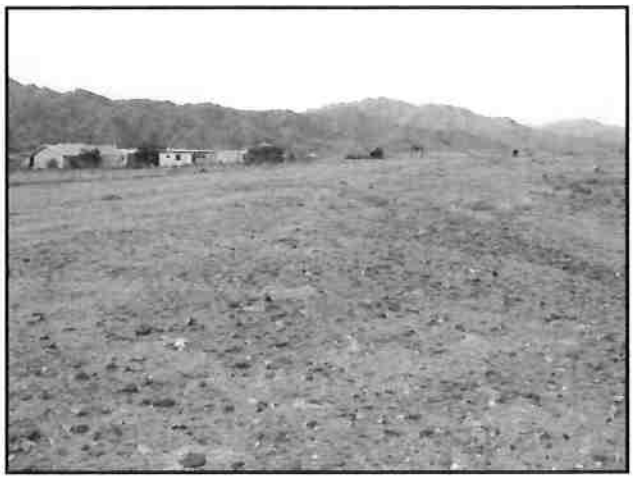

**Figure 7:** View of Oena area E near mine compound.

**Figure 8:** View of Oena area H in a small river valley.

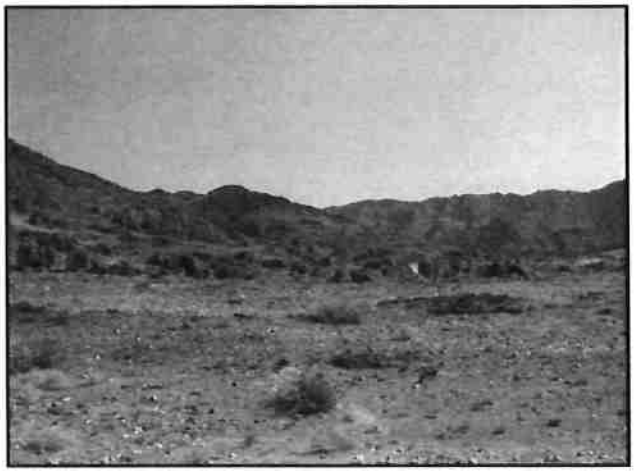

**Figure 9:** View of Oena area L at foot of mountain.

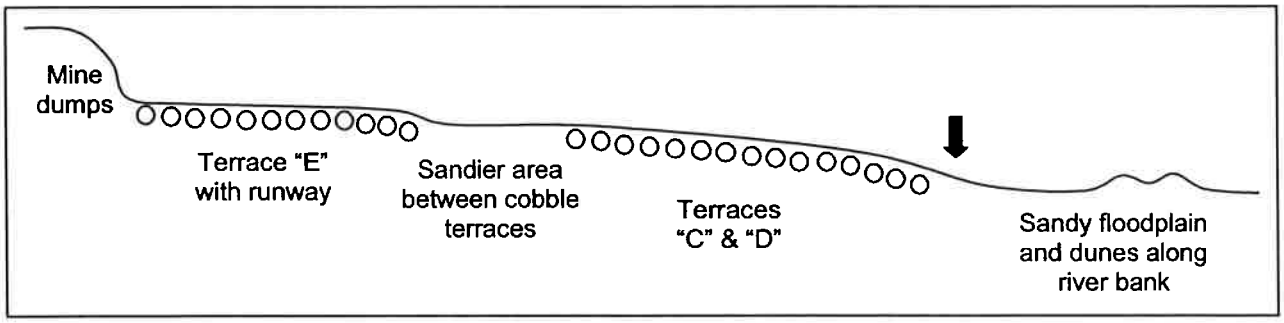


**Figure 10:** Schematic cross-section through the Oena Proper area looking towards the west. The red arrow indicates the approximate position of the 1:100 year flood line below which mining cannot take place.

### 3.2. Sandberg

Figure 11 shows an aerial view of the Sandberg mining area. The different environments encountered during the survey are labelled and described below. This area is unique in that it is very sandy and has large dunes extending up the surrounding mountains. In total, the Sandberg area is 1.8 km in length.

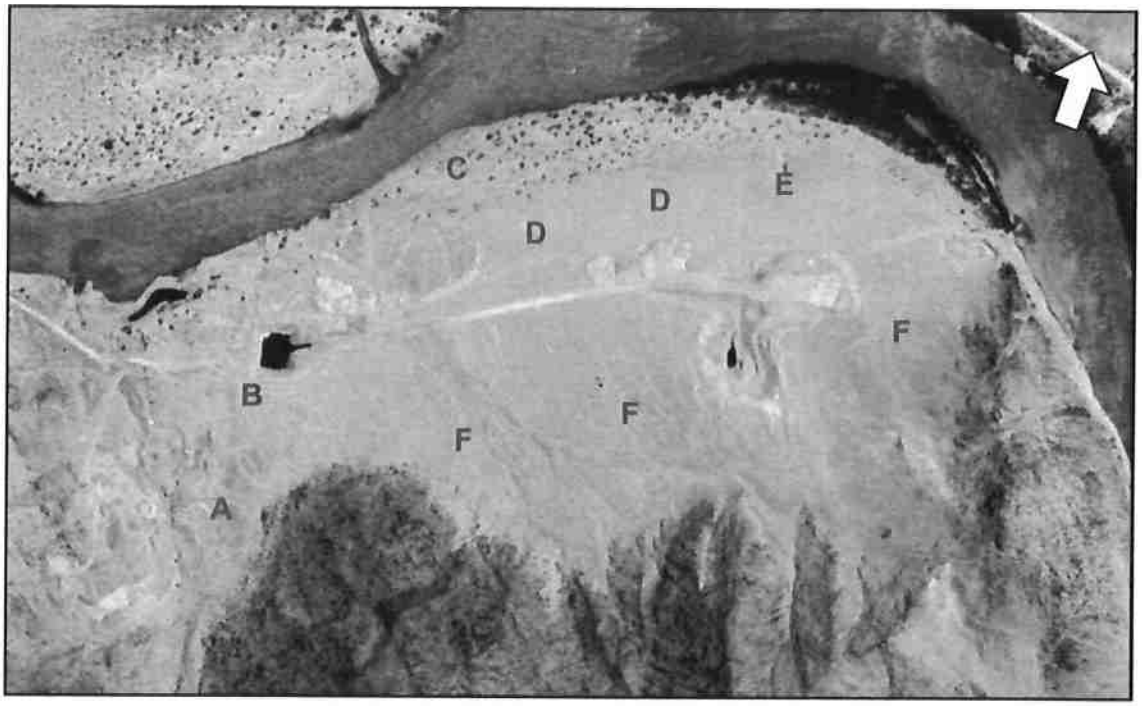


**Figure 11:** Aerial photograph showing the various environments within the Sandberg area.

A: Gravel-covered area. The gravel is rock fragments from the mountain and not cobbles (Figure 12).
B: Flat, sandy plain with small quantities of rock fragments.
C: Sandy floodplain with very little river gravel and occasional trees. It lies within the 1:100 year flood zone and will not be mined (Figure 13).
D: Sandy floodplain with river gravel. Many small natural concentrations of cobbles were evident (Figure 13 & 14).
E: Similar to area "D" but with a great many more river cobbles (Figure 15).
F: Sandy plain with gravel formed by rock fragments eroded from the mountain. This zone extends steeply up the lowermost slopes of the mountain (Figures 16 & 17).

Figure 18 shows a schematic cross-section through the Sandberg area.

**Figure 12:** View across Sandberg area A.

**Figure 13:** The transition between Sandberg area C on the left and area D on the right.

**Figure 14:** View of Sandberg area D.

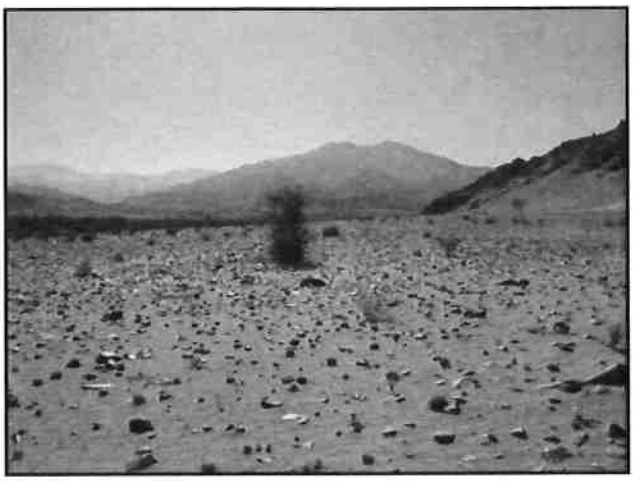

**Figure 15:** View of Sandberg area E.

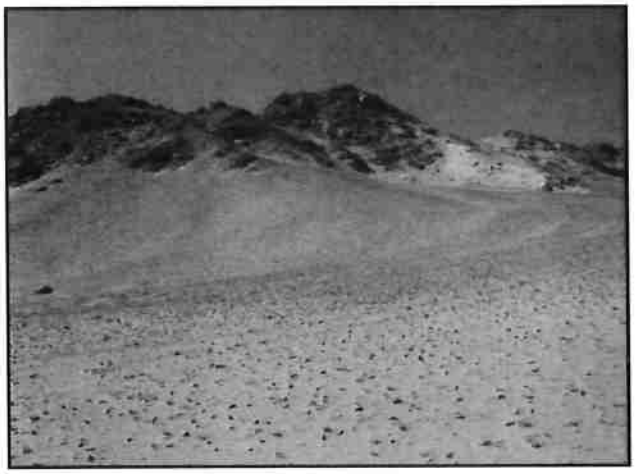

**Figure 16:** View of Sandberg area F.

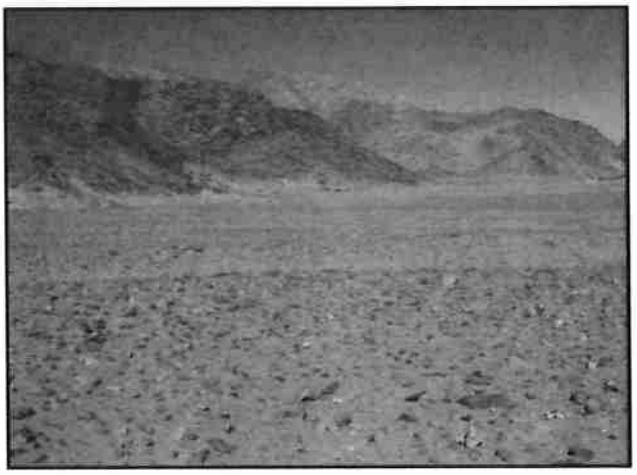

**Figure 17:** View of Sandberg area F.

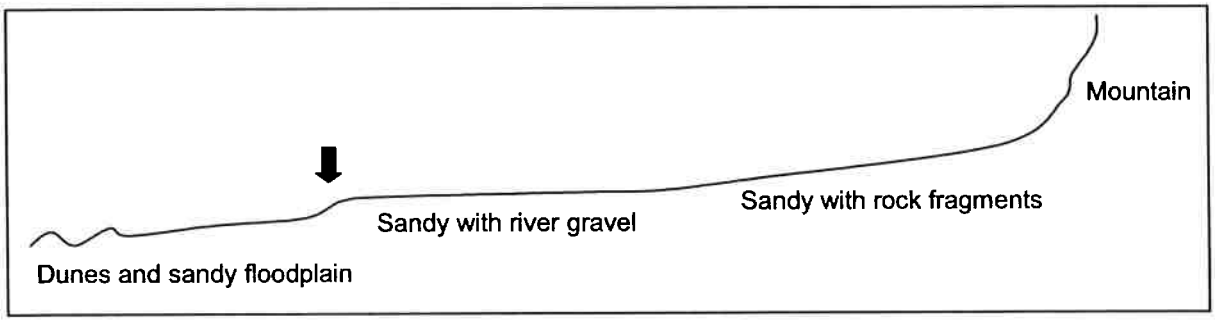


**Figure 18:** Schematic cross-section through the Sandberg area looking towards the northeast. The red arrow indicates the approximate position of the 1:100 year flood line below which mining cannot take place.

