



Liddell Coal Operations Pty Limited

**REPORT ON WORKS
UNDERTAKEN UNDER
ABORIGINAL HERITAGE
IMPACT PERMIT #2348**

November 2013

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PERMIT #2348**

Prepared by
Umwelt (Australia) Pty Limited
on behalf of
Liddell Coal Operations Pty Limited

Project Director: **Jan Wilson**
Project Manager: **Nicola Roche**
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Newcastle

75 York Street
Teralba NSW 2284

Ph. 02 4950 5322

www.umwelt.com.au

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APPENDICES

- 1 AHIP #2348**
- 2 Artefact Attribute Recording Methodology and Data**

1.0 Introduction

Liddell Colliery is an open cut coal mine located approximately 25 kilometres north-west of Singleton and 13 kilometres south of Muswellbrook in the upper Hunter Valley of New South Wales (refer to **Figure 1.1**). Liddell Colliery is currently operated by Liddell Coal Operations Pty Limited (Liddell Coal).

Liddell Coal obtained consent (DA 305-11-01) in 20 November 2002 to continue operations within its development consent area¹. DA 305-11-01 related to the continuation of operations involving a variety of activities, including the extension of an existing dam (Dam 13) located on Chain of Ponds Creek. The approved activities required impacts to an area defined as the Chain of Ponds site area (refer to Umwelt 2001), which contained several recorded archaeological sites. The conditions of DA 305-11-01 required Liddell Coal to obtain a Consent to Destroy permit (now referred to as an Aboriginal Heritage Impact Permit – AHIP) prior to undertaking any works associated with impacts to these sites and the deposits between them. Consequently, Liddell Coal obtained AHIP #2348 (issued under Section 90 of the *National Parks and Wildlife Act 1974*) from the Department of Environment and Conservation (DEC, now the Office of Environment and Heritage – OEH). Under AHIP #2348, Liddell Coal was required to carry out cultural heritage works within the Chain of Ponds site area. This report provides a summary of those works including a description of the approved methodology and a review of the results of these works, in accordance with AHIP requirements.

1.1 Background to AHIP#2348

The Chain of Ponds area was originally assessed as part of an Aboriginal Heritage Assessment (Umwelt 2001) that formed part of an Environment Impact Statement completed for a proposed continuation of operations at Liddell Colliery. During the course of archaeological survey conducted by Umwelt (Australia) Pty Limited (Umwelt) (2001), a series of sites (LID 29, LID30, LID31 and LID32) were identified along Chain of Ponds Creek. Umwelt (2001:6.11) considered that LID29, LID31 and LID32 were likely to be associated with less disturbed sub-surface deposits, forming the basis for the identification of the Chain of Ponds site area (which also included LID30 despite slightly higher levels of disturbance). The Chain of Ponds site area was assessed as being of moderate scientific significance. The Chain of Ponds site area also contained site G13, an artefact scatter located on the eastern side of Chain of Ponds creek opposite LID31. All sites are shown in **Figure 1.2**.

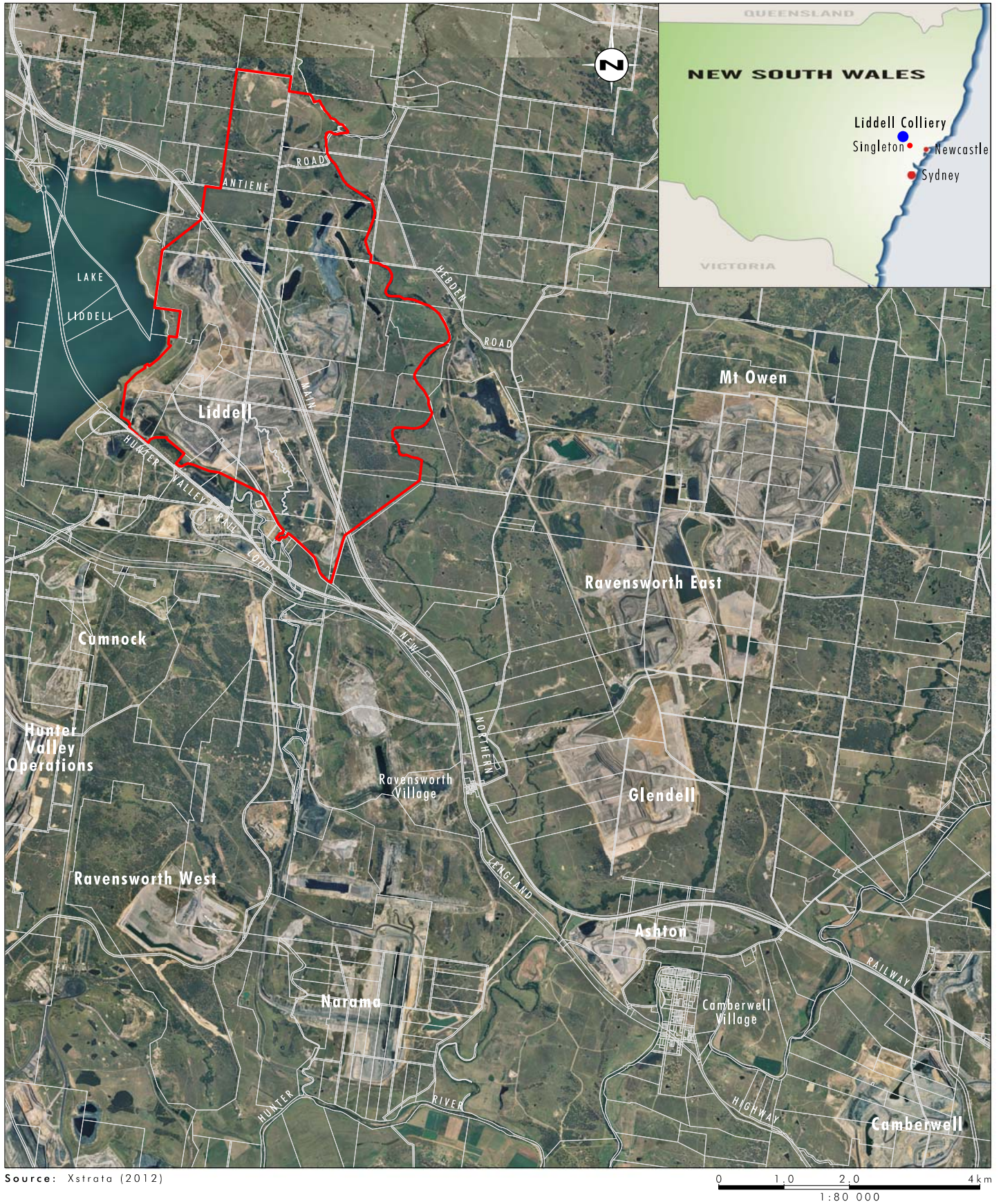
Umwelt (2001) recommended that a Section 90 consent (now referred to as an AHIP) should be obtained for the site area and a salvage program (involving surface collection and sub-surface investigation in the form of grader scrapes) should be conducted prior to development impacts.

Condition 3.3 (b) of DA 305-11-01 specifies:

The Applicant shall obtain a NPWS Consent to Destroy from the NPWS Director-General prior to any works associated with the destruction and/or interference of the Aboriginal artefact find locations and the deposits between them, identified as LID1, 2,3,4,5,11,13,14,16,17,18,20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, SP1, 2, 3 and the Brayshaw site B.

In accordance with Condition 3.3, Liddell Coal submitted an application for an AHIP and was granted AHIP #1443 on 12 November 2002. AHIP #1443 subsequently expired before any

¹ Note that DA 305-11-01 has been subject to a number of modifications since 2002. However, this report relates to works done prior to modifications.



Legend
 Liddell DA Boundary

FIGURE 1.1
Locality Map



Source: Xstrata (2012)

0 0.5 1.0 2.0 km
1:40 000

Legend

- ▬ Liddell DA Boundary
- ▬ AHIP #2348
- Site Boundaries (Umwelt 2011)
- AHIMS Registered Location

FIGURE 1.2

Location of AHIP #2348 Area

salvage activities were undertaken in the Chain of Ponds site area. In 2006, Liddell Coal commissioned Umwelt to prepare an updated AHIP application for the Chain of Ponds site area. This application provided a methodology for surface collection and for the completion of grader scrapes within areas that retained topsoil. This AHIP application was submitted to DEC on 1 March 2006 and AHIP #2348 was issued on 3 October 2006 (refer to **Appendix 1**). AHIP #2348 applies to an area of approximately 59 hectares located to the west of the Old New England Highway and contained sites LID29 (AHIMS #37-3-0427), LID30 (AHIMS #37-3-0426), LID31 (AHIMS #37-3-0428), LID32 (AHIMS #37-3-0426) and G13 (AHIMS #37-3-0690), as shown in **Figure 1.2**. AHIP #2348 was issued to Liddell Coal for a period of 10 years, that is, until 3 October 2016.

The salvage activities required under AHIP #2348 were conducted by Umwelt and the relevant Aboriginal parties primarily from 20 to 22 November 2006, with additional salvage undertaken on 6 April 2011 in conjunction with historic archaeological testing (Umwelt 2011). In accordance with current requirements, Aboriginal Site Impact Recording Forms have been submitted to OEH in relation to impacts to sites discussed in this report.

1.2 Project Team

This report was prepared by Nicola Roche (Senior Archaeologist, Umwelt) and reviewed by Jan Wilson (Manager Cultural Heritage, Umwelt). The cultural heritage works approved under AHIP #2348 were conducted by Maree Waugh (Wanaruah Local Aboriginal Land Council), Mark Skene (Upper Hunter Wonnarua Council), Rhonda Ward (Ungooroo Aboriginal Corporation), Des Hickey (Wonnarua Nation Aboriginal Corporation), Margaret and John Matthews (Aboriginal Native Title Consultants), Nicola Roche and Aara Welz (Archaeologists, Umwelt). Ed Wegner (Environment and Community Officer, Liddell) supervised the works and provided logistic support. The additional historic archaeological testing work was conducted by Tim Adams (Senior Archaeologist, Umwelt), Amanda Reynolds (Archaeologist, Umwelt), David French (Wanaruah Local Aboriginal Land Council as a member of the Liddell Aboriginal Stakeholder Reference Group) and George Sampson (Cacatua Culture Consultants as a member of the Liddell Aboriginal Stakeholder Reference Group).

1.3 Report Structure

The objective of this report is to detail works undertaken in accordance with AHIP #2348, in accordance with the requirements of Specific Condition 7 of AHIP #2348. It is understood that further salvage works may be enacted under AHIP #2348, which remains valid until October 2016. Should further works be required, they will be the subject of additional reporting that should incorporate the information provided in this report and should remain in accordance with AHIP requirements.

This report comprises:

- information on consultation with Aboriginal parties undertaken in relation to AHIP #2348;
- a review of background information to provide context to the works conducted under AHIP #2348;
- a summary of the approved methodology for works conducted under AHIP #2348; and
- information on the results of these works including relevant mapping and provision of detailed attribute recording for salvaged artefacts.

2.0 Aboriginal Party Consultation

The application for AHIP #2348 was prepared in consultation with Wanaruah Local Aboriginal Land Council, Upper Hunter Wonnarua Council Inc., Lower Wonnarua Tribal Council Inc., Ungooroo Aboriginal Corporation, Wonnarua Nation Aboriginal Corporation and Aboriginal Native Title Consultants. Each of these Aboriginal parties was provided with the opportunity to participate in salvage works in 2006, with the representatives present during salvage works listed in **Section 1.3**. The subsequent historic archaeological testing works in 2011 were conducted in consultation with the Liddell Coal Aboriginal Stakeholder Reference Group. Aboriginal party representatives assisted in all aspects of the salvage, including discussions regarding location and extent of grader scrapes. A copy of this report will be provided to the relevant Aboriginal parties.

3.0 Background Information

This section provides information on the environmental context of the AHIP #2348 area and the nature of the sites contained within this area.

The Liddell development consent area is typically undulating to gently hilly, with three major drainage lines present within the area: Bowmans Creek; Bayswater Creek and Chain of Ponds Creek. The AHIP #2348 area is centred on Chain of Ponds Creek, which is dammed to the north (Dam 13) and flows to Bayswater Creek in the south (outside the AHIP #2348 area). At the time of salvage works, the creek contained water only in deeper sections and exhibited varying levels of erosion. In some areas, gully erosion extended up to 30 metres from the current creek channel whilst in others erosion was limited to steep bank collapse, resulting in a lower level of exposure. The lower slopes bordering the creek were relatively gently inclined, changing gradually to more moderately inclined slopes leading to elevated areas bordering the Old New England Highway and mining haul road. Vegetation across much of the AHIP #2348 area had been cleared, with regrowth and mature bull oak dominating the creek line and extending into some of the adjoining slope areas. At the time of the salvage, there were a number of cleared vehicle tracks within the AHIP area as well as a large fire break track graded as an emergency requirement. Other disturbance factors within the area included power lines, telecommunications cables, dams and other water management infrastructure such as artificial channels and overflow pipes from Dam 13.

As discussed in **Section 1.1**, the AHIP #2348 area is centred on the Chain of Ponds site area, which was identified by Umwelt (2001) as including the banks of Chain of Ponds Creek and the adjoining lower slopes and containing sites LID29, LID30, LID31 and LID32. Umwelt (2001) considered that the site area was likely to contain sub-surface deposits extending beyond the boundaries of the recorded sites. The information provided by Umwelt (2001) in relation to sites LID29, LID30, LID31 and LID32 is summarised below.

LID29 was recorded as an artefact scatter located immediately to the south of Dam 13 on the banks and flats bordering Chain of Ponds creek. Artefacts were identified in four separate exposures: an area of 30 metres by 10 metres on the western side of a concrete culvert (9 artefacts); an exposure at the base of the dam wall between the discharge point and creek channel (12 artefacts), an area of 70 metres by 30 metres on the western bank of the creek (36 artefacts); and an area of 40 metres by 5 metres towards the southern end of the site (7 artefacts). The site was mapped as a maximum area of approximately 200 metres (north-south) by 170 metres (east-west), as shown in **Figure 1.2**. Artefacts recorded within this site included flakes, broken flakes, retouched flakes and cores, with these artefacts manufactured from mudstone, silcrete, quartzite and hornfels.

LID30 was described as being located approximately 350 metres from Chain of Ponds creek. Five artefacts were recorded in an erosion scour associated with an access track 10 metres to the north-east of the Old New England Highway and running parallel to this road (refer to **Figure 1.2**). Based on the high level of disturbance at this site, Umwelt (2001) considered that it was unlikely that additional sub-surface artefacts would remain in this area. The visible artefacts were manufactured from mudstone and silcrete and consisted of a flake, a broken flake, a flaked piece, a retouched flake and a core.

LID31 was recorded as a single quartz core visible in an ant nest exposure on the western bank of Chain of Ponds creek. It was assessed that further artefacts may be present (but not visible) in this area but that they would have been subject to disturbance as a result of vegetation clearance and cultivation.

LID32 was located in an area of gully erosion and bank collapse to the east of Chain of Ponds Creek. The artefacts were recorded within an area of 100 metres along the creek bank and were eroding from the upper portion of the bank. A total of 57 artefacts were recorded including a grindstone, flakes, broken flakes, retouched flakes and flaked pieces. Raw materials used in artefact manufacture were mudstone, silcrete, quartz and sandstone.

G13 was located on a small exposure on the eastern bank of Chain of Ponds creek. The exposure was approximately 9 metres by 3 metres centred on a large ants' nest. It contained seven artefacts (five mudstone and two chert), with artefact types including a broken flake with retouch/usewear and a heavily reduced mudstone core.

In assessing the Chain of Ponds site area as a whole, Umwelt (2001) identified that the site complex was of moderate archaeological significance on a local scale. This assessment was based on the perceived representativeness, integrity (LID29 and LID32), connectedness, complexity and research potential of the site area. AHIP #2348 was issued with reference to this evaluation and included a requirement for both surface collection and grader scrapes to be conducted within the AHIP #2348 area.

4.0 Methodology

The surface collection and grader scrapes were carried out in accordance with the methodology specified in the AHIP application, as summarised below.

4.1 Surface Collection

The surface collection methodology was as follows:

- the AHIP area was inspected by Aboriginal party representatives and archaeologists and all visible surface artefacts were flagged;
- artefact distributions within each site were photographed and scale plans of the site were drawn;
- where appropriate, artefacts were recorded as loci (clusters) for the purposes of documentation and analysis, with loci recorded sequentially across the AHIP #2348 area rather than on being numbered sequentially within each site; and
- artefacts were then collected and bagged according to site, loci and distribution.

4.2 Grader Scrapes

Grader scrape locations were selected based on the approximate locations identified in the AHIP application. However, there was some minor variability in grader scrape location to take into account changes in erosion and to target areas with a greater visible depth of topsoil bordering surface artefact concentrations. It is noted that a fire trail had been graded as an emergency action and therefore it was not possible to grader scrape at this location and the relevant scrape was modified accordingly in consultation with Aboriginal party representatives.

A total of 10 grader scrapes were undertaken during the 2006 salvage program. Each grader scrape was divided into 10 metre units along its length and soil was removed in approximately 5 centimetre spits until B horizon soils were encountered. The Aboriginal parties were provided with the opportunity to inspect the scrape following the removal of each spit and to rake through windrowed material.

An additional five grader scrapes were conducted over the course of historical archaeological testing in relation to brick rubble exposed in 2006 grader scrape 6. These additional scrapes were all located in the area surrounding scrape 6 and were conducted under an exception (under Section 139(4) of the *Heritage Act 1977*), as reported by Umwelt (2011). As these additional works were also located within the AHIP #2348 area, the methodology outlined in this section was also adhered to, including the involvement of Aboriginal party representatives in the work.

The location of all identified artefacts was recorded using a 12 channel GPS and the artefacts were collected. Within one scrape (scrape 8) a small cluster of artefacts was identified within a discrete area. No further scraping was conducted in the area of the artefact cluster and an area of 50 centimetres by 50 centimetres was excavated with trowels to a depth of 10 centimetres until all artefacts within the concentration were collected. The adjoining section of windrowed soil was raked and re-spread to allow artefacts to be more readily detected. Sieving was subsequently conducted at 10 metres intervals along the windrow.

4.3 Artefact Attribute Recording

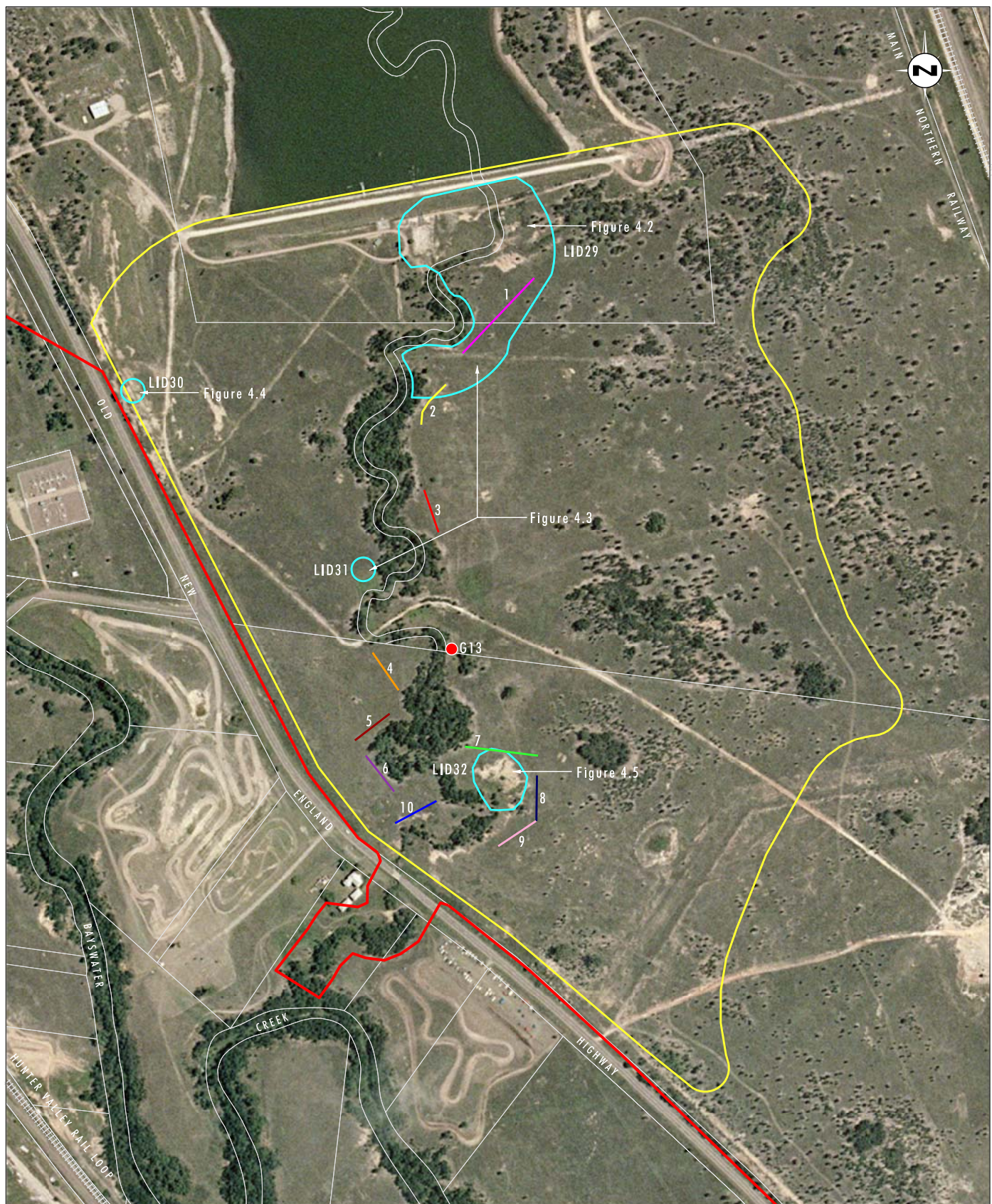
Following the completion of the collection and grader scrapes, the artefacts were subject to attribute analysis in accordance with the detailed methodology provided in **Appendix 2**.

5.0 Results

This section documents the results of the surface collection and grader scrapes, including provision of the artefact attribute recording information. For ease of reference, the originally recorded site locations and the location of grader scrapes are shown in **Figure 5.1**.

5.1 Surface Collection

The results of the surface collection works are described with reference to the identified sites. One artefact was provided to the archaeologist without provenance information and therefore is excluded from the current discussion but was documented and retained in accordance with AHIP #2348 requirements.



