Appendix 13
Aboriginal Heritage

South East Open Cut Project
&
Modification to the
Existing ACP Consent

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Aboriginal Archaeological Assessment

Ashton Coal Operations Ltd
Proposed South East Open Cut Project

Report to:
Ashton Coal Operations Ltd

5th November 2009

Aboriginal Archaeological Assessment

Ashton Coal Operations Ltd
Proposed South East Open Cut Project

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Our Reference	Arch_Report_ACOL_FINAL_05112009_V2	
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Executive Summary

Insite Heritage Pty Ltd have been commissioned by Ashton Coal Operations Ltd (ACOL) to conduct an Aboriginal archaeological heritage assessment of an area that has been selected for the development of the South East Open Cut coal mine (herein described as the study area).

ACOL currently operate the ACP both underground and open cut coal mines approximately 14km north of Singleton in the Hunter Valley. The study area adjoins the current underground operations east of Glennies Creek and is separated from the existing open-cut by the New England Highway.

The Aboriginal archaeological assessment identified 85 archaeological sites (artefact scatters, isolated finds and scarred trees combined) within the study area. The sites have been grouped into landscape units and recorded on site recording cards electronically submitted to DECCW (refer Appendix H). A number of identified sites were of low significance, comprising low density open artefact scatters or isolated finds, however sites located on the terrace and slopes above Glennies Creek are considered to be of moderate to high scientific significance within a local and regional context.

The sites are located on shallow soils and there is low potential for stratified deposits, as is typical of open sites in the Hunter Valley. However, the significance of the sites arises from the cumulative contexts, dense site contents and in some cases, apparent horizontal integrity of the assemblages. Should these sites require salvage the information will form a data base from which to explore inter and intra loci variability. The analysis shall also consider the application of the models arising from Witter's 2002 assessment of the area west of Glennies Creek.

When approved, the proposed development will directly impact on the sites located within the study area. Further investigation and the salvage of thee sites is warranted on the basis of cultural and scientific significance. Detailed recommendations are contained within the body of this report (refer to Section 7.0 and Appendix D). Whilst the majority of sites will be impacted, the scarred tree located in the area of the dam is unlikely to be impacted by inundation (Appendix E & F).

The area is of significance to many of the stakeholders. To address the cultural significance of the area it is proposed to develop a detailed methodology for salvage of the sites with the stakeholders by means of a workshop. The methodology will seek to address the scientific questions arising from the sites as well as the stakeholders need to address cultural requirements.

A geomorphological assessment was undertaken by Dr Philip Hughes (refer Appendix G). The geomorphology fieldwork was carried out on the 26th October 2009 and a field day was held with the stakeholders on the 27th October 2009. The field day gave an opportunity for stakeholders to discuss Dr Hughes' findings with him. The assessment did not identify any evidence of Pleistocene landscapes to be located within the study area.

The authors of this report are Angela Besant, Christopher Carter and Elizabeth Wyatt of Insite Heritage Pty Ltd.

1.0 Project Overview

1.1 Location

The study area is located in the upper Hunter Valley, New South Wales, approximately 14km north of Singleton adjacent to the New England Highway and south of the village of Camberwell.

The location of the study area is outlined in Figure 1 below and covers an area of approximately 400 hectares.

1.2 Project Details

The proposed development involves the construction and operation of an open cut coal mine with associated surface facilities, access roads, environmental bund and conveyor linking the proposed mine to existing processing facilities. Coal will be extracted via open-cut methods within the study area (refer to Figure 2 below). The conveyor will then transport the coal across Glennies Creek, the New England Highway and to Ashton Coal surface facilities on the north side of the Highway.

A power line is also proposed which will take one of two route options. The routes traverse the underground mine area, and then travels on the southern boundary of the open cut area. The proposed routes can be seen in Figure 2.

1.3 Site Description

The study area is bounded to the north by the New England Highway and to the west by Glennies Creek. The New England Highway runs along a ridge line with several tributaries flowing west from the ridge through the study area to Glennies Creek. The majority of the study area is linked via a corridor to the existing facilities of Ashton Coal. This corridor runs from the north-west section of the study area crossing Glennies Creek to link with the existing mine on the northern side of the New England Highway (see Figure 1).

The study area is currently used for grazing and in part occasional cropping. At least ten residential buildings with sheds, stables and yards are located within the study area. The majority of the land has been cleared with some standing timber within the Camberwell Common, along creek lines and in a small area in the south-eastern corner of the study area. The study area has been divided, via wire fencing, into numerous paddocks. Some paddocks have been pasture improved with lucerne cultivated in several paddocks in the south-western sector of the study area adjacent to Glennies Creek. A public road (Glennies Road) provides access from the New England Highway to properties within the study area.

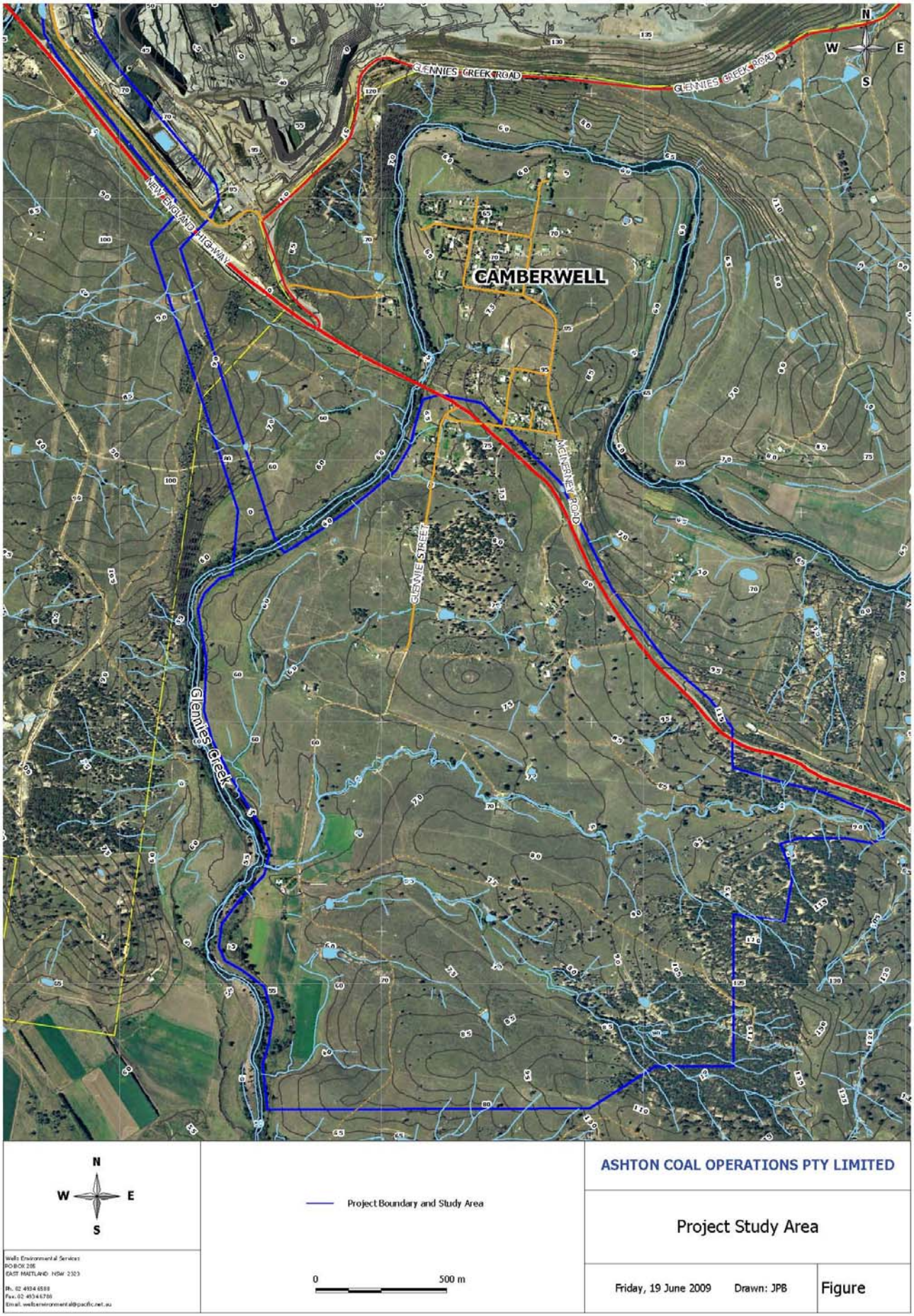


Figure 1 - Plan of Study Area (outlined in dark blue). Glennies Creek bounds area to the west with the New England Highway to the north-east. *(courtesy Wells Environmental Services)*.