### 3.3. Blokwerf

Figures 19 to 21 show aerial views of the Blokwerf mining area. The different environments encountered during the survey are labelled and described below. This enormous area consists of quite variable environments and is 6.0 km in length.

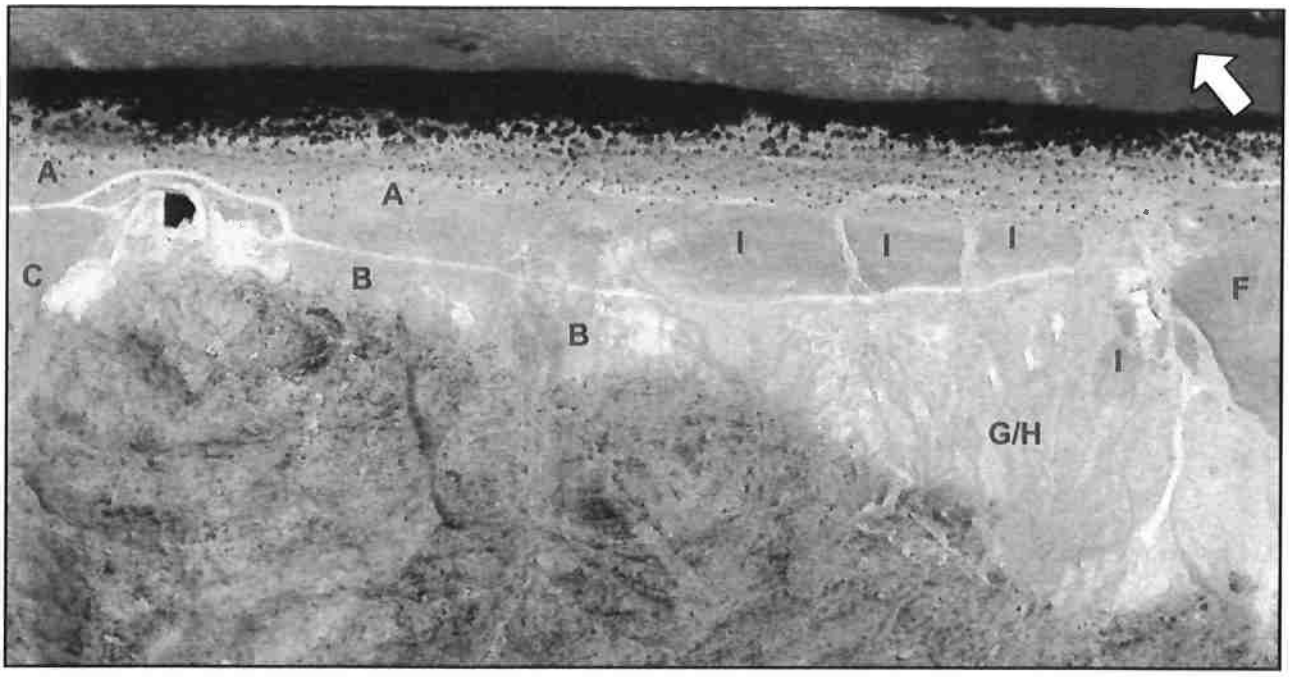


**Figure 19:** Aerial photograph showing the various environments within the northern part of the Blokwerf area.


**Figure 20:** Aerial photograph showing the various environments within the central part of the Blokwerf area.

A: A deflated area with a few rocks and trees (Figure 22). This area is within the 1:100 year flood zone and will not be mined.
B: Flat area with gravel composed of rock fragments eroded from the mountain (Figure 23).
C: River valley with rock fragments all over the ground surface.
D: Sandy area with rock fragments and occasional bedrock outcrops which sometimes form low ridges extending from the mountain onto the plain.


**Figure 21:** Aerial photograph showing the various environments within the southern part of the Blokwerf area.

E: Sandy floodplain with scattered trees (Figures 24 & 25). This area is the same as "A" and lies within the 1:100 year flood zone.
F: A large, raised cobble terrace (Figures 26 – 28).
G: Areas of raised terrace but covered with rock fragments (Figure 30).
H: Sandy plain with scattered rock fragments that get denser closer to the mountain (Figures 31 & 32).
I: A raised terrace, some parts of which have quartz gravel on the surface. There are many small outlying areas with this substrate (Figure 33).
J: Terrace covered in quartz gravel and with many small hills caused by the braiding of the river that enters the Orange River valley at this point (Figure 34).
K: Flat area with many outcrops of granite/gneiss as well as isolated boulders and clusters of boulders (Figure 35).

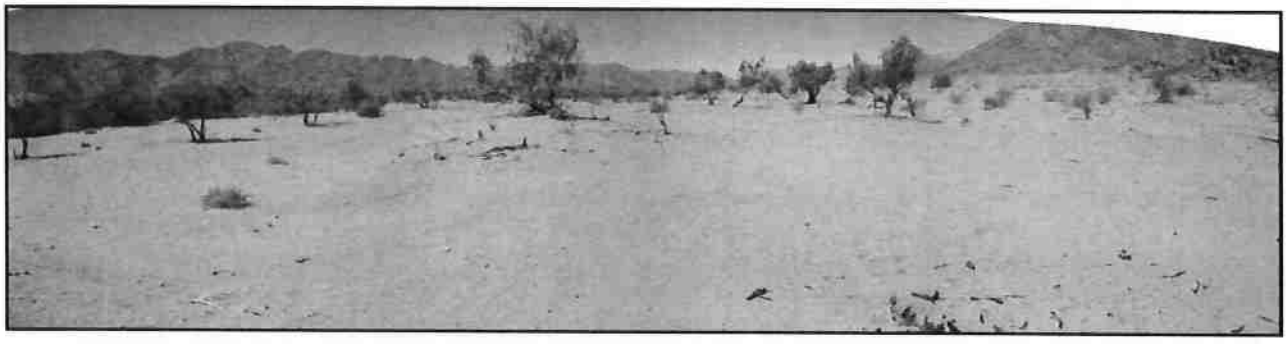

**Figure 22:** View of the river floodplain at Blokwerf area A.

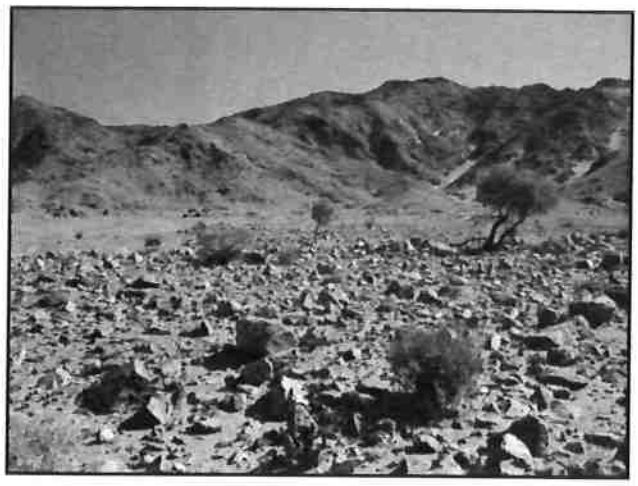

**Figure 23:** View of Blokwerf area B.

**Figure 24:** View of Blokwerf area D.

**Figure 25:** View of Blokwerf area E.

**Figure 26:** View of Blokwerf area F.

**Figure 27:** View of Blokwerf area F at the point where it slopes down onto the sandy river floodplain.

**Figure 28:** View of the northern-most end of Blokwerf terrace F with person for scale.

**Figure 30:** View of Blokwerf area G.

**Figure 31:** View of Blokwerf area H.

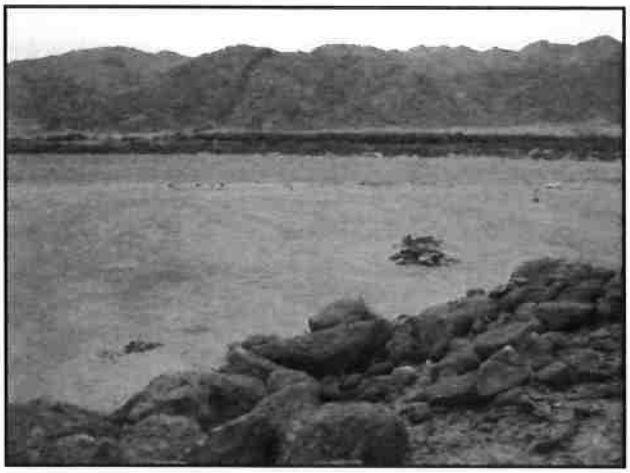

**Figure 32:** View from the mountain across Blokwerf area H to the terrace that is area F (the pinkish strip in front of the trees).

**Figure 33:** Part of the terrace at Blokwerf area I.

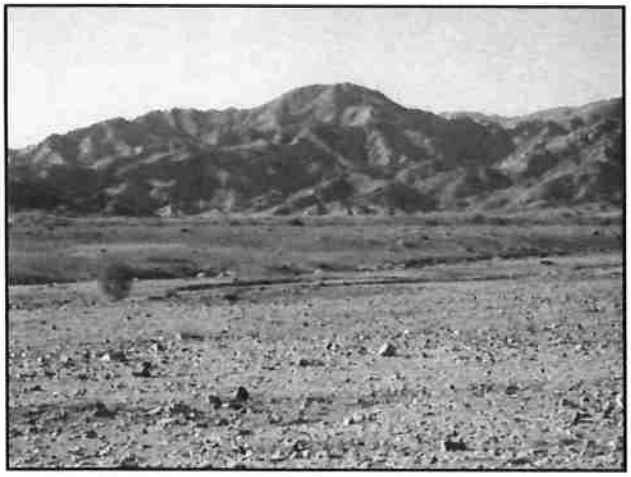

**Figure 34:** View across Blokwerf area J.

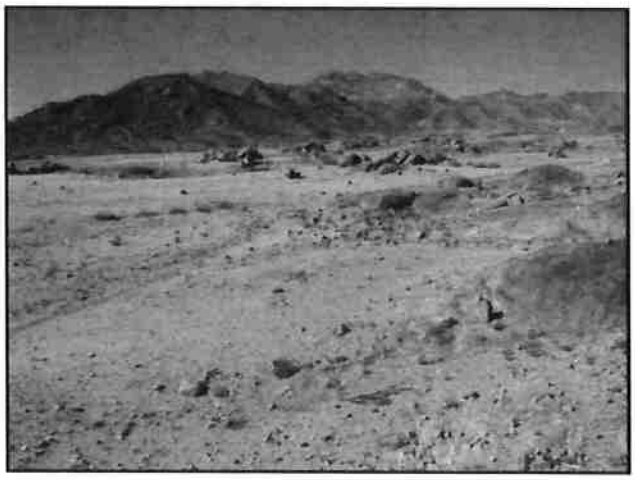

**Figure 35:** View across Blokwerf area K.

**Figure 36:** View across Blokwerf area G/H showing the interspersed sandy and gravelly areas.

### 3.4. Visrivier

Figure 37 shows an aerial view of the Visrivier mining area. The different environments encountered during the survey are labelled and described below. Note that this survey was not comprehensive but merely scoping in nature and that the entire area is not described. The Visrivier area is 3.0 km in length.


**Figure 37:** Aerial photograph showing the various environments within the Visrivier area. The position of some outcrops of calcrete is also marked.

A: A big, sandy plain with rocks and gravel composed of rock fragments eroded from the mountain (Figure 39).

B: A zone of denser rock fragments. This area merges with A as the rock fragments increase towards the mountain slopes.
C: The sandy floodplain with scattered trees. This area is within the 1:100 year flood zone and will not be mined.
D: Several patches of cobble terrace (Figure 40).
E: An area of high ground covered by rock fragments and cut by a braided stream (Figure 41).
F: An area with rock fragments and some calcrete exposures (Figure 42).

**Figure 38:** View over the Visrivier area looking towards the west showing the generally gravelly nature of the ground surface.