Source: Xstrata (2012)

0 100 200 300m
1:6000

Legend

- ▬ Liddell DA Boundary
- ▬ AHIP #2348
- ▬ Site Boundaries (Umwelt 2011)
- AHIMS Registered Location

- | Grader Scrapes | |
|--|---|
| ▬ Grader Scrape 1 | ▬ Grader Scrape 6 |
| ▬ Grader Scrape 2 | ▬ Grader Scrape 7 |
| ▬ Grader Scrape 3 | ▬ Grader Scrape 8 |
| ▬ Grader Scrape 4 | ▬ Grader Scrape 9 |
| ▬ Grader Scrape 5 | ▬ Grader Scrape 10 |

FIGURE 5.1

Location of Previously Recorded Sites
and Grader Scrapes

5.1.1 LID29

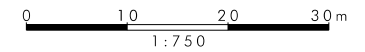
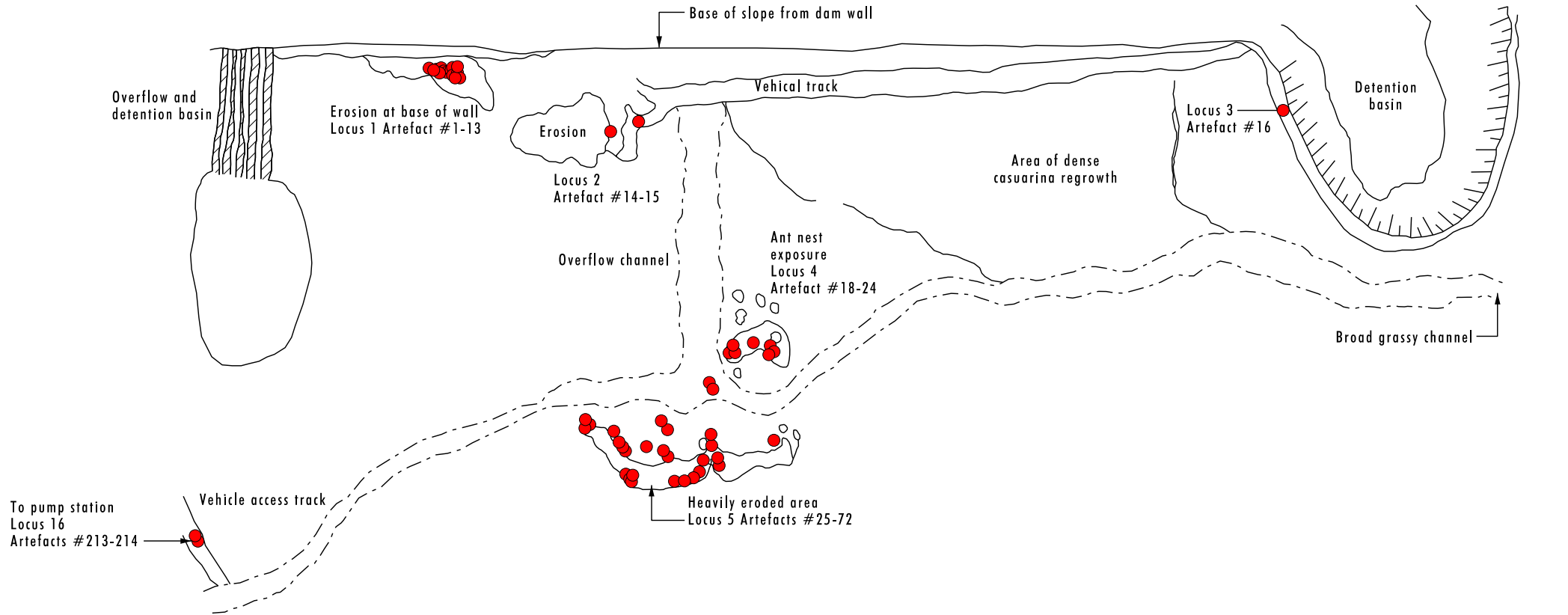
As discussed in **Section 3.0**, this site was originally recorded as 64 artefacts dispersed across four exposures. The distribution of artefacts within this site includes the four loci originally recorded but also incorporates an additional five loci containing 22 artefacts, as shown in **Table 5.1** and **Figures 5.2** and **5.3**. There was an increase in the number of recorded artefacts within two of the previously recorded exposures (loci 1 and 5), with one less artefact salvaged from each of loci 4 and 7. However, a total of 34 additional artefacts were recovered from the site.

Table 5.1 – Comparison of Surface Collection and Original Site Records for Lid29

Locus	# of artefacts	Description	Comparison with 2001 site record
1	14	Small erosion exposure (approximately 20 x 5 metres) at base of dam wall.	Fits description of exposure 2, which originally contained 12 artefacts.
2	2	Area of erosion (approximately 20 x 10m) adjoining access track.	Not previously recorded.
3	1	Single artefact in large area of exposure associated with detention basin.	Not previously recorded.
4	8	Ant nest exposure (approximately 10 x 5 metres) on western side of concrete culvert adjacent to overflow channel.	Fits description of exposure 1, which originally contained 9 artefacts.
5	47	Area of erosion (approximately 60 x 20 metres) on western side of concrete culvert at termination of overflow channel.	Fits description of exposure 3 but subject to additional erosion and gullyng along channel of Chain of Ponds Creek, hence slight variation from original description, as shown in Plate 1 . Exposure 3 originally contained 36 artefacts.
6	15	Erosion exposure (approximately 15 x 5 metres) on bank of Chain of Ponds Creek adjacent to vehicle track.	Not previously recorded.
7	6	Exposure (approximately 15 x 5 metres) within graded fire break at intersection with vehicle track at south end of site.	Likely to be same record as exposure 4, which originally contained 7 artefacts.
16	2	Vehicle track exposure leading to pump station.	Not previously recorded.
17	2	Patchy exposure (approximately 15 x 15 metres) associated with regrowth casuarina on western side of Chain of Ponds Creek.	Not previously recorded.
Total	97		Site originally recorded as containing 64 artefacts

5.1.2 LID30

As discussed in **Section 3.0**, this site was originally recorded as five artefacts within an access track running parallel to and 10 metres from the Old New England Highway. As shown in **Figure 5.4**, this matches the salvaged location of a proportion of the artefacts

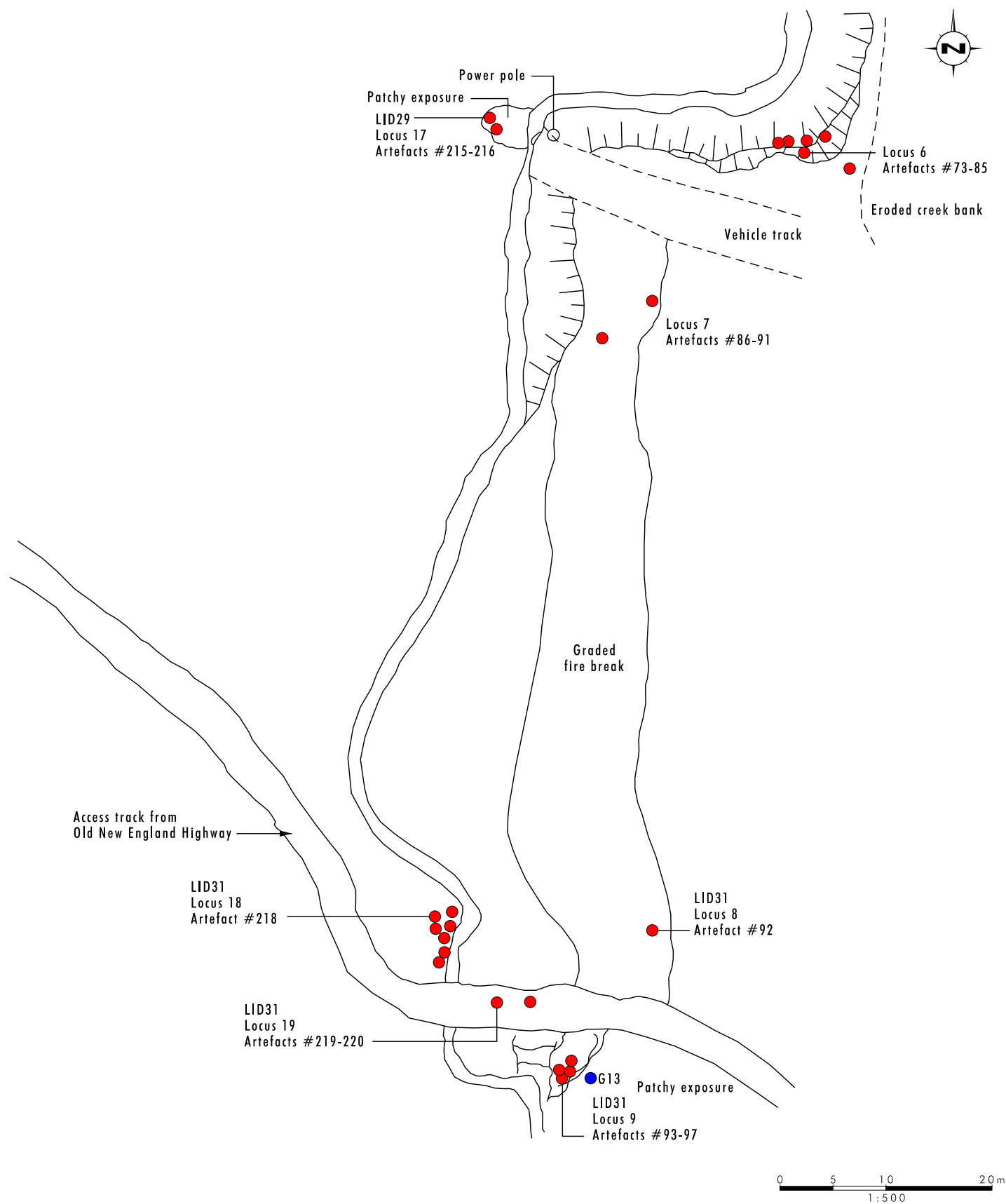


Legend

- Artefacts
- ▬ Slope
- - Chain of Ponds Creek

FIGURE 5.2

Plan of Artefact Distribution
LID29



Legend

- Artefacts
- AHIMS Registered Location
- Slope

FIGURE 5.3

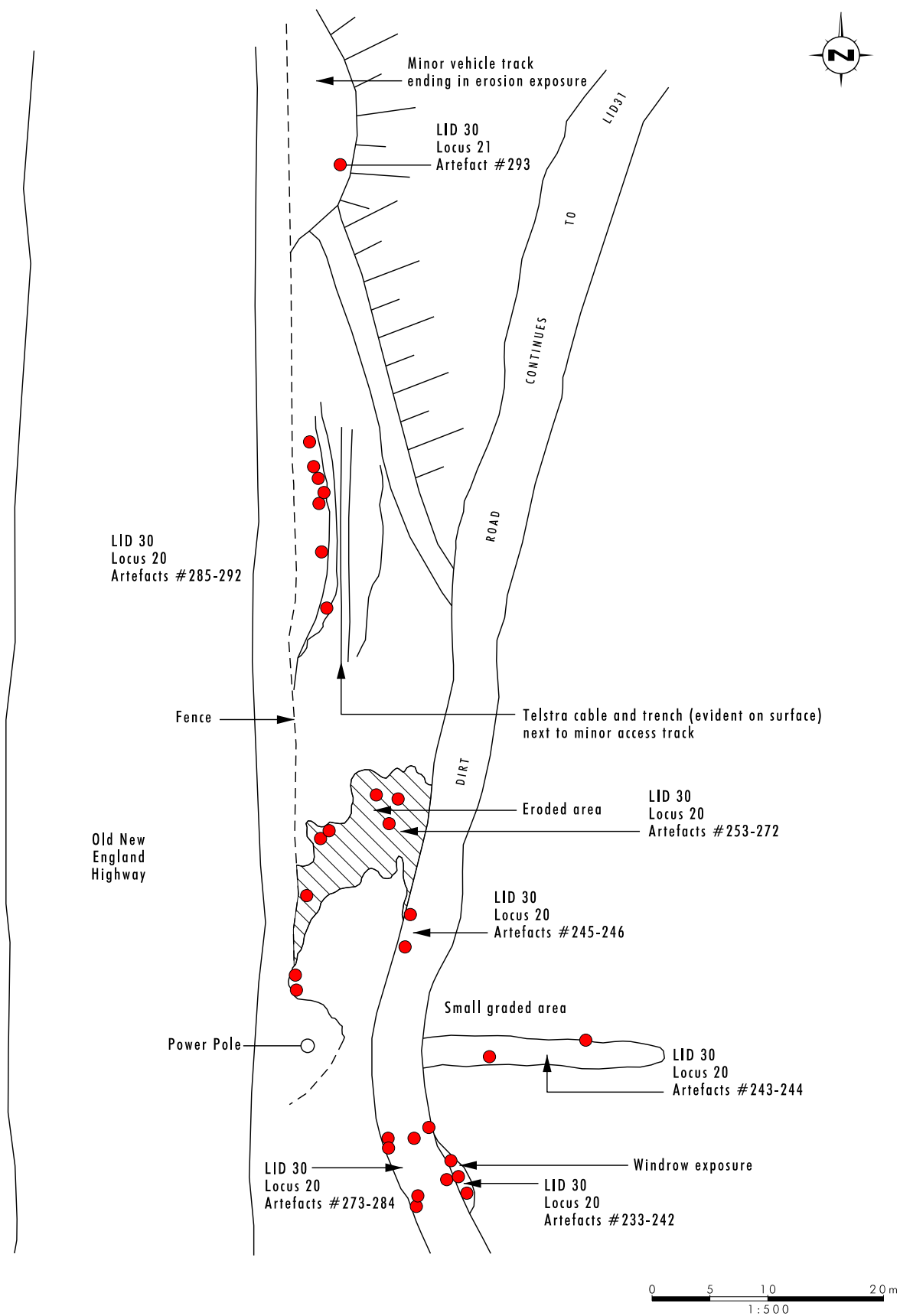
Plan of artefact distribution
LID29 and LID31



PLATE 1
LID29 Locus 5.
Facing west



PLATE 2
LID30 Locus 20.
Facing west



Legend
● Artefacts
▬ Slope

FIGURE 5.4

Plan of Artefact Distribution
LID30

within LID30 locus 1. However at the time of salvage, this locus contained a much higher number of artefacts (68) dispersed along the access track and in areas of ongoing erosion associated with the access track and other infrastructure, including a Telstra cable. This is likely to reflect the high level of visibility afforded by exposures associated a continuation of disturbance noted by Umwelt (2001) and shown in **Plate 2**. An additional locus containing one artefact was identified to the north of the main concentration of artefacts within this site but still within the bounds of the same landform and disturbance area.

5.1.3 LID31 and G13

LID31 was originally recorded as a single artefact on an ant nest exposure, with Umwelt (2001) noting that it was likely that other artefacts may be present but not visible. This is reflected by the presence of G13 on the opposite side of Chain of Ponds Creek. Given their proximity and presence within the same landform (albeit on different sides of the creek) these sites are grouped for the purpose of this report. An artefact was collected at a location (locus 18) adjacent to a graded access road and matching the original description of LID31. However it was a mudstone broken flake rather than the originally recorded quartz core. An additional seven artefacts (five mudstone artefacts, one silcrete and one quartz artefact) were identified at three additional loci broadly meeting the description of G13 and associated with the access track, as shown in **Plate 3** and **Figure 5.3**. One more artefact (mudstone flake) was also found on the graded fire trail adjoining this track, as shown in **Figure 5.3**.

5.1.4 LID32

This site was originally recorded as a total of 57 artefact distributed within an area of gully erosion and bank collapse extending for approximately 100 metres along the eastern bank of Chain of Ponds Creek. As shown in **Figure 5.5** and **Plate 4**, this description broadly corresponds to the area identified as loci 10 and 11 during the surface collection, from which a total of 55 artefacts were recovered. An additional 52 artefacts were collected from locus 12, which consisted of a large area of gully erosion and exposure to the south of Chain of Ponds Creek extending over an area of approximately 40 metres by five metres. This is likely to reflect heightened levels of erosion and exposure in the period since the original site recording. A further seven artefacts were also recovered from three loci of LID32 situated on the northern side of Chain of Ponds Creek, as shown in **Figure 5.5**.

5.2 Grader Scrapes

The location of grader scrapes is shown in **Figure 5.1**. A brief description of each grader scrape and the location of salvaged artefacts are provided in **Table 5.2** below.

In general terms, the soil profile was relatively consistent across all grader scrapes, with some variations in depth and inclusions. The soil profile typically consisted of a thin humic layer composed of grass and grass roots overlying a light grey-brown fine clay loam with variable inclusions (A₂ soil horizon). This in turn overlaid a bright red loamy clay B horizon which was evident at varying depths both within and between grader scrapes, with a maximum excavated depth of 40 centimetres of A₂ soil horizon.

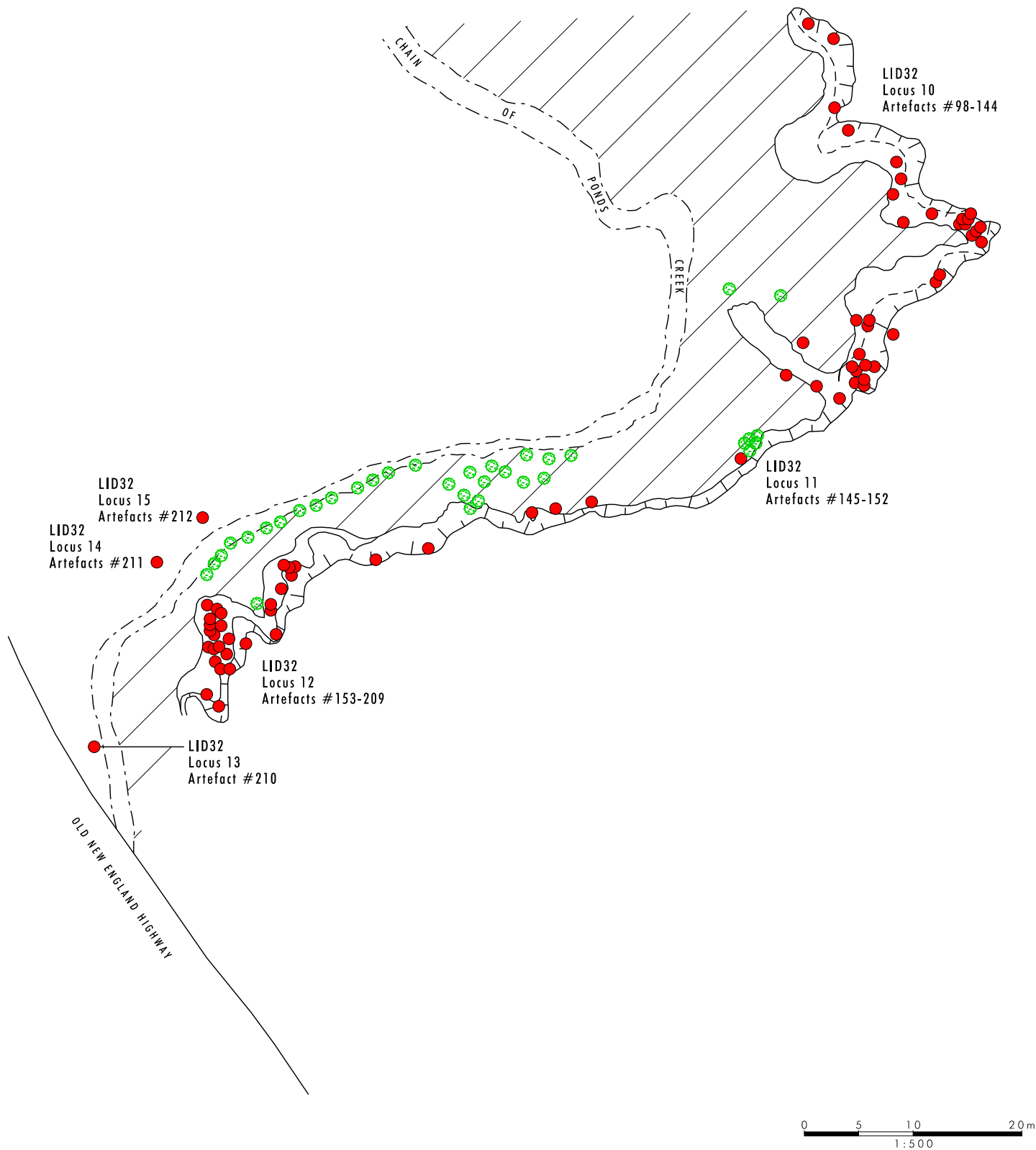
Whilst small amounts of discarded construction material (bricks and rubble) were present within a number of grader scrapes, grader scrape 6 contained what appeared to be consolidated brick rubble within an area approximately 15 metres from its southern extent (refer to **Plate 5**) opposite the State Heritage registered Chain of Ponds Hotel. In accordance with Specific Condition 6 of AHIP #2348, this section of the grader scrape was not further excavated to ensure that potential historic heritage items were not disturbed. This area was subsequently re-visited to undertake historical archaeological testing and an



PLATE 3
LID31 Locus 19.
Facing north-east



PLATE 4
LID32 Locus 10.
Facing east



Legend

- Artefacts
- ⊗ Regrowth Bullock
- ▨ Patchy Grass Coverage/Explosure
- ▬ Slope
- - Chain of Ponds Creek

FIGURE 5.5

Plan of Artefact Distribution
LID32



PLATE 5
Grader Scrape 6 in progress,
with historical material shown in centre-view



PLATE 6
Grader scrape 8 in progress.
Facing south

additional four small scrapes were conducted (refer to Umwelt 2011). Three additional artefacts were recovered and all were located within the original grader scrape 6.

Table 5.2 – Grader Scrape Results

Scrape #	Associated site	Length (m)	Depth (cm)	Description	Artefacts
1	LID29	110	40	Approximately parallel to Chain of Ponds Creek to the south of LID29 locus 5 and east of LID29 locus 6 across gently inclined lower slopes.	2 - interval 11 at approximately 40 cm depth.
2	LID29	50	35	Extending south-west from LID29 locus 7 across gently inclined lower slopes to the east of Chain of Ponds Creek.	3 - 2 in spit 4 (intervals 1 and 2) and 1 in spit 6 (interval 5).
3	LID31/G13	40	30	Approximately parallel to Chain of Ponds Creek across possible former meander cut-off adjacent to an existing access track to the north of LID31 locus 7.	0
4	LID31	50	30	South-east to north-west across possible meander cut-off to the south of LID31 locus 19.	0
5	LID32	50	35-40	Located on gently inclined lower slope to the north of Chain of Ponds Creek.	3 - 1 each in spit 4 and 5 (interval 1) and 1 in spit 6 (interval 2).
6	LID32	55 but then reduced to 40	30	Located on gently inclined lower slope to the east of Chain of Ponds Creek and west of Old New England Highway. Brick rubble identified in intervals 1 and 2 and scrape shortened by 15 metres to avoid disturbance of potential historic heritage material, in accordance with Specific Condition 6 of AHIP #2348. Additional artefacts recovered from historical scrapes conducted within the same area.	4 - 1 in spit 6 (interval 2) and 3 in subsequent historical scrapes.
7	LID32	80	25	Extending from bank of Chain of Ponds Creek in the west to gently inclined lower slopes at the eastern end and immediately to the north of LID32 locus 10.	4 - 1 in spit 3 (interval 2), 1 in spit 4 (interval 6) and 2 in spit 5 (intervals 7 & 8).