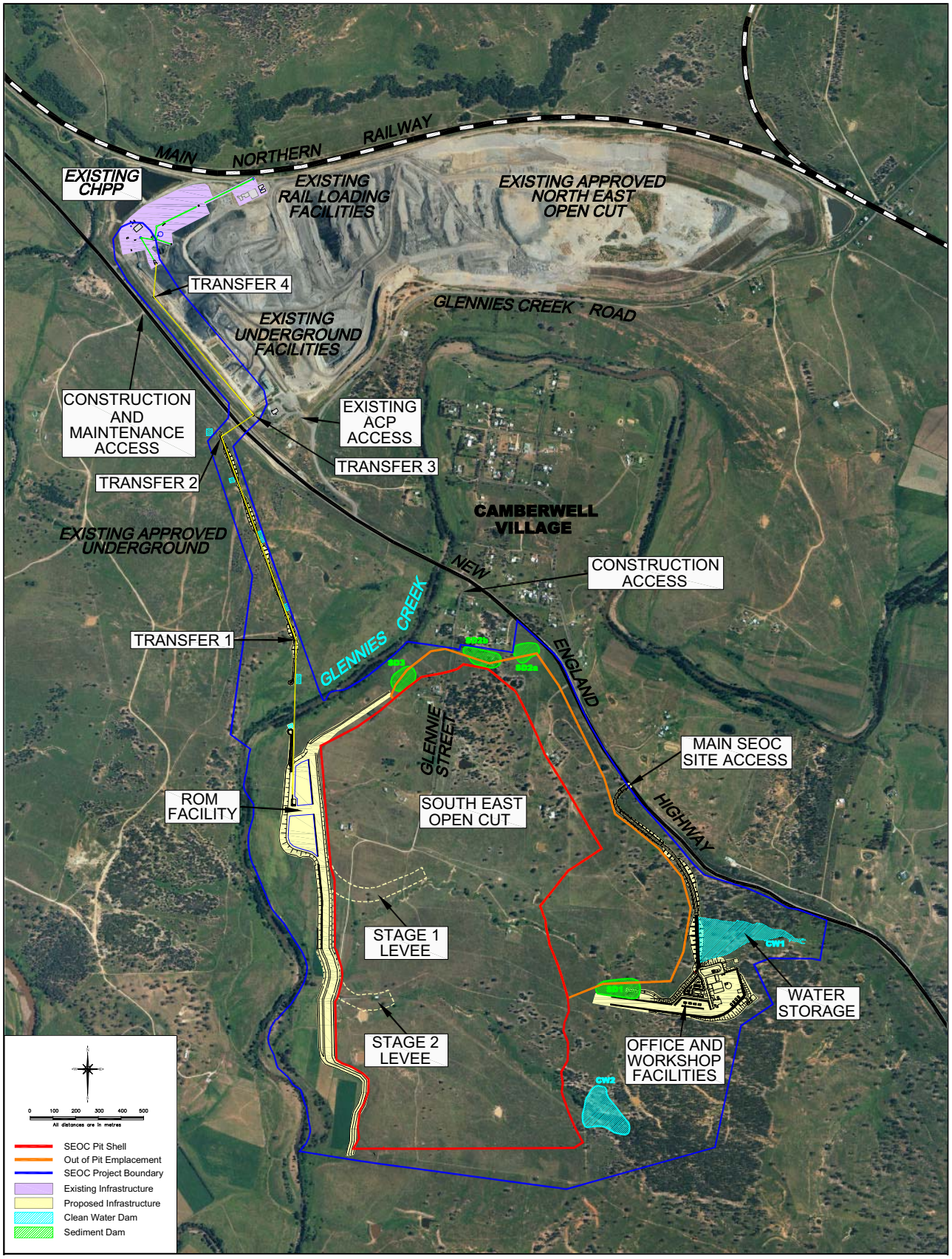


Figure 2 - Project Details (study area outlined in dark blue) (courtesy ACOL)

1.4 Community Consultation

Community consultation for the project was conducted by Wells Environmental Services consultants and ACOL.

Letters of notification of the project and a request for the contact details of Aboriginal stakeholder groups who may have an interest in the project were sent to Department of Environment & Climate Change (DECC), NSW Native Title Services, Office of the Registrar and Singleton Council.

Letters of invitation to register an interest in the project were sent to all stakeholders known to ACOL in accordance with their own register. Additional stakeholders identified by the aforementioned departments were also invited by letter to register. The dates of letters and responses can be seen in Appendix B.

Advertisements of the project, inviting registrations of interest from community stakeholder groups and individuals, were placed in the public notices section of the Singleton Argus and the Sydney Morning Herald on the 09.10.2008 and 17.10.2008.

A total of 21 registrations of interest were received for the project. All registrations were contacted by mail and invited to participate in the field work. Due to the number of registrations field work was assigned on a roster basis, of three days per group with the groups indicating preferred days for work.

The field work was attended by representatives from the following groups:

Table 1 - List of Community Groups who participated in the field work.

Culturally Aware	Ungooroo Aboriginal Corp.	Hunter Valley Cultural Consultants
Ungooroo C.C. Services	Giwiir Consultants	Wonnarua Nations Aboriginal Corp.
Wattaka Cultural Consultants Services	Upper Hunter Heritage Consultants	Lower Hunter Wonnarua Council Inc.
Wanaruah Local Aboriginal Land Council	Cacatua Culture Consultants	Hunter Valley Cultural Surveying
Wonnarua Culture Heritage	Hunter Valley Aboriginal Corp.	Yarrawalk Enterprises
Aboriginal Native Title Consultants	Wonn1 Contracting	

Late registrations of interest were received from Yinarr Cultural Services (25 05.09), Mr S Franks (02.09.09 - Mr Franks was also registered as Biami and has advised that all registrations for him are to be listed under Tocomwall Pty Ltd), Mrs. B Foot (via email correspondence from the DECCW on 03.09.09) and Valley Culture (19.10.09).

All registered parties have received a draft copy of the report for their review and comment. In general the community have supported the process to date. Should approval be granted the salvage methodology will be developed in a workshop with the community, and their ideas incorporated into the final salvage plan.

The stakeholders were invited to attend a field inspection of the geomorphology work on the 27.10.09. Dr Hughes explained his results to the community and was

available for questions. At this time the stakeholders were also informed of the status and general progress of the project.

Please refer to Appendices A and B for the community consultation log and project advertisements and Appendix D for Community Reports.

1.5 Environmental Context

Geology & Soils

The study area is predominantly located within the Roxburgh and Hunter Soil Landscapes adjacent to Glennies Creek (Kovac & Lawrie 1991).

The generalised geology of the Hunter Valley places the study area within the Late Permian Singleton Coal Measures and comprises coal, tuff, conglomerates, shales, fluvial and barrier sandstones (Drysdale *et al*, 2000:12). The main soil types are yellow Soloths on slopes with Earthy and Siliceous Sands on mid to lower slopes. Red Soloths, red Solodic Soils and Red Podzolic Soils also occur (Kovac & Lawrie 1991:254

Sandstone exposures were noted in several on slopes and crests where sheet erosion had removed the upper soil unit.

The main soil types consist of Red Clays on mid to upper slopes, with Black Earths and Grey Clays on mid to lower slopes.

The soils of the Hunter Soil Landscape are formed from Quaternary alluvium with the main types consisting of Brown Clays and Black Earths on former channels and tributary flats. Alluvial Soils occur on levees and flats adjacent to the current channel with Red Podzolic Soils and Lateritic Podzolic Soils on former terraces and Non-calcic Brown Soils and yellow Solodic Soils in some drainage lines (Kovac & Lawrie 1991:212).

Within the Roxburgh Soil Landscape Yellow Podzolic Soils occur on upper to mid slopes with red Solodic Soils on more rounded hills, with Lithosols occurring on crests. Where outcrops of conglomerate occur Brown Podzolic Soils occur on slopes, with Yellow Soloths also present in some drainage lines (Kovac 1991).

The flood regime of the Hunter Valley has impacted on the alluvial soils along the Hunter River and major tributaries including Glennies Creek (Geary *et al*, 2000:70). Deep cuts along Glennies Creek have exposed alluvial soils of over 4m thick.

Landform & Topography

The landform of the study area is characterised by undulating low hills. Elevations range from 50m at Glennies Creek with slope gradients range from 4-7% with slope lengths from 800-1000m. Local relief ranges from 50-120m. Rounded undulating low hills with elevations from 110-130m occur across the eastern sector of the study area. The New England Highway runs along the north-eastern boundary of the study area and its route follows a ridge line in this sector. This ridge line contains the highest areas of the study area with elevations between 110m and 130m.

The Hunter Soil Landscape is located on the level flood plains and river terraces of Glennies Creek. Elevations range from 50-60m with slopes from 0-3% and local relief less than 10m (Kovac & Lawrie 1991:213). The Roxburgh Soil Landscape is

located on undulating low hills and undulating hills with local relief from 60-120m and slopes from 8-10% (Kovac 1991).

Vegetation

Local native vegetation comprises open-woodland with main tree species of ironbark, yellow box, white box, and eucalypt with a grassy understorey (Drysdale *et al*, 2002:25).

Few stands of native vegetation remain in the study area due to the clearing of land for agricultural purposes.

The creek terraces along the western boundary of the site have been repeatedly ploughed for cropping. Much of the current tree cover has regrown since the 1950's. The 1958 air photo shows the site as a degraded, cleared property.

Hydrology

The study area is bounded to the west by Glennies Creek, a permanent (third order) stream that is a tributary of the Hunter River. The confluence of the Hunter River and Glennies Creek is approximately one kilometre south of the study area. Four ephemeral streams (first and second order) flow into Glennies Creek within the study area. Their catchment is generally contained within the study area and they rise below the ridge crest along the north-eastern boundary. While these watercourses are ephemeral, deep 'chains-of-ponds' were noted in several reaches and may have held water for extended periods.

Noble (in Witter,2002:5) quoted Dangar in 1824 when he described Glennies Creek as a "...narrow, deep, swift flowing stream full of fresh water fish, mussels and waterfowl". While Glennies Creek was described as being permanent, the creek did run dry in the 1845 drought.