**Figure 39:** View across part of Visrivier area A.

**Figure 40:** View across Visrivier area D with river cobbles.

### 3.5. Kabies

Figure 43 shows an aerial view of the Kabies mining area. The different environments encountered during the survey are labelled and described below. Note that this survey was not comprehensive but merely scoping in nature and that the entire area is not described. In total the Visrivier area is 2.0 km in length. Note that a massive sandy floodplain (the 1:100

year flood zone) occurs to the north of the cobble terraces and that this plain was not examined at all.

A: This is a massive cobble terrace standing well above the sandy floodplain. It is composed of densely packed cobbles (Figures 44 & 45).
B: The base of the mountain with many fragments of rock on the surface. This zone grades into area A.

**Figure 41:** View across Visrivier area E.

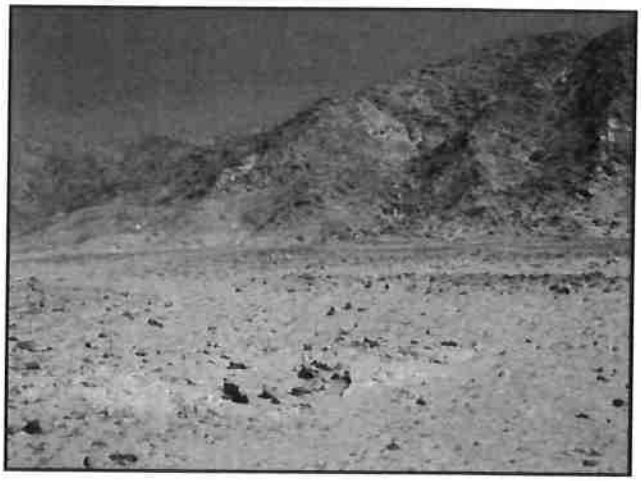

**Figure 42:** Visrivier Area F with calcrete exposed in the foreground.


**Figure 43:** Aerial photograph showing the various environments within the Kabies area.

**Figure 44:** View of the edge of the terrace that forms Kabies area A. A person is just visible on the crest of the terrace in the distance.

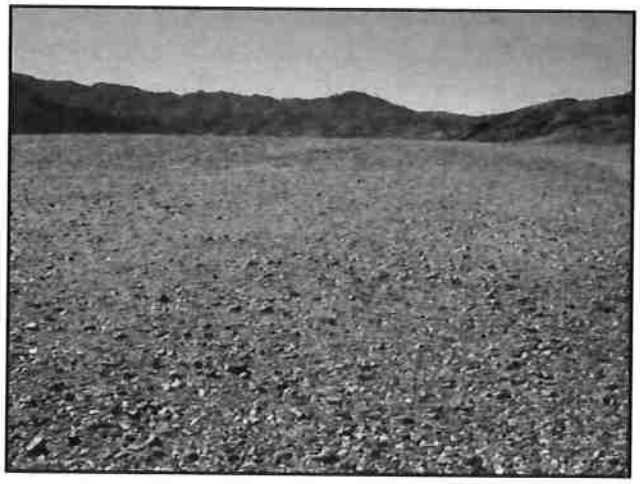

**Figure 45:** View across the surface of Kabies area A. It is composed of very densely packed cobbles.

# 4. HERITAGE CONTEXT

Several archaeological research projects have been carried out along the Orange River with the nearest being those downstream at Jakkalsberg (Brink & Webley 1996; Orton 2007, 2008; Webley 1997) and Bloeddrift (Smith *et al.* 2001) and near the mouth of the Fish River opposite Kabies (Robertshaw 1979). Other work has been carried out in the Richtersveld mountains (Webley 2001; Webley *et al.* 1993). All the sites reported on date to within the last 5000 years and relate to either hunter-gatherers (throughout) or pastoralists (within the last 2000 years). Most sites present as open scatters of artefacts, faunal and other remains very close to the Orange River. The most recent sites (generally less than 2000 years old) are often found along the high tree-covered levee immediately adjacent to the river, while older sites going back into the mid-Holocene are usually located further back on the floodplain. The Orange river is significant in the debate on the origins of pastoralism in South Africa as it constitutes one of the routes along which people and sheep are thought to have moved some 2000 years ago (Ehret 1982; Elphick 1985). There is archaeological evidence to support pastoralism in the Richtersveld dating back to 900 AD. Sites such as Jakkalsberg A and B, near Sendelingsdrift, contain large numbers of sheep bones suggesting pastoralist people (Brink & Webley 1996; Webley 1997). It is suggested that these were the ancestors of the Nama people currently resident in the area (Carstens *et al.* 1987). Travellers to the Richtersveld do, however, record seeing both San (Bushman hunter-gatherer) and Khoekhoen (pastoralist) groups still living there during the mid 19$^{th}$ century.

Other older material has not been documented in this area but much further inland Malan (1947) and Van Riet Lowe (1952) documented Early Stone Age (ESA) artefacts in the gravel terraces of the Vaal River and Sampson (1968) recorded extensive Middle Stone Age (MSA) occurrences along the Orange River. Fossil mammals were also found in the Vaal River gravels and described by Cooke (1946, 1949). It is possible that such material might also occur downstream in the Richtersveld gravel terraces. Beaumont *et al.* (1995) note the presence of low density scatters of stone artefacts over much of Bushmanland to the east and southeast of the Richtersveld suggesting that material of this age is widespread.

The following account of activities during the historical period is taken from Carstens *et al.* (1987), Fleminger (2008) and Williamson (2000). The first travellers to the Orange River

included elephant hunters such as Jacobus Coetzee in 1660. The earliest European penetration of the Richtersveld via the coastal route was by William Paterson and Colonel Gordon in 1779. Dr E Richter, an inspector of the Rhenish Mission Society, visited the area in 1830. The area was subsequently named after him. A mission station was established at Kuboes in the mid 19th century.

Captain James Edward Alexander (geographer and explorer) was in the Sendelingsdrift area in 1837 and prospected for copper at Kodas. He explored the south bank of the Orange from the mountains of the Richtersveld to the sea, and proposed transporting copper down the Orange River by barge to the mouth, and then by ship to Europe. There is an inscription to this effect at the Baaken mine. In 1845, Thomas Fannin also travelled to the Orange River and reported on favourable copper deposits. He started an open cast mine in the area – this site is reputed to be the oldest commercial mining site in South Africa. In 1847 the British extended their control to the Orange River and the Richtersveld was included in the Namaqualand district. By the 1890s, the inhabitants of the Richtersveld demanded clarity regarding their ownership of the land. Eventually in 1934 a formal "ticket of occupation" was issued by the government giving the indigenous groups communal rights to the land which was technically still held in trust by the state. The Richtersveld then became a "coloured reserve" under a management board.

# 5. METHODS

The survey was conducted over a period of six days, from the 5th to the 10th of September 2009, by two archaeologists. All finds were photographed and their positions taken using hand-held GPS receivers on the WGS84 datum. Walk paths are indicated on the aerial photographs in Figures 46 to 52 below.

Although they will not be mined, areas within the 1:100 year flood zone were briefly examined at times in order to improve our understanding of the distribution of archaeological sites on the local landscape. It should be noted that the mine dumps are generally placed along the base of the mountains and rehabilitated there. For this reason the base of the mountains was searched quite closely. While five areas were scheduled for survey, only three, Oena Proper, Sandberg and Blokwerf were searched comprehensively. Within these areas we found several areas disturbed by mining activities. These were not searched. The other two mining areas, Visrivier and Kabies, were subjected only to a preliminary survey

## 5.1. Limitations

Visibility was excellent throughout but due to mine dumps some areas could not be searched. No other limitations were experienced.

# 6. FINDINGS

Only one site included historical artefacts. Besides this, a number of recent herder camps are present among the trees within the 1:100 year flood zone. These will not be described here as they are not covered by the NHRA and will not be impacted. There was also a pair of stone alignments that seemed to have been cleared to create a track. These are assumed recent and, although listed in Table 1, are not discussed further. All the other findings

presented here pertain to the Stone Age. Note that many "sites" are in fact merely concentrations of artefacts where photographs were taken. We tried to record as many of the denser patches of artefacts as possible. However, low densities of artefacts are present throughout much of the surveyed area, particularly on the cobble terraces.

The types of sites found will be described in general terms rather than presenting a detailed account of each, while the full list is tabulated in Table 1. All sites seen, regardless of whether they will be impacted or not, are listed here for the record but Table 1 shows whether they will be impacted by virtue of indicating their location at the base of the mountain, on the river terraces or within the 1:100 year flood zone. Due to the large number of visually similar scatters recorded, only a representative selection of photographs is included in this section. Aerial photographs indicating the location of the sites are presented below.

While consecutive numbers were allocated in the field for ease of reference, proper site names have now been assigned. These are in the format XXYYYY/ZZZ where XX is an acronym for the mining area, YYYY is the year of recording and ZZZ is the number of the site in that area and year. So, for example, OP2009/015 would be the 15$^{th}$ site recorded in Oena Proper in 2009. This system is easy to extend in future with no danger of duplicating names. The area codes are as follows:

Oena Proper: OP  Sandberg: SB  Blokwerf: BW  Visrivier: VR  Kabies: KB

### 6.1. Early/Middle Stone Age scatters

Many of the archaeological occurrences seen and recorded during the survey were of this type and most were in the Oena Proper and Blokwerf sections. They were also the most extensive. Of the 24 recorded, most were on the cobble terraces that have been targeted for mining. They display a range of stone materials, primarily quartzites of different colour and grain size. It was noticeable that the nature of the artefacts differed between terraces probably supporting a range of ages for the material. The scatters are not archaeological sites in the true sense as they are widespread and seem associated with the cobbles rather than with a particular place. The "sites" are in fact areas where there are high densities of artefacts and where photographs were taken (Figures 53 & 54). The cobble terraces were generally very difficult to survey (Figure 26 and 33) and it is very likely that many artefacts went unnoticed even within the areas where more careful searches were made for the purposes of accumulating artefacts to photograph.

Some areas included occasional ESA hand-axes (Figures 55 to 57), while at others we found diagnostic MSA flakes (Figure 58) and radial cores (Figure 59). Rare retouched pieces are probably also MSA in age (Figure 60). The general size and state of weathering of all these artefacts seems to preclude an ascription to the LSA but we cannot confidently assign all of the material to one of the ESA or MSA. We recognised a distribution of cores, chunks and flakes on a white/grey quartzite, some of which appeared more recently knapped, and which do not contain characteristic ESA or MSA elements. The flakes were square, side-struck and some retained their original cortex. It would appear that *in situ* knapping may have occurred.

Most of the stone scatters can be regarded as of very low significance, but those areas where we found higher concentrations are worth sampling and have been assigned medium significance. This is largely because little is known about the Early and Middle Stone Age in the Richtersveld region.

**Table 1:** Summary data for all recorded archaeological occurrences. Note that #73 was deemed to be related to 20th century mining activities and excluded from this table, while #78 was almost certain to be recent but this could not be determined.