Table 5.2 – Grader Scrape Results (cont)

Scrape #	Associated site	Length (m)	Depth (cm)	Description	Artefacts
8	LID32	50	40	Located on a gently inclined lower slope to the east of erosion scour associated with LID32 locus 10.	49 - 1 in windrow between spits 2 & 3, 4 in spit 4 (intervals 2 and 4) and 44 from discrete concentration within 50 cm by 50 cm area in interval 2 at a maximum depth of 10 cm.
9	LID32	50	25-30	Adjoins southern end of scrape 8 on gently inclined lower slope to the south of Chain of Ponds Creek and south of LID32 locus 11.	0
10	LID32	50	20	Located on gently inclined lower slope immediately adjacent to a track containing LID32 loci 13-15.	5 in spit 2 (interval 2).
Total number of artefacts					70

Grader scrape 8 within LID32 (refer to **Plate 6**) was notable as it contained a concentration of 44 silcrete artefacts within an area of approximately 50 centimetres by 50 centimetres at a maximum depth of 10 centimetres. The concentration was detected whilst approximately 41 of the artefacts remained in-situ and were subsequently excavated by hand. The results of attribute analysis of this concentration of artefacts will be discussed further in **Section 6.0**.

5.3 Summary

The surface collection of sites LID29 to 32 resulted in the recovery of a total of 285 artefacts. In general terms, the distribution of artefacts within the sites and the condition of the sites themselves was broadly similar to that described in original recordings. However, changes in levels of erosion, disturbance and ground surface visibility are reflected in some minor variations in site contents and artefact distribution.

The increased number of artefacts recovered during the surface collection and the presence of sub-surface artefacts in seven of 10 grader scrapes indicates that Umwelt (2001) correctly identified the potential for additional artefacts to be present within the Chain of Ponds site area. However, the density of artefacts identified in a sub-surface context by grader scraping was relatively low, with the notable exception of a concentration of artefacts within grader scrape 8. In addition, artefacts were not identified in scrapes 3, 4 and 9, further supporting the notion that sub-surface artefact distribution was variable in density and may be discontinuous in areas.

6.0 Artefact Attribute Recording

The complete artefact attribute records for the assemblage salvaged under AHIP #2348 are included in **Appendix 2** and were used to develop the basic analysis of the results of artefact attribute recording provided below. Due to the relatively small size of the sub-surface (grader scrape) assemblage from LID29 and the low number of artefacts from LID31 (including G13), detailed discussion of the assemblages from these locations will to some extent, be reflective of sampling bias and therefore is not reviewed in detail. Discussion of the assemblage from other locations is provided in descriptive terms to aid further comparative analysis (if warranted) with other assemblages from the local area, such as that from the adjacent Bayswater Creek site area (Umwelt in prep.) The primary attributes discussed are artefact class, artefact raw material and percentage cortex. These attributes were selected on the basis that they can assist in identifying the nature of activities undertaken on site and the possible sources of raw material, which is relevant in discussing how Aboriginal people utilised the Chain of Ponds Creek site area and moved around the broader landscape. Further discussion is also provided regarding the concentration of sub-surface artefacts within grader scrape 8 of LID32.

6.1.1 Artefact class

Table 6.1 shows that broken flake was the most common artefact class in all sites with the exception of LID31 and LID29 sub-surface. However, as discussed above, this may be a reflection of sample size. The range and percentage of flakes and broken flakes are fairly consistent between LID29, LID32 and LID32 sub-surface. In contrast, LID30 contains a much smaller proportion of complete flakes, which may be explained with reference to the higher rate of heat shatter within this site (17 per cent as compared to 3 per cent or less for all other locations). The representation of cores is also slightly lower within LID30 (1 per cent) when compared to LID29, LID32 and LID32 sub-surface for which cores comprise between 3 to 6 per cent of the assemblage. It is noteworthy that both LID32 and LID32 sub-surface contain a retouched artefact identified as a flake used as a core, indicating that the percentage of artefacts used as cores within this site is actually slightly higher.

The presence of a large ground-edge axe within the LID32 sub-surface assemblage is also worthy of further discussion. Artefacts of this type are relatively rare in the local context and are most commonly found with damage/modification that affects their suitability for on-going use, indicating that they may have been intentionally discarded. The axe within grader scrape 7 of the LID32 sub-surface assemblage has been manufactured from a large weathered cobble of volcanic material that is likely to be either basalt or hornfels but is too weathered on the external surface to distinguish between these raw materials. It has one small section of grinding to form a relatively blunt edge (refer to **Plate 7**). There is also some striations and colour change on a non-edge section of the axe that appears to indicate it has been used for grinding for purposes other than to create a ground edge. In addition, the edge of the artefact opposite to the ground edge exhibits extensive pitting, indicating it may have been used as a hammerstone or for other high impact purposes. While some negative scarring is present on an edge of the implement, it is likely to be the result of damage rather than intentional flaking and there is no evidence of it having been subject to attempts to resharpen the ground edge. The implement appears to have still been viable for use, albeit with a limited area of ground edge available.



PLATE 7

Artefact #8. Bifacially axe from LID32 sub-surface (grader scrape 5).
Area of ground edge at right of photo and additional grinding along upper left edge



PLATE 8

Artefacts #277 (at left) and 79 (at right). Ventral surface of artefact #277 with backing on right margin.
Dorsal surface of artefact #79 with backing on right margin

Table 6.1 – Artefact Classes by Percentage within Site

	Flake		Broken flake		Flaked piece		Core		Axe		Heat shatter		Retouched flake		Broken retouched flake		Broken backed flake		Retouched broken flake		Geometric microlith		Flake used as core		Total #
Name	#	%	#	%	#	%	#	%	#	%	#	%	#	%	#	%	#	%	#	%	#	%	#	%	
LID29	30	31%	44	45%	4	4%	5	5%		0%	3	3%	4	4%	4	4%	3	3%		0%		0%		0%	97
LID30	11	16%	31	45%	6	9%	1	1%		0%	12	17%	4	6%	2	3%		0%	2	3%		0%		0%	69
LID31	4	44%	2	22%		0%	1	11%		0%	1	11%		0%		0%		0%	1	11%		0%		0%	9
LID32	39	35%	56	51%	4	4%	3	3%		0%	1	1%	3	3%	2	2%		0%		0%	1	1%	1	1%	110
LID29 sub- surface	3	60%	1	20%	1	20%		0%		0%		0%		0%		0%		0%		0%		0%		0%	5
LID32 sub- surface	24	37%	27	42%	5	8%	4	6%	1	2%		0%	2	3%	1	2%		0%		0%		0%	1	2%	65
Total	111	31%	161	45%	20	6%	14	4%	1	0%	17	5%	13	4%	9	3%	3	1%	3	1%	1	0%	2	1%	355

Retouched artefacts were identified in all sites (including sub-surface components). The proportion of retouched artefacts within LID32 and LID32 sub-surface was relatively high at 7 per cent however, both LID29 and LID30 contained even higher percentages of retouched artefacts at 11 per cent and 12 per cent respectively. Whilst it is not within the scope of this document to seek further clarifications for this trend variation, it may be further explored based on comparative analysis with other assemblages salvaged within the Liddell area (Umwelt in prep).

The majority of retouched artefacts within all sites were amorphous retouched flakes and had been subject to acute or steep retouch. However, unifacially backed artefacts comprised 45 per cent of retouched artefacts within LID29 (examples shown in **Plate 8**) and 14 per cent within LID32. Tranchet retouch was noted on one artefact from LID30 and one from LID32. The term tranchet retouch refers to the removal of a flake (typically elongated) from a flake using the margins of the original flake as a platform and involving the removal of all or part of the margin of the flake from the ventral through to the dorsal surface. Tranchet retouch is generally associated with the reduction strategy of 'burination', which results in the production of a retouched flake with a thicker edge (proximal, lateral or dorsal) that may still have two sharp surfaces (the burin) and a flake that is typically elongated and has two ventral surfaces (the burin spall). The purpose of tranchet retouch is not clearly understood but may relate to the use of the burin for activities requiring a strong working edge (e.g. engraving or carving of wood or bone) and/or the production of elongated flakes that may have been suitable for further retouch in the form of backing to produce backed points or backed blades.

Table 6.2 – Retouched Artefacts by Raw Material and Percentage within Site

Site	Retouch Type	Raw Material						% of retouch within site
		Silcrete	Mudstone	Chert	Volcanic	Quartzite	Total	
LID29	Acute		1			1	2	18
	Steep		3		1		4	36
	Unifacially backed	3	2				5	45
LID30	Acute	1	3				4	50
	Steep	1	2				3	38
	Tranchet		1				1	12
LID31	Acute		1				1	100
LID32	Acute	1	2	1			4	57
	Unifacially backed		1				1	14
	Tranchet	1					1	14
	Flake used as core	1					1	14
LID32 sub-surface	Acute	3					3	75
	Flake used as core	1					1	25
Total		12	16	1	1	1	31	

The relatively small number of retouched artefacts within the surface assemblage means that further interpretation of retouch types in relation to potential activities is difficult. However, one formal tool type, a geometric microlith, was identified within LID32 (as shown in **Plate 9**). Backed artefacts of this type in a south-eastern Australian context are typically considered to have been most common between 3500 to 1500 BP (BP refers to years before present, with present taken as 1950) though have been recorded as early as 7000BP (Robertson et al. 2009). This provides a relative date for this artefact only and cannot be assumed to represent the date of accumulation of the LID32 site or indeed any other site within the Chain of Ponds complex.

6.1.2 Artefact Raw Materials

The range of raw materials present within the assemblage is shown in **Table 6.3**. Within sites LID29, 30 and 32 (surface), 50 per cent or more of the assemblage was manufactured from mudstone, with silcrete comprising between 20 to 30 per cent of the assemblage. These proportions were reversed within the LID32 sub-surface assemblage, where silcrete was the dominant raw material (80 per cent of the assemblage) and mudstone was notably less common (14 per cent of the assemblage). As will be discussed in **Section 6.1.4**, the significantly higher proportion of silcrete in the LID32 sub-surface assemblage reflects the presence of a concentration of silcrete knapping events within a small area of this grader scrape. As will be discussed later in this report, it is likely that this higher proportion of silcrete artefacts may primarily represent a small number of knapping events rather than the accumulation of multiple silcrete artefacts from varying activities, therefore indicating that the dominance of silcrete in this site should not be considered evidence of a specific change in raw material preference. Other raw materials are represented at low levels across the assemblage including tuff, chert, volcanic (possibly hornfels or basalt but not identifiable due to weathering), petrified wood, quartzite, porcellanite, silicified sandstone and an indeterminate raw material that appears to be a silicified conglomerate. The exception is LID29, where quartzite artefacts comprised 18 per cent of the assemblage. A detailed discussion of probable sources of all of these raw materials is provided in Umwelt (2013) and will be further discussed in a subsequent salvage report for the adjacent Bayswater Creek site area (Umwelt in prep.).

6.1.3 Percentage Cortex

The assessment of the amount of cortical surface remaining on a core or on the dorsal surface of other artefacts provides an indication of reduction strategies with reference to the distance to raw material sources. For the purpose of this assessment, primary reduction indicates the initial reduction of a piece of stone where surface of the core being reduced is still covered in cortex and a flake produced from reduction of the corticated surface has 100% cortex on its dorsal surface and platform. Primary reduction typically dominates an assemblage in sites associated with raw material sources (quarries), at sites close to raw material sources and at sites occupied recently after leaving the raw material source (in terms of time elapsed since leaving the source as opposed to distance travelled). Secondary reduction refers to artefacts that have both flake scars and cortex. A site with a high proportion of secondary reduction indicates that the site is relatively more distant (compared to a site dominated by primary reduction) from the raw material source in terms of either geographic distance or time lapsed since leaving the source. Tertiary reduction indicates artefacts that retain no cortex. A site dominated by tertiary reduction indicates that the site is relatively more distant (compared to a site dominated by primary or secondary reduction) from the raw material source in terms of either geographic distance or time.



PLATE 9

Artefact #205. Geometric microlith orientated laterally showing dorsal surface with backing on left margin and removing platform and termination



PLATE 10

Artefacts from LID32 sub-surface (grader scrape 8) showing samples of two dominant categories of silcrete

Table 6.3 – Artefact Raw Materials by Percentage within Site

	RM																						
	Silcrete		Mudstone		Tuff		Chert		Volcanic		Petrified wood		Quartz		Quartzite		Porcellanite		Silicified sandstone		Other		Total
Name	#	%	#	%	#	%	#	%	#	%	#	%	#	%	#	%	#	%	#	%	#	%	
LID29	20	21%	50	52%	3	3%		0%	1	1%	1	1%	17	18%	3	3%		0%	1	1%	1	1%	97
LID30	14	20%	50	72%		0%	1	1%		0%		0%	2	3%	1	1%		0%	1	1%		0%	69
LID31	1	11%	7	78%		0%		0%		0%		0%	1	11%		0%		0%		0%		0%	9
LID32	34	31%	55	50%		0%	3	3%		0%	3	3%	9	8%		0%	5	5%	1	1%		0%	110
LID29 sub-surface	4	80%	1	20%		0%		0%		0%		0%		0%		0%		0%		0%		0%	5
LID32 sub-surface	52	80%	9	14%		0%	1	2%	1	2%		0%	1	2%		0%		0%	1	2%		0%	65
Total	125	35%	172	48%	3	1%	5	1%	2	1%	4	1%	30	8%	4	1%	5	1%	4	1%	1	0%	355

For the purposes of this assessment, levels of reduction are considered with reference to complete flakes and core. Other artefact types are excluded on the basis that breakage, retouch and issues of artefact orientation may result in misleading patterning. For example, the distal portion of a flake may have exhibited cortex but if the flake is broken and only the proximal portion remains in the assemblage, this will not be identified. Unfortunately, due to the relatively small size of both the complete flake and core component of the assemblage, these results may reflect sample bias and are discussed in general terms only.

As shown in **Table 6.4**, the complete flake assemblage provides evidence of secondary and tertiary reduction only, with tertiary reduction dominant in LID29, LID29 sub-surface and LID32 sub-surface. Secondary reduction is dominant in LID30 only, with co-dominance evidenced in LID31 and 32. When the level of cortical coverage on cores is considered the majority (11 of 14) exhibit 30 per cent or less cortex, with only one mudstone, one silcrete and one quartz core exhibiting between 35 to 50 per cent cortical surface. This is indicative of a moderate to high level of reduction of artefacts within the site, suggesting that the Chain of Ponds site area is not located in proximity to raw material sources utilised for the manufacture of artefacts within the salvaged assemblage. Rather, the presence of both primary and secondary reduction indicates people were either remaining at the site whilst reducing artefacts through the secondary and into the tertiary stage of reduction or may have been occupying the site at different times in the cycle of moving between raw material sources. That is, artefacts within the assemblage make have been deposited on the way 'out' from the raw material source involving secondary reduction and on the way 'back in' to the raw material source when artefacts had been subject to greater (tertiary) levels of reduction or a combination of both. Given the relatively small number of artefacts within the assemblage and the limited number of discrete and identifiable knapping events, it seems the latter is more likely.

Table 6.4 – Level of Reduction of Complete Flakes by Raw Material

Site	0%C	Silcrete	Mudstone	Chert	Quartz	Quartzite	Porcellanite	Silicified sandstone	Total
LID29	Tertiary	3	13		2	1			19
	Secondary	2	6		2			1	11
LID30	Tertiary	1	1		1				3
	Secondary		6			1		1	8
LID31	Tertiary	1			1				2
	Secondary		2						2
LID32	Tertiary	8	7		3		1	1	20
	Secondary	5	9	1	3		1		19
LID29 sub-surface	Tertiary	2							2
	Secondary		1						1
LID32 sub-surface	Tertiary	12	4	1				1	18
	Secondary	4	2						6
Total		38	51	2	12	2	2	4	111

6.1.4 LID32 Sub-Surface Assemblage

As mentioned in **Section 6.1.2**, a cluster of silcrete artefacts was identified in grader scrape 8 within the LID32 sub-surface assemblage. A total of 41 of the 48 silcrete artefacts within grader scrape 8 are categorised as either a light grey pink silcrete with small to large clasts or a light red silcrete with small to large clasts (refer to **Plate 10**). Due to the potential for

colour variance within a single cobble of silcrete and the potential for heat affect to result in colour change, it is possible that these artefacts could all originate from a single silcrete source (such as a large cobble or flake). No primary flakes were identified within this assemblage and the majority of complete flakes had been subject to tertiary reduction, indicating (as discussed in **Section 6.1.2**) that this silcrete source was not in the immediate vicinity of the site. However, when this assemblage is considered as a whole (with reference to the limitations discussed previously), approximately 33 per cent of silcrete artefacts exhibited cortex, although only three broken flakes and one flaked piece exhibited cortical surfaces over the entirety of one face of the artefact. Two of the three cores within the concentration exhibited cortex. All cortex was classified as pebble cortex, indicating that the silcrete was sourced as water-rolled pebbles as opposed to being quarried from outcropping material. Interestingly, the presence of three cores within the concentration indicates that reduction of the single-source silcrete cobbles/flakes was undertaken in such a way as to create at least three separate cores, which in turn were further reduced. All cores appear to have been rotated only once and only one core was exhausted (that is, was unlikely to produce additional viable flakes), implying that raw material conservation was not a high priority for the knapper/s. Given the clustering of the artefacts and the similarities in silcrete, it is likely the artefact concentration represents a single use event (that is, one or two people sitting and making silcrete artefacts from a large cobble or flake), rather than the accumulation of artefacts over many years. It is noted that this supposition applies only to this concentration, not to the entirety of the Chain of Ponds site area assemblage.

7.0 Summary

This report has been completed to ensure compliance with the reporting requirements of AHIP #2348 in relation to works conducted by the relevant Aboriginal parties and Umwelt. These works consisted of collection of all identified surface artefacts within the AHIP #2348 area and the completion of grader scrapes at locations identified as likely to contain a greater depth of topsoil. The surface collection resulted in the recovery of a total of 285 artefacts. In general terms, the distribution of artefacts within the sites and the condition of the sites themselves reflected the original site records, with some differences in site contents and artefact distribution attributable to changes in levels of erosion, disturbance and ground surface visibility.

The increased number of artefacts recovered during the surface collection and the presence of sub-surface artefacts in seven of ten grader scrapes indicates that Umwelt (2001) correctly identified the potential for additional artefacts to be present within the Chain of Ponds site area. However, the density of artefacts identified in a sub-surface context by grader scraping is relatively low. The notable exception to this is the concentration of artefacts within grader scrape 8, which is considered likely to represent the reduction of single source silcrete flake/cobble as a single-use event rather than the accumulation of artefacts over many years. In addition, artefacts were not identified in three grader scrapes, further supporting the notion that sub-surface artefact distribution was variable in density and may be discontinuous in areas.

The brief analysis of results of artefact attribute recording identified some interesting aspects of the AHIP #2348 assemblage. This included the presence of a ground-edge axe that may also have been used as an upper grindstone and a hammerstone but did not bear any modifications/damage that would have limited its ongoing use. In addition, the relatively high proportion of retouched artefacts within the assemblage may warrant further investigation. It is proposed that the results of the AHIP #2348 salvage will be reviewed with reference to other major salvage works conducted by Umwelt within local area including the Bayswater Creek site area (Umwelt in prep) when more meaningful comparative analysis will be possible.

8.0 References

- Roberston, G, Attenbrow, V and Hiscock, P. 2009. Multiple Uses for Australian Backed Artefacts. *Antiquity*. June 2009. Vol 83.
- Umwelt (Australia) Pty Limited (Umwelt) 2001. Liddell Colliery Continued Operations Environmental Impact Statement Appendix 11 Aboriginal Archaeological Assessment. Report to Liddell Coal Operations Pty Limited.
- Umwelt (Australia) Pty Limited (Umwelt) 2011. Archaeological Testing in the Vicinity of Chain of Ponds Inn, Liddell. Report to Liddell Coal Operations Pty Limited.
- Umwelt (Australia) Pty Limited (Umwelt) 2013. Glendell Mine Surface and Subsurface Salvage Under Section 90 Aboriginal Heritage Impact Permit #2267. Report to Xstrata Mt Owen.
- Umwelt (Australia) Pty Limited (Umwelt) In prep. Test excavation and salvage works undertaken under Aboriginal Heritage Impact Permits #2388 and 2896, Liddell, NSW. Report to Liddell Coal Operations Pty Limited.



APPENDIX 1

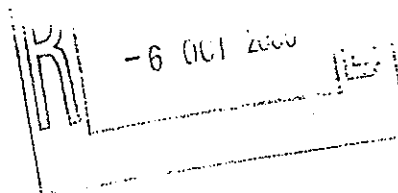
AHIP #2348



Department of
Environment and Conservation (NSW)

Your reference :
Our reference : DOC06/04876 Permit #2348
Contact : Maria Cotter, 02 6773 7018
Date : 29 September 2006
3 OCTOBER

Mr E. Wegner
Environmental Coordinator
Liddell Coal Operations Pty Ltd
PO Box 7
SINGLETON NSW 2304



Dear Mr Wegner,

Re: Section 90 consent application for the destruction of Aboriginal objects during dam infrastructure works in the Chain of Ponds Area, Liddell Singleton LGA [Permit #2348].

I refer to your application dated March 3 2006 seeking consent from the Department of Environment and Conservation (DEC) under section 90 of the *National Parks & Wildlife Act 1974* to destroy Aboriginal objects contained within the Liddell Coal Mine Lease area. I understand that the s90 consent is sought to enable the development of a dam to hold mine waste water.

Please find attached a copy of the duly approved permit (NPWS #2348). This Permit is issued to Liddell Coal Operations Pty Ltd for a period of ten (10) years. You are reminded that the permit covers only those areas described in the permit schedules. The Permit Holder retains the responsibility for ensuring that all relevant parties in any way associated with the activity are aware of the Special, Specific and General Conditions of the Permit.

If you wish to discuss any of the above matters further please contact Maria Cotter, Archaeologist, on (02) 6773 7018.