The 1:100 flood level of the Hunter River covers the low floodplain and first and second terraces of Glennies Creek and can deposit sediments up to 50cm thick (Mitchell, 2002:7).

2.0 Archaeological Context

2.1 Regional Indigenous Archaeological Context

In the course of development related studies evidence of Aboriginal occupation has generally been dated to the Holocene period (the last 10,000 years). There have been a few examples of sites dated back to the Pleistocene within the Hunter Valley to supportevidence found in other parts of NSW proving Aboriginal occupation extending back into the Pleistocene. An example is the world's oldest ritual cremation at Lake Mungo in western NSW dated to 26,000 year ago (Mulvaney *et al*. 1999). The potential for sites dating back to the Pleistocene in open environments such as predominates in the Hunter, is due to environmental factors. Other Pleistocene dates have been found in other environmental contexts such as Moffats Swamp where Baker (1994) found material dating to 17,000 years ago deep within the Pleistocene sand dunes.

Sites from the Holocene (the last 10,000 years) period are far more common in the open site context. Within this period the morphology of the stone artefacts has been used to give a general estimate of the antiquity of the manufacturing technique. Earlier reduction techniques have been known as the 'core and scraper tradition' that focused on the initial reduction of cores to produce flake blanks for use as tools (Koettig 1990). The resultant cores were abandoned at the stone source and the flake blanks formed at times when relatively large tools size and shape was dependant upon the character of the stone. The replacement of this technological approach with the manufacture of microliths that were then hafted to produce a functional tool occurred about 5,000 years ago. The change in manufacturing technique replaced the long cutting edges of the previous large flake with a composite tool comprised of small artefacts, resin, bindings and wood. An advantage of the change may have been the use of raw material previously too small for this purpose (Moore 2000). Reasons for change in technological characteristics have been proposed by Hiscock (1994) who suggested that increased mobility may have become necessary during the Holocene, as people occupied areas of unfamiliar environmental resources, or as climatic fluctuations rendered the environment less predictable. The extension of stone resources to include small pebbles and small outcrops would have increased the amount of time between visits to the stone sources previously used.

Tindale (1974) and Horton (1999) place Camberwell in the area of the Wonnarua peoples, bordering the Awabakal to the east and Worimi to the north. The environment of the Hunter Valley has been reviewed by Brayshaw (1984) based on the records of early explorers. The explorers reported areas of rich meadow, thinly timbered with deep loam soils. Food resources included 'possum, bear, wallaby, kangaroo rat, bandicoot, porcupine, flying fox,' (Dawson in Brayshaw n.d.). Rivers were described with abundant fish, also "they were expert hunters of the wild ducks, pigeons and brush turkeys. The gins and children hunted and captured the smaller animal, and sought out the hiding places of various grubs and the nests of the native stingless bees" (Green in Brayshaw nd).

Material culture of the local Aboriginal people included items made of wood, bark, plant fibres, stone, shell and bone including such items as spears, clubs, shields, dishes, canoes, nets, cloaks, cord and cutting implements.

The Aboriginal population of the region suffered greatly following the arrival of European settlers. European settlement of the Hunter Valley commenced in the early 1800's which in turn had a catastrophic impact on the local Wonnarua peoples and their traditional culture. Populations were greatly reduced due to the introduction of previously unknown diseases and traditional social structures disintegrated. A significant Aboriginal population remains in the area today and they take an active interest in their cultural heritage.

2.2 AHIMS Search

A search of the AHIMS (Aboriginal Heritage Information Management System) register was conducted for an area of 30 square kilometres surrounding the study area. The search identified 50 sites recorded in that area. Table 2 contains the results of the search and Figure 3 displays the location of recorded sites.

No sites were recorded within the study area. Sites in the immediate vicinity are located on the opposite side of Glennies Creek to the west of the study area. These sites were recorded by Hardy (2001) and Witter (2002). Figure 4 shows the location of these sites. In that figure, Glennies Creek is shown as 'Fal Brook' and the study area is to the east of Fal Brook and south of the New England Highway. The majority of sites cluster on the terrace of Bowman's Creek although a number of sites (including the largest) are located on slopes and the ridge above Glennies Creek. The 'Glennies Creek site' contains over 200 artefacts and three sets of grinding grooves and Witter (2002) assessed it as being of high significance.

Table 2 - Results of AHIMS search

Site_No	Site Name	Site Type
37-3-0006	Ashton Waterhole Site	Artefact Scatter, Grinding Grooves
37-3-0500	ASH 4	Artefact Scatter
37-3-0501	ASH 5	Artefact Scatter
37-3-0502	ASH 6	Artefact Scatter
37-3-0503	ASH 7	Artefact Scatter
37-3-0511	ASH 15	Artefact Scatter
37-3-0512	ASH 16	Artefact Scatter
37-3-0513	ASH 17	Artefact Scatter
37-3-0514	ASH 18	Artefact Scatter
37-3-0515	ASH 19	Artefact Scatter
37-3-0516	ASH 20	Artefact Scatter
37-3-0517	ASH 21	Artefact Scatter
37-3-0518	ASH 22	Artefact Scatter
37-3-0529	Ashton EWA 24	Artefact Scatter
37-3-0533	Ashton Peak Ridge site	Artefact Scatter
37-3-0534	Ashton Hunter River slope site	Artefact Scatter
37-3-0535	Ashton EWA 97	Artefact Scatter
37-3-0536	Ashton High Spur site	Artefact Scatter
37-3-0537	Ashton High Ridge Workshop site	Artefact Scatter
37-3-0538	Ashton Glennies Flats 2 site	Artefact Scatter
37-3-0539	Ashton Glennies Flats site 1	Artefact Scatter
37-3-0540	Ashton Glennies Bluff site	Artefact Scatter
37-3-0541	Ashton Glennies Creek site	Artefact Scatter, Grinding Grooves
37-3-0543	Ashton EWA 80	Artefact Scatter
37-3-0544	Ashton EWA 50	Artefact Scatter
37-3-0545	Ashton EWA 51	Artefact Scatter
37-3-0546	Ashton EWA 52	Artefact Scatter
37-3-0547	Ashton EWA 56	Artefact Scatter
37-3-0548	Ashton EWA 57	Artefact Scatter
37-3-0549	Ashton EWA 60	Artefact Scatter
37-3-0550	Ashton EWA 68	Artefact Scatter
37-3-0551	Ashton EWA 69	Artefact Scatter
37-3-0552	Ashton EWA 70	Artefact Scatter
37-3-0553	Ashton EWA 71	Artefact Scatter
37-3-0554	Ashton EWA 78	Artefact Scatter
37-3-0555	Ashton EWA 83	Artefact Scatter
37-3-0556	Ashton EWA 89	Artefact Scatter
37-3-0557	Ashton EWA 91	Artefact Scatter
37-3-0562	SC - 1	Artefact Scatter
37-3-0572	SC - 12	Isolated Artefact
37-3-0573	SC - 13	Isolated Artefact
37-3-0577	SC - 17	Artefact Scatter
37-3-0578	SC - 18	Isolated Artefact
37-3-0579	SC - 19	Isolated Artefact
37-3-0580	SC - 20	Artefact Scatter
37-3-0581	Ashton EWA 93	Artefact Scatter
37-3-0737	Ashton EWA 77	Artefact Scatter
37-6-0235	Rixs Creek	Artefact Scatter
37-6-0236	Rixs Creek	Artefact Scatter