[Location: ter = river terraces; mtn = foot of mountain; out = rocky outcrop; flz = 1:100 year flood zone]
[Stone artefact materials: qtz = quartz; qz = quartzite; ccs = cryptocrystalline silica]

| Field Site # | Official Site name | Co-ordinates | Date recorded | Type | Significance | loca-tion | mitig-ation | Brief description |
|---|---|---|---|---|---|---|---|---|
| 1 | OP2009/001 | S 28 04 07.2 E 17 01 06.4 | 05-Sep-09 | ESA/MSA scatter | Very Low | ter | no | runway terrace ESA/MSA scatter |
| 2 | OP2009/002 | S 28 03 38.3 E 17 01 16.0 | 06-Sep-09 | ESA/MSA scatter | Very Low | ter | no | artefacts |
| 3 | OP2009/003 | S 28 03 51.8 E 17 01 16.4 | 06-Sep-09 | ESA/MSA scatter | Low-Medium | ter | yes | runway terrace ESA/MSA scatter, with hand-axe |
| 4 | OP2009/004 | S 28 03 52.4 E 17 01 18.6 | 06-Sep-09 | ESA/MSA scatter | Low-Medium | ter | yes | runway terrace ESA/MSA scatter |
| 5 | OP2009/005 | S 28 03 22.0 E 17 02 12.6 | 06-Sep-09 | LSA scatter | Very Low | mtn | no | probable LSA artefact scatter on hilltop |
| 6 | OP2009/006 | S 28 03 32.1 E 17 01 52.0 | 06-Sep-09 | ?LSA scatter | Very Low | out | no | quartz scatter on quartz outcrop |
| 7 | OP2009/007 | S 28 03 55.7 E 16 01 30.9 | 06-Sep-09 | ESA/MSA scatter | Very Low | ter | no | runway terrace ESA/MSA scatter |
| 8 | OP2009/008 | S 28 03 53.3 S 17 01 30.6 | 06-Sep-09 | ESA/MSA scatter | Very Low | ter | no | runway terrace ESA/MSA scatter |
| 9 | OP2009/009 | S 2803 53.0 E 17 01 29.6 | 06-Sep-09 | ESA/MSA scatter | Very Low | ter | no | runway terrace ESA/MSA scatter |
| 10 | OP2009/010 | S 28 03 48.6 E 17 01 30.8 | 06-Sep-09 | ESA/MSA scatter | Low-Medium | ter | yes | runway terrace ESA/MSA scatter |
| 11 | OP2009/011 | S 28 03 46.5 E 17 01 33.4 | 06-Sep-09 | ESA/MSA scatter | Very Low | ter | no | runway terrace ESA/MSA scatter |
| 12 | OP2009/012 | S 28 03 46.6 E 17 01 32.1 | 06-Sep-09 | ESA/MSA scatter | Low-Medium | ter | yes | runway terrace ESA/MSA scatter |
| 13 | OP2009/013 | S 28 03 51.4 E 17 01 28.6 | 06-Sep-09 | ESA/MSA scatter | Very Low | ter | no | runway terrace ESA/MSA scatter |
| 14 | OP2009/014 | S 28 04 10.4 E 17 00 57.1 | 06-Sep-09 | LSA scatter | Very Low | flz | no | ephemeral LSA (?historical) site, LG, UG, flaked artefacts, bone, OES, glass nearby |
| 15 | OP2009/015 | S 28 04 07.2 E 17 00 58.0 | 06-Sep-09 | LSA scatter | Very Low | flz | no | ephemeral LSA (?historical) site, LG only |
| 16 | OP2009/016 | S 28 04 05.1 E 17 00 59.2 | 06-Sep-09 | LSA scatter | Very Low | flz | no | ephemeral LSA (?historical) site, UG, various flaked artefacts, bone midden |
| 17 | SB2009/001 | S 28 02 26.8 E 17 04 29.6 | 07-Sep-09 | ESA/MSA scatter | Very Low | ter | no | spatially distinct scatter of qz flakes and cores, ESA/MSA |
| 18 | SB2009/002 | S 28 02 38.4 E 17 04 30.4 | 07-Sep-09 | LSA scatter | Low | ter | no | LSA scatter behind boulder, 20+ tiny thin pot sherds, OES and qtz |
| 19 | BW2009/001 | S 28 02 37.0 E 17 05 34.2 | 07-Sep-09 | LSA scatter | Medium | flz | yes | LSA scatter of pottery only. 11 thin sherds but most quite big. |
| 20 | BW2009/002 | S 28 04 54.8 E 17 07 27.7 | 08-Sep-09 | MSA/LSA scatter | Very Low | ter | no | artefact scatter |
| 21 | BW2009/003 | S 28 04 50.3 E 17 07 21.0 | 08-Sep-09 | LSA scatter | Low | mtn | no | stone and pottery scatter in front of boulders |
| 22 | BW2009/004 | S 28 04 50.6 E 17 07 20.2 | 08-Sep-09 | LSA scatter | Medium | mtn | yes | pottery scatter around and under |

| Field Site # | Official Site name | Co-ordinates | Date recorded | Type | Significance | loca-tion | mitig-ation | Brief description |
|---|---|---|---|---|---|---|---|---|
| | | | | | | | | boulders, qtz crystals |
| 23 | BW2009/005 | S 28 04 49.5 E 17 07 20.7 | 08-Sep-09 | LSA scatter | Low | mtn | no | pottery scatter in front of boulder |
| 24 | BW2009/006 | S 28 04 47.2 E 17 07 18.3 | 08-Sep-09 | LSA scatter | Very Low | mtn | no | quartz scatter on rock outcrop |
| 25 | BW2009/007 | S 28 04 34.5 E 17 07 04.1 | 08-Sep-09 | MSA/LSA scatter | Very Low | mtn | no | artefact scatter around boulder |
| 26 | BW2009/008 | S 28 04 34.0 E 17 07 06.9 | 08-Sep-09 | MSA/LSA scatter | Very Low | ter | no | artefact scatter qtz and qz |
| 27 | BW2009/009 | S 28 04 28.5 E 17 07 08.8 | 08-Sep-09 | ESA/MSA scatter | Very Low | ter | no | area F artefacts |
| 28 | BW2009/010 | S 28 04 26.2 E 17 07 07.9 | 08-Sep-09 | ESA/MSA scatter | Very Low | ter | no | area F artefacts |
| 29 | BW2009/011 | S 28 04 20.2 E 17 06 59.8 | 08-Sep-09 | LSA scatter | Very Low | ter | no | artefact scatter qtz |
| 30 | BW2009/012 | S 28 04 17.2 E 17 06 57.0 | 08-Sep-09 | LSA scatter | Very Low | ter | no | artefact scatter qtz |
| 31 | BW2009/013 | S 28 04 14.7 E 17 06 55.0 | 08-Sep-09 | LSA scatter | Very Low | ter | no | artefact scatter qtz |
| 32 | BW2009/014 | S 28 04 15.2 E 17 06 53.6 | 08-Sep-09 | LSA scatter | Very Low | ter | no | artefact scatter qtz and qz |
| 33 | BW2009/015 | S 28 04 13.8 E 17 06 50.2 | 08-Sep-09 | LSA scatter | Very Low | ter | no | artefact scatter qtz and qz |
| 34 | BW2009/016 | S 28 04 14.4 E 17 06 48.2 | 08-Sep-09 | LSA scatter | Very Low | mtn | no | artefact scatter qtz and qz |
| 35 | BW2009/017 | S 28 04 13.3 E 17 06 48.8 | 08-Sep-09 | LSA scatter | Very Low | mtn | yes | artefact scatter qtz |
| 36 | BW2009/018 | S 28 04 10.5 E 17 06 50.4 | 08-Sep-09 | LSA scatter | Very Low | out | no | artefact scatter qtz |
| 37 | BW2009/019 | S 28 04 08.8 E 17 06 55.4 | 08-Sep-09 | MSA/LSA scatter | Very Low | ter | no | area I artefacts |
| 38 | BW2009/020 | S 28 04 07.7 E 17 06 48.1 | 08-Sep-09 | LSA scatter | Very Low | mtn | yes | artefact scatter qtz |
| 39 | BW2009/021 | S 28 04 01.8 E 17 06 47.2 | 09-Sep-09 | LSA scatter | Very Low | out | no | artefact scatter qtz |
| 40 | BW2009/022 | S 28 04 01.5 E 17 06 42.3 | 09-Sep-09 | LSA scatter | Medium | mtn | yes | artefact scatter, dense on outcrop |
| 41 | BW2009/023 | S 28 04 01.1 E 17 06 40.5 | 09-Sep-09 | LSA scatter | Very Low | mtn | no | artefact scatter qtz, on outcrop |
| 42 | BW2009/024 | S 28 04 02.3 E 17 06 41.0 | 09-Sep-09 | LSA scatter | Very Low | mtn | no | artefact scatter qtz, on platform in front of boulders |
| 43 | BW2009/025 | S 28 04 03.7 E 17 06 43.8 | 09-Sep-09 | MSA/LSA scatter | Very Low | mtn | no | artefact scatter qtz, qz and ccs, on outcrop |
| 44 | BW2009/026 | S 28 03 55.7 E 17 06 27.5 | 09-Sep-09 | LSA scatter | Very Low | mtn | no | artefact scatter qtz, qz and ccs, around boulders |
| 45 | BW2009/027 | S 28 03 56.2 E 17 06 35.5 | 09-Sep-09 | LSA scatter | Very Low | out | no | artefact scatter qtz, and 1 ccs, in front of outcrop |
| 46 | BW2009/028 | S 28 03 58.2 E 17 06 37.6 | 09-Sep-09 | LSA scatter | Very Low | out | no | artefact scatter qtz, qz and ccs, on outcrop |
| 47 | BW2009/029 | S 28 03 54.3 E 17 06 37.5 | 09-Sep-09 | LSA scatter | Very Low | out | no | artefact scatter qtz, cobbles, on outcrop |
| 48 | BW2009/030 | S 28 03 50.6 E 17 06 27.7 | 09-Sep-09 | LSA scatter | Very Low | out | no | artefact scatter qz and some qtz, in front of boulders |

| Field Site # | Official Site name | Co-ordinates | Date recorded | Type | Significance | loca-tion | mitig-ation | Brief description |
|---|---|---|---|---|---|---|---|---|
| 49 | BW2009/031 | S 28 03 53.9 E 17 06 27.0 | 09-Sep-09 | ESA/MSA/LSA scatter | Low-Medium | mtn | yes | artefact scatter around boulders, hand-axe and diagnostic MSA |
| 50 | BW2009/032 | S 28 03 50.3 E 17 06 26.3 | 09-Sep-09 | LSA scatter | Very Low | mtn | no | artefact scatter qtz and ccs, HS, LG frag, next to boulder |
| 51 | BW2009/033 | S 28 03 51.6 E 17 06 23.6 | 09-Sep-09 | MSA/LSA scatter | Very Low | mtn | no | artefact scatter qtz and qz among boulders at foot of mountain |
| 52 | BW2009/034 | S 28 03 59.3 E 17 06 22.7 | 09-Sep-09 | MSA/LSA scatter | Very Low | mtn | no | artefact scatter qtz and qz ephemeral on outcrop |
| 53 | BW2009/035 | S 28 03 47.3 E 17 06 23.2 | 09-Sep-09 | LSA scatter | Very Low | mtn | no | artefact scatter qtz and qz, in front of boulders |
| 54 | BW2009/036 | S 28 03 43.8 E 17 06 22.0 | 09-Sep-09 | ESA/MSA/LSA scatter | Very Low | mtn | no | artefact scatter qtz, qz and ccs, cobbles, 3 UG, around boulders |
| 55 | BW2009/037 | S 28 03 43.3 E 17 06 19.6 | 09-Sep-09 | MSA/LSA scatter | Very Low | mtn | no | artefact scatter qtz and qz among boulders at foot of mountain |
| 56 | BW2009/038 | S 28 03 42.0 E 17 06 16.7 | 09-Sep-09 | MSA/LSA scatter | Very Low | mtn | no | artefact scatter, wide, ephemeral, qtz, qz and ccs at foot of small valley |
| 57 | BW2009/039 | S 28 03 39.7 E 17 06 16.1 | 09-Sep-09 | LSA scatter | Very Low | mtn | no | artefact scatter qtz, qz and ccs at foot of mountain |
| 58 | BW2009/040 | S 28 03 39.7 E 17 06 15.2 | 09-Sep-09 | LSA scatter | Very Low | mtn | no | artefact scatter qtz, qz and ccs, HS, pebbles in front of boulders at foot of mountain |
| 59 | BW2009/041 | S 28 03 37.7 E 17 06 15.6 | 09-Sep-09 | MSA/LSA scatter | Very Low | mtn | no | artefact scatter qtz and qz, around boulders |
| 60 | BW2009/042 | S 28 03 34.2 E 17 06 14.3 | 09-Sep-09 | MSA/LSA scatter | Very Low | mtn | no | artefact scatter qtz and qz, in front of boulders, some behind, scatter over wide area |
| 61 | BW2009/043 | S 28 03 32.3 E 17 06 07.8 | 09-Sep-09 | ESA/MSA/LSA scatter | Very Low | mtn | no | artefact scatter qz, qtz, ccs, some ESA-like, qtz rare |
| 62 | BW2009/044 | S 28 03 34.1 E 17 06 20.4 | 09-Sep-09 | MSA/LSA scatter | Very Low | ter | no | area H artefacts from 20 m diameter area |
| 63 | KB2009/001 | S 28 06 15.3 E 17 10 18.7 | 10-Sep-09 | LSA scatter | Medium | ter | yes | 2 stone features with artefact scatter |
| 64 | KB2009/002 | S 28 06 15.2 E 17 10 19.7 | 10-Sep-09 | LSA scatter | Low-Medium | ter | yes | ? stone feature and artefact scatter |
| 65 | KB2009/003 | S 28 06 14.4 E 17 10 23.6 | 10-Sep-09 | MSA/LSA scatter | Low-Medium | ter | yes | qtz and qz artefacts on terrace |
| 66 | KB2009/004 | S 28 06 14.6 E 17 10 25.8 | 10-Sep-09 | MSA/LSA scatter | Very Low | ter | no | qtz and qz artefacts on terrace |
| 67 | KB2009/005 | S 28 06 18.7 E 17 10 34.3 | 10-Sep-09 | LSA scatter | Very Low | ter | no | qtz scatter on terrace |
| 68 | KB2009/006 | S 28 06 18.2 E 17 10 35.5 | 10-Sep-09 | LSA scatter | Very Low | ter | no | qtz scatter on terrace |
| 69 | KB2009/007 | S 28 06 19.1 E 17 10 36.6 | 10-Sep-09 | LSA scatter | Very Low | ter | no | qtz scatter on terrace |
| 70 | KB2009/008 | S 28 06 19.6 E 17 10 35.1 | 10-Sep-09 | LSA scatter | Very Low | ter | no | qtz scatter on terrace |
| 71 | KB2009/009 | S 28 06 20.6 E 17 10 34.0 | 10-Sep-09 | LSA scatter | Very Low | ter | no | qtz scatter on terrace |