Yours sincerely

GARY DAVEY *BRENDAN DITANO*
Director North East Branch
Environment Protection and Regulation Division

ADJ

DEC exercises regulatory activities on behalf of the EPA
Department of Environment and Conservation NSW

Locked Bag 914 Coffs Harbour NSW 2450
Federation House Level 7, 24 Moonee St Coffs Harbour NSW 2450

Telephone (02) 6651 5946
Facsimile (02) 6651 6187

ABN 30 841 387 271
www.environment.nsw.gov.au



Department of
Environment and Conservation (NSW)

CONSENT #2348

NATIONAL PARKS AND WILDLIFE ACT 1974

SECTION 90

CONSENT TO CARRY OUT THE PARTIAL DESTRUCTION OF AN
ABORIGINAL OBJECT/PLACE AND PERMIT TO COLLECT AND/OR
EXCAVATE FOR THE PURPOSE OF SALVAGE

WHEREAS the Aboriginal objects described in Schedule "A" are situated upon the land described in Schedule "B", and constitute Aboriginal objects within the meaning of Section 90 of the National Parks and Wildlife Act 1974, and WHEREAS application has been made by:

LIDDELL COAL OPERATIONS Pty Ltd
Pikes Gully Road
off New England Highway
via Ravensworth NSW 2330

FOR CONSENT to destroy those objects in the course of:

Dam infrastructure development works in the vicinity of the Chain of Ponds area, Liddell Colliery, Pikes Gully Road, Singleton Local Government Area.

NOW I, Lisa Corbyn, Director-General of Department of Environment and Conservation, in pursuance of Section 90 of the said Act, and subject to the conditions hereunder set out DO HEREBY CONSENT to the partial destruction of the said objects/place by the said applicant. AND FURTHER, in accordance with the said Conditions, and in pursuance of Section 90 of the said Act, I DO HEREBY PERMIT the salvage collection of the said objects from the aforesaid land, prior to destruction of the objects, by the nominated archaeologists (UMWELT (AUSTRALIA) Pty Limited) and representatives of the Aboriginal community.

TERMS AND CONDITIONS OF THIS CONSENT

This Consent is issued subject to General Terms and Conditions covering all Permits and Consents, as well as the Specific Terms and Conditions pertaining to Consents to destroy Aboriginal objects and any Special Conditions, all of which conditions are detailed in the attached pages.

DATED at COFFS HARBOUR this ~~THIRD~~ ^{OCTOBER} day of ~~September~~ 2006.

B. Di Iorio
B. DI IORIO ACTING
DNES.

Issued for the Director-General of
Department of Environment and Conservation

NPWS is part of the Department of Environment and Conservation

SCHEDULE A:

Generally, all Aboriginal objects, within the definition of the *National Parks and Wildlife Act 1974*, but excluding human skeletal remains.

SCHEDULE B:

The specific area delineated on **Attachment 1** entitled *Area covered by DEC s90 Consent # 2348 Chain of Ponds Area, Liddell Colliery, Singleton LGA* as identified in the consent application registered 3 March 2006 with the Department of Environment and Conservation as DOC 06/04876 (subject land), and including the following Aboriginal sites:

LID 29, AHIMS site #37-3-0427
(centrepont AMGE 314310, AMGN 6413400)
Liddell Colliery Mine Lease
Parish: Liddell; County: Durham; Singleton Local Government Area.

LID 30, AHIMS site #37-3-0426
(centrepont AMGE 314045, AMGN 6413173)
Liddell Colliery Mine Lease
Parish: Liddell; County: Durham; Singleton Local Government Area.

LID 31, AHIMS site #37-3-0428
(centrepont AMGE 314256, AMGN 6413168)
Liddell Colliery Mine Lease
Parish: Liddell; County: Durham; Singleton Local Government Area.

LID 32, AHIMS site #37-3-0426
(centrepont AMGE 314400, AMGN 6412800)
Liddell Colliery Mine Lease
Parish: Liddell; County: Durham; Singleton Local Government Area.

SPECIAL CONDITIONS APPLYING TO CONSENTS WITH SALVAGE

1. The Consent Holder will ensure that the archaeological and Aboriginal salvage program required for AHIMS Sites LID 29, #AHIMS 37-3-0427; LID30 AHIMS #37-3-0426; LID 31 AHIMS #37-3-0428; and LID 32, AHIMS #37-3-0464 is undertaken and completed prior to commencement of any substantial clearing and/or ground disturbing works on the land subject to the development application, in accord with s90, *National Parks and Wildlife Act 1974*.
2. The Consent Holder will ensure that the proposed archaeological and Aboriginal salvage program including the use of grader scrapes to monitor for sub-surface deposits, is conducted by a suitably qualified archaeologist, and in accordance with the methods described in the

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Consent Application registered with the Department of Environment and Conservation on the 3 March 2006 as DOC06/04876.

3. The Consent Holder will ensure that suitably experienced representatives of the local Aboriginal community are involved in the salvage of Aboriginal objects and in the monitoring of ground disturbance works associated with the grader scrapes, as described in the consent application registered with the Department of Environment and Conservation on the 3 March 2006 as DOC06/04876.
4. The Consent Holder will ensure that all Aboriginal objects salvaged under this Consent are given into the care and control of the Wonaruah Local Aboriginal Land Council for safe-keeping in a locked cabinet within the Land Council Offices, as outlined in the Care Agreement for Aboriginal Objects submitted with this s90 Application and dated the 28 February 2006.
5. The Consent Holder shall ensure that any proposals to modify the mitigation measures and/or salvage methodology outlined in the Consent application are firstly discussed with the identified Aboriginal stakeholders for the project, and have the endorsement of the Department of Environment and Conservation, prior to modifications being implemented.
6. The Consent Holder shall ensure that all contractor/s and/or maintenance personnel involved in the dam infrastructure development works on the subject lands described in Schedule 'B' undergo an induction to be informed of the National Parks and Wildlife Act (1974) legislative obligations in the management and/or protection of Aboriginal objects and/or Aboriginal places.
7. The Consent Holder shall ensure that during ground disturbing works should any skeletal material be uncovered which is thought to represent human remains, all work must cease in the immediate vicinity and the Consent Holder must contact the NSW Police and the Department of Environment and Conservation (Environment Line, phone 131555). Work must not recommence in the area where the skeletal material has been uncovered until such time as the NSW Police and the Department of Environment and Conservation have provided advice, following consultation with the relevant Aboriginal community groups, on whether there are any subsequent approval requirements.

SPECIFIC CONDITIONS APPLYING TO CONSENTS WITH SALVAGE

1. The Consent covers only those objects described in the instrument and in any Schedules thereto.
2. In the case of Consents granted to cover development activities, the Permit is granted to cover only those circumstances described in the Schedules, and subject to there not being discovered in the course of

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further operations, in the progress of that development requiring the Consent, any other objects which will be damaged or destroyed by the continuation of the operation. (Destruction of such objects would require the granting of a separate Consent).

3. The Consent is conditional upon all relevant development approvals having been obtained.
4. Should the objects listed in Schedule 'B' above remain in existence ten (10) years from the date of this document, the Consent shall be deemed to be void, and any further damage to the objects will require the preparation of a new Consent document.
5. Prior to the Consent becoming effective, the objects described in the Schedules must be salvaged, following the guidelines attached. The salvage work is to be carried out by UMWELT (AUSTRALIA) Pty Limited and representatives of the local Aboriginal community.
6. Should any 'relic', defined under the *Heritage Act* of NSW be uncovered, then excavation or disturbance of that area is to stop immediately and the Heritage Council of NSW is to be informed in accordance with S.146 of the Heritage Act, 1977 (as amended). Historical archaeologists at the Heritage Council can be contacted on (02) 8837 8500.

A 'relic' under the *Heritage Act* is defined as any deposit, object or material evidence-

- (a) which relates to the settlement of the area that comprises NSW, not being Aboriginal settlement; and
 - (b) which is 50 or more years old.
7. The holder of the Consent shall furnish the Department of Environment and Conservation with a report at the completion of the salvage work or expiry of the Consent or any renewal thereof, or as specified in the guidelines, whichever occurs first. Such report shall include:
 - a complete list of all material recovered;
 - a detailed description of the methods of excavation/collection and analysis used;
 - a detailed plan of the site, including the location of collection areas, all trenches, auger holes and spoil heaps;
 - summary of consultation undertaken with relevant Local Aboriginal Land Councils or relevant Aboriginal Community Groups.

General Terms and Conditions

1. Permits and Consents are not transferable.
2. A Permit covers only that area stated in the Permit
3. A Consent covers only that area stated in the instrument of Consent and in any Schedules thereto.

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4. Permits may be revoked at any time at the discretion of the Director-General.
5. Terms and conditions of Permits may be varied at any time at the discretion of the Director-General.
6. The Person to whom the Permit is issued or the Consent granted shall be responsible for the manner in which the work covered by the Permit or Consent is performed.
7. An officer of the Department of Environment and Conservation, acting on the authority of the Director-General, may at any time examine work done or any objects recovered under any Permit or Consent.
8. Permits and Consents are necessary for all activities for which they are issued or granted, but do not in themselves give authority to enter or work on freehold land or leased Crown Land. Permission must be sought from the owner or occupier and arrangements made with him/her.
9. The holder of the Permit or Consent shall furnish, when required to do so, an undertaking to indemnify the Department of Environment and Conservation against all actions, suits, claims and demands of whatsoever nature and all costs, charges and expenses in respect of any accident or injury to any person or property which may arise solely out of the existence of any works associated with the Permit or Consent.
10. The Department of Environment and Conservation shall have the right to copy all such reports prepared under DEC Permits or Consents, to allow consideration thereof by qualified referees.
11. For a period of five years from the date of issue of the Permit, the holder of the Permit or Consent may refuse to allow the Department of Environment and Conservation, if such information is held by those institutions, to make public any information contained in any report referred to in Condition 10 above, except where it is deemed necessary for management, protection or research reasons. After this period of five years from the date of issue of the Permit or Consent, the DEC shall have the right to use and authorise the use of information contained in all reports submitted under the Permit or Consent, except where specifically requested by the holder of the Permit or Consent.
12. Upon publication of any information relating to work done under a Permit or Consent, a copy of such publication(s) shall be forwarded to the Department of Environment and Conservation.
13. The holder of the Permit or Consent shall consult with the local Aboriginal community regarding the work covered by the Permit or Consent and shall respond to any reasonable request to involve the Aboriginal community in the work.
14. The Department of Environment and Conservation may supply copies of relevant reports as furnished by the holder of the Permit or Consent

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to local Aboriginal communities. Upon request by the Service, the holder of the Permit or Consent shall supply a summary of his/her findings with photographs, diagrams, etc., as required, to local Aboriginal communities or other interested local groups.

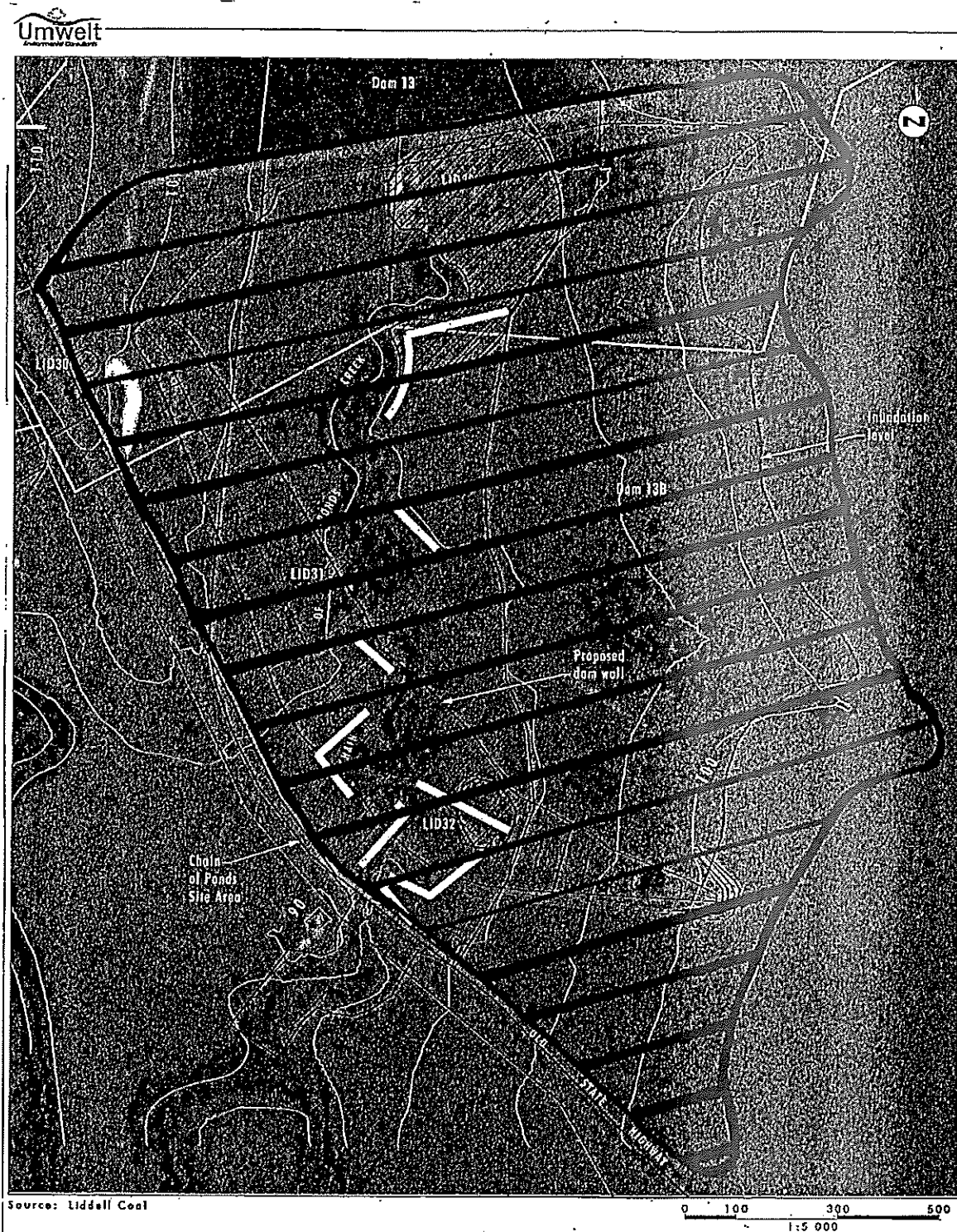
15. The holder of the Permit or Consent shall keep field records and a copy of all such records shall be lodged with the Department of Environment and Conservation at the termination of each field-work period if requested.
16. The holder of the Permit or Consent shall notify the local office of the Department of Environment and Conservation at the commencement and completion of fieldwork, and shall supply to District officers details of field work programs and results if requested.
17. In the event of a Permit being revoked -
 - a) The Person to whom that Permit was issued shall
 - (i) Furnish an undertaking to indemnify the Department of Environment and Conservation against all actions, suits, claims and demands of whatsoever nature, and all costs, charges and expenses in respect of any accident or injury to any person or property which may arise solely out of the existence of any works associated with the Permit;
 - (ii) leave the areas, the subject of that Permit, in a condition satisfactory to the Department of Environment and Conservation within two weeks from the date of revocation of that Permit;
 - (iii) furnish the Department of Environment and Conservation within six months from the date of revocation of the Permit, a full report on the work completed at the date of revocation. Such a report shall include a complete list of any material recovered.
 - (b) The Department of Environment and Conservation shall have the right to use and authorise the use of information collected under the Permit.

29 September 2006
End

Attachment 1

Area covered by DEC s90 Consent #2348 Chain of Ponds Area, Liddell Colliery Singleton LGA.

(Source: Umwelt (Australia) Pty Limited, 2006. *S90 Consent Application for LID 29, LID 30, Lid 31 and Lid 32 within the Chain of Ponds Area, Liddell Mine*, Figure 3: Location of Grader Scrapes. Registered with DEC as DOC06/04876 March 3 2006).



LEGEND



Area covered by s90 Consent # 2348



APPENDIX 2

Artefact Attribute Recording
Methodology and Data

Appendix 2 – Stone Artefact Records and Stone Artefact Analysis Data

Artefact Recording Methodology

The attributes that were recorded for the artefacts recovered from the project area are listed on the artefact recording form and are outlined below. A discussion follows each attribute, detailing the method of recording, potential problems with the method proposed, and the possible behavioural implications of each attribute. For purposes of comparability, the methodology for the analysis of stone artefacts from the project area is the same as that used for other Hunter Valley assemblages analysed by Umwelt.

Common Attributes

Artefact Class

Description: Artefact class is a primarily a technological category reflecting the mechanical processes which resulted in the physical form of the artefact at the time of recovery. Classes used include flakes, broken flakes, retouched flakes, flaked pieces, cores, flake-cores, hammerstones, grindstones, ground-edge axes, heat-shattered fragments, and non-diagnostic fragments. Retouched flakes are further subdivided into categories that are typological in nature, namely Bondi Point, backed blade, geometric microlith, elouera and flake used as a core. Definitions for all classes of retouched flake are provided below. Other typological categories include axe/blank, grindstone, hammerstone and anvil.

Retouched flake (complete or broken) – any flake or piece of a flake that has flaked subsequent to original manufacture i.e. where negative flakes scars impinge on the ventral surface and can be clearly seen to have been initiated after the original flaking activity.

Bondi Point – a backed artefact that is asymmetric in shape.

Backed blade – a backed artefact that is greater than 25 millimetres in maximum dimension, is symmetric in shape and is twice as wide as it is long.

Geometric microlith – a backed artefact that is symmetric in shape and is less than 25 millimetres in maximum dimension (McCarthy 1976:45).

Elouera – a backed artefact that is greater than 25 millimetres in maximum dimension, is approximately symmetric in shape and is triangular in section. The thick margin is unifacially or bifacially backed and the chord may exhibit usewear or polish (McCarthy 1976:29).

Flake used as a core – a flake in which the primary purpose of retouch appears to have been for the removal of flakes rather than the modification of the margins of the artefact.

Problems: Classing artefacts does not usually entail significant problems, other than occasional ambiguities between flaked pieces and broken flakes, and between (retouched) flakes and flake-cores (see section titled ‘**Retouch**’ for further explanation). In relation to typological classifications, ambiguity is an inherent feature of artefact typology, with the lines between different types frequently imprecise. To minimise this problem, working definitions for each class used are defined above.

Uses: This category will be used to assess differences in provisioning strategies (e.g. core provisioning vs. flake provisioning), differences in site function/use (e.g. presence/absence of grindstones), and the taphonomic effects of fire on site integrity (e.g. differences in the ratio

of heat-shattered fragments: other artefact classes). Furthermore, despite the problem with the use of typology discussed above, typology proceeds on the basis that at different places and at different times people manufactured artefacts with specific shapes and characteristics. As a result, the general period during which an artefact was made can be inferred if it is of a specific form. It is also not uncommon to infer that a given artefact form implies a given artefact function, and that from the shape of the artefact the activities taking place at the site can be specified, though these suggestions so far lack archaeological support. The problems with both of these uses are well documented, and any such inferences drawn here will be sparing. There is, however, some potential benefit in approaches based on subsistence patterns and the organization of technology. On this basis, it may be possible to make some assertions from artefact typology as to the way subsistence may have been organised at different places through the landscape.

Raw Material

Description: A largely self-explanatory attribute, raw materials expected to be present include silcrete, indurated mudstone/tuff, quartz, crystalline tuff, quartzite, petrified wood, porcellanite and basic volcanics.

Problems: This category is usually without problems, though it is acknowledged that some disagreement exists as to the appropriate nomenclature for the material most frequently referred to as 'indurated mudstone'. Strong arguments have been made for replacing the term with indurated rhyolitic tuff; however, as the category is nominal and not technical or geological the only criteria guiding the choice of term here are that the meaning of the term be understandable to others and that it be applied consistently. For these reasons, the term indurated mudstone will be used to make the class more easily compared with other studies and to differentiate this raw material from other tuffs from different sources (e.g. the crystalline tuff that comes from the Bowmans Creek cobble beds).

Uses: Raw material is an important attribute, which may broadly indicate the place of origin of an artefact. The dominance of one raw material or another may also be used to group or differentiate sites. Raw material is also frequently used in concert with attributes in the creation of analytic units for more in-depth inter and intra site comparisons.

Artefact Weight

Description: Artefact weight will be measured for all artefacts to one tenth of a gram.

Problems: This attribute does not entail any difficulties.

Uses: One of the most useful artefact attributes, weight is the most effective approximation of volume for a given raw material. As such it most accurately reflects the amount of stone being brought to a site. Average weight within a given artefact class is also a good indication of the amount of 'stress' that has been placed on the provisioned material. Large pieces of stone still retaining usable potential are unlikely to be discarded when people are conserving their technological resources (for example, as they move increasingly away from places where replacement material is available). Alternatively, when people are close to the raw material source, or when they are provisioning larger amounts of material to a site, the pressure on the 'exhaustion threshold' is relieved and there should be a resultant rise in the average weight of discarded artefacts.

Dimensions

Percussive Dimensions (for complete flakes)

Description: Percussive dimensions measure the length of the flake in the direction of force application from the point that force was applied. In this regard it relates to the length of core face that was removed during the manufacture of the artefact. Width is oriented across the face of the flake from the mid-point of length, and thickness from the mid-point of length and width of the ventral to the corresponding point on the ventral.

Problems: While not as arbitrary as maximum dimensions, there is some uncertainty as to what these attributes are actually measuring in terms of the flake manufacturing process.

Use: Variations in average flake dimensions, and in the distribution of flake sizes in histograms, are expected to correlate with differences in the provisioning and reduction strategies at different places. For example, the reduction of cores at a site will produce a large number of moderate to small flakes and some larger flakes. As a result the histogram of flake length will show a relatively consistent increase in number of flakes from large to small. Contrastingly, when most flakes are the result of retouching or maintenance tasks on other flakes, the majority of the flakes remaining should be very small, with comparably few large to moderate flakes. However, it may be the case that a few moderate to large flakes will be discarded at the site as they are exhausted through excessive/heavy retouch or simply thrown away prior to a reprovisioning event. In such a case, a histogram of artefact size should show a bimodality in regard to length (a small peak in the moderate range and a large peak in the small range), and an even more pronounced bimodality in regard to thickness (most retouching flakes being very thin).

Maximum Dimensions (for all other artefact types)

Description: Maximum length will be measured on all artefacts and maximum width and thickness will be measured on all artefacts with the exception of flaked pieces and heat shatter. 'Length' will arbitrarily be measured along the longest plain, with width the longest of the plains at 90° to length, and thickness measured at 90° to both.

Problems: There are no problems associated with the measuring of maximum dimensions, although it needs to be noted that the definitions of length, width and thickness are entirely arbitrary and do not reflect any aspect of artefact manufacture.

Uses: Maximum dimensions are most useful as a broad measure of size, and may have a role in assessing fragmentation rates (particularly in the case of heat-shattered fragments) and calculating Minimum Numbers of Artefacts (MNA).