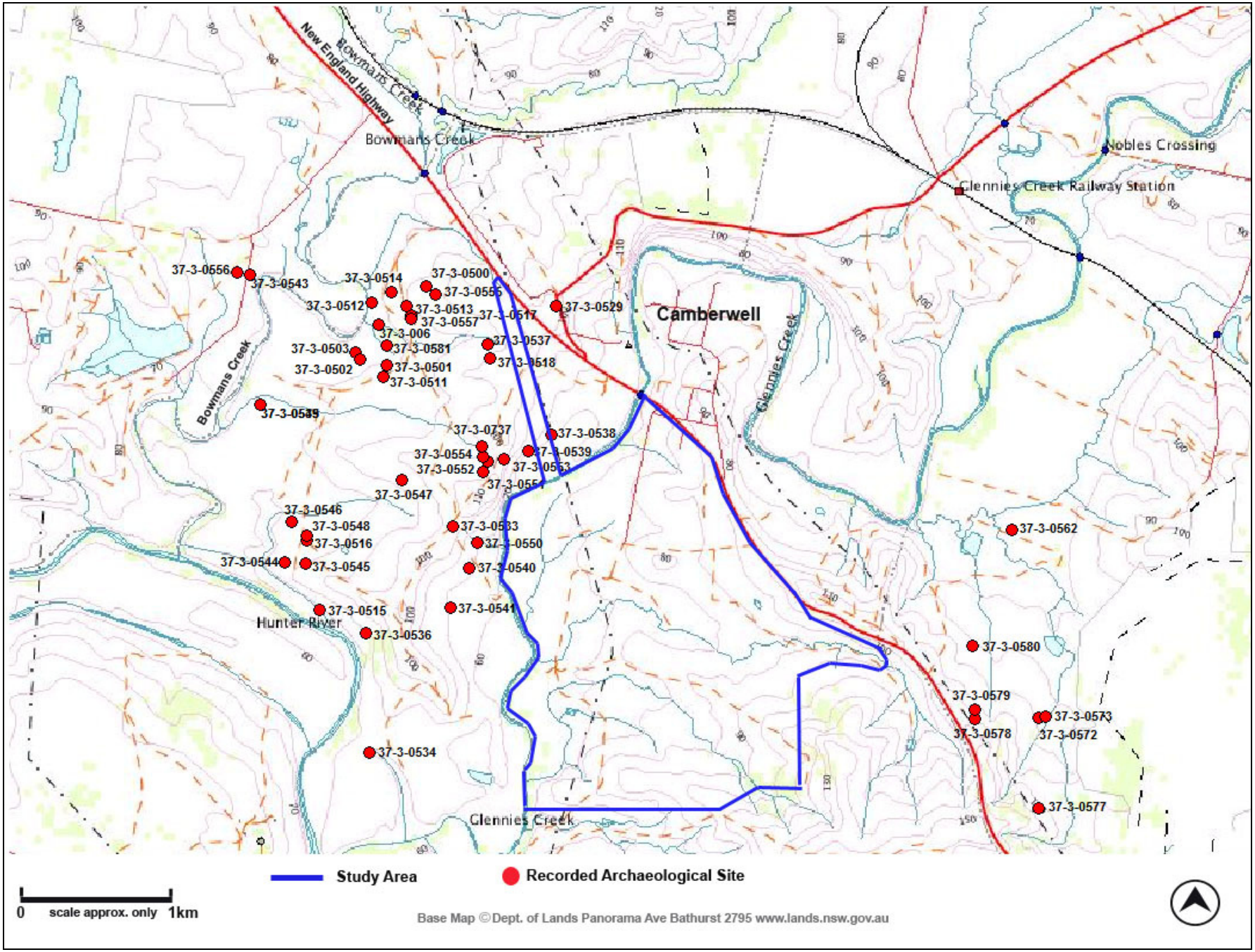


Figure 3 - Location of recorded archaeological sites in proximity to the study area.

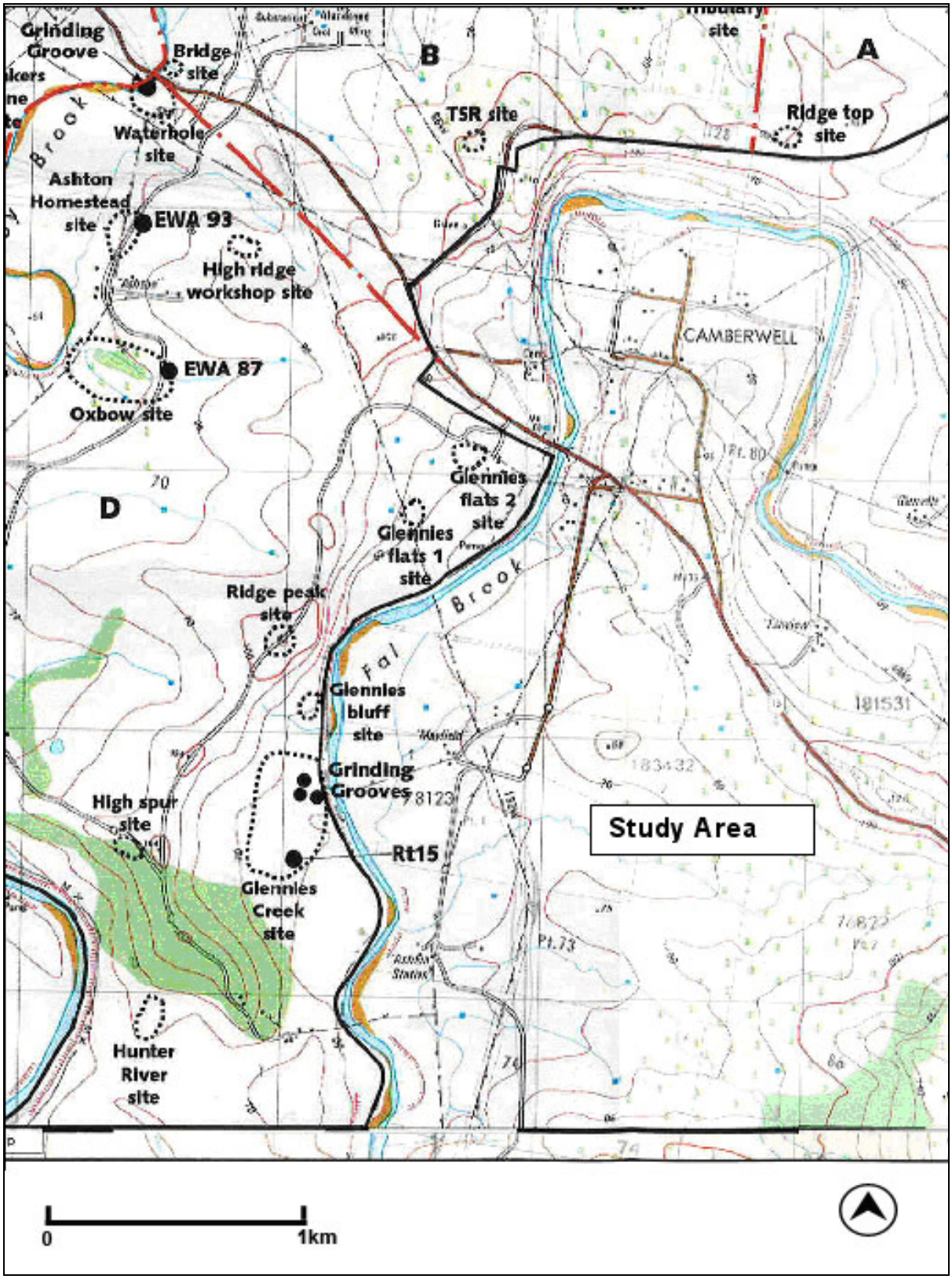


Figure 4 - Map showing location of sites adjacent to the study area (from HLA, 2002)

2.3 Local Indigenous Archaeological Context

A review of previous archaeological assessments in proximity to the proposed development was conducted in order to place the study area into an archaeological context.

Research in the Hunter Valley has attempted to address various questions related to Aboriginal culture, lifestyles and change over time. Subjects studied include tool manufacture and distribution of stone resources, trade, potential for Pleistocene sites, camp site distribution within the landscape, and landscape modelling.

Koettig (1986 - 1987) excavated a number of sites on the alluvial flats of Glennies Creek following a survey for the Glennies Creek to Singleton pipeline. The excavations revealed distinct A and B soil units and a geomorphologist who investigated this site suggested that the B unit could date from 10,000 to 30,000 years old. Of note, one site was radiocarbon dated to over 13,000 years BP and contained evidence of a hearth and associated artefacts. This site was located 1m below the ground surface within the B soil horizon. Koettig later suggested that other sites of a Pleistocene age within the region were likely to be found at such depths in clay deposits.

Hughes (2009 refer Appendix G) has reviewed Koettig's work site and describes it as follows;

"Archaeological assemblages of claimed Pleistocene age had been recovered by Margrit Koettig (1986, 1987) from colluvial and alluvial terrace deposits along the upper reaches of Glennies Creek (also known as Fal Brook) dating from between about 13,000 and 35,000 years ago. The consultant has visited these sites and is familiar with the reports on them.

It is important to note that they more than 10km away from the study area in a very different environmental setting in hilly country away from the main Hunter Valley. Where these sites occur, Glennies Creek (Fal Brook) is a well defined permanent river in a well defined valley with well defined gently sloping, well drained banks along it, all of which were in existence during the Pleistocene as well as the Holocene. As such, the banks of this river would have provided a focus for repeated occupation throughout the time Aboriginal people have been in the region, thus enhancing the likelihood that Pleistocene artefacts might be detected. In contrast, in most parts of the Hunter Valley, including the study area, it is difficult to reconstruct Pleistocene landscapes, let alone identify places which might have been foci for Aboriginal occupation during the Pleistocene (for a discussion of this see ERM 2004, Chapter 2, and Dean-Jones and Mitchell 1993)."

Koettig (1990 & 1992) located fifty-five archaeological sites within the Camberwell lease to the northeast of the current study area. Prior to the commencement of mining within this lease, excavations were undertaken to gain a better insight to the variability of the archaeological record at a regional and local level. These excavations revealed the following site types - hearths, heat treatment pits and an

oven. Artefact scatters were found to be more extensive and dispersed than originally thought but did not have large concentrations as have been found at other sites within the Hunter Valley. The most common material was found to be mudstone and artefact types included backed blades, manuports, anvils and hammerstones. It was also determined that much of the silcrete had been heat-treated.

Excavation showed that these sites represented discrete activity units, knapping floors, ovens, hearths and heat treating areas; distance between these features was unpredictable, and their distribution along the creek lines unpatterned. All the dated sites found at Camberwell were of the mid-Holocene period (Koettig 1992).

Rich (1992) salvaged sites at Narama Previous work had found the majority of sites to lie close to the creek line however there were a few sites, under thick grasses, found on the hill slopes (Rich 1992:18-20). The research focus behind the excavation of the sites at Narama was to determine the density and type of materials and distribution, particularly the relationship of sites to creeks. The concentration of archaeological material was found on the central valley floors or the alluvial terraces.