| Field Site # | Official Site name | Co-ordinates | Date recorded | Type | Significance | loca-tion | mitig-ation | Brief description |
|---|---|---|---|---|---|---|---|---|
| 72 | KB2009/010 | S 28 06 21.8 E 17 10 33.6 | 10-Sep-09 | LSA scatter | Very Low | ter | no | qtz scatter on terrace, 1 ccs |
| 74 | VR2009/001 | S 28 06 11.4 E 17 09 03.4 | 10-Sep-09 | LSA scatter | Very Low | mtn | no | ephemeral qtz scatter |
| 75 | VR2009/002 | S 28 06 12.1 E 17 09 01.2 | 10-Sep-09 | LSA scatter | Very Low | mtn | no | qtz vein quarry site but veryvfew flakes present, good quality qtz |
| 76 | VR2009/003 | S 28 06 17.3 E 17 08 50.7 | 10-Sep-09 | LSA scatter | Very Low | mtn | no | qtz scatter on platform below boulders on mountain |
| 77 | VR2009/004 | S 28 06 13.1 E 17 08 51.4 | 10-Sep-09 | LSA scatter | Very Low | mtn | no | qtz scatter on hill summit |
| 78 | VR2009/005 | S 28 06 08.3 E 17 08 54.0 | 10-Sep-09 | — | Very Low | ter | no | 2 parallel stone alignments, road width, ? old road |
| 79 | VR2009/006 | S 28 06 05.5 E 17 08 46.9 | 10-Sep-09 | ESA/MSA scatter | Very Low | ter | no | qz scatter on terrace |
| 80 | OP2009/017 | S 28 04 02.5 E 17 01 08.6 | 05-Sep-09 | ESA/MSA scatter | Very Low | ter | no | runway terrace ESA/MSA scatter |
| 81 | OP2009/018 | S 28 03 36.3 E 17 01 11.5 | 06-Sep-09 | Historical | Very Low | flz | no | historical scatter, annular ware, glass, fish bone |
| 82 | OP2009/019 | S 28 03 48.0 E 17 01 04.7 | 06-Sep-09 | LSA/Historical | Very Low | ter | no | Possible stockpost, circle of rocks, ?skerm, no historical artefacts |
| 83 | OP2009/020 | S 28 03 55.7 E 17 01 17.8 | 06-Sep-09 | ESA/MSA scatter | Very Low | ter | no | runway terrace ESA/MSA scatter |
| 84 | OP2009/021 | S 28 03 54.7 E 17 01 29.1 | 06-Sep-09 | ESA/MSA scatter | Very Low | ter | no | runway terrace ESA/MSA scatter |
| 85 | BW2009/044 | S 28 04 07.4 E 17 07 03.2 | 08-Sep-09 | ESA/MSA scatter | Medium | ter | yes | artefact scatter qz, ?MSA |
| 86 | BW2009/045 | S 28 03 42.8 E 17 06 47.3 | 09-Sep-09 | ESA/MSA scatter | Very Low | ter | no | artefact scatter qz, ?MSA |
| 87 | BW2009/046 | S 28 03 56.3 E 17 06 34.5 | 09-Sep-09 | MSA/LSA scatter | Very Low | out | no | artefact scatter qtz and qz behind boulders |
| 88 | BW2009/047 | S 28 03 32.9 E 17 06 38.3 | 09-Sep-09 | MSA/LSA scatter | Very Low | ter | no | artefact scatter |
| 89 | BW2009/048 | S 28 03 32.9 E 17 06 30.0 | 09-Sep-09 | ESA/MSA scatter | Medium | ter | yes | artefact scatter qz, ?MSA |
| 90 | BW2009/049 | S 28 03 28.4 E 17 06 28.6 | 09-Sep-09 | ESA/MSA scatter | Medium | ter | yes | artefact scatter qz, ?MSA |
| 91 | BW2009/050 | S 28 03 13.6 E 17 06 18.2 | 09-Sep-09 | ESA/MSA scatter | Very Low | ter | no | artefact scatter qz, ?MSA |