Cortex – Amount and Type

Description: Cortex refers to the 'skin' of a rock – the surface that has been weathered to a different texture and colour by exposure to the elements over a long period. The amount of cortex as a percentage of surface area will be measured on all artefacts as a percentage of the surface area (in relation to flakes, cortex can, by definition only occur on the dorsal and platform surfaces). The nature of cortex – its shape and texture – will vary depending on where the raw material was sourced.

Problems: This is a relatively unambiguous descriptive category.

Use: When a natural cobble is first selected it will usually be covered in cortex. Therefore the first artefacts produced from it will have a complete coverage of cortex on the dorsal side (primary reduction). As the cobble is increasingly reduced the amount of cortex on each

artefact will rapidly decrease (secondary reduction) until it ceases to be present on artefacts (tertiary reduction). As a result the consideration of the amount of cortex on an artefact should provide an indication of how early in the reduction sequence the artefact was produced. If large numbers of artefacts or a high proportion of the artefacts of a raw material retain cortex it may indicate that the site is located in close proximity to the source. Differences between the proportions of artefacts retaining cortex between different raw materials indicates relative differences in distance to the raw material source. This does not necessarily mean distance in terms of measurable distance across the landscape; it may also reflect the length of time since leaving the source. For example, the last campsite when a group is returning to the source of the raw material may be very close to the source in terms of distance, but distant in terms of time elapsed since the group left the source. If artefacts with cortex are occurring in sites a long distance from the place of origin of the natural cobble, then it is likely that cobbles were being transferred to the site when still only slightly reduced. This would imply an attempt to maximise the amount of stone being provisioned with the weight of transported material being a relatively minor concern.

Cortex type may help to clarify the source of the raw material (e.g. from river gravels [rounded, cortex many microscopic conchoidal fractures], surface scree [cortex weathered, porous, often oxidised, can be angular or rounded] or from outcrops [dependent on raw material type, more likely to have flat angular surfaces or recorticated flake scars]).

Attributes to be Recorded on Flakes

In most circumstances flakes, whether broken or whole, will account for the majority of artefacts in an assemblage. Flakes are frequently produced in large numbers during reduction events, though most are never subject to use. Flakes are generally inferred to be the most utilitarian of the basic artefact categories, usually possessing a sharp edge along the entire circumference when whole and amenable to reworking patterns which may yield formal 'implements' or 'tools', such as backed artefacts and scrapers.

Knapping Type

Description: Three main knapping methods are used in the production of flakes, resulting in flakes with distinctive characteristics. The first is freehand percussion, where the objective piece is held in the hand and struck with a hard hammer (e.g. a hammerstone), resulting in 'classic' flakes with a single bulb, and a ringcrack/point of force application (PFA). The second knapping method is bipolar reduction, where the objective piece is struck against an anvil. This results in flakes that have straight sheer faces and crushing at both ends. The third is pressure flaking, where an indenter is placed against the edge from which the flake is to be removed and force is applied. The resulting flakes have a characteristically diffuse bulb, with no errature scar and no PFA.

Problems: Ambiguities do exist in this classification, and the identification of pressure flakes in particular may be difficult, however difficulties are expected to be relatively infrequent.

Use: Freehand percussion, bipolar reduction and pressure flaking are all different approaches to reduction, with different advantages and disadvantages. Pressure flaking is the most controlled method, in terms of the location and intensity of force applied. However pressure flaking does not produce large flakes and is usually associated with fine retouching work. Bipolar reduction is usually viewed as a system employed to increase core use-life. As cores become small their inertia thresholds drop making it difficult to reduce flakes via the freehand method. Resting the core and applying bipolar technique allows flakes to be reduced from a core too small to hold or from small round pebbles with no platform angle to initiate reduction. Pressure flaking when undertaken using an anvil often results in a form of bipolar reduction. Patterns in the distribution of flakes resulting from backing may be used to locate areas of backed artefact manufacture. Patterns in the distribution of flakes produced

by bipolar knapping maybe used to indicate where there was pressure to maximize core potential.

Artefact Breakage

Description: At a basic level, flakes break in six different ways. Three are transverse (at 90° to the direction of percussion) – proximal, medial, distal; two are longitudinal (along the plane of percussion) – left, right (oriented from the ventral view); one is a cone fracture (in which the break longitudinally bisects the bulb of percussion; and one ambiguous – transverse and longitudinal (in which dorsal and ventral can be clearly distinguished, but at least one of the lateral and proximal or distal margins are missing).

Problems: It is occasionally difficult to be certain of the breakage on an artefact. In most cases, however, the kind of breakage can be ascertained.

Use: It is important to differentiate broken from complete flakes for the purposes of analysis, as the two are not comparable in regard to a number of measures. The amount of artefact breakage in an assemblage also indicates the degree of fragmentation to which the assemblage has been subject. In highly fragmented assemblages, the actual number of artefacts represented may be significantly exaggerated. Quantifying breakage allows a more accurate approximation of artefact numbers to be made.

Heat Affect

Description: Heat will affect artefacts in different ways, depending on the way it has occurred. Most heat affected flakes on fine-grained material will reveal a greasy surface lustre on newly flaked surfaces and some discoloration (e.g. porcellanite turns from white to blue), however as heat becomes excessive signs such as potlidding (the ‘popping’ of small plate-like pieces off the flake) or crazing (multiple fracture lines in multiple directions across the face of the flake) will occur. The presence of any of these features will be recorded.

Problems: This is a relatively unambiguous descriptive attribute for fine-grained materials – its application to coarse-grained materials is perhaps less certain.

Use: Trends in the spatial distribution of heat-affected artefacts may be used to indicate either heat-treatment (the controlled application of heat to improve flaking qualities) or post-depositional burning (uncontrolled heating through bush-fires or stump burning) depending on the signs of heating and associated archaeological features (e.g. hearths).

Platform Size – Width and Thickness

Description: The platform is the surface into which force is applied in the formation of a flake. Platform width is measured across the platform in the same direction as flake width, while platform thickness follows flake thickness

Problems: Some ambiguity exists on ‘where to stop measuring’ platform width and thickness, particularly on primary cortical flakes on rounded cobbles (the first flakes removed from a natural cobble), and platform surfaces comprised of multiple flake scars. Despite this the measure appears to work quite well for the majority of flakes.

Use: Platform size is expected to decrease under two circumstances. The first is when flakes are produced from small cores. The second is somewhat more speculative and based on the premise of a correlation between very small (focalized) platforms and the production of parallel-sided flakes (blades) associated with backed artefact manufacture.

Platform Surface

Description: Platform surface will be recorded as one of the following: cortical, single flake scar, multiple flake scars, faceted (where the platform that consists of three or more negative flake scars each of which have a clear initiation on the platform surface), ground, crushed or cortical.

Problems: This is a largely unambiguous descriptive attribute.

Use: The surface of a platform provides information about the history of the core prior to the detachment of the flake, and also about methods employed to control the flaking process. Faceting in particular has been linked to the systematic production of 'blades'. Patterns in the spatial distribution of these attributes may be used to infer differences in reduction strategies.

Overhang Removal

Description: Frequently prior to the detachment of a flake from a core, the thin overhanging 'lip' of the core was removed in order to stop 'crushing' or force dissipation at the point of force application. Overhang removal results in the presence of small regular scars along the dorsal face of the platform. For the purposes of the present analysis, an arbitrary maximum length for overhang removal scars was set at three millimetres; any scar over three millimetres is considered a dorsal scar.

Problems: This is a largely unambiguous descriptive attribute.

Use: Overhang removal is often seen as a form of raw material conservation. If a knapper desires to remove thin flakes from the face of the core by striking close to its edge, overhang removal may avoid the platform crushing and the resultant flake ending in a step termination which must be removed from the face of the core before flake production can continue. Thus, raw materials within assemblages that have high relative proportions of overhang removal, or total assemblages that have high relative proportions of overhang removal, will be used to indicate raw material conservation, which can then be interpreted in relation to human resource use patterns/preferences.

Dorsal Scar Count

Description: The dorsal face of a flake provides a partial record of previous flaking episodes to have occurred down the core face at or near the same point. The number of flake scars on the dorsal surface of a flake that are clearly discernable and are longer than three millimetres in length will be recorded.

Problems: There is some ambiguity in this measure, hence the use of the term 'clearly discernable' above. Furthermore, by the nature of the flaking process, each subsequent scar will remove traces of the previous scars, resulting in an incomplete record. For these reasons, this measure needs to be treated with some caution.

Use: Dorsal scar count is a rough indication of how much flaking has occurred prior to the detachment of the flake in question. It also provides a maximum against which to form ratios of 'aberrant to non-aberrantly terminating scars', 'parallel to non-parallel scars' and 'number of scars per rotation' (see next three attributes), all of which may assist in clarifying the reduction process and assist in understanding differences in the Aboriginal use of raw materials and sites or environmental contexts.

Number of Aberrantly Terminating Dorsal Scars

Description: Aberrant terminations are further discussed below under **Terminations**. For the purposes of this description it is sufficient to say that flake scars terminating as steps and hinges will be recorded as aberrant in this assessment.

Problems: The problem(s) with this count are the same as those for the previous.

Use: As cores become smaller and more heavily reduced, the inertia threshold will fall and platform angle will increase, resulting in an increase in the number of aberrant terminations as a percentage of the number of flakes removed. Flakes that have a high number of aberrantly terminating flake scars as a percentage of the total are expected to have been produced towards the exhaustion threshold of the core. This measure may be used to indicate pressure on raw material availability and provisioning strategies.

Number of Parallel Flake Scars

Description: A basic count of the number of parallel flake scars. A dorsal scar will only be considered parallel if there are two extant parallel dorsal ridges that are clearly discernable from breaks, margins or subsequent scars.

Problems: As previous.

Use: Examining the ratio of parallel to non-parallel scars on the dorsal surface of flakes may help to clarify the prevalence of 'blade' production in the reduction systems at different places. It may also be possible from examining this ratio in relation to flake size to test whether blade production occurred at a specific stage in the reduction sequence, or whether it was present throughout the complete reduction sequence.

Dorsal Scar Rotation Count

Description: As a core is reduced it may be turned or rotated to provide new platforms or overcome problems with increasing platform angles. As a result, flakes may be detached which cut across old flake scars. The result should be apparent as dorsal scars in different direction to the direction of percussion of the flake being recorded. For a scar to be considered to provide evidence of rotation, the initiation or termination of the scar must be apparent or a medial section of a scar with clear attributes (ripple marks etc) that demonstrate the orientation of the scar and it must be clear that the orientation of the scar is at more than 45 degrees to the platform or another flake scar. As with core rotations, the initial flake direction is counted as zero and subsequent rotations are counted from one.

Problems: The problem with this measure is the same as that for dorsal scar counts in general.

Use: Core rotation is increasingly likely towards the exhaustion threshold of cores, when platform angles increasingly approach or exceed 90° (it becomes very difficult to remove flakes from platforms with angles exceeding 90°). If it is possible to show a correlation between flake size and number of dorsal scar rotations then it will become possible to infer from differences in the spatial distribution of this data that core exhaustion was more frequently approached in some areas than in others. If it is not possible to show this correlation, then it may be taken to suggest that core rotation was part of the reduction strategy throughout the reduction continuum.

Termination

Description: Termination refers to the way in which force leaves a core during the detachment of a flake. Every complete flake has a termination. There are patterns in the form which terminations will take, with the major categories (those to be used here) being: feather, hinge, step, plunging, retroflexed, inflexed, axial (associated with bipolar reduction) and cortical.

Problems: This is a largely unambiguous descriptive attribute. The only point at which uncertainty does enter is in differentiating some transversely snapped flakes from step terminated flakes. In the majority of cases, however, this problem does not arise.

Use: Different terminations have different implications both for flake and core morphology. A flake with a feather termination (in which force exits the core at a low or gradual angle) will have a continuous sharp edge around the periphery beneath the platform. This has advantages in terms of the amount of the flake edge which can be used for cutting, and also makes the flake far more amenable to subsequent retouching or resharpening activities. Detaching flakes with feather terminations also has minimal impact on the effective platform angle of the core, and so platform angle thresholds are reached relatively slowly while feather terminating flakes continue to be produced.

Hinge and step terminating flakes have none of these advantages. They result in edges which are amenable neither to cutting nor to retouching. Furthermore, hinge and step terminations lead to rapidly increasing effective platform angles, leading to a requirement for core rejuvenation and core exhaustion. For these reasons, such terminations are considered undesirable or *aberrant*. The number of aberrant flake terminations is expected to increase towards the end of a core's uselife, as reduction in core size and increase in core platform angle make it increasingly difficult to detach feather terminating flakes. In areas where aberrantly terminating flakes are relatively common it may be inferred that core potential was more thoroughly exploited. From this it may in turn be inferred that the pressure to realize core potential (e.g. a strategy of heavy raw material conservation) was greater. Increased mobility/emphasis on portability is one possible explanation of such a pattern.

Outrepassé flakes have the opposite effect on core morphology to step and hinge flakes, in that they remove the entire core face and part of the core bottom. As a result, such flakes may be used to rejuvenate cores in which core angles have become high but which still retain useable potential (e.g. are still quite large). The presence of outrepassé flakes may be taken to indicate core rejuvenation and the requirement to increase core use-life.

Retouch

Description: Retouch is the term given to alterations made to a flake by the striking of subsequent flakes from its surface. Retouching may be done either to alter artefact form or to rejuvenate (resharpen) dulled edges, and possibly both. The degree of amount of retouch was recorded as a presence or absence.

Problems: This is a largely unambiguous descriptive attribute. The only area in which difficulty may arise is in instances where edge damage cannot be differentiated from retouch. This occurs infrequently, as edge damage is usually a modern alteration to artefact form that can be noted through differences in surface colour between the flake scar and the rest of the artefact surface.

Use: The two main uses of retouch need to be separated for the purposes of this discussion. Retouch to achieve form (for example, artefact backing) is distinct from retouch for the purposes of edge rejuvenation. 'Formally retouched' artefacts are anticipated to occur at places of manufacture and places of discard. Importantly, such artefacts will be

manufactured prior to use as part of a gearing up or preparation for activities such as hunting. The presence of concentrations of such artefacts, including incomplete specimens may indicate the base-camp locations from which mobile subsistence activities were conducted. Such artefacts are also expected to be present among very small assemblages at distances from occupational foci, as the result of discard, loss, or breakage.

Edge rejuvenation retouch is expected to increase as the availability of replacement materials decreases. Such artefacts are expected to represent 'personal gear', an implement carried with a person and maintained for repeated use. Unlike formally retouched pieces, artefacts with edge rejuvenation will not be produced *in preparation for* activities. The sharpest and most useful edge is a fresh edge. Rather, rejuvenation will occur as need arises. The presence of such artefacts at occupational foci is likely to represent discard following use and prior to reprovisioning/retooling. The percentage of artefacts exhibiting retouch is expected to increase in systems where large amounts of replacement raw material are not available.

It needs to be noted that a third type of retouch also occurs, aimed at neither formalisation of shape or edge rejuvenation. This is when a flake (usually a large to very large flake) has been used for the subsequent production of utilitarian flakes (e.g. when it has been used as a core as defined in '**Artefact Class**'). This strategy is quite prevalent in the Hunter Valley. Differentiating such artefacts from other retouched artefacts is empirically difficult, however, is intuitively quite easy. Any such intuitive judgements can, however, be tested during the analysis phase, as such flakes are expected to be quite distinct from other retouched artefacts in size and weight.

Retouch Type

Description: Retouch type is a technological attribute relating the way in which retouch was carried out. Categories to be used are steep, acute, unifacial, bifacial, tranchet and/or used as core. Tranchet retouch is defined as retouch that results in the removal of the majority of one or more of the flake margins parallel to the flake axis. This results in the production of a flake with two ventral surfaces and may also be used to establish a secondary platform perpendicular to the original flake axis from which additional flakes may be removed.

Problems: This is a largely unambiguous descriptive attribute.

Use: Whether retouch results in a steep or acute edge is important in relation to the possible functions of those edges. Acute retouch results in sharp edges suitable for cutting whilst steep retouch can be used to totally remove a sharp edge (to blunt as in backed artefacts) or to produce thick strong edges suitable for adzing or scraping. Thus, artefact function can be suggested by recording this attribute (residue and use-wear analysis is also planned to substantiate these interpretations). The recording of the technique used for retouch addresses questions related to techniques of implement manufacture and thus another form of human behaviour that can be analysed within and between assemblages.

Retouch Location

Description: Each flake will be divided into eight segments: proximal end, proximal left, proximal right, marginal left, marginal right, distal left, distal right, and distal end; with the presence or absence of retouch in each to be recorded

Problems: Apportioning sections relies on a visual division of the flake, which may be slightly inaccurate. This is not expected to be a significant effect.

Use: An examination of retouch location may reveal trends in distance decay (e.g. increasing number of margins retouched over distance, or may simply reveal non-random

patterns in the way in which retouching was carried out. If the former, then the trend may be used to suggest trajectories along which flakes were being carried as personal gear. In the case of the latter, the information would provide an insight into the manufacturing/reduction systems being employed.

Attributes to be Recorded on Cores

The following attributes are to be recorded on cores. Most information taken from cores concerns the way in which they were reduced – what pressures, controls and systems were applied.

Percentage of Surface Flaked

Description: This attribute involves an estimate of the percentage of the outer surface of the core which has had flake scars removed from it.

Problems: This is a visual estimate and liable to prove reasonably inaccurate and coarse. Nevertheless, it remains useful.

Use: This measure can be useful in assessing degree of core reduction. In particular, it can be useful in locating areas of heavy core reduction, particularly when used in concert with the following two measures.

Number of Rotations

Description: This measure mirrors **dorsal scar rotation count** as discussed above.

Problems: This measure has the same problems as **number of flake scars**.

Use: Different reduction systems use core rotation in different ways. In some systems, cores are rotated only once, after the striking of the initial flake to form a platform. All subsequent scars are removed in one direction from that platform. Other systems will involve repeated rotations between two platforms, or may involve continuous core rotation and numerous platforms. It may be the case that through the use-life of a core a number of different strategies will be used.

Assessing core rotation may help to clarify reduction systems, and the stage in the reduction system at which the individual core was discarded. This can be used to indicate differences in use of raw materials both within assemblages and between assemblages.

Number of Aberrantly Terminating Scars

Description: Flake scars terminating as steps and hinges will be recorded as aberrant in this assessment.

Problems: There should be no problems with this simple count.

Use: As cores become smaller and more heavily reduced, the inertia threshold will fall and platform angle will increase, resulting in an increase in the number of aberrant terminations as a percentage of the number of flakes removed. Flakes which have a high number of aberrantly terminating flake scars as a percentage of the total are expected to have been produced towards the exhaustion threshold of the core. This measure will be used to indicate pressure on raw material availability and provisioning strategies.

Comments

Description: a column will be supplied in the data base for recording comments. This may include comments on attributes such as artefact colour, granularity, presence and nature of inclusions, or other comments that do not fit inside one of the attribute classes.

The comments column may include additional typological information outside that included within the artefact class attribute. In the case of the present assemblage, this includes the description 'scraper' for relatively thick flakes that exhibit steep retouch to create a margin or margin(s) that indicate that the artefact may have been used as a scraper. Other interpretive comments include 'redirecting flake' (a flake that uses a former platform as a dorsal ridge to redirect the fracture plane), 'rejuvenating flake' (a flake that has a former platform as a dorsal ridge and which has a plunging termination that removed a section of the core in order to facilitate subsequent reduction of the core) and 'platform removal flake' (a flake that contains a former platform on the dorsal surface).

Problems: Comments on the purpose of an artefact are confined to the comments section to avoid subjectivity in attribute recording. As these comments are defined above, there should be no problems.

Use: Descriptions of artefacts can sometimes be useful for assisting in locating conjoins.