Stuart (1999) surveyed an area for a proposed waste rock dump to the east of Glennies Creek and to north of the Camberwell village. The survey concentrated on an area along Station Creek, a tributary of Glennies Creek. The survey located 3 artefact scatters and 16 isolated finds. No sites were assessed as being of high significance, one artefact scatter was regarded as being of medium significance and the remainder were of low significance.

HLA Envirosciences (2005) conducted subsurface investigations for the proposed extension of the Rail Unloader Facility at Newdell Junction, just north of Ravensworth for Macquarie Generation. A previous survey identified three sites (MG#1, 2 &3), all open artefact scatters, located on lower slope and in an open depression. The main artefact types recorded at the sites include flakes, broken flakes, retouched flakes and cores, with raw material types of silcrete, mudstone and FGS (fine grained siliceous). Subsurface testing was conducted at sites MG#1 and MG#2 and in designated areas of sensitivity across the site. A total of 197 whole and broken artefacts were recovered from subsurface testing, with the majority (156) were identified as flakes. 24 retouched flakes were also recorded of which 5 were backed artefacts. 5 cores were also identified. 88 of the artefacts were manufactured from silcrete, and 88 from FGS. Small numbers of chert, volcanic and quartz were also recorded. The majority of artefacts were recovered from areas of testing located on the lower slopes. Only three artefacts were recovered from test pits located on the alluvial flat, but it was considered that artefacts may have been removed from this area due to flooding or buried deeper than the 80cm excavation limit.

Umwelt (2002) conducted an archaeological assessment for enlargement of a mine water storage dam for the Nardell Coal Mine. The survey covered an area of approximately 1200 x 300m and was situated on a hill and gently sloping land to the

north of the New England Highway and south of the Macquarie Generation coal conveyor, north of Ravensworth. The survey identified six sites (N1-N5 and the Dam Site) predominantly open artefacts scatters.

The Umwelt (2002) survey also revisited five sites identified by Stuart (1996) located in Nardell Colliery land, north of the Macquarie Generation coal conveyor (Nard 8,9,11,12&13). The dominant raw material types were mudstone and silcrete with some porcellanite and glass with main artefact types recorded as flakes, broken flakes, flaked pieces and cores. The largest site recorded by Stuart and re-recorded by Umwelt, Nard 12 (37-3-0523), comprises of 150 artefacts in a 50m x 30m area. Severe sheet erosion and previous disturbances were noted at the site.

In 2004, Umwelt surveyed land at Glendell for a proposed open cut mine project. This area is approximately three kilometres to the north of the study area and comprises similar landform units, within the Glennies and Bowman's Creek catchments. The survey recorded 29 artefact scatters, 7 isolated finds and a quarry site. The majority of sites were within 30m of watercourses (63%). Three sites contained more than 100 artefacts with mudstone being the most commonly utilised material followed by silcrete. Two sites were deemed to be of high significance and three to be of moderate to high significance.

In 2008 Insite Heritage conducted an archaeological survey along the route of a proposed pipeline corridor from Camberwell to the Liddell and Bayswater Power stations. The southern sector of the corridor is in the vicinity of the study area. This survey located 15 sites however only one (Liddell EW15) was in the vicinity of the study area, located approximately 2 kilometres to the west. Liddell EW15 was an artefact scatter of low significance.

HLA Envirosciences (2001) carried out an archaeological assessment for White Mining Ltd at Camberwell for the Ashton Coal Project. This area adjoins the current study area immediately to west of Glennies Creek. Vehicle and foot surveys were conducted over the 801ha proposed for impact (HLA 2001:16). The survey identified twenty four archaeological sites. Twenty of the recorded sites were identified as artefacts scatters ranging from 2 to approximately 200 artefacts, with the majority containing 4-10 artefacts. Four isolated artefacts were also recorded. The majority of recorded artefact types were flaked pieces and flakes with some cores and tools, with silcrete and mudstone the dominant raw material with minor quartz and quartzite. The majority of sites were located along drainage channels, and adjacent creek flats and low ridge lines.

Witter (2002) resurveyed the area, revisited previously recorded sites and identified an additional 18 sites, 31 isolated artefacts and 6 sets of grinding grooves. Ground exposures were targeted from areal photographs and of 285 inspected 102 contained artefacts (EWA's). The EWA's were then combined on the basis of spacing and topographic context and given a collective name. Three sites (Waterhole, Oxbow and Glennies Creek sites) comprised over 200 artefacts in numerous loci. These three sites were located on high ground adjacent to a deep section of a permanent creek. A similarity in the frequency of artefact type within the

assemblage of the three sites were noted with a low component of micro-blade technology. Two sites were associated with grinding grooves.The Ashton Glennies Creek site contained over 200 artefacts including numerous implements. Witter described a workshop as "...a single intensive event which belonging (*sic*) to a highly specialised set of activities ... including boring holes and carving."

Witter undertook artefact analysis on the three largest sites, the Waterhole Site, Oxbow Site and the Glennies Creek site. The debitage attribute analysis looked at inter site comparison of debitage terminations and platform types, and flake shape and platform modification. The comparison found that the Oxbow and Glennies Creek sites were surprisingly similar and collectively the sites could be considered the same site type characterised by little microblade production and abundant expanded flakes. Microbalde cores were found (36) however few blades were found even considering broken flakes that may have formed proximal or distal parts of blades. Witter interprets this pattern attempts to prepare a core ofor blade production with little success. Of the 36 blade cores 16 were considered trials (2002 pp111-115).

Excluding debitage flakes the assemblages comprised large medium and heavy duty tools. This is based on the frequency of resharpening flakes often expanded in shape. These flakes tend to be intermediate in shape and about half had modified platforms. The expanded flakes indicate the presence of tools of a large size and high angle platform which when retouched for sharpening purposes produce flakes large enough to be recorded. However there were few large nuclear tools in the Glennies Creek sites which suggests that these tools were removed and possibly cached elsewhere such as the Oxbow or Bridge site where large tools were found. The Waterhole site also had similar debitage characteristics with evidence of a little more microblade production.

The landscape context of the three sites had the following characteristics;

All three are located on the creeks where the channel is close to the lower valley slope and the channel narrows. Witter's hypothesis is that these sections of Bowmans and Glennies Creek may have been optimal for the location of fish traps and provided long lasting deep waterholes.

Witter then applied the principles of archaeographic systems to the study area and characterised the assemblages within landform units as follows;

River Valley System – based on the Hunter River – abundant hearth and fire cracked rock, varied assemblages with large microblade workshops.

Brook Valley System – very large artefact concentrations, high proportion of large complete flakes, limited microblade workshops.

Creek Valley System – extensive dense artefact scatters frequent microblade production.

Central Ridge System – small artefact scatters particularly on flattened spurs and ridge crests. Also scatters occur in tributary heads. Assemblages are varied and may include small microblade workshops.

Northern Ridge system – small artefact scatters with occasional large microblade workshops generally in tributary valleys.

The Brook Valley System and Northern Ridge System are the principle archaeographic units applicable to the South East Open Cut study area.

Mitchell (2002) conducted a geomorphological study on the western side of Glennies Creek and Bowmans Creek. A transect of small pits were excavated into a terrace on Glennies Creek (Figure 5). At Glennies Creek a small section of elevated terrace was subsequently covered by colluviums. The test pit in this area revealed a paleosoil at 500mm below the surface. Of note, an artefact was exposed in the pit wall by rain wash. This artefact was 550mm below the ground surface within the buried soil profile (Mitchell, 2002:22). Mitchell suggested this buried soil profile may be of an early Holocene or possibly a late Pleistocene age.

Sites dating to the Pleistocene are uncommon in the Hunter Valley and, as such, sites with any potential to provide dates of this age are considered to be very significant.

A Subsidence Management Plan Archaeological Impact Assessment (SMP AIA) was also undertaken by Insite Heritage Pty Ltd (2008b) on behalf of ACOL for the proposed longwall and miniwall panels 5-9, located approximately 1.5km to the west of the study area. The project area was located in an area covered by a previous archaeological survey undertaken by Witter (2002). The SMP AIA identified nine previously recorded sites which were located in the project area. These sites comprise of five isolated artefacts and three artefact scatters all of which contained less than three artefacts at each site. One large artefact scatter (EWA 82 Brunkers Lane Site) was also relocated. Ten artefacts were recorded at this site where 2 had been recorded previously. Witters 2002 assessment that subsurface deposits may occur on the creek terraces between Brunkers Lane and Bowmans Creek was reiterated.