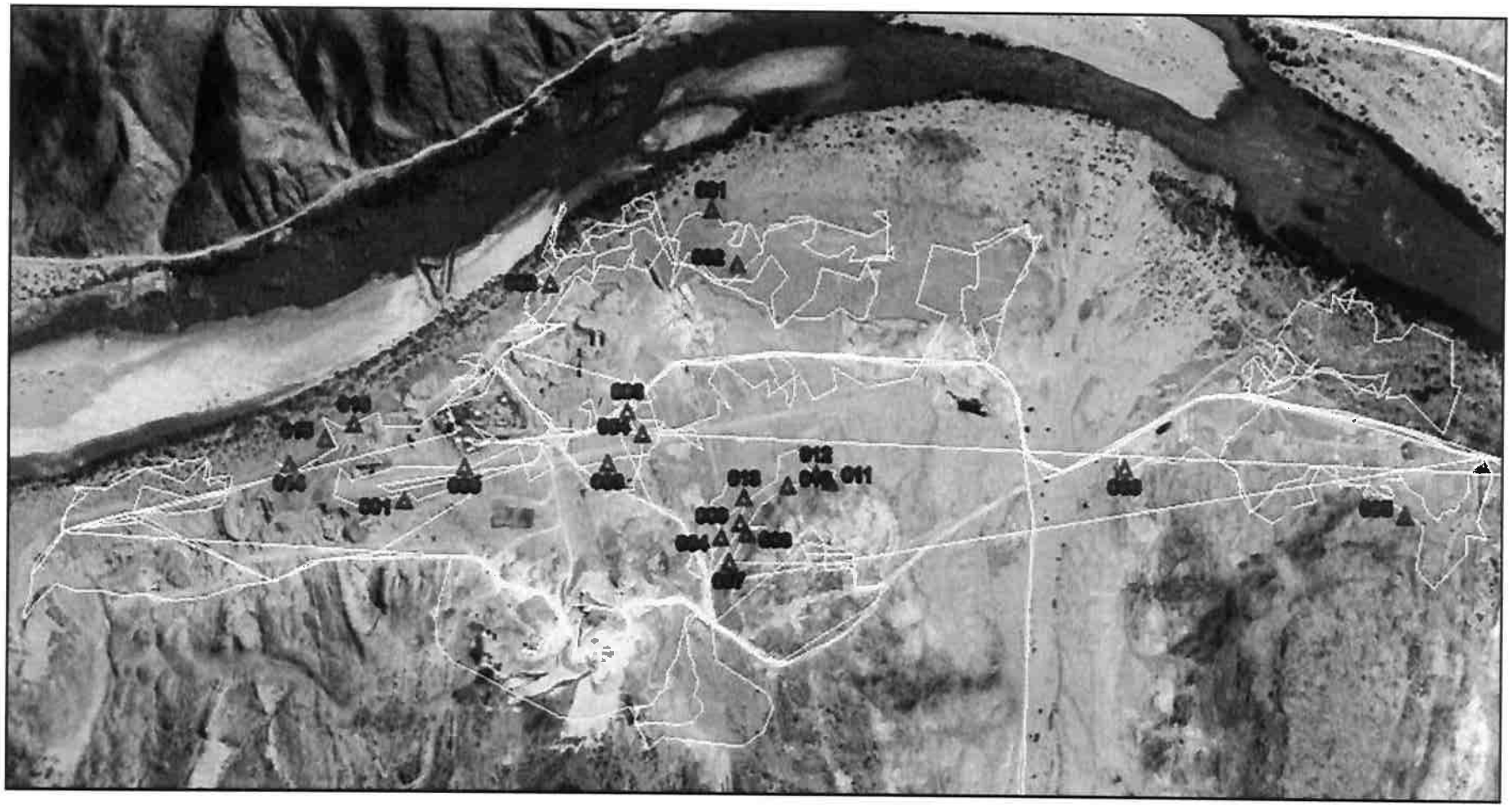

**Figure 46:** Walk paths and site locations at Oena Proper.


**Figure 47:** Walk paths and site locations at Sandberg.

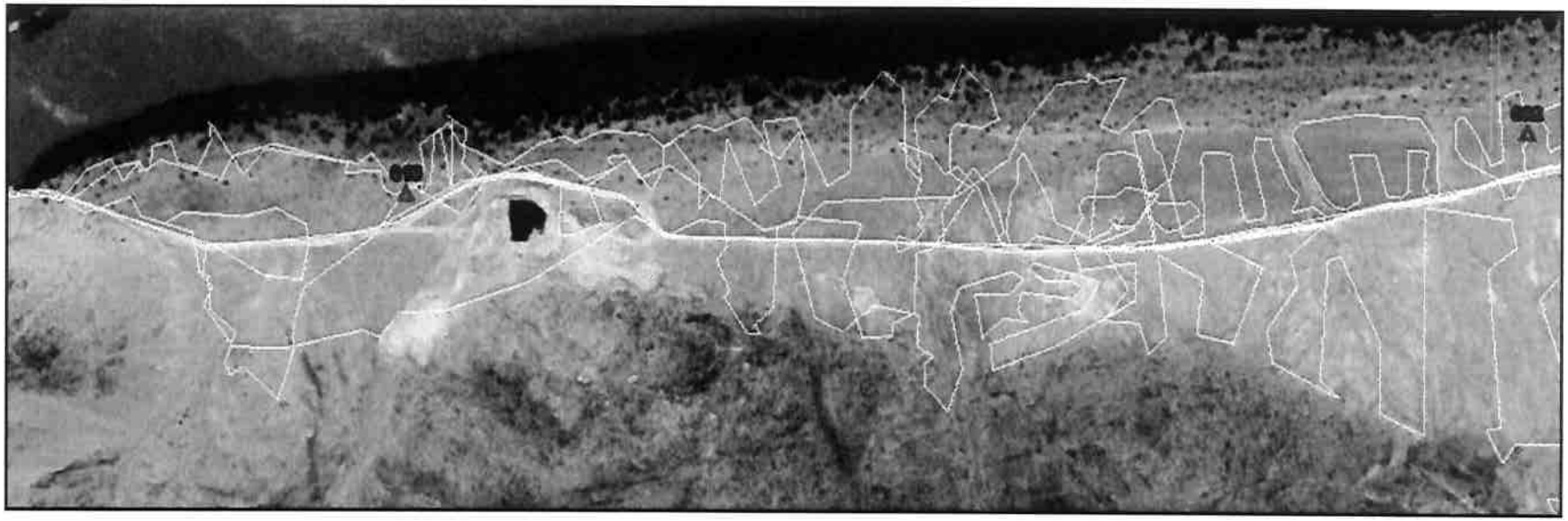

**Figure 48:** Walk paths and site locations at Blokwerf (north).

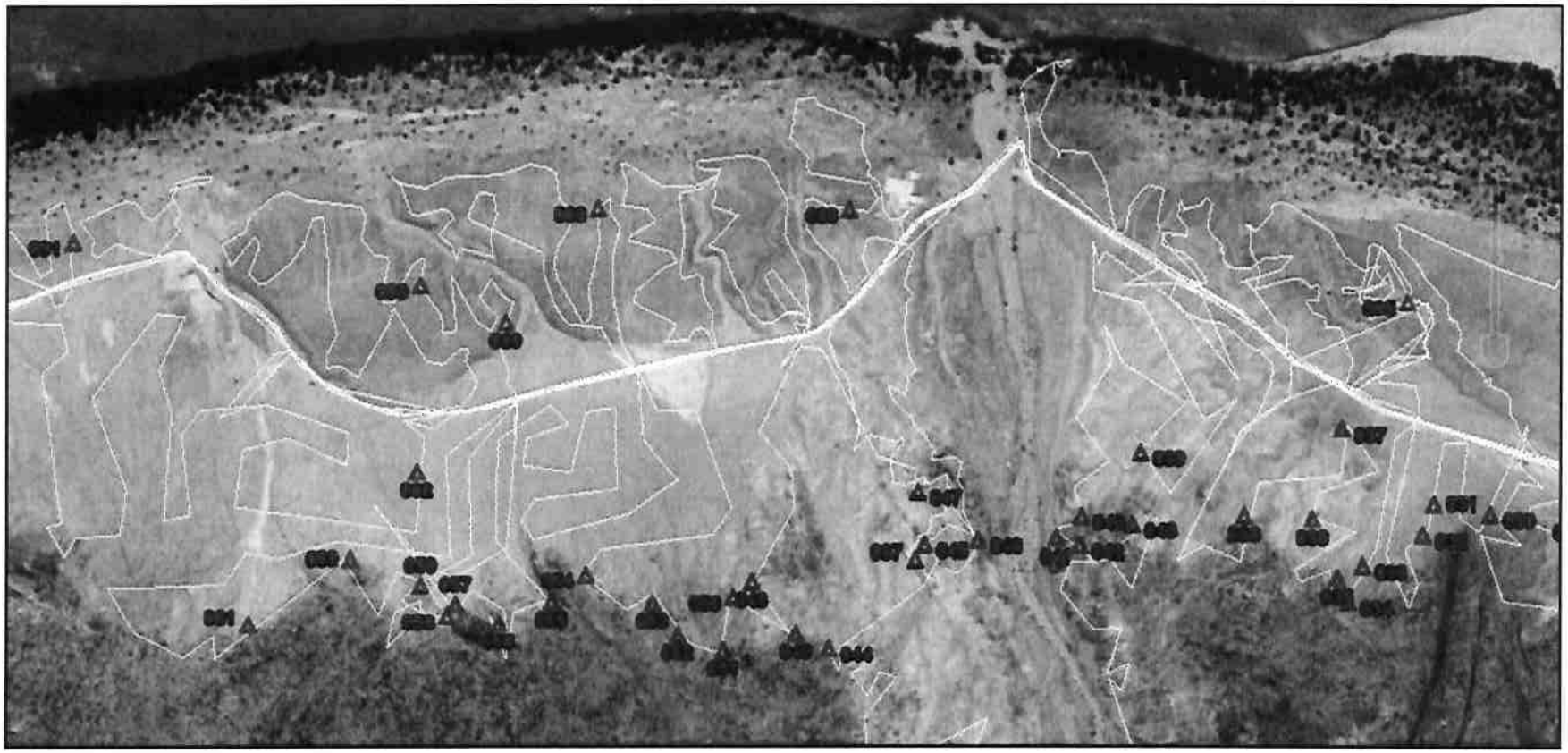

**Figure 49:** Walk paths and site locations at Blokwerf (central).

**Figure 50:** Walk paths and site locations at Blokwerf (south).

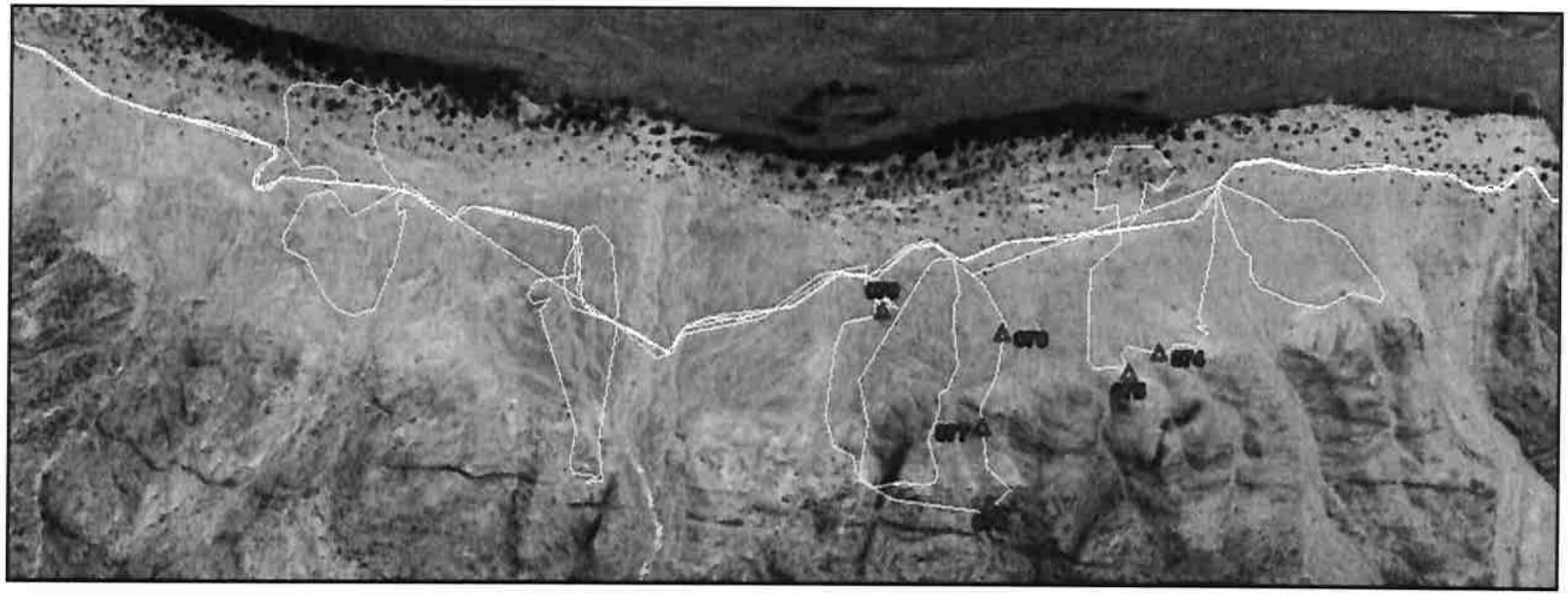

**Figure 51:** Walk paths and site locations at Visrivier.

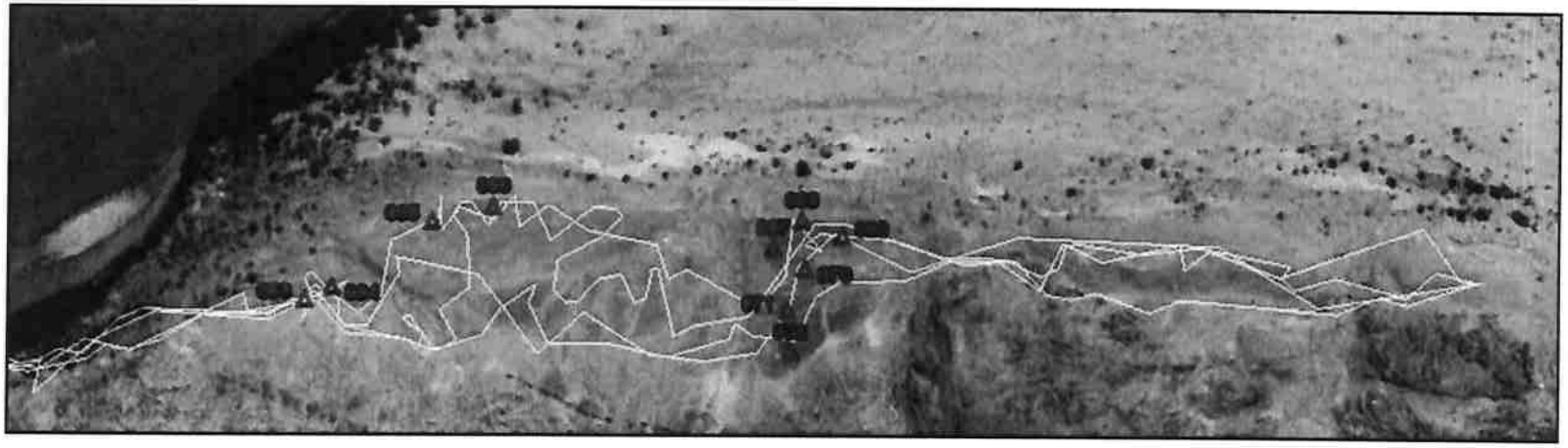

**Figure 52:** Walk paths and site locations at Kabies.

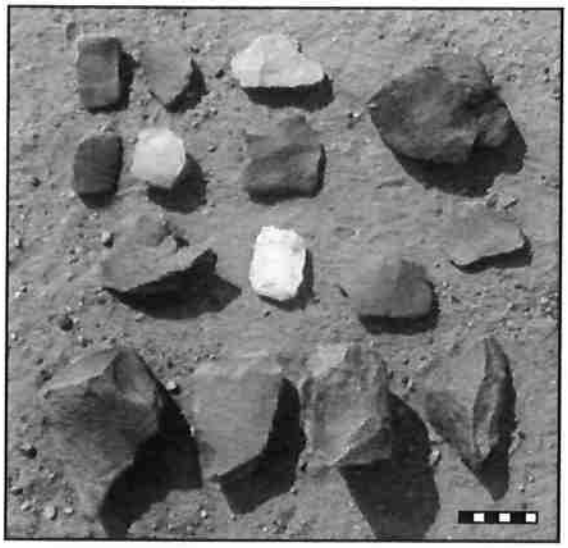

**Figure 53:** ESA/MSA artefacts from OP2009/004. Scale in cm.

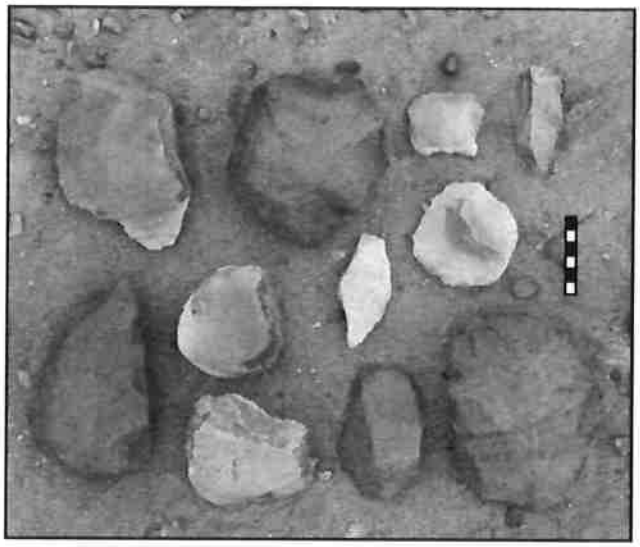

**Figure 54:** ESA/MSA artefacts from BW2009/009. Scale in cm.

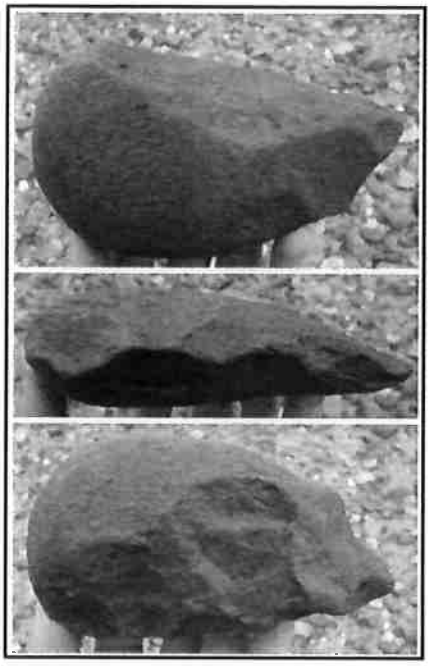

**Figure 55:** Hand-axe from BW2009/027.

**Figure 56:** Hand-axe from BW2009/028

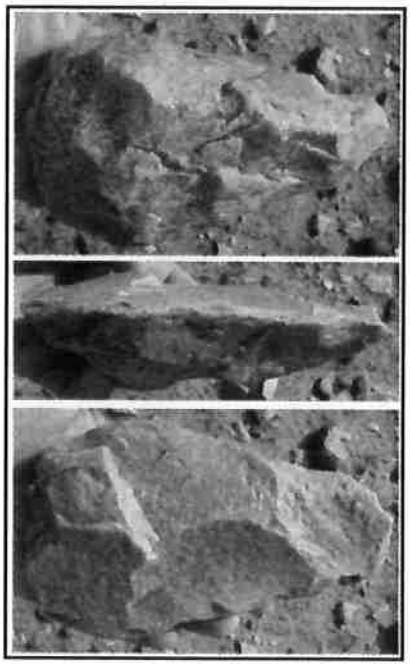

**Figure 57:** Hand-axe from OP2009/003

## 6.2. Early/Middle/Later Stone Age scatters

Scatters in which artefacts of all three Stone Ages were mixed were rarely encountered. This is no doubt due to the very strong relationship between environment and age that has been discussed. Mixed assemblages are generally less informative than unmixed ones but, of the three found, one was regarded as being low-medium significance due to the number of diagnostic artefacts present (Figure 61).

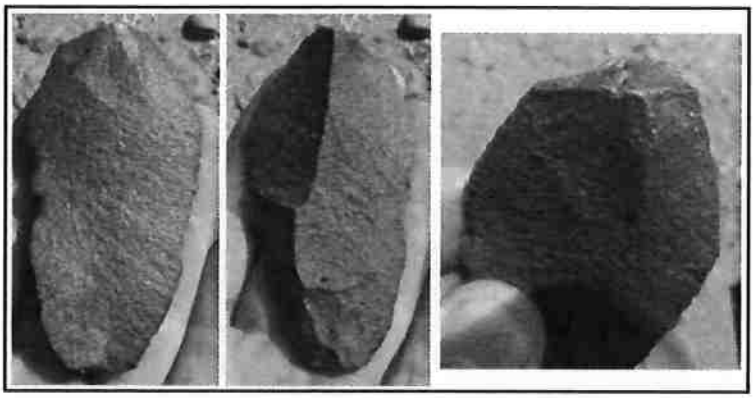

**Figure 58:** A large MSA blade with a faceted platform from OP2009/013.

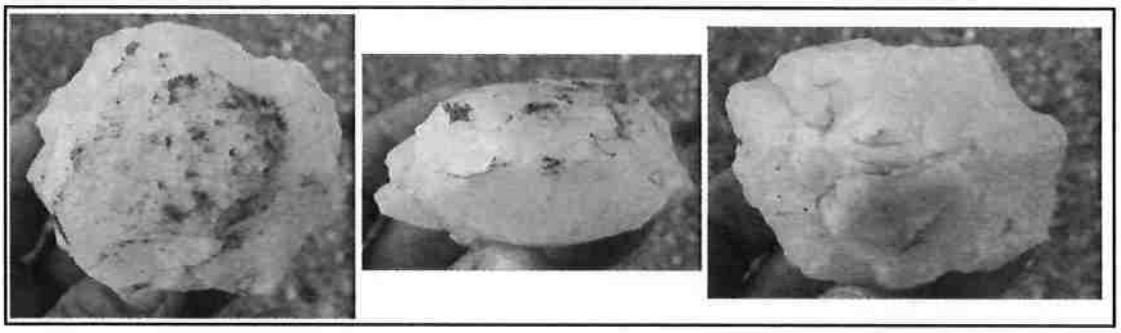

**Figure 59:** An MSA radial core from Blokwerf area J.

**Figure 60:** A retouched flake almost certain to be MSA from BW2009/091.

### 6.3. Middle/Later Stone Age scatters

Some 16 artefact scatters were recognised to contain elements of both the MSA and LSA (Figures 62 to 65). Essentially the MSA component was of quartzite and generally displayed some weathering, while the LSA artefacts were usually of quartz. It is, of course, always possible that some quartz could be MSA and some quartzite LSA.