Key to the Artefact Recording Form

General						
AC--Artefact Class 1. Flake 2. Broken flake 3. Retouched flake 3a. Bondi Point 3b. Backed blade 3c. Geometric microlith 3d. Elouera 3e. Flake used as a core 4. Flaked piece 5. Core 6. Axe/blank 7. Grindstone 8. Hammerstone 9. Anvil 10. Manuport 11. Heat Shatter 12. Other	RM--Raw Material 1. Silcrete 2. Mudstone 3. Tuff 4. Chert 5. Volcanic 6. Petrified wood 7. Hornfels 8. Sandstone 9. Quartz 10. Quartzite 11. Porcellanite 12. Silicified Sandstone 13. Chalcedony 14. Fine grained siliceous 15. Other	KM--Knapping Method 1. Freehand percussion 2. Bipolar reduction 3. Pressure flaking 4. Hammerdressing 5. Grinding	Wt--Weight Weight of artefact in grams (Not to be recorded in field)	Lgth / Width / Thickness For whole flakes use percussion L/W/T. For all other artefacts, use block L/W/T	% C -- % Cortex For flake categories record % dorsal cortex for all other artefact. % cortex of whole artefact.	HA--Heat Affected 0. No 1. Colour change 2. Pot lids 3. Crenated 4. Crazed 5. Heat fracture 6. Greasy lustre
					Cortex Type 0. No cortex 1. Pebble 2. Outcrop 3. Scree 4. Indeterminate	<div style="background-color: #e0ffff; text-align: center; padding: 2px; margin-bottom: 5px;">General</div> Comment: Use this space to record any other pertinent details (e.g. colour, granularity)
Flakes						
PW--Platform Width Width of platform between right & left lateral margin	PS--Platform Surface 0. Missing 1. 1 scar 2. 2 scars 3. >3 scars 4. Facetted 5. Ground 6. Crushed 7. Cortical	DSC--Dorsal Scar Count Count the number of scars on the dorsal surface of a flake, rotated flake or broken flake	DSROT--Rotation Has the flake, broken flake or retouched flake come from a rotated core? 0. Not rotated or count no of rotations	RLOC--Location Location of retouch margin - e flake will be divided into eight sections: 1. Proximal end 2. Proximal left 3. Proximal right 4. Marginal left 5. Marginal right 6. Distal left 7. Distal right 8. Distal end	RT--Retouch Type 1. Acute 2. Steep 3. Unifacially backed 4. Bifacially backed 5. Ground 6. Tranchet 7. Flake used as core	AB--Artefact breakage 0. None 1. Transverse 2. Longitudinal 3. Cone fracture 4. Transverse and longitudinal 5. Edge damage
PT--Platform Thickness Distance between the pfa and the dorsal surface	OH--Overhang Removal 0. Absent 1. Present	S/HDSC- -Step/Hinge Dorsal Scar Count Count of number of scars on the dorsal surface with step or hinge terminations	Termination 0. Missing 1. Feather 2. Step. 3. Hinge 4. Plunging 5. Retroflexed 6. Inflexed 7. Axial 8. Cortical	Fits more than one attribute eg. A retouched broken flake--use both numbers eg. 3/2--broken retouched flake use both numbers eg. 2/3		% Flaked--Percentage of artefact flaked Area of dorsal that has been that has been flaked (this will be 100% minus the area of cortex)
Cores						
Rot--Rotation 0. Not rotated or count no. of rotations	PP--Platform Preparation 0. Absent 1. Overhang removal 2. Facetting 3. Grinding	ST--Scar Types 1. Feather 2. Step. 3. Hinge 4. Plunging 5. Retroflexed	6. Inflexed 7. Axial 8. Blade scars If >1 scar then list all e.g. 1/2/3	Exh--Exhausted Was the core exhausted when discarded at the site 0. No 1. Yes		

Total	No.	Site Name	Scrape #	No.	E_MGA	N_MGA	Spit/Loci	Interval	AC	RM	KM	Wt	Lgth	Width	Thick	0%C	CT	HA	PW	PT	PS	OH	DSC	S/HDSC	PDSC	DSRot	Term	RLOC	RT	AB	%Flkd	Rot	PP	ST	Exh	Comment		
1		LID29 sub-surface	1	1	314470	6413500	10	11	1	1	1	0.1	4	11	1	0	0	0	6	1	1	0	4	0	0	0	1	0	0	0	100					light yellow pink, med clasts		
2		LID29 sub-surface	1	2	314470	6413500	10	10	4	1	0	0.1	12	6	3	0	0	0																	same raw material as 1			
3		LID29 sub-surface	2	1	314435	6413447	4	1	1	2	1	15.9	33	52	7	20	1	1	47	7	7	1	7	2,0	0	0	8	0	0	0	80					mid yellow with red ha, broken into 3 conjoins during excavation		
4		LID29 sub-surface	2	2	314435	6413447	4	2	2	1	0	0.9	14	20	4	30	1	0	0	0	0	0	2	0	0	0	1	0	0	4	70					light red brown, chattering on distal margin		
5		LID29 sub-surface	2	3	314435	6413447	6	4	1	1	1	6.5	26	33	8	0	0	0	16	5	1	0	4	0	0	0	3	0	0	0	100					light yellow with med clasts, small break on left margin		
6		LID32 sub-surface	5	1	314386	6413097	4	1	1	12	1	38	49	41	14	0	0	0	36	15	1	0	3	0	0	0	1	0	0	0	100					very poor quality raw material		
7		LID32 sub-surface	5	2	314386	6413097	5	1	1	2	1	19.1	32	44	13	20	1	1,4	8	5	1	0	10	0,5	0	0	3	0	0	0	80					mid orange with red ha		
8		LID32 sub-surface	5	3	314386	6413097	6	2	6	5	5	604.9	128	69	40	90	1	0																	bifacial grinding on one margin to form axe, edge appears to have been flaked prior to grinding, coarse striations on 1 ground edge, finer on other, negative flake scar on one ground face has been truncated by grinding - possible damage,repair, 3 clear negative flake scars around butt probably produced through use as hammerstone, pitting on butt indicates use as hammerstone. Patina is similar across entire artefact (including ground surfaces) but higher level of patina associated with slightly dishd area on side with -ve scar on ground face - possible grinding surface. Prob basalt or hornsfels			
9		LID32 sub-surface	6	1	314361	6413051	6	2	1	2	1	0.5	14	8	2	0	0	0	10	2	1	0	5	0	0	1	1	0	0	0	100					light red grey		
10		LID32 sub-surface	7	1	314470	6413060	3	2	3	1	1	1.3	24	17	4	0	0	1,6	R	R	R	1	2	0	0	0	1	1,3	1	0	100					dark red with small siliceous, large quartz clasts		
11		LID32 sub-surface	7	2	314470	6413060	4	6	3e	1	1	105.9	56	55	35	0	0	1	27	21	1	1	7	2	0	0	R	4,5,6,7,8	7	0	100	4	1	1,2	0	light yellow to light pink with small to med clasts, dorsal scars defined based on initiation at flake platform		
12		LID32 sub-surface	7	3	314470	6413060	5	7	1	2	1	19.6	32	45	10	20	1	0	19	11	1	1	6	0,2	0	0	3	0	0	0	80					mid yellow heavily patinated with grey cortex		
13		LID32 sub-surface	7	4	314470	6413060	5	8	1	2	1	9	35	23	11	0	0	0	18	9	5	0	10	0,2	0	2	6	0	0	0	100					heavily patinated, mid to dark yellow		
14		LID32 sub-surface	8	1	314550	6413028	2,3	2	5	1	1	85.5	67	47	29	5	1	0															1	0	1	0	light pink,red to grey with very large quartz clasts and small siliceous clasts, poor raw material and only 3 definitive flake scars	
15		LID32 sub-surface	8	2	314550	6413028	4	2	5	1	1	25.4	34	28	19	0	0	1,6															1	0	1	0	mid red with small sil clasts, greasy lustre on some scars, heat affect on others	
16		LID32 sub-surface	8	3	314550	6413028	4	4	5	9	1	96.3	56	41	30	50	1	0																2	0	1,2	0	heavily veined quartz with incipient fractures, heavy step fractures on 1 platform
17		LID32 sub-surface	8	4	314550	6413028	4	4	2	1	0	0.9	17	10	5	0	0	0	0	0	0	0	5	0	0	0	1	0	0	1	100					light pink with small to med clasts, prox broken		
18		LID32 sub-surface	8	5	314550	6413028	4	4	2	1	0	0.9	10	11	5	0	0	0	0	0	0	0	2	0	0	0	0	0	0	1	100					light pink with small to med clasts, medial fragment		
19		LID32 sub-surface	8	6	314550	6413028	6	2	1	1	0	13.7	18	24	23	20	1	0	43	17	1	0	5	0	0	2	4	0	0	0	80					light to mid red with small to large clasts		
20		LID32 sub-surface	8	7	314550	6413028	6	2	2	1	0	6.1	35	17	10	100	1	0	0	0	0	0	0	0	0	0	1	0	0	4	0					flake fragment with proximal and one margin missing, light to dark red with small to large clasts		
21		LID32 sub-surface	8	8	314550	6413028	6	2	1	1	1	0.4	10	13	3	0	0	0	8	3	1	0	1	0	0	0	3	0	0	0	100					light pink with smal to med clasts, large errillure scar		
22		LID32 sub-surface	8	9	314550	6413028	6	2	2	1	0	5.6	25	24	10	100	1	0	0	0	0	0	0	0	0	0	1	0	0	1	0					mid red with small to med clasts, thick relatively fresh break to leave distal		
23		LID32 sub-surface	8	10	314550	6413028	6	3	1	1	1	0.1	9	10	2	0	0	0	6	2	1	0	1	0	0	0	3	0	0	0	100					light yellow with small clasts, dorsal surface is former ventral		
24		LID32 sub-surface	8	11	314550	6413028	6	3	2	1	1	0.7	24	7	2	0	0	1	0	0	0	0	3	0	0	0	6	0	0	1	100					light yellow to dark red with small clasts, damage on ventral, proximal broken		
25		LID32 sub-surface	8	12	314550	6413028	6	3	4	1	0	11.4	40	27	14	40	1	0																	light red with dark red cortex, same rm as 9, small to large clasts			
26		LID32 sub-surface	8	13	314550	6413028	6	3	5	1	1	9.9	30	24	12	30	1	0															1	0	1	1	mid red with small to med clasts, same rm as 12, broken	
27		LID32 sub-surface	8	14	314550	6413028	6	3	2	1	0	9.1	25	42	10	10	1	0	0	0	0	0	2	0	0	0	1,8	0	0	1	90					light red with small to large clasts, same rm as 12, v. smooth cortex, thick break, distal portion		
28		LID32 sub-surface	8	15	314550	6413028	6	3	3	1	1	5.9	18	24	10	30	1	0	21	9	1	0	3	0	0	0	1	2,4	1	0	70					same rm as 12, v. large single retouch		
29		LID32 sub-surface	8	16	314550	6413028	6	3	1	1	1	1.7	26	11	6	20	1	6	6	4	1	0	4	0	0	0	1	0	0	0	80					same rm as 12		

Total	No.	Site Name	Scrape #	No.	E_MGA	N_MGA	Spit/Loci	Interval	AC	RM	KM	Wt	Lgth	Wdth	Thick	0%C	CT	HA	PW	PT	PS	OH	DSC	S/HDSC	PDSC	DSRot	Term	RLOC	RT	AB	%Flkd	Rot	PP	ST	Exh	Comment	
30		LID32 sub-surface	8	17	314550	6413028	6	3	2,3	1	1	1.9	20	14	4	80	1	6	16	5	1	0	1	0	0	0	0	5	1	1	20						same rm as 12, notched with rt at distal edge of notch, rt may continue through notch but too granular to show, distal tip broken
31		LID32 sub-surface	8	18	314550	6413028	6	3	2	1	0	1.1	18	8	6	60	1	0	0	0	0	0	1	0	0	0	0	0	0	1	40						same rm as 12, medial portion
32		LID32 sub-surface	8	19	314550	6413028	6	3	4	1	0	1.8	16	12	7	100	1	0																		same rm as 12, looks heat affected on 1 face, fresh breaks on others	
33		LID32 sub-surface	8	20	314550	6413028	6	3	2	1	0	19.1	37	50	11	100	1	0	0	0	0	0	0	0	0	0	1	0	0	1	0						same rm as 12, majority of platform intact but relatively fresh break has removed pfa
34		LID32 sub-surface	8	21	314550	6413028	6	3	2	1	1	1.7	17	13	6	20	1	6	0	0	0	0	2	0	0	0	1	0	0	1	80						same rm as 12, broken, greasy lustre on 1 dorsal scar
35		LID32 sub-surface	8	22	314550	6413028	6	3	2	1	0	0.1	10	6	2	0	0	0	0	0	0	0	2	0	0	0	0	0	0	4	100						same rm as 12, medial portion
36		LID32 sub-surface	8	23	314550	6413028	6	3	2	1	1	0.1	11	8	2	0	0	0	3	1	1	0	3	0	0	0	0	0	0	1	100						same rm as 12, distal broken
37		LID32 sub-surface	8	24	314550	6413028	6	3	1	1	1	0.1	5	4	1	0	0	0	3	1	1	0	1	0	0	0	1	0	0	0	100						same rm as 12
38		LID32 sub-surface	8	25	314550	6413028	6	3	2	1	0	0.3	12	11	3	0	0	0	0	0	0	0	1	0	0	0	1	0	0	4	100						same rm as 12, distal with both margins missing
39		LID32 sub-surface	8	26	314550	6413028	6	3	1	1	1	0.1	8	7	2	50	1	6	4	6	6	0	1	0	0	0	1	0	0	0	50						same rm as 12
40		LID32 sub-surface	8	27	314550	6413028	6	3	1	1	1	0.3	9	8	6	0	0	0	4	1	1	0	4	0	0	1	1	0	0	0	100						same rm as 12
41		LID32 sub-surface	8	28	314550	6413028	6	3	4	1	0	0.9	11	11	6	40	1	0																		same rm as 12	
42		LID32 sub-surface	8	29	314550	6413028	6	3	2	1	1	0.1	9	8	7	0	0	0	0	0	0	0	2	0	0	0	0	0	0	1	100						
43		LID32 sub-surface	8	30	314550	6413028	6	3	1	1	1	1.1	24	8	3	0	0	0	5	1	1	0	4	0	0	0	1	0	0	0	100						light grey pink with small to large clasts
44		LID32 sub-surface	8	31	314550	6413028	6	3	2	1	0	0.2	12	7	4	0	0	0	0	0	0	0	2	0	0	0	0	0	0	1	100						same rm as 30, medial portion
45		LID32 sub-surface	8	32	314550	6413028	6	3	2	1	0	0.1	12	7	3	0	0	0	0	0	0	0	2	0	0	0	0	0	0	1	100						same rm as 30, medial portion
46		LID32 sub-surface	8	33	314550	6413028	6	3	2	1	0	0.4	16	5	6	0	0	0	0	0	0	0	3	0	0	0	0	0	0	1	100						same rm as 30, medial portion
47		LID32 sub-surface	8	34	314550	6413028	6	3	4	1	0	0.1	6	2	1	0	0	0																		same rm as 30	
48		LID32 sub-surface	8	35	314550	6413028	6	3	2	1	0	0.1	10	6	3	0	0	0	0	0	0	0	1	0	0	0	0	0	0	4	100						same rm as 30, 1 margin but not clear where from
49		LID32 sub-surface	8	36	314550	6413028	6	3	2	1	1	0.2	10	9	2	0	0	0	10	2	1	0	0	0	0	0	6	0	0	2	100						same rm as 30, left and right margins missing
50		LID32 sub-surface	8	37	314550	6413028	6	3	1	1	1	0.1	9	7	1	0	0	0	5	1	6	0	1	0	0	0	1	0	0	0	100						same rm as 30
51		LID32 sub-surface	8	38	314550	6413028	6	3	2	1	0	0.1	7	4	1	0	0	0	0	0	0	0	2	0	0	0	1	0	0	1	100						same rm as 30, proximal broken
52		LID32 sub-surface	8	39	314550	6413028	6	3	4	1	0	0.1	8	3	1	0	0	0																		same rm as 30	
53		LID32 sub-surface	8	40	314550	6413028	6	3	1	1	1	11.3	19	29	10	0	0	0	19	9	1	0	3	0	0	0	1	0	0	0	100						same rm as 12, appears to have platform just below cortex with former ventral
54		LID32 sub-surface	8	41	314550	6413028	6	3	1	1	1	0.1	3	5	1	0	0	0	7	1	1	0	1	0	0	0	1	0	0	0	100						same rm as 12
55		LID32 sub-surface	8	42	314550	6413028	6	3	1	1	1	0.3	17	9	2	0	0	0	4	1	6	0	1	0	0	0	1	0	0	0	100						same rm as 30
56		LID32 sub-surface	8	43	314550	6413028	6	3	2	1	1	8.7	36	21	13	0	0	0	36	12	1	0	4	0	0	0	1	0	0	0	100						same rm as 30
57		LID32 sub-surface	8	44	314550	6413028	6	3	2	1	0	1.2	10	17	6	0	0	0	0	0	0	0	1	0	0	0	0	0	0	1	100						same rm as 30, medial portion
58		LID32 sub-surface	8	46	314550	6413028	6	3	2	1	1	0.1	15	5	2	0	0	0	0	0	0	0	3	0	0	0	1	0	0	1	100						same rm as 10, proximal broken
59		LID32 sub-surface	8	47	314550	6413028	6	3	1	1	1	0.4	7	13	4	0	0	0	14	6	1	0	4	0	0	0	1	0	0	0	100						same rm as 10
60		LID32 sub-surface	8	48	314550	6413028	6	3	1	1	1	0.1	8	11	2	0	0	0	0	0	6	0	1	0	0	0	6	0	0	0	100						same rm as 10
61		LID32 sub-surface	8	49	314550	6413028	6	3	2	1	2	0.4	15	5	3	0	0	0	0	0	0	0	2	0	0	0	0	0	0	2	100						same rm as 10, medial portion with both margins missing
62		LID32 sub-surface	8	50	314550	6413028	6	3	1	1	1	0.1	10	9	2	0	0	0	6	2	1	0	1	0	0	0	3	0	0	0	100						same rm as 12, 2 ventrals
67		LID32 sub-surface	10	1	314438	6413000	2	2	2	2	2	0.2	15	11	2	0	0	6	3	1	6	0	4	0	0	0	1	0	0	2	100						same raw material as 1, broken from left distal to part way up left margin
63		LID32 sub-surface	10	2	314438	6413000	2	2	2	2	1	0.1	5	8	1	0	0	6	7	1	2	0	1	0	0	0	1	0	0	2,5	100						light pink v. fine grained, ed on distal, right margin broken
64		LID32 sub-surface	10	3	314438	6413000	2	2	1	2	1	0.8	19	16	2	0	0	6	3	1	1	0	4	0,1	0	1	1	0	0	0	100						same raw material as 1
65		LID32 sub-surface	10	4	314438	6413000	2	2	1	2	1	0.6	17	13	3	0	0	6	6	2	1	0	4	0	0	1	1	0	0	0	100						same raw material as 1, recent break on left margin
66		LID32 sub-surface	10	5	314438	6413000	2	2	2	2	1	0.3	19	12	1	0	0	6	0	0	6	0	7	0	0	0	0	0	0	1	100						same raw material as 1, distal broken
68		LID29		1	314455	6413657	1	0	1	2	1	5.4	22	40	7	20	1	0	32	5	7	1	5	0,2	0	0	1	0	0	0	80						light yellow weathered mudstone
69		LID29		2	314455	6413657	1	0	1	9	1	9.7	26	25	10	0	0	0	14	5	6	0	2	0	0	0	1	0	0	0	100						coarse white quartz with some orange discolouration
70		LID29		3	314455	6413657	1	0	2	3	0	5.3	32	14	8	0	0	0	19	7	1	0	3	0	0	0	0	0	0	1	100						Bowmans tuff, distal missing
71		LID29		3a	314455	6413657	1	0	2	3	0	2.3	19	15	4	0	0	0	16	7	1	0	2	0	0	0	0	0	0	1	100						Bowmans tuff, distal missing
72		LID29		4	314455	6413657	1	0	2	2	0	2	14	21	7	0	0	1	0	0	0	0	5	0	0	1	1	0	0	1	100						light yellow with pink ha, platform removal flake
73		LID29		5	314455	6413657	1	0	1	2	1	0.6	18	13	3	0	0	1	5	2	6	0	3	0	0	0	3	0	0	0	100						light yellow with pink ha
74		LID29		6	314455	6413657	1	0	2	3	1	6.4	21	29	8	0	0	0	18	5	6	0	3	0	0	1	1	0	0	2	100						Bowmans tuff, left margin broken
75		LID29		7	314455	6413657	1	0	1	2	1	0.7	18	16	3	10	4	0	6	2	2	0	3	2,0	0	0	1	0	0	0	90						light yellow
76		LID29		8	314455	6413657	1	0	1	2	1	0.3	16	12	3	0	0	0	3	2	1	0	4	0	0	1	1	0	0	0	100						light yellow, platform removal flake with platform on dorsal rotated
77		LID29		9	314455	6413657	1	0	3	2	1	18.8	42	28	12	10	1	0	20	11	2	1	8	0,3	0	0	R	6,7,8	2	0	90						mid yellow heavily patinated but with less patination on rt
78		LID29		10	314455	6413657																															

Total	No.	Site Name	Scrape #	No.	E_MGA	N_MGA	Spit/Loci	Interval	AC	RM	KM	Wt	Lgth	Wdth	Thick	0%C	CT	HA	PW	PT	PS	OH	DSC	S/HDSC	PDSC	DSRot	Term	RLOC	RT	AB	%Flkd	Rot	PP	ST	Exh	Comment		
79		LID29		11	314455	6413657	1	0	2,3b	2	1	0.2	14	8	2	0	0	0	3	1	6	0	3	0	0	0	0	3,5	3	1	100						light yellow, distal broken and truncates backing on right margin - broken backed blade or Bondi Point	
80		LID29		12	314455	6413657	1	0	1	2	1	5.2	33	24	7	10	1	0	4	2	1	0	11	2,3	0	1	3	0	0	0	90						light yellow	
81		LID29		13	314455	6413657	1	0	5	2	1	8.7	27	25	14	0	0	0														2	0	1,3	1		mid yellow with heavy patination on majority of scars but with fresh scars - reused	
82		LID29		14	314475	6413651	2	0	1	2	1	0.4	15	12	2	10	1	0	7	3	2	0	4	0	0	0	8	0	0	0	90						light yellow	
83		LID29		15	314486	6413654	2	0	2	2	1	0.4	10	12	5	0	0	1	0	0	0	0	3	0	0	0	3	0	0	4	100						light yellow with red ha, prox and left margin missing	
84		LID29		16	314670	6413718	3	0	2	1	1	2.7	31	23	5	0	0	0	0	0	6	0	4	1,0	0	0	0	0	0	0	1	100						light grey platform crushed and distal missing
85		LID29		17	314551	6413643	4	0	2	2	1	1.5	19	13	5	10	1	0	0	0	0	0	6	0	0	0	0	0	0	1	90						light red with dark red cortex, platform broken and distal missing, chattering on right margin	
86		LID29		18	314551	6413643	4	0	2	10	1	2.6	24	17	4	60	1	0	12	4	1	0	1	0	0	0	0	0	0	1	100						dark grey, distal missing	
87		LID29		19	314552	6413638	4	0	1	9	1	0.4	11	10	3	10	1	0	3	2	1	0	3	0	0	1	1	0	0	0	90							
88		LID29		20	314540	6413634	4	0	2	2	1	0.1	11	9	2	0	0	0	0	0	0	0	4	2,0	0	0	1	0	0	1	100						light yellow, prox broken	
89		LID29		21	314540	6413634	4	0	2	2	1	0.3	9	13	4	0	0	0	14	2	2	0	4	1,0	0	0	0	0	0	0	1	100						light yellow, distal broken
90		LID29		22	314544	6413634	4	0	1	2	1	2.1	23	19	5	0	0	0	13	5	1	0	7	1,0	0	1	1	0	0	0	100						mottled orange and white, part of left margin broken	
91		LID29		23	341550	6413631	4	0	2	9	0	1	14	10	8	0	0	0	13	10	7	0	3	0	0	0	0	0	0	4	100							
92		LID29		24	314550	6413631	4	0	1	1	1	0.9	16	22	3	0	0	0	9	2	1	0	2	0	0	0	1	0	0	0	100						yellow grey with small clasts	
93		LID29		25	314547	6413612	5	0	1	2	1	10.3	20	12	28	0	0	0	12	8	6	0	10	1,0	0	4	1	0	0	0	100						light yellow, platform removal flake, 2nd formal ventral	
94		LID29		26	314542	6413610	5	0	2	9	1	0.4	17	6	3	0	0	0	0	0	0	0	1	0	0	0	0	0	0	1	100						proximal and part distal missing	
95		LID29		27	314542	6413610	5	0	1	9	1	1.5	33	12	4	0	0	0	8	2	1	0	2	0	0	0	1	0	0	0	100						white with med crystal size	
96		LID29		29	314542	6413610	5	0	2	9	1	0.4	11	6	2	0	0	0	5	3	6	0	2	0	0	0	0	0	0	1	100						distal missing	
97		LID29		30	314542	6413610	5	0	4	9	0	0.2	11	6	5	0	0	0													100							
98		LID29		31	314536	6413605	5	0	2	2	0	0.6	26	8	3	30	1	0	0	0	0	0	3	0	0	0	1	0	0	1	70						light yellow, bulbous termination, proximal broken	
99		LID29		32	314535	6413605	5	0	5	1	1	12.4	39	22	14	30	1	6														0	0	1	1		light red grey with red cortex, small siliceous clasts, large opaque, greasy lustre on -ve scar and some other surfaces but not on all	
100		LID29		33	314535	6413605	5	0	2	1	1	4.3	31	17	6	0	0	0	17	6	1	0	4	0	1	0	0	0	0	1	100						mid pink with small to med siliceous clasts and large opaque clasts	
101		LID29		34	314532	6413608	5	0	1	1	1	2.3	24	15	7	20	1	6	16	10	7	0	4	1,0	0	0	1	0	0	0	80						dark red with cream cortex, greasy lustre on dorsal scars, small series of step fractures on dorsal right margin	
102		LID29		35	314531	6413609	5	0	1	1	1	4.5	40	17	5	5	1	0	3	5	7	0	1	0	0	0	1	0	0	0	95						mid red with med clasts, dorsal scar is natural fracture plane, usewear on left margin, 2nd former ventral	
103		LID29		36	314531	6413604	5	0	3	5	1	35.7	41	45	11	20	1	0	59	11	R	0	4	0	0	0	6	1	2	0	80						retouch is single scar on platform, with second possible retouch scar truncated. Creates notch and nose	
104		LID29		37	314531	6413604	5	0	1	1	1	7.2	37	23	8	0	0	0	16	10	1	0	5	0	0	0	1	0	0	0	100						light pink with small to med siliceous clasts and med opaque clasts	
105		LID29		38	314529	6413604	5	0	1	2	1	5.5	26	26	9	0	0	0	21	8	1	0	6	0	0	2	1	0	0	0	100						mid yellow with brown patination on dorsal	
106		LID29		39	314528	6413604	5	0	2	1	0	87.8	75	53	20	0	0	0	0	0	0	0	4	0	0	0	1	0	0	1	100						very thick break, proximal missing, light red, small siliceous clasts, med opaque clasts	
107		LID29		40	314526	6413598	5	0	5	2	1	18.5	40	23	17	30	1	0													2	1	1,3	1		light yellow with brown cortex, possible blade core		
108		LID29		41	314526	6413598	5	0	5	2	1	47.4	48	42	26	40	1	0													2	0	1,3	1		light yellow with red banding, brown cortex		
109		LID29		42	314526	6413598	5	0	11	2	0	3.4	32	14	6	10	1	5																		mid red with dark red cortex		
110		LID29		43	314524	6413600	5	0	3	2	1	3.7	26	22	6	20	1	0	7	2	6	0	2	0	0	1	1	3	2	0	80						light cream pink with red cortex, former ventral on dorsal, retouch creates small notch and nose on right margin	
111		LID29		44	314519	6413599	5	0	2,3	2	0	0.4	16	9	3	0	0	0	R	R	R	R	3	0	0	0	0	1,2,3,5	3	1	100							light yellow, broken after manufacture
112		LID29		45	314517	6413601	5	0	2	2	0	1.6	25	15	4	10	1	0	0	0	0	0	3	0	0	0	1	0	0	1,5	90						light yellow with brown cortex, ed on left and right margins	
113		LID29		46	314515	6413606	5	0	2	2	0	0.2	12	9	2	0	0	0	0	0	0	0	1	0	0	0	3	0	0	4	100						light yellow, left distal portion	
114		LID29		47	314515	6413602	5	0	1	2	1	4.3	30	19	8	0	0	0	16	8	1	0	3	0,1	0	1	6	0	0	5	100						mid yellow with heavy patination on dorsal, old ed on left distal, fresh ed on right margin	
115		LID29		48	341520																																	