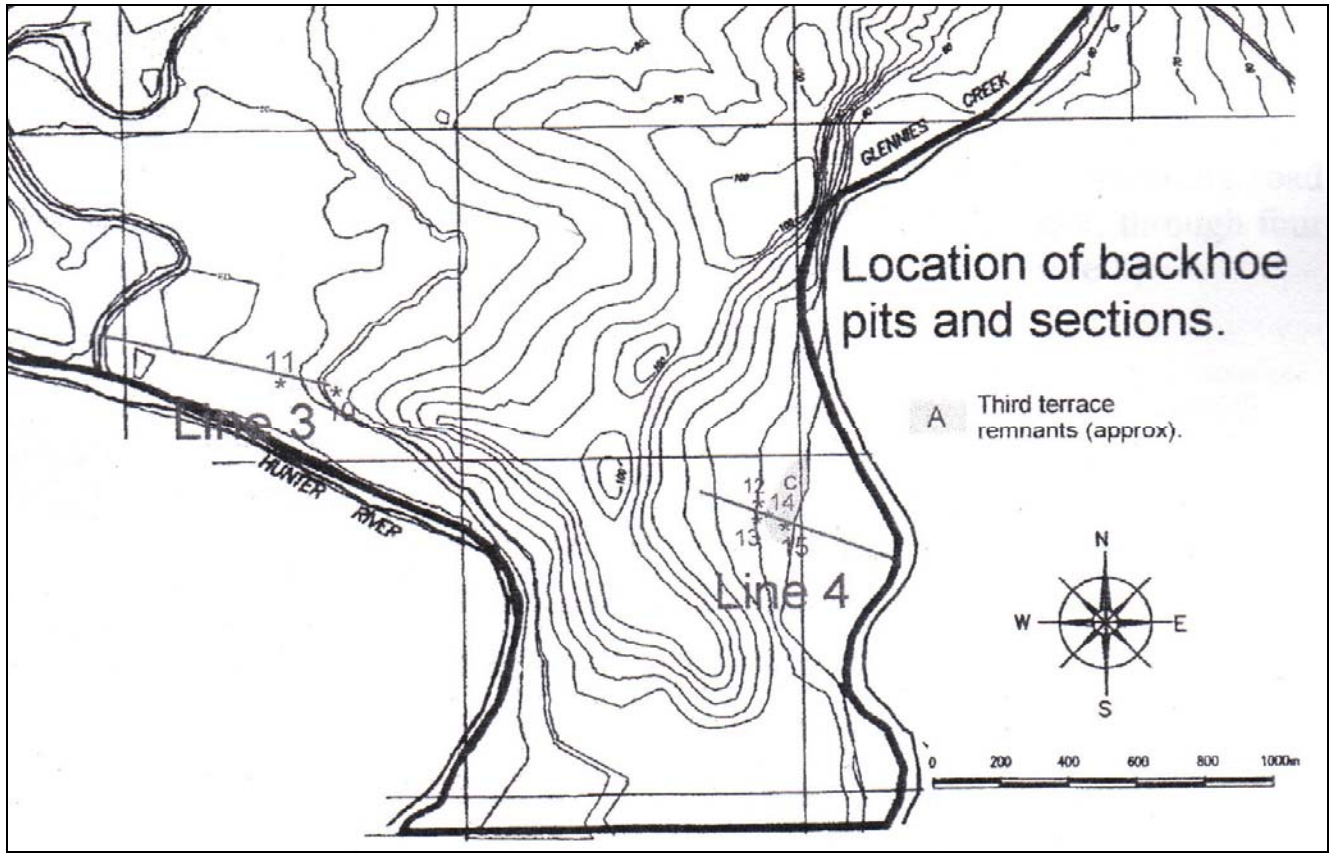


Figure 5 The location transect 4 on the western bank of Glennies Creek (Mitchell 2002).
The late Pleistocene - early Holocene terrace is marked C.

2.4 Predictive Model of Archaeological Potential

The archaeological record of the Hunter Valley has revealed a distinct site patterning for the region. Previous archaeological investigations have shown that archaeological sites are more prevalent in areas in close proximity to water sources with the number and density of archaeological sites increasing with the permanence of the water resource. Areas surrounding creek confluences have also been shown to be of importance in the region and potentially contain larger and more complex archaeological sites. River terraces have also been noted to have been favoured areas for Aboriginal encampments. The preference for occupation close to water resources may also lead to the re-deposition of artefacts in alluvial sediments and the exposure of subsurface archaeological material as a result of geomorphological processes. Whilst these areas can be favoured for larger camp sites, smaller artefact scatters may occur in all landscapes, resulting from movement between areas and the procuring of resources.

The following is a brief description of the site types that may occur within the study area:

ARTEFACT SCATTERS: In most archaeological contexts, an artefact scatter has been defined as either the presence of two or more stone artefacts within 50 or 100 metres of each other.

An artefact scatter may consist of surface material only, which has been deflated by erosion, and may involves a sub-surface deposit of varying depth. Other features may be present within artefact scatter sites, including hearths or stone-lined fireplaces, and heat treatment pits.

Artefact scatters may represent the evidence of:

Camp sites, where everyday activities such as habitation, maintenance of stone or wooden tools, manufacturing of stone or wooden tools, management of raw materials, preparation and consumption of food and storage of tools has occurred;

Hunting or gathering events;

Other events spatially separated from a camp site (eg. tool production or maintenance); or

Transitory movement through the landscape.

The detection of artefact scatters depends upon conditions of surface visibility and ground disturbance and post-depositional change through either sediment accumulation or surface erosion. Vegetation cover and deposition of sediments generally obscures artefact scatter sites and prevents their detection during surface surveys. High levels of ground disturbance can also obscure or remove evidence of a site.

Isolated finds are single artefacts. They may be representative of simple, singular discards or may be all that is visible within a site, with other material either obscured from view or buried beneath the surface.

BURIALS: Human remains tended to be placed in hollow trees, caves or sand deposits. Usually burials are only identified when eroding out of sand dunes or creek banks, or when disturbed by development. Aboriginal communities are strongly opposed to the disturbance of burial sites.

Burials have been located in the Hunter Valley (*pers. obs*. Muswellbrook, 2003) and at the Bolwarra Burial Site (AHIMS Site No. 36-4-0061). However, the probability of detecting burials during fieldwork is extremely low.

GRINDING GROOVES: Grinding grooves are formed in stone where stone hatchet or axe 'blanks' have had their edges ground sharp. Suitable blanks are prepared by taking flakes off the edges of pebbles then grinding the edge smooth and sharp with a repeated, linear motion across the surface of the grind-stone. Sandstone is generally preferred, as the sand particles have excellent abrasive qualities particularly when water is introduced onto the grindstone. Grinding grooves are located on the western side of Glennies Creek (AHIMS Site No. 37-3-0541).

SCARRED TREES: Scarred trees contain scars caused by the removal of bark for use in manufacturing canoes, containers, shields or shelters. Mature trees and remnants of stands of the original vegetation have the potential to contain scars.

PLEISTOCENE SITES: Pleistocene sites may be found on Pleistocene surfaces which have been subsequently buried. The preservation of Aboriginal sites that date back more than 10,000 years BP, are a rare find in the Hunter Valley, particularly in open areas. The work of Witter 2002 indicates the area of potential to be high creek terraces of Glennies Creek. The assessment for the potential for Pleistocene sites to occur on the east side of Glennies Creek has been conducted by Dr Philip Hughes, consultant geomorphologist (see Appendix G).

Based on the archaeographic system applied by Witter to the western side of Glennies Creek there are two systems applicable to the South East Open Cut. These are the Brook Valley System characterised by very large artefact scatters with large complete flakes and some microblade production.

The Central ridge system applies to the low ridge through the central and eastern parts of the study area. This area is not quite ridge but a series of spurs from the main ridge that runs north south to the east of the study area. The elevation is similar to the low ridge on the western side of Glennies Creek. Therefore this area should contain small artefact scatters that may include some microblade production. These sites may also occur in the tributary heads.

There have been few modified trees recorded in the area probably owing to the mining and pastoral history of the area. Grinding grooves may occur in sandstone along watercourses.

2.5 Historical Aboriginal Context

Despite intensive European settlement of the Hunter Valley region in the 19th Century, a number of small Aboriginal encampments still survived in the Hunter Valley, one of these decampments was reportedly located at Glennies Creek (Blyton et al 2004:57-60).

In the late 19th Century reserves for Aboriginal people were established at Caroona and St. Clair or Mt Olive Station near Carrowbrook. The mission at St Clair was approximately 60 acres and was reportedly the focus of the Aboriginal community in the Upper Hunter during the 20th Century (Blyton et al 2004:57-60). From 1905-1916 the mission was managed by the Aborigines Inland Mission. From 1916-1923 the St Clair mission was then operated under the absolute control of the Aborigines Protection Board. In 1923 the mission was closed off to the Aboriginal people (Blyton et al 2004:57-60).

The mission was located approximately 25km upstream from the study area. In a conversation with DECCW, Wannaruah Elder, Ms Barabra Foot recalls walking down from the mission to Bowman's and Glennies Creek (refer to Appendix D). The area was used for fishing and is an area of very high significance. Ms Foot describes that there are fish traps and burials in the area as well as very large sites and grinding grooves located at the Waterholes.

3.0 Archaeological Survey

3.1 Survey Objective

The aim of the survey was to identify any Aboriginal sites or areas of potential archaeological deposit within the study area which may be impacted by the proposed development. Survey results were then assessed as to their significance and the likely impact of the proposed development.

3.2 Survey Details

The survey was conducted between 15-19 December 2008 and was carried out by Angela Besant, Elizabeth Wyatt and Christopher Carter (archaeologists) and Aboriginal community representatives. The survey of the study area was conducted primarily on foot with some vehicle transects in areas of severely limited visibility. Where vehicle transects were used, systematic sweeps about fifty metres apart were used to find any small areas of exposure, for example cattle tracks, ants nests or spot erosion.

The study area was divided into areas to be surveyed based on landform units. Figure 5 outlines the Survey Area boundaries. Details of each survey unit are included Table 3 below.

Survey transects were carried out within the separate landform units – spur/ridge crest, slopes, creek terrace and gully, that form the survey units or areas. Surface visibility was limited by vegetation and leaf litter. The transects were inspected on foot by groups of four and six persons, walking parallel in a relatively straight lines spaced 8 to 10 metres apart. Each individual in the transect group could deviate temporarily to inspect exposed or disturbed areas more closely.