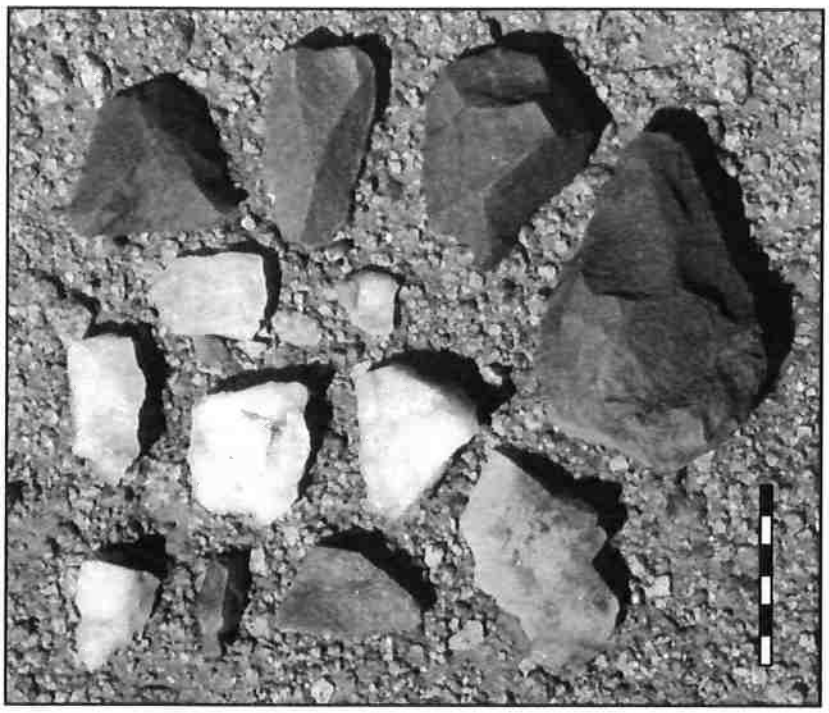

**Figure 61:** A selection of artefacts from BW2009/031. The large artefact on the right is an ESA hand-axe, the middle flake at the top is an MSA blade while the small quartz artefacts are likely to be LSA. Scale in cm.

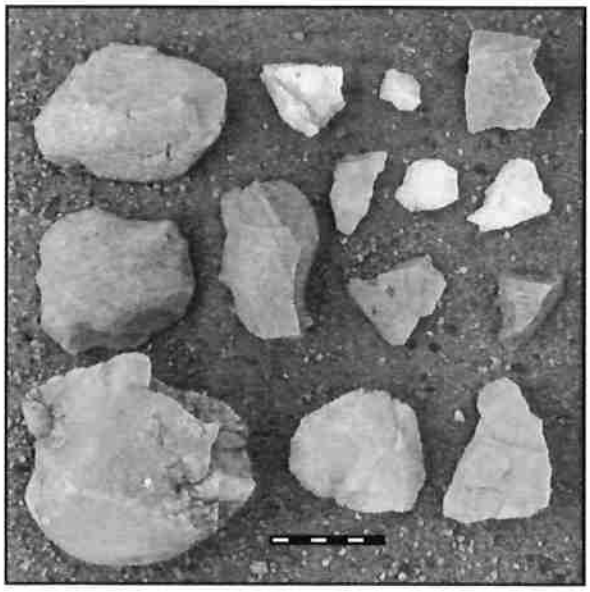

**Figure 62:** A selection of artefacts from BW2009/008. The small quartz ones are likely LSA while the quartzite ones are probably all MSA. Scale in cm.

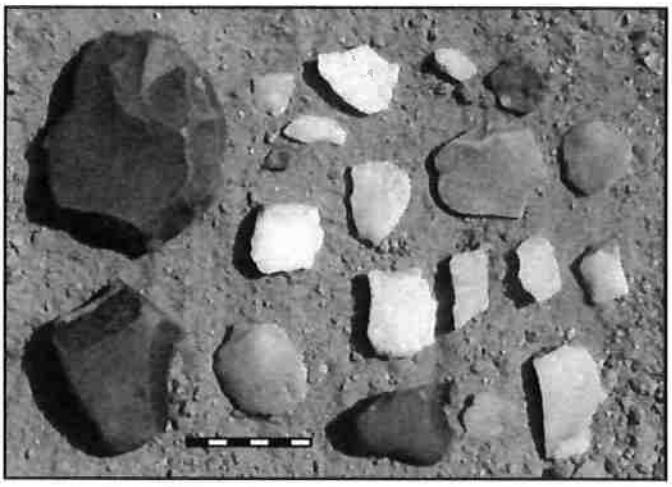

**Figure 63:** A selection of artefacts from BW2009/042. Again the quartz is likely to be LSA and the quartzite MSA. Scale in cm.

### 6.4. Later Stone Age scatters

Altogether 45 scatters of artefacts pertaining to the LSA were noted. This is the only period from which sites were found in all five mining areas and in all four location types. Although we had expected to find *in situ* or deflated material along the edges of the trees in the 1:100 year flood zone (c.f. Orton 2007; Webley 1997), this was seldom the case with the only examples being very ephemeral scatters. Most LSA material turned out to be located along the base of

the mountains, often associated with rocky outcrops or gneiss boulders (Figures 64 & 65). No doubt the rocks were in use as wind breaks and occupations were brief resulting in no deposits accumulating. Pottery was noted on several of these scatters and in all cases it was found to be very thin. Two approximate thickness measurements were taken: 3.5 mm and 4.2 mm. Artefacts were invariably of quartz. Occasional fragments of ostrich eggshell were also found associated with some of the scatters. Figures 68 to 71 show a selection of LSA material. A curious feature of these scatters at the Blokwerf area was their relationship to the geology. It was noticeable that a slight change in the geology occurred near the northern end of Blokwerf (central). No sites were found along the mountain on the northern side of this change (Figures 48 and 49).