Total	No.	Site Name	Scrape #	No.	E_MGA	N_MGA	Spit/Loci	Interval	AC	RM	KM	Wt	Lgth	Wdth	Thick	0%C	CT	HA	PW	PT	PS	OH	DSC	S/HDSC	PDSC	DSRot	Term	RLOC	RT	AB	%Flkd	Rot	PP	ST	Exh	Comment	
118		LID29		51	314517	6413595	5	0	2	2	1	0.9	17	8	6	0	0	0	7	7	1	0	1	0	0	0	0	0	0	3,5	100						mid yellow with darker orange, ed broken distal
119		LID29		52	314517	6413595	5	0	2	2	1	4.6	27	15	13	0	0	2	15	7	3	0	6	2,1	0	0	0	0	0	1	100						mid yellow with medium patination, potlid has removed much of ventral surface, distal broken
120		LID29		53	314517	6413595	5	0	2	2	1	1	17	14	6	0	0	0	8	2	1	0	4	0	0	0	0	0	0	1	100						mid yellow with darker orange, distal broken
121		LID29		54	314519	6413584	5	0	1	2	1	0.7	16	13	4	0	0	0	8	4	1	0	5	0	0	1	6	0	0	5	100						mid yellow with darker orange, ed on distal
122		LID29		55	314519	6413591	5	0	2	2	0	1.3	14	15	5	30	1	0	0	0	0	0	3	2,0	0	0	0	0	0	1	70						mid yellow with darker yellow, light brown cortex, medial portion
123		LID29		56	314519	6413591	5	0	1	1	1	7.3	25	38	8	0	0	0	19	6	1	0	2	0	0	0	1	0	0	0	100						large opaque (chert) inclusions, very large grain size
124		LID29		57	314519	6413591	5	0	4	2	0	1	20	16	3	0	0	0																		heavily patinated light red and cream	
125		LID29		58	314519	6413591	5	0	2	2	0	1	21	20	3	0	0	0	0	0	0	0	2	0	0	0	1	0	0	4	100						mid yellow with darker orange patination on dorsal
126		LID29		59	314519	6413591	5	0	1	2	1	1.8	21	15	5	0	0	0	13	6	1	0	6	0,1	0	0	1	0	0	0	100						mid yellow heavily weathered
127		LID29		60	314519	6413591	5	0	2	15	1	3.5	33	17	5	0	0	0	16	5	1	0	2	0	0	0	0	0	0	1	100						dark grey with light grey clasts, possibly silicified conglomerate
128		LID29		61	314521	6413596	5	0	2	9	0	1.1	15	11	5	70	1	0	0	0	0	0	1	0	0	0	0	0	0	1	30						distal and proximal missing
129		LID29		62	314524	6413596	5	0	2	1	1	4.1	24	24	8	0	0	1,6	14	9	1	0	7	3,1	0	0	1	0	0	1	100						grey to light red with small siliceous clasts, break on right lateral and right distal with greasy lustre on breaks
130		LID29		63	314524	6413596	5	0	1	10	1	51.4	69	50	14	0	0	0	9	10	1	0	6	1,0	0	0	1	0	0	5	100						dark grey with dark red, ed on left distal
131		LID29		64	314504	6413584	5	0	1	2	1	4.5	33	29	6	0	0	0	13	6	1	1	11	3,0	0	0	1	0	0	0	100						mid yellow with dark orange patination on ventral
132		LID29		65	314531	6413628	5	0	2,3	10	1	15.6	41	34	10	0	0	0	22	10	1	0	4	2,0	0	0	0	6	1	2	100						mid pink, right margin and part of distal broken, rt may have continued
133		LID29		66	314521	6413628	5	0	1	2	1	1.8	31	13	6	0	0	0	5	0	6	0	7	2,0	0	0	1	0	0	0	100						white, very heavily patinated
134		LID29		67	314503	6413603	5	0	2	2	0	0.4	18	8	2	0	0	0	0	0	0	0	1	0	0	0	6	0	0	4	100						mid yellow with dark orange patination, prox and right margin missing
135		LID29		68	314503	6413603	5	0	1	2	1	0.2	7	11	2	0	0	0	11	3	2	0	3	0	0	0	1	0	0	0	100						mid yellow, heavily patinated
136		LID29		69	314500	6413601	5	0	5	1	1	9.2	35	16	10	0	0	1													1	3	3,8	1		light yellow with red heat affect, very fine grained	
137		LID29		70	314500	6413601	5	0	2	1	0	0.9	14	18	4	0	0	2,6	0	0	0	0	1	0	0	0	0	0	0	1	100						mid red, very fine grained, medial portion
138		LID29		71	314500	6413601	5	0	4	1	0	1	26	13	6	0	0	6																		mid red with greasy lustre on one break	
139		LID29		72	314487	6413598	5	0	1	2	1	11.8	27	33	11	30	1	0	13	7	7	0	6	3,0	0	0	1	0	0	0	70						mid yellow orange, heavily patinated, subcortical surface on termination
140		LID29		73	314463	6413504	6	0	2,3	2	1	0.3	11	13	3	0	0	0	5	2	1	0	8	1,6	0	0	1,R	7	2	0	100						cream to light pink, left margin missing
141		LID29		74	314458	6413503	6	0	2	2	1	2.7	20	22	6	10	1	0	10	4	1	0	10	4,1	0	0	0	0	0	5	90						mid yellow, use wear on right distal, ed has removed most of distal
142		LID29		75	314458	6413503	6	0	1	12	1	6.5	27	30	9	10	1	0	6	1	6	0	4	1,0	0	1	6	0	0	0	90						light yellow pink, part of right margin missing
143		LID29		76	314454	6413504	6	0	1	9	1	6.8	28	24	8	40	1	0	18	5	1	0	4	1,0	0	0	8	0	0	0	60						dark grey and white
144		LID29		77	314454	6413504	6	0	2	9	1	4.6	33	16	7	30	1	0	13	4	1	0	3	0	0	1	0	0	0	1	70						same rm as 76, distal missing
145		LID29		78	314454	6413504	6	0	2	9	1	1.8	25	15	6	0	0	0	0	0	0	0	5	0	0	0	0	0	0	1	100						same rm as 76, distal missing
146		LID29		79	314454	6413504	6	0	2	9	0	2.1	19	18	5	0	0	0	0	0	0	0	2	0	0	0	0	0	0	4	100						same rm as 76, medial portion of either left or right margin
147		LID29		80	314454	6413504	6	0	2	9	1	5.5	30	19	9	20	1	0	7	3	1	0	7	0	0	1	0	0	0	1	80						same rm as 76, distal missing
148		LID29		81	314454	6413504	6	0	2	9	1	0.8	11	13	3	0	0	0	8	3	1	0	1	0	0	0	0	0	0	4	100						same rm as 76, distal and left margin missing
149		LID29		82	314455	6413508	6	0	2	1	0	25.8	54	34	20	0	0	0	0	0	0	0	13	0	0	0	4	0	0								

Total No.	Site Name	Scrape #	No.	E_MGA	N_MGA	Spit/Loci	Interval	AC	RM	KM	Wt	Lgth	Width	Thick	0%C	CT	HA	PW	PT	PS	OH	DSC	S/HDSC	PDSC	DSRot	Term	RLOC	RT	AB	%Flkd	Rot	PP	ST	Exh	Comment	
161	LID31		92	314457	6413279	8	0	1	2	1	0.8	7	20	5	10	1	0	14	4	1	0	6	3,0	0	0	1	0	0	0	90					dark yellow	
162	LID31		93	314452	6413214	9	0	11	2		5.5	19	14	13	30	1	5																	mid yellow, large conchoidal scar		
163	LID31		94	314452	6413214	9	0	5	2	1	16.9	36	25	18	30	1	0													3	0	1,2,3	0	mid yellow, some blade like scars		
164	LID31		95	314452	6413214	9	0	2	2	1	0.6	20	9	5	0	0	0	0	0	0	0	4	0	0	0	1	0	0	1	100					mid yellow, platform broken	
165	LID31		96	314452	6413214	9	0	1	2	1	1	11	14	7	10	1	0	15	5	7	0	5	0	0	1	1	0	0	0	90					mid yellow, similar conchoidal scar to 93	
166	LID31		97	314455	6413206	9	0	3,2	2	1	2.9	24	29	5	90	1	0	11	4	1	0	3	2,0	0	0	0	0	6	1	1	10					mid yellow, both distal margins missing, rt on break on distal left
167	LID32		98	314485	6413033	10	0	2	2	1	6	30	22	11	0	0	0	0	0	0	0	5	0	0	0	1	0	0	1	100					light cream, break may have occurred during manufacture	
168	LID32		99	314482	6413032	10	0	2	2	0	0.8	11	11	5	0	0	0	0	0	0	0	4	1,0	0	0	0	0	0	0	4	100					medial portion with left margin missing
169	LID32		100	314487	6413032	10	0	1	9	1	0.6	18	18	3	0	0	0	8	2	1	0	3	0	0	0	1	0	0	0	100					1 dorsal scar follows flaw in rock	
170	LID32		101	314492	6413036	10	0	2	2	1	1.6	24	15	4	0	0	0	15	3	1	0	11	2,0	0	1	0	0	0	4	100					heavily patinated grey white, left and distal missing	
171	LID32		102	314498	6413037	10	0	2	2	0	0.2	9	10	2	0	0	0	0	0	0	0	3	0	0	0	3	0	0	1	100					mid pink, heavily patinated on ventral, distal portion	
172	LID32		103	314506	6413044	10	0	1	2	1	0.1	7	6	3	20	1	0	7	3	1	0	2	0	0	0	6	0	0	0	80					very low platform angle, mid yellow	
173	LID32		104	314509	6413042	10	0	1	2	1	4.1	32	15	6	0	0	0	11	4	2	0	6	0	0	0	1	0	0	5	100					lighty yellow to pink, ed on distal tip	
174	LID32		105	314506	6413041	10	0	2	1	1	2.9	21	17	5	0	0	0	16	7	1	0	3	0	0	1	0	0	0	1	100					grey pink, smalll clasts, verging on quartzite	
175	LID32		106	314509	6413042	10	0	5	4	1	2.2	20	12	11	0	0	0												2	0	1,2	1	grey to mid pink, 1 weathered surface			
176	LID32		107	314510	6413080	10	0	2	2	1	4.7	32	17	11	60	1	0	0	0	0	0	2	0	0	1	1	0	0	1	40					mid yellow, break just below platform, formal ventral on dorsal	
177	LID32		108	314510	6413080	10	0	1	2	1	20.9	52	29	9	90	1	0	20	4	1	1	2	1,0	0	0	8	0	0	0	10					mid yellow	
178	LID32		109	314510	6413080	10	0	2	1	3	0.7	17	11	3	70	1	0	9	2	1	0	1	0	0	0	0	0	0	1	30					light pink with small clasts, distal missing	
179	LID32		110	314510	6413080	10	0	3	1	1	7	45	14	7	0	0	0	17	7	2	1	3	1,0	0	0	1	1,5,7	6	0	100					dark grey, small clasts, 2 ventral surfaces, burinated	
180	LID32		112	314513	6413048	10	0	2	1	1	14.1	38	30	11	30	1	0	15	9	1	0	6	0	0	1	0	0	0	1	70					lighty yellow with red cortex, small clasts, distal missing	
181	LID32		113	314513	6413048	10	0	1	1	1	4.4	33	25	7	0	0	0	9	4	1	0	5	2,0	0	0	1	0	0	0	100					dark red, small siliceous clasts, large opaque	
182	LID32		114	314513	6413048	10	0	2	9	1	1.5	14	18	5	10	1	0	6	3	1	0	5	0	0	0	1	0	0	1	90					glass-like, very good quality	
183	LID32		115	314515	6413049	10	0	1	9	1	1	18	11	5	0	0	0	8	5	1	0	3	0	0	0	1	0	0	0	100					similar rm as 114	
184	LID32		116	314522	6413045	10	0	2	9	1	1.6	22	13	5	10	1	0	0	0	0	0	3	0	0	0	8	0	0	1	90					proximal missing	
185	LID32		117	314522	6413044	10	0	2	2	0	4.4	26	18	8	70	1	0	0	0	0	0	1	0	0	0	8	0	0	1	30					mid yellow, proximal missing	
186	LID32		118	314525	6413032	10	0	1	9	1	10.1	34	30	8	95	1	0	17	5	1	0	0	0	0	0	8	0	0	0	5					ed on left distal	
187	LID32		119	314525	6413032	10	0	2	1	1	2	29	18	3	0	0	6	0	0	0	0	5	0	0	0	1	0	0	1	100					light pink to red with small siliceous clasts and large opaque clasts, proximal missing	
188	LID32		120	314525	6413032	10	0	1	1	1	10.2	43	26	9	20	1	6	15	7	6	0	3	0	0	0	1	0	0	0	80					similar rm to112, 119, use wear on marginal left and marginal right	
189	LID32		122	314526	6413028	10	0	2	2	1	0.2	16	7	2	10	1	0	5	2	7	0	4	1,0	0	0	0	0	0	0	1	90					mid yellow, distal missing
190	LID32		123	314526	6413028	10	0	2	2	0	0.2	13	11	2	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	1	100					light yellow, medial portion
191	LID32		124	314526	6413028	10	0	2	2	1	0.8	17	12	3	5	1	0	11	3	4	0	4	0	0	0	0	0	0	1,5	95					mid yellow with brown cortex, ed on right margin, distal missing	
192																																				

Total	No.	Site Name	Scrape #	No.	E_MGA	N_MGA	Spit/Loci	Interval	AC	RM	KM	Wt	Lgth	Width	Thick	0%C	CT	HA	PW	PT	PS	OH	DSC	S/HDSC	PDSC	DSRot	Term	RLOC	RT	AB	%Flkd	Rot	PP	ST	Exh	Comment	
206		LID32		140	314529	6413020	10	0	2	2	0	1.3	18	20	2	0	0	0	0	0	0	0	3	0	0	0	0	0	0	4	100						mid yellow, medial with right margin missing
207		LID32		141	314529	6413020	10	0	1	4	1	9.6	20	21	14	40	1	0	21	13	1	0	3	0	0	1	1	0	0	0	60						2nd former ventral surface present
208		LID32		142	314518	6413019	10	0	1	9	1	0.7	15	12	4	0	0	0	6	2	1	0	4	0	0	0	1	0	0	0	100						
209		LID32		144	314521	6413017	10	0	1	1	1	7	32	15	15	0	0	6	6	4	1	0	7	0	0	1	6	0	0	0	100						mid pink with small clasts, greasy lustre on scars on dorsal
210		LID32		145	314525	6412987	11	0	1	1	1	4.4	45	18	5	0	0	0	11	6	3	0	4	0	0	0	1	0	0	0	100						light yellow with light pink sub cortex, med clasts
211		LID32		146	314504	6412967	11	0	1	2	1	1	23	11	4	0	0	0	3	2	1	0	4	0	0	0	1	0	0	5	100						light yellow heavily patinated, ed on both margins
212		LID32		147	314503	6412966	11	0	2,3	2	0	2.4	19	24	6	0	0	0	0	0	0	0	3	0	0	0	R	6,7,8	1	1	100						heavily patinated cream to brown, distal portion retouched probably before breakage, rt from below rip at break onto dorsal surface
213		LID32		148	314503	6412966	11	0	1	2	1	4	23	30	5	50	1	0	5	1	6	0	3	0,1	0	0	1	0	0	0	50						dark red, part of platform broken during manufacture
214		LID32		149	314498	6412961	11	0	1	2	1	0.2	23	7	2	0	0	0	6	2	6	0	3	0	0	0	1	0	0	0	100						light yellow brown
215		LID32		150	314475	6412944	11	0	4	1	0	3.8	33	14	6	0	0	0																		light yellow red with med siliceous clasts and cherty sections	
216		LID32		151	314463	6412944	11	0	2	2	1	4.4	46	16	6	0	0	0	0	0	0	0	3	0,1	0	0	1	0	0	1	100						light red with heavily patinated cream dorsal surface, platform broken
217		LID32		152	314463	6412944	11	0	2	1	0	1.1	30	7	5	0	0	5	0	0	0	0	2	1,0	0	1	0	0	0	1	100						med patination, hs forms one dorsal scar, chattering on right margin
218		LID32		153	314463	6412944	12	0	1	2	1	1.6	28	15	3	70	1	0	10	5	1	0	4	0	0	0	1	0	0	0	30						dark red cortex, light red interior
219		LID32		154	314463	6412944	12	0	1	1	1	3.2	37	12	7	0	0	0	11	4	1	0	8	3,0	0	1	3	0	0	0	100						similar rm to 150, redirecting flake
220		LID32		155	314459	6412939	12	0	1	1	0	36.7	56	33	25	0	0	0	8	7	1	0	4	0	0	0	1	0	0	0	100						dark red with small siliceous clasts and large opaque clasts
221		LID32		156	314459	6412939	12	0	2	1	1	1.4	19	14	5	0	0	0	8	4	4	0	6	2,0	0	1	0	0	0	1	100						light yellow with pink subcortex, med clasts, distal missing, facetting on platform extends onto scar below platform
222		LID32		157	314459	6412939	12	0	2	11	1	0.8	12	12	4	10	2	1	6	3	2	0	4	1,0	0	0	0	0	0	1	90						light cream with grey blue heat affect, distal broken
223		LID32		159	314451	6412938	12	0	1	9	2	3.1	26	13	7	80	1	0	7	2	6	0	4	1	0	0	7	0	0	0	20						
224		LID32		160	314451	6412938	12	0	1	1	1	7.7	31	28	8	0	0	0	12	10	2	0	5	0	0	0	1	0	0	0	100						dark red with white inclusions, very poor raw material
225		LID32		161	314451	6412938	12	0	1	1	1	5.4	47	19	10	0	0	6	7	11	1	0	4	1,0	0	1	1	0	0	0	100						dark red, conjoining with greasy lustre on break only (heated whilst flake then broken), 2nd ventral surface present
226		LID32		162	314451	6412938	12	0	1	1	1	0.4	11	9	4	60	1	6	11	4	1	1	0	0	0	0	1	0	0	0	40						greasy lustre on platform and ventral only
227		LID32		164	314452	6412935	12	0	1	12	1	5.7	29	26	8	0	0	0	18	7	1	0	11	4,1	0	0	3	0	0	0	100						dark brown coarse grained
228		LID32		165	314449	6412937	12	0	3	4	1	2.9	25	16	7	0	0	0	17	6	1	0	8	0	0	0	1	2,4,6	1	0	100						light cream, very fine grained
229		LID32		166	314449	6412937	12	0	4	2	0	1	23	13	5	0	0	0																		cream, very fine grained	
230		LID32		167	314457	6412941	12	0	3e	1	1	28.2	44	30	22	10	1	0	33	20	1	0	2	0	0	0	R	5,7,8	7	0	90	0	0	1,2,3	0		dark red, limited siliceous inclusions
231		LID32		168	314457	6412941	12	0	1	1	1	3.2	32	20	4	70	1	0	14	6	3	0	2	0	0	0	1,8	0	0	0	30						light red cortex with bright yellow interior
232		LID32		169	314457	6412941	12	0	2	1	1	1.1	11	14	6	0	0	0	13	8	2	0	2	0	0	0	0	0	0	1	100						light yellow with med clasts, distal broken
233		LID32		170	314457	6412941	12	0	2	1	1	4.6	28	23	5	0	0	0	20	7	3	0	4	1,0	0	0	0	0	0	1	100						mid grey with med clasts, distal broken
234		LID32		171	314457	6412941	12	0	1	1	1	3.7	28	22	7	0	0	0	14	3	1	0	5	1,0	0	1	3	0	0	0	100						light grey banded with v.fine siliceous inclusions
235		LID32		172	314457	6412941	12	0	2	2	0	1.5	28	21	5	5	1	0	0	0	0	0	3	1,0	0	0	3	0	0	4	95						mid yellow with heavy patination on dorsal, left and right margins missing and broken diagonally from left to right
236		LID32		173	314457	6412941	12	0	2	1	0	2.6	18	28	4	95	1	6	0	0	0	0	2	0	0	1	1	0	0	1	5						dark red, greasy lustre on ventral only, proximal missing
237		LID32		174	314457	6412941	12	0	2	2	0	0.7	8	29	5	100	1	0	0	0	0	0	0	0	0	0	1	1	0	1	0						<