Sites were recorded by the following features:

Location (Recorded using Garmin GPS 72 hand held GPS, WGS 84 datum)

Visible Extent - as determined by the extent of the artefact scatter or the extent of the visible area of the scatter and the extent of potential archaeological deposit surrounding the scatter and the basis for the PAD definition (for example break of slope, surrounding sterile exposure or thinning of the soil profile), landform i.e. top of creek bank, face of creek margin, base of creek bank, small crest, flat, base of minor slope.

Aspect

Stone Artefacts - were recorded at a basic level including type, colour, raw material, basic dimensions and obvious diagnostic features (eg cortex, edge wear, backing etc). Artefacts were not removed from the area.

Sites containing large numbers of artefacts were sampled, that is only artefacts within a given area (eg 1sqm) were recorded in detail. Artefacts outside of this arbitrary area were counted.

Table 3 summarises the survey data and Appendix C contains details of artefacts located, within the study area.

The total area of the study area is approximately 400ha. The majority of the study area was covered by the survey, with the exception of some lucerne paddocks in the south western portion of the study area which were under cultivation and were unable to be accessed. One of these paddocks was able to be surveyed once permission was granted from the land holder after it had been ploughed. The total effective survey coverage (visible ground surface inspected taking into account archaeological visibility) was approximately 30ha or 7.6% of the inspected area. General surface visibility ranged from less than 1% over densely vegetated areas to 100% in several larger exposures. The effective survey coverage was calculated by using an average of the estimated surface visibility.

At the land owner's request, recently sown lucerne and millet paddocks in the south-western sector of the study area were not surveyed. While these areas have a high potential for containing Aboriginal sites, a representative sample of this type of landform unit was surveyed elsewhere. Additional areas were also surveyed for a proposed water storage area and surface facilities, located outside of the study area shown in Figure 6 below, adjacent to the eastern boundary. These areas are displayed in Figure 2.

There were few mature trees located within the study area. All trees of any size were inspected for evidence of scarring. Exposures of outcropping sandstone were inspected for axe-grinding grooves.

The lack of surface visibility did restrict the survey and not all artefacts located were recorded in detail. However, the level and nature of survey coverage and recording or artefact detail, is considered satisfactory to present an effective assessment of the Aboriginal heritage resources identified and those potentially present within the study area. Therefore the survey provides a valid basis for determining the probable impacts of the development and formulating recommendations for the management of the identified and potential Aboriginal heritage resources.

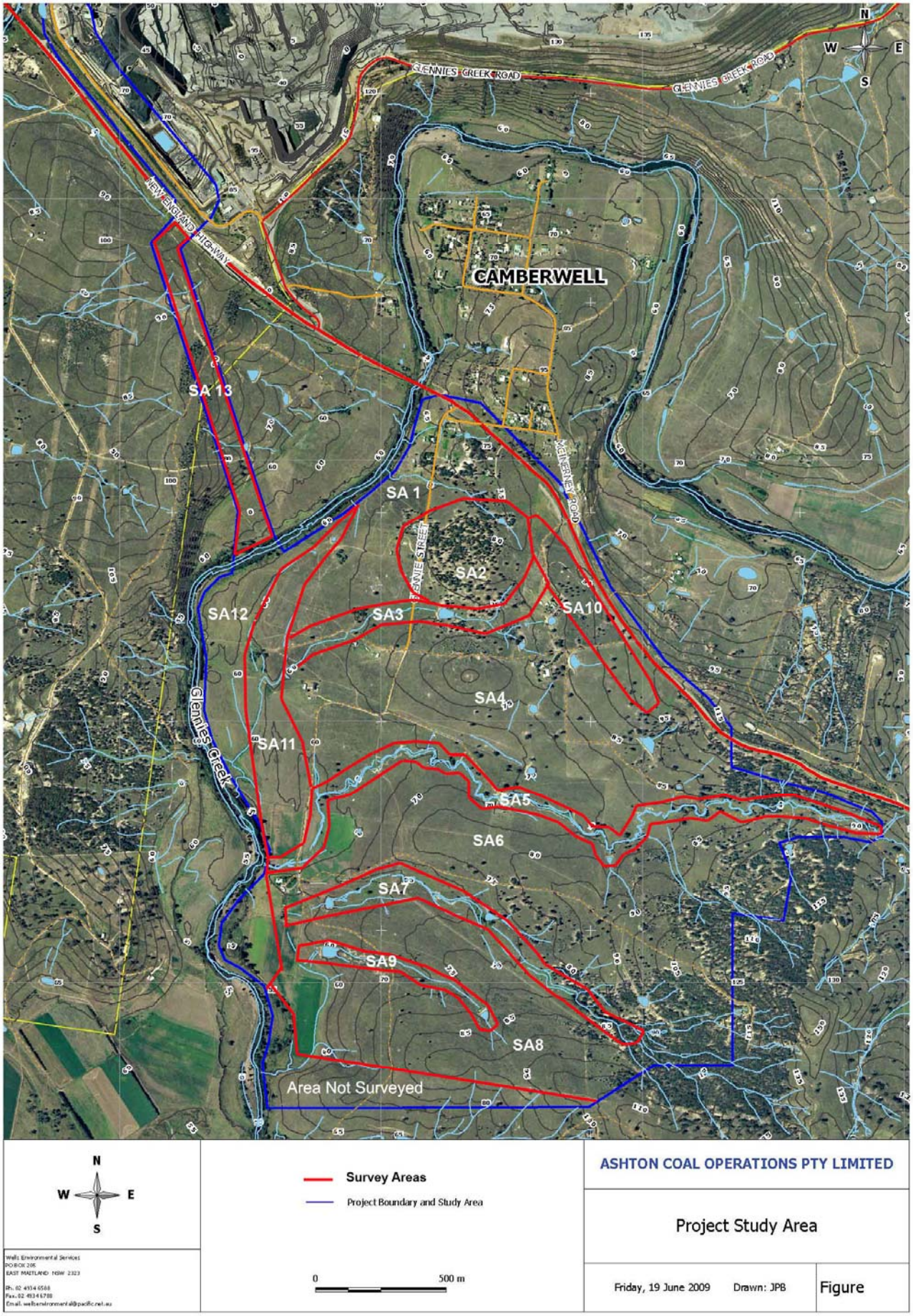


Figure 6 - Survey Area Boundaries

Table 3 - Details of Survey Areas

Unit	Location	Survey Type	Landform	Approx. Area	Surface Visibility (SV)	Arch. Visibility (AV)	Effec. Coverage m²[1]	Sites/ Artefacts	Notes
SA1	Hillside west of Glennies Street, above terraces east of Glennies Creek	Foot	Lower slopes	27ha	0-10%	0-60%	4050	11/32	Gentle to moderate slope with westerly aspect. Modified with several houses being built along Glennies Street. Very low surface visibility due to heavy cover of exotic grasses (pasture). Few mature native trees. Exposures along vehicular tracks, driveways and around dams.
SA2	Camberwell Common, south of New England Highway and east of Glennies Street.	Foot	Spur crest	11.7ha	10-80%	10-80%	14332.5	6/199	Gentle to moderate slope. Open woodland but mainly replanting with eucalypt and casuarina. Large areas of exposure on hill top,. Visibility restricted by leaf litter and areas of native grasses.
SA3	Gully runs west from lower edge of ridge crest near New England Highway to Glennies Creek.	Foot	Gully/creek line	5.4ha	20%	60%	6480	1/2	Gentle slope. Ephemeral creek with limited exposure along eroded bank and dam wall. Very low surface visibility in lower reaches due to heavy grass cover.
SA4	Spur running down from New England Highway, west to Glennies Creek.	Foot & Vehicle Transects	Slopes	69ha	<10%	60-80%	48300	11/35	Gentle to moderate slope. Modified and cleared. Divided into several paddocks and currently used for pasture for cattle and horses. Very low surface visibility due to heavy grass cover. Few exposures around dams, along vehicular and stock tracks.
SA5	Gully runs west from lower edge of ridge crest near New England Highway to Glennies Creek.	Foot	Gully/creek line	10.8ha	20%	30-60%	10800	11/92	Gentle slope with steep creek banks in some areas. Scattered eucalypts along banks. Ephemeral watercourse but some deep pools would hold water for extended periods. Exposures along eroded sections of bank. Dense grass cover away from banks.

[1] Where a range is shown EC calculated using median of range.

Unit	Location	Survey Type	Landform	Approx. Area	Surface Visibility (SV)	Arch. Visibility (AV)	Effec. Coverage m^2[1]	Sites/ Artefacts	Notes
SA6	Spur running down from eastern boundary of study area, west to Glennies Creek	Foot & Vehicle Transects	Slopes	119ha	<10%	10%	11900	12/59	Gentle to moderate slope. Modified and cleared. Divided into several paddocks and currently used for pasture for cattle and horses. Very low surface visibility due to heavy grass cover. Few exposures around dams, along vehicular and stock tracks.
SA7	Gully runs west from woodland on eastern boundary of study area to Glennies Creek.	Foot	Gully/creek line	10ha	20-50%	60%	21000	6/34	Gentle slope. Scattered eucalypts in western areas ranging to closed woodland in upper (east) reaches. Exposures along eroded sections of bank, including extensive areas with good visibility in upper reaches. Large dam in lower sector surrounded by eroded areas with good visibility.
SA8	Spur running down from eastern boundary of study area, west to Glennies Creek	Foot & Vehicle Transects	Slopes	64ha	<10%	50-70%	38400	14/88	Gentle to moderate slope. Modified and cleared. Divided into several paddocks and currently used for pasture for cattle and horses. Very low surface visibility due to heavy grass cover. Few exposures around dams, along vehicular and stock tracks.
SA9	Gully runs west from woodland on eastern boundary of study area to Glennies Creek.	Foot & Vehicle Transects	Gully/creek line	3.4ha	25-70%	25-60%	6863.75	2/97	Gentle to moderate slope. Modified and cleared. Divided into several paddocks and currently used for pasture for cattle and horses. Very low surface visibility due to heavy grass cover. Few exposures around dams, along vehicular and stock tracks. Good exposures in west sector around gravel pit.
SA10	Ridge line running along New England Highway.	Foot	Ridge crest	27ha	80%	50%	108000	2/3	Gentle slope with dense grass cover over majority of area. An area along New England Highway boundary approx. 1km x 40m has been ripped for tree planting creating high surface visibility. Disused trotting track also has good visibility.

Unit	Location	Survey Type	Landform	Approx. Area	Surface Visibility (SV)	Arch. Visibility (AV)	Effec. Coverage m^2[1]	Sites/ Artefacts	Notes
SA11	Terraces and former creek channels above Glennies Creek floodplain.	Foot	Terrace	46ha	<10%	50%	23000	6/469	Low undulations and level areas above floodplain. Very heavy grass cover with deep soils. Visibility limited to vehicular tracks and dams.
SA12	Banks of Glennies Creek – western boundary of study area.	Foot	Creek bank/floodplain	7.5ha	25%	10%	1875	0	Steep banks (3-6m) along creek line. Very low surface visibility due to vegetation. Exposures in some areas show soil to be >4m deep. Floodplain subject to heavy flooding.
SA13	Conveyor Corridor West of Glennies Creek	Foot	Slope	6.25ha	10-40%	80%	12500	3/14	Unformed vehicle track provided good surface visibility. Sheet erosion noted along edge of dam wall in the southern portion of the survey area. Artefacts identified in the northern section of the survey area relating to High Ridge Workshop site recorded by Witter (2002). Proposed conveyor is also highly likely to impact on Glennies Flats site.
	Totals			**407.05ha**			**307501.25 (30.75ha)**	**85/1,124**	

3.3 Survey Results

The survey identified a total of 1,125 artefacts from 85 sites. The details of the recorded sites are presented in Table 4 below and their locations shown in Figure 7.

Table 4 - Details of Recorded Sites

Unit	Site	Landform	Exposure (Approx. m)	Visibility	Description
SA1	1	Slope	60 X 5	100% SV 50% AV	Artefact scatter: Large exposure formed by driveway approaching house from Glennnies Road. B horizon exposed by sheet erosion. Ironstone gravel background. Artefacts: 5 silcrete, 2 mudstone.
SA1	2	Slope	10 x 6	75% SV 75% AV	Artefact scatter: Exposure of gravels near house paddock. Limited visibility away from exposure due to light grass cover. Artefacts: 2 mudstone.
SA1	4	Slope	30 x 10	50% SV 50% AV	Artefact scatter: Limited exposures under trees in grassed paddocks. Gravel background. Artefacts: 2 silcrete, 1 mudstone
SA1	5	Slope	6 x 2.5	75% SV 50% AV	Artefact scatter: Limited exposure along fence line in grassed paddock. Artefacts: 2 mudstone
SA1	5ST	Slope			Historic scarred tree. Tree has been cut, only bottom portion of tree remaining. Scar located on W side of tree. Tree located on N side on E-W fenceline.
SA1	6	Slope	20 x 15	80% SV 60% AV	Artefact scatter: Exposure with background gravels. Artefacts: 2 mudstone
SA1	7	Slope	5 x 4	80% SV 50% AV	Artefact scatter: Exposure in ant's nest in open woodland. Artefacts: 2 mudstone
SA1	8	Slope	4 x 14	90% SV 70% AV	Artefacts located in trackway. Located NE of SA11.6 Artefact: 1 silcrete, 5 mudstone
SA1	9	Slope	45 x 30	<10% SV <10% SV	Artefact scatter: Well grassed paddock with limited exposures. Moderate potential for sub-surface material Artefacts:5 mudstone, 3 silcrete
SA1	10	Slope	1 x 1	<10% SV <10% AV	Isolated find: Well grassed paddock with limited exposures. Artefact: 1 FGS
SA1	11	Slope	1 x 1	<10% SV <10% AV	Isolated find: Well grassed paddock with limited exposures. Two artefacts located approx. 20m apart. Artefacts: 2 mudstone
SA2	1	Spur crest	20 diam.	50% SV 90% AV	Artefact scatter: Exposed area on hill side under open eucalypt and casuarina woodland (replanted). Visibility limited by leaf litter and light grass cover. B horizon exposed by sheet erosion. Artefacts: 1 silcrete. 1 mudstone
SA2	2	Spur crest	50 x 3	75% SV 50% AV	Isolated find: Exposure along track running across hill side. Exposed area on hill side under open eucalypt and casuarina woodland (replanted).

Unit	Site	Landform	Exposure (Approx. m)	Visibility	Description
					Artefacts: 1 mudstone
SA2	3	Spur crest	5 0 x 50	50% SV 75% AV	Artefact scatter: Exposure on hill top. Visibility limited by leaf litter, gravels and light grass cover. Exposed area on hill side under open eucalypt and casuarina woodland (replanted). Numerous artefacts across site but numbers decrease on slopes. B horizon exposed in part due to sheet erosion. 80m above ephemeral creek line. High potential for sub-surface material. Artefacts: 11 mudstone, 8 silcrete (10 x 10 area recorded in detail) 91 mudstone, 47 silcrete, 1 quartz (count only outside of sample area)
SA2	4	Spur crest	30 x 15	90% SV 75% AV	Artefact scatter: Exposure on hill top. Exposed area on hill side under open eucalypt and casuarina woodland (replanted). Visibility restricted away from exposure. Artefacts: 4 mudstone, 2 silcrete
SA2	5	Spur crest	2 x 2	75% SV 50% AV	Artefact scatter: Small exposure on hill slope. Exposed area on hill side under open eucalypt and casuarina woodland (replanted). Artefacts: 1 mudstone, 1 volcanic.
SA2	6	Spur crest	20 x 10	75% SV 75% AV	Artefact scatter: One of a number of exposures on gentle hill slope below crest, under open eucalypt woodland (replanted). Thin layer, light sandy soils with clay B horizon exposed in part due to sheet erosion. High potential for sub-surface deposit. Artefacts: 26 mudstone, 3 silcrete. Concentration and number of small (<10mm) flakes suggest this may have been a knapping floor.
SA3	1	Gully	40 x 10	75% SV 75% AV	Artefact scatter: Exposure alongside small dam in gully, possible sub-surface deposits. Artefacts: 2 mudstone
SA4	1	Slope	5 x 5	75% SV 75% AV	Isolated find: Limited exposure on slope under scattered eucalypt woodland (replanted). Heavy grass cover away from exposure. Artefacts: 1 mudstone
SA4	2	Slope	2 x 1	75% SV 75% AV	Isolated find: Small exposure amongst dense grass. Artefacts: 1 mudstone
SA4	3	Slope	7 x 3	50% SV 50% AV	Isolated find: Small exposure in house paddock, heavy grass cover away from exposure. Few sandstone exposures. Artefacts: 1 mudstone
SA4	4	Slope	30 x 5	80% SV 25% Av	Isolated find: Exposure around small dam. Artefact: 1 volcanic
SA4	5	Slope	1 x1	80% SV 50% AV	Isolated find: Small exposure in ditch adjacent to access road. Low visibility away from track. Artefact: 1 mudstone
SA4	6	Slope	6 x 2	75% SV 50% AV	Artefact scatter: Mid slope in grassed paddock with heavy stock treadage Artefacts: 1 mudstone, 1 silcrete

Unit	Site	Landform	Exposure (Approx. m)	Visibility	Description
SA4	7	Slope	5 x 5	50% SV 50% AV	Isolated find: Mid slope in grassed paddock, sheet erosion Artefacts: 1 mudstone
SA4	8	Slope	15 x 3	80% SV 60% AV	Artefact scatter: Mid slope adjacent to exposure along fence line. Artefacts: 2 mudstone
SA4	9	Slope	2 x 2	80% SV 60% AV	Artefact scatter: Mid slope in grassed paddock, sheet erosion Artefacts: 2 silcrete, 1 mudstone
SA4	10	Slope	15 x 5	50% SV 50% AV	Artefact scatter: Upper slope in grassed paddock, sheet erosion Moderate potential for sub-surface deposit. Artefacts: 6 mudstone, 2 FGS, 1 silcrete, 1 chert
SA4	11	Slope	50 x 20	60% SV 80% AV	Artefact scatter: Upper slope in grassed paddock with scatter of casuarinas. Moderate potential for sub-surface deposit. Artefacts: 9 silcrete, 2 mudstone
SA5	1	Gully	500 x 10	50% SV 80% AV	Artefact scatter: On creek line, exposures due to erosion along