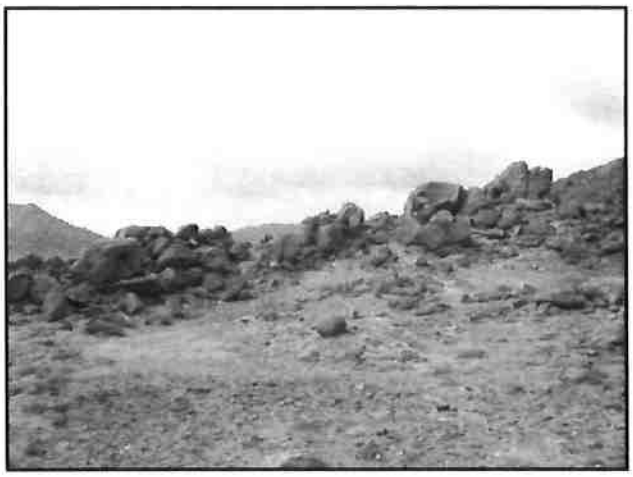

**Figure 64:** The complex of boulders in which we found BW2009/003 to 005.

**Figure 65:** A typical LSA site location: BW2009/003.

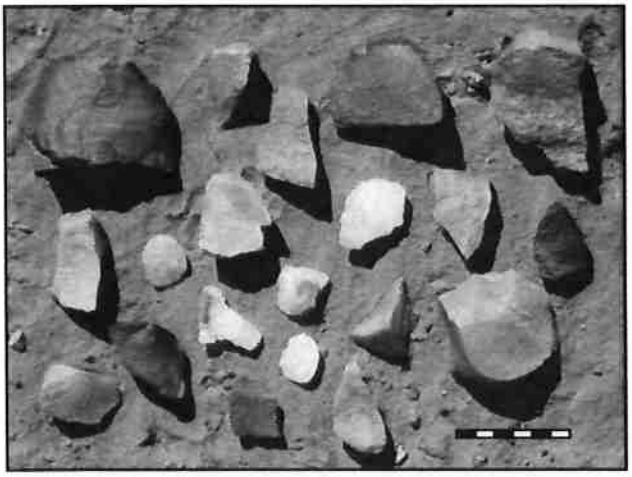

**Figure 66:** A selection of artefacts from KB2009/003. Although all the artefacts could be MSA, the quartz ones are more likely LSA.

**Figure 67:** The context in which the KB2009/003 artefacts were found.

**Figure 68:** A scatter of LSA artefacts and pottery under a tree and within the 1:100 year flood zone.

**Figure 69:** LSA artefacts from BW2009/020. Scale in cm.

**Figure 70:** Pottery and quartz crystals at BW2009/004.

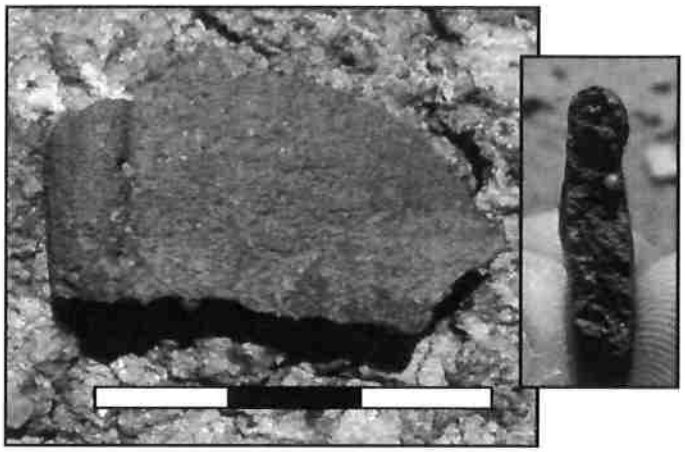

**Figure 71:** A rim sherd from SB2009/002. Scale in cm.

### 6.5. Later Stone Age/Historical scatter

Just one site was considered to be either LSA or historical. While no historical (or other) artefacts were found, the apparent spatial integrity of this site suggested it might not be very old at all. It consists of a 'circle' of rocks that we assume to represent anchors for a hut (Figure 72). A separate set of rocks to one side may represent the cooking area.

### 6.6. Historical scatter

Again just one historical site was recorded. It is an ephemeral scatter that includes fish bones, some glass and a single ceramic fragment. The ceramic is annular ware which was fairly typical of the late 19$^{th}$ century. Of course this could suggest an early 20$^{th}$ century age but without evidence to support this we have included it here as an archaeological site. (The NHRA defines archaeology as being greater then 100 ears of age.)

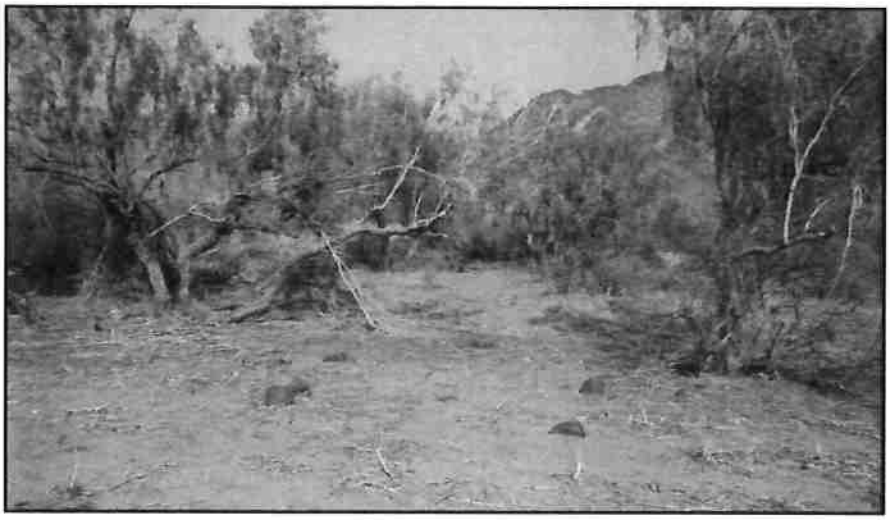

**Figure 72:** The stone 'circle' presumed to indicate the placement of a hut at OP2009/019.

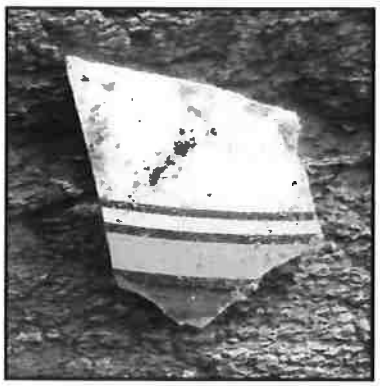

**Figure 73:** The fragment of Annular ware from 0P2009/018.

# 7. CONCLUSIONS

## 7.1. Discussion

Although no good *in situ* archaeological sites were found, a large suite of material was recorded across the five proposed mining locations. We suspect that the lack of *in situ* material within the 1:100 year flood zone, as occurs at Jakkalsberg downstream (Orton 2007; Webley 1997), may be a result of different erosional and depositional processes occurring in this area. Nevertheless, material pertaining to the ESA, MSA and LSA was found, along with one site including historical artefacts. None of the occurrences found were deemed to be highly significant with ratings in the range of very low to medium being applied to all finds (Table 1).

Table 2 shows a summary of the location data for the 90 recorded sites. The vast majority of all ESA and MSA material is to be found on the river terraces, invariably among cobbles. This spatial relationship no doubt pertains to the availability of stone material for flaking and, as such, the artefacts are perhaps more related to quarrying and artefact production areas than to living sites. Furthermore, some artefacts seem to be very heavily eroded or perhaps water rolled. The latter would presumably indicate their deposition during flood events. They may thus have originated upstream. However, it is clear that the majority of artefacts of this age on the cobble terraces were flaked more or less where we found them. Of particular note here is BW2009/048 where a distinctive pale quartzite was extensively flaked.

LSA scatters were also frequently found on the terraces, but many of these, particularly in the Blokwerf area, were on terraces covered by recent aeolian sand. These scatters are more likely to indicate camp sites from which all organic materials have been removed through the effects of the weather. That sites were most common on the terraces is, of course, strongly influenced by the fact that these areas were the focus of our survey.

**Table 2:** Summary table showing the number of each type of site per location type.

| Type | Location type | | | | |
|---|---|---|---|---|---|
| | mountain | rock outcrops | terrace | flood zone | Total |
| ESA/MSA | - | - | 23 | - | 23 |
| ESA/MSA/LSA | 3 | - | - | - | 3 |
| MSA/LSA | 8 | 1 | 7 | - | 16 |
| LSA scatter | 20 | 7 | 14 | 4 | 45 |
| LSA/Historical | - | - | 1 | - | 1 |
| Historical | - | - | - | 1 | 1 |
| Total | 31 | 8 | 45 | 5 | 89 |

The next most frequent location was along the base of the mountain. Because mining will not take place in these areas, they are frequently used for dumping of deposits mined from the terraces (Figure 74). The reason for this is that when rehabilitated the dump will blend in more easily with the slope than it would if left standing proud on the river terrace. This pattern of dumping threatens sites along the base of the mountain and for this reason we included this strip in our survey. By far, most of the archaeological material found in this area was LSA. As suggested above, this must relate to the use of boulders as shelters for overnight camps. We found no evidence of any sort of longer term occupation anywhere during the survey. The isolated rock outcrops also tended to be dominated by LSA finds for the same reason.

**Figure 74:** Mine dumps are frequently placed against the base of the mountain as in this example at Blokwerf.

Table 3 provides a summary of all the sites located and recorded. It also shows the number requiring mitigation both by type and by area. Not included in the latter count are three other pottery scatters that we have deemed to have little intrinsic value. However, if collected with some of the sites requiring mitigation, they would add value to the interpretation of the latter as a group. If and when mitigation occurs, the responsible archaeologist should consider collecting material from these less important sites simply to improve the quality of the overall record. They are SB2009/002, BW2009/003 and BW2009/005.

Sites within the 1:100 year flood zone should be entirely safe from mining and the small number of them is, as stated above, no doubt due to a combination of our very limited search of this zone and the prevailing environmental conditions.

No burials and no rock art were found within the study area. The generally rocky nature of the substrates would likely have deterred burial in the river terraces. The heavily degrading rock surfaces would not preserve paintings and no rocks suitable for engraving were noted.

### 7.2. Mitigation requirements

Table 3 provides an assessment of the numbers of sites per mining area and the number that will require some sort of mitigation. Note that only Oena Proper, Sandberg and Blokwerf have been searched exhaustively.

**Table 3:** Summary of sites recorded during the survey. The numbers outside the brackets are totals while those in brackets indicate the number requiring mitigation if they are to be disturbed.

| Type | n | | | | | |
|---|---|---|---|---|---|---|
| | OP | SB | BW | VR* | KB* | Total |
| ESA/MSA | 14 (4) | 1 (1) | 7 (3) | 1 | - | 23 (8) |
| ESA/MSA/LSA | - | - | 3 (1) | - | - | 3 (1) |
| MSA/LSA | - | - | 14 | - | 2 (1) | 16 (1) |
| LSA scatter | 5 | 1 | 27 (3) | 4 | 8 (2) | 45 (5) |
| LSA/Historical | 1 | - | - | - | - | 1 (0) |
| Historical | 1 | - | - | - | - | 1 (0) |
| Total | 21 (4) | 2 (1) | 51 (7) | 5 (0) | 10 (3) | 89 (15) |

* VR and KB have not been searched completely.

Mitigation will be relatively quick to accomplish at most of these sites since all are open scatters lying on the surface. While occasional areas may require some sieving of the sandier substrate, the majority could be done through careful surface collection within a grid system. The main aim of the mitigation will be to document the nature of the ESA and MSA artefacts that are present and to document the pottery tradition present in the area. It is unfortunate that no finds of significance accompanied the pottery at any of the sites found. Only one pottery site preserved some organic material (OES fragments) which could be the only chance at dating the pottery.

### 7.3. Further Phase 1 work

While the three main areas were surveyed comprehensively, it should be noted that Visrivier and Kabies have only received preliminary searches. Both will require further survey as the initial results show that archaeological occurrences are present at each of them. Preliminary indications are that nothing of high significance will be found that might prevent mining there in the future.

## 8. RECOMMENDATIONS

It is recommended that mining be allowed to proceed at Oena Proper, Sandberg and Blokwerf once archaeological mitigation has taken place. Visrivier and Kabies may not be mined until further survey and subsequent mitigation (as may be required) have taken place.

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