Total	No.	Site Name	Scrape #	No.	E_MGA	N_MGA	Spit/Loci	Interval	AC	RM	KM	Wt	Lgth	Width	Thick	0%C	CT	HA	PW	PT	PS	OH	DSC	S/HDSC	PDSC	DSRot	Term	RLOC	RT	AB	%Flkd	Rot	PP	ST	Exh	Comment		
248		LID32		187	314445	6412938	12	0	11	1	0	0.1	10	8	1	0	0	2																			pot lid	
249		LID32		188	314445	6412940	12	0	4	1	0	2.2	15	12	7	10	1	1,6																				
250		LID32		189	314445	6412940	12	0	1	11	1	0.1	9	7	3	20	2	0	6	2	7	0	2	0	0	0	0	3	0	0	0	80						
																																					light grey with some pink ha, distal tip broken, 1 dorsal scar heavily weathered - poss surface just below cortex	
251		LID32		190	314445	6412940	12	0	2	1	1	12.1	50	29	11	0	0	1	19	4	3	0	2	0	0	0	0	0	0	1	100							
252		LID32		191	314445	6412940	12	0	2	2	1	1.1	31	9	3	0	0	0	2	1	1	0	7	0,1	0	2	0	0	0	1	100							mid red, distal tip broken, redirecting flake
																																					dark red cortex with light to dark grey interior, partial potlid on ventral	
253		LID32		192	314445	6412940	12	0	1	1	1	2.7	20	18	8	20	1	1,2,6	19	9	7	0	2	0	0	0	1	0	0	0	80							light yellow with red sub-cortex skin on platform and 1 dorsal scar
254		LID32		193	314445	6412940	12	0	3	1	1	1.5	24	12	6	10	1	0	9	3	1	0	3	0	0	0	1	7	1	0	100							heavily patinated, breaks on both margins up to prox and distal missing
255		LID32		194	314445	6412940	12	0	2	2	1	1.6	20	15	5	0	0	0	0	0	0	0	1	0	0	0	0	0	0	4	100							mid red with heavy patination, recent break from right margin to distal, recent ed
257		LID32		196	314445	6412940	12	0	2	2	1	1.9	21	12	6	15	1	0	10	9	7	0	2	0	0	0	0	0	0	4,5	85							burin spall, orange-brown sub-cortical skin present on dorsal
258		LID32		197	314445	6412940	12	0	1	11	1	0.7	27	6	5	0	0	0	3	0	6	0	3	0	0	0	1	0	0	0	100							light cream and grey, distal broken
259		LID32		198	314445	6412940	12	0	2	6	1	0.6	17	9	4	0	0	0	6	3	1	0	3	0	0	0	0	0	1	100							distal broken	
260		LID32		199	314445	6412940	12	0	2	11	1	1	22	9	5	0	0	0	4	2	3	0	2	0	0	0	0	0	1	100							mid red brown cortex, heavy patination on 1 dorsal scar	
261		LID32		200	314445	6412940	12	0	2	11	1	0.2	19	6	3	5	4	0	4	3	1,7	2	0	0	0	0	0	0	1	100								
262		LID32		201	314445	6412940	12	0	2	6	1	0.6	11	22	3	0	0	0	15	3	2	2	0	0	0	1	0	0	0	1	100							same rm as 198, winged platform, distal missing
																																					mid red, heavy patination on dorsal, lighter on ventral, less on break and rt	
263		LID32		202	314434	6412934	12	0	2,3	2	1	1	20	8	5	0	0	0	4	3	2	0	5	0	0	1	0	6	1	1	100							thick break through mid section
264		LID32		203	314434	6412934	12	0	2	1	0	1.4	17	11	7	0	0	0	0	0	0	0	9	0	0	1	1	0	0	4	100							break from right margin to right distal
265		LID32		204	314434	6412934	12	0	2	9	1	0.1	10	6	2	0	0	0	6	2	1	0	1	0	0	0	1	0	0	4	100							dark red
266		LID32		205	314434	6412934	12	0	1	2	1	0.9	17	13	5	40	1	0	5	3	1	0	3	0	0	0	1	0	0	0	60							heavily patinated on dorsal, left margin and part of introflexed term missing
267		LID32		206	314434	6412934	12	0	2	2	0	0.9	15	14	3	0	0	0	13	0	6	0	1	0	0	0	0	0	4	100							mid yellow brown, distal missing	
268		LID32		207	314434	6412934	12	0	2	2	1	1.5	13	16	6	0	0	0	14	6	2	1	6	1,1	0	0	0	0	1	100								
																																					mid red with black red patination, v.thick break	
269		LID32		208	314434	6412934	12	0	2	2	1	3.8	16	27	7	10	1	0	16	7	1	0	4	0	0	1	0	0	1	90							mid pink with med clasts, v thick break	
270		LID32		209	314434	6412934	12	0	2	1	1	2.8	22	16	7	0	0	0	0	0	0	0	6	0	0	1	1	0	0	1	100							mid brown yellow with left and right margins broken, including right proximal
271		LID32		210	314399	6412969	13	0	2	2	1	2.7	15	21	7	95	1	0	12	2	1	0	0	0	0	0	1	0	0	2	5						mid yellow, ed on distal	
272		LID32		211	314415	6412981	14	0	2	2	0	1.1	19	13	3	0	0	0	0	0	0	0	5	0	0	0	1	0	0	1,5	100							dark red with some area of skin below cortex and cortex
273		LID32		212	314428	6412982	15	0	5	1	1	195.2	82	53	31	35	1	0																			mid yellow	
274		LID32		212a	314428	6412982	15	0	4	1	0	0.1	11	6	2	0	0	0																				
275		LID32		212b	314428	6412982	15	0	2	2	1	1.9	20	14	9	10	1	0	0	0	0	0	4	0	0	1	8	0	0	1	90							heavily patinated, proximal broken, redirecting flake
276		LID29		213	314395	6413551	16	0	2	6	1	3.1	34	14	5	10	1	0	5	3	1	0	6	0	0	0	0	0	0	1	90							red cortex, distal missing
																																					proximal and distal missing, some usewear on proximal break	
277		LID29		214	314395	6413551	16	0	2,3b	1	0	1.7	27	12	5	0	0	6	0	0	0	0	1	0	0	0	0	4	3	1	100							
																																						1 pfa perpendicular to flake axis and in line likely to have partially fractured core prior to final flaking, also additional former ventral with double pfa, usewear within rt scars
278		LID29		215	314364	6413497	17	0	3	2	1	117.2	68	44	29	40	1	0	30	13	7	0	6	0,1	0	1	R	6,8	1	0	60							some ed on distal
279		LID29		216	314357	6413494	17	0	1	2	0	2.5	23	12	7	0	0	0	4	10	1	0	5	0,1	0	0												

Total	No.	Site Name	Scrape #	No.	E_MGA	N_MGA	Spit/Loci	Interval	AC	RM	KM	Wt	Lgth	Wdth	Thick	0%C	CT	HA	PW	PT	PS	OH	DSC	S/HDSC	PDSC	DSRot	Term	RLOC	RT	AB	%Flkd	Rot	PP	ST	Exh	Comment			
289	LID30			227	314160	6413342	20	0	1	2	1	0.6	12	12	3	10	1	0	6	2	7	1	3	0	0	0	3	0	0	5	100							mid red with dark red cortex, ed has removed small portion of left and right margins	
290	LID30			228	314156	6413342	20	0	11	2	0	6.5	29	16	13	15	1	4,5																				heavily weathered light red with dark red cortex, ed on right margin	
291	LID30			229	314156	6413342	20	0	1	2	1	4.2	27	21	7	10	1	0	7	2	7	0	5	1,0	0	1	1	0	0	5	90								dark red cortex with heavy patination
292	LID30			230	314156	6413342	20	0	1	2	1	1.5	9	15	9	30	1	0	1	1	6	0	5	0	0	0	1	0	0	0	70								
293	LID30			231	314156	6413342	20	0	2	1	1	0.4	9	10	3	0	0	0	0	0	0	0	4	0	0	0	0	0	0	1	100								distinctive cream and brown banded, medial portion
294	LID30			232	314156	6413342	20	0	11	2	0	1.1	17	10	5	0	0	5																			dark red		
295	LID30			233	314166	6413332	20	0	11	2	0	1.2	18	14	5	0	0	5																			mid red, heavily patinated		
296	LID30			234	314166	6413332	20	0	1	2	1	0.1	8	7	1	0	0	0	4	1	1	0	4	0	0	0	3	0	0	0	100								mid yellow red
297	LID30			235	314166	6413332	20	0	2	2	1	0.3	13	8	4	0	0	0	3	6	1	0	3	0	0	0	0	0	0	1	100								light red to red yellow, distal missing
298	LID30			236	314166	6413332	20	0	11	2	0	0.7	14	11	4	0	0	5																			light red with mod to heavy patination		
299	LID30			237	314166	6413332	20	0	2	2	1	3.1	21	16	8	0	0	0	19	13	1	0	2	0	0	0	0	0	0	1	100								heavily weathered mid yellow
300	LID30			238	314166	6413332	20	0	2	2	0	0.8	11	12	4	0	0	0	0	0	0	0	2	0	0	0	0	0	0	1	100								light red yellow, medial portion
301	LID30			239	314166	6413332	20	0	11	2	0	0.6	12	11	4	0	0	5																					
302	LID30			240	314166	6413332	20	0	3,2	2	1	8.8	33	20	12	5	1	0	7	4	7	1	6	0	0	0	R	4,8	2	3	95								dark red, heavily patinated, rt creates notch on left margin
303	LID30			241	314156	6413346	20	0	4	2	0	0.5	13	8	7	15	1	0																				light red with fresh breaks and some areas of heavy patination	
304	LID30			242	314156	6413346	20	0	11	2	0	3.9	22	21	10	0	0	5																				dark red with areas of heavy patination	
305	LID30			243	314157	6413368	20	0	2,3	2	0	3.8	14	28	9	30	1	0	0	0	0	0	4	0	0	1	R	6,8	1	0	70								mid red with dark red cortex
306	LID30			244	314170	6413377	20	0	1	12	1	9.2	13	18	7	30	1	0	18	11	7	0	2	0	0	0	3	0	0	0	70								heavily weathered
307	LID30			245	314139	6413384	20	0	11	2	0	0.8	14	7	6	0	0	5																				heavily patinated	
308	LID30			246	314139	6413387	20	0	2	1	0	4.3	24	18	7	0	0	6	0	0	0	0	4	1,0	0	0	1	0	0	4	100								proximal missing and broken from right lateral to distal, greasy lustre on 1 break
309	LID30			247	314139	6413387	20	0	3	1	1	4.9	19	29	8	100	1	0	29	8	7	0	0	0	0	R	6,7,8	1	0	0									light yellow with brown cortex, usewear on rt
310	LID30			248	314139	6413387	20	0	2	2	0	0.4	11	9	4	10	1	0	7	4	7	0	3	0	0	0	0	0	4	90								patinated, distal and right margin missing	
311	LID30			249	314139	6413387	20	0	1	2	1	7.3	24	23	19	30	1	0	21	14	7,1	0	7	1,2	0	2	3	0	0	0	70	0	0		0	0		0	patinated, mid red with yellow on interior
312	LID30			250	314139	6413387	20	0	2	1	0	0.1	9	7	4	0	0	0	8	3	1	1	2	0	0	0	0	0	4	100	0	0		0	0		0	dark red and grey, distal and right missing	
313	LID30			251	314139	6413384	20	0	1	2	1	1.6	14	12	7	10	1	0	16	8	1	0	5	0	0	1	1	0	0	0	90	0	0		0	0		0	mid yellow with dark red cortex, edge damage on left margin
314	LID30			252	314138	6413388	20	0	2,3	2	1	12.9	28	33	12	80	1	0	26	13	1	0	2	0	0	0	R	5,7,8	2	4	20	0	0		0	0		0	heavily patinated, including on rt scars, recent damage on platform and left margin
315	LID30			253	314127	6413391	20	0	2	2	0	5.9	24	23	11	20	1	0	0	0	0	0	3	0	0	0	0	0	4	80	0	0		0	0		0	light pink-yellow with dark red cortex, thick breaks on distal, left and right margins	
316	LID30			254	314127	6413391	20	0	2	2	1	0.8	15	14	4	90	1	0	16	3	1	0	1	0	0	0	1	0	0	2	10	0	0		0	0		0	light yellow with darker cortex and pink tip, crushing on platform
317	LID30			256	314127	6413391	20	0	2	2	0	0.1	5	3	1	0	0	0	0	0	0	0	1	0	0	0	0	0	4	100	0	0		0	0		0	light yellow	
318	LID30			257	314129	6413390	20	0	2	2	0	0.1	13	6	4	0	0	0	0		0	0	2	0	0	1	0	0	1	100	0	0		0	0		0	light yellow	
319	LID30			258	314129	6413390	20	0	4	2	0	0.7	14	10	5	0	0						0		0			0	0	100	0	0		0	0		0	dark red, very glossy	
320	LID30			259	314129	6413390	20	0	1	9	0	10.7	39	24	11	0	0	0	15	9	6	0	6	0	0	0	4	0	0	0	100	0	0		0	0		0	flawed quartz with incipient fracture plains
321	LID30			261	314123	6413390	20	0	2	1	0	0.9	13	8	7	0	0	0	0	0	0	0	3	0	0	0	0	0	1	100	0	0		0	0		0	light yellow with red sub-cortex , medial fragment	
322	LID30			262	314123	6413390	20	0	2	1	0	1.2	19	14	5	0	0	0	0	0	0	0	4	0	0	0	0	0	4	100	0	0		0	0		0	light yellow with darker red patches, medial section	
323	LID30			263	314123	6413390	20	0	2	1	0	0.4	9	9	4	0	0	0	0	0	0	0	4	0	0	0	0	0	1	100	0	0		0	0		0	light yellow, medial portion	
324	LID30			264	314123	6413390	20	0	4	4	0	0.7	14	11	5	10	4						0		0	0		0	0	0	0	0	0		0	0		0	dark grey
325	LID30			265	314123	6413390	20	0	2	2	0	0.4	10	8	5	70	1	0	0	0	0	0	0	0	0	0	0	0	1	30	0	0		0	0		0	light yellow with dark red cortex, medial portion	
326	LID30			266	314123	6413390	20	0	2	2	0	0.1	10	5	3	0	0	0	0	0	0	0	2	0	0	0	1	0	0	1	100	0	0		0	0		0	light yellow, distal portion only
327	LID30			267	314123	6413390	20	0	2	2	0	0.1	7	5	2	0	0	0	0	0	0	0	1	0	0	0	0	0	4	100	0	0		0	0		0	mid yellow-orange	
328	LID30			268	314123	6413390	20	0	2	2	0	0.1	7	6	1	0	0	0	0	0	0	0	1	0	0	0	0	0	4	0	0	0		0	0		0	mid red, medial portion	
329	LID30			269	314123	6413390	20	0	2	2	0	0.1	8	6	1	0	0	0	0	0	0	0	1	0	0	0	0	0	4	100	0	0		0	0		0	light yellow, medial portion	
330	LID30			271	314122	6413384	20	0	11	2	0	3.2	23	12	11	0	0	4,5					0		0	0		0	0	100	0	0					0		
331	LID30			272	314125	6413375	20	0	5	2	1	18.6	40	26	18	20	1	0					0		0	0		0	0	0	4	1	1,2,3	1				light yellow with darker cortex, possible ventral surface but not clear	
332	LID30			273	314134	6413364	20	0	4	2	0	0.9	21	12	6	0	0						0		0	0		0	0	100	0	0					0		
333	LID30			274	314134	6413364	20	0	11	2	0	0.1	15	10	2	0	0	2					0		0	0		0	0	100	0	0					0	dark red pot lid	
334	LID30			275	314134	6413364	20	0	2	2	0	4.5	23	16	8	0	0	0	23	9	4	0	6	0	0	0	0	0	1	0	0	0		0	0		0	banded yellow and brown, distal missing, some 'ripping' on platform	
335	LID30			276	314133	6413360	20	0	2	1	1	0.9	11	19	4	0	0	0	9	1	6	0	5	0	0	0	1	0	0	2	0	0	0		0		0	coarse dark grey and brown, right margin missing	
336	LID30			277	314133	6413360	20	0	3,2	2	0	6.6	33	20	10	0	0	0	0																				

Total	No.	Site Name	Scrape #	No.	E_MGA	N_MGA	Spit/Loci	Interval	AC	RM	KM	Wt	Lgth	Width	Thick	0%C	CT	HA	PW	PT	PS	OH	DSC	S/HDSC	PDSC	DSRot	Term	RLOC	RT	AB	%Flkd	Rot	PP	ST	Exh	Comment					
337		LID30		278	314133	6413360	20	0	3	2	1	29.6	40	45	19	30	1	0	11	4	3	0	6	0,2	0	2	1	4,5	1	0	70	0	0		0	mid red and yellow (dark on cortex), use on distal, retouched on right to create notch and nose with use					
338		LID30		279	314133	6413360	20	0	11	2	0	4.9	31	14	11	0	0	4,5					0		0	0			0	0	0	0	0	0	0	0	2 clear negative scars present but too broken to identify further				
339		LID30		280	314133	6413360	20	0	2	1	1	3.7	22	13	10	20	1	0	13	14	7	0	5	0	0	0	0	0	0	1	0	0	0	0	0	0	0	light yellow, break on distal much less patinated but with use			
340		LID30		281	314133	6413360	20	0	2	1	0	0.5	12	8	4	10	1	0	0	0	0	0	2	0	0	0	0	0	0	0	4	0	0	0	0	0	0	0	light yellow, medial portion		
341		LID30		282	314133	6413360	20	0	1	2	1	1.3	12	13	7	50	1	0	13	8	1	0	3	0	0	1	1	0	0	0	0	50			0	0	light yellow with pink on platform				
342		LID30		283	314133	6413360	20	0	2	2	0	1.6	16	10	6	0	0	0	0	0	0	0	5	0	0	1	0	0	0	1	100	0	0		0	0	0	0	mid red, heavily patinated, medial portion		
343		LID30		284	314133	6413360	20	0	1	1	1	16.1	39	31	12	0	0	0	23	8	1	0	7	0,2	0	1	1	0	0	0	0	100	0	0		0	0	0	0	light red with large clasts, some breakage on edge	
344		LID30		285	314104	6413418	20	0	2	9	1	0.4	12	10	4	0	0	0	9	4	2	0	4	0	0	0	0	0	0	0	1	100	0	0		0	0	0	0	distal missing	
345		LID30		286	314105	6413431	20	0	2	1	0	0.8	22	17	3	0	0	0	0	0	0	0	4	0	0	0	0	0	0	0	4	100	0	0		0	0	0	0	medial portion with left margin missing	
346		LID30		287	314097	6413439	20	0	2	1	0	3.2	22	13	8	0	0	0	0	0	0	0	5	1,1	0	0	0	0	0	0	4	100	0	0		0	0	0	0	medial portion with left margin missing	
347		LID30		288	314094	6413441	20	0	2	2	0	3.8	31	28	7	20	1	0	12	4	6	0	5	0,1	0	0	0	0	0	0	4	80	0	0		0	0	0	0	light yellow, edge of prox, right margin and distal broken	
348		LID30		289	314090	6413446	20	0	4	2	0	0.7	14	9	6	10	1						0		0	0			0	0	90	0	0		0	0	0	0			
349		LID30		290	314088	6413450	20	0	11	2	0	3.4	27	11	9	0	0						0		0	0			0	0	100	0	0		0	0	0	0			
350		LID30		291	314085	6413458	20	0	1	10	1	7.1	21	30	9	30	1	0	11	6	1	0	3	0	0	1	1	0	0	0	0	70	0	0		0	0	0	0	dark red grey, fine grained	
351		LID30		293	314083	6413499	21	0	3	1	1	90	62	67	17	20	1	0	31	14	1	0	3	0	0	0	R	6,7,8	2	0	80	0	0		0	0	0	0	medium grained, retouch creates notch and nose on distal		
352				294	0	0	0	0	3	2	1	248	50	31	63	80	1	0	R	R	R	1	1	0	0	1	1	1	7	0	20	1	1	3	1	1	0	0	one negative dorsal scar repatinated, tabular mudstone cobble		
353		LID32 sub-surface	6	295	314378	6413023		0	1	4	1	5.7	33	24	7	0	0	0	9	4	1	0	5	0	0	0	6	0	0	0	100	0	0		0	0	0	0	dark grey banded material, ed on right margin, identified in historical scrape 2 within scrape 6		
354		LID32 sub-surface	6	296	314385	6413017		0	2	1	0	4.2	32	15	9	0	0	0	0	0	0	0	4	0	0	0	1	0	0	0	1	100	0	0		0	0	0	0	dark grey and pink, distal only, identified in historical scrape 1 within scrape 6	
355		LID32 sub-surface	6	297	314383	6413018		0	1	1	0	17	38	16	25	10	1	0	15	0	6	0	5	0	0	1	1	0	0	0	0	90	0	0		0	0	0	0	grey and pink, platform broken during manufacture, identified in historical scrape 1 within scrape 6	
356		LID32		298	314396	6412974	13	0	2	1	1	4.9	37	15	6	0	0	0	18	5	1	0	4	0	0	1	0	0	0	0	1	100	0	0		0	0	0	0	grey and pink, distal missing	
357		LID32		299	314376	6412995	14	0	2	6	1	2.9	33	16	5	0	0	0	11	2	6	0	6	1,0	0	0	0	0	0	0	0	1	100	0	0		0	0	0	0	banded yellow and brown, distal missing



Newcastle

75 York Street
Teralba NSW 2284

Ph. 02 4950 5322

www.umwelt.com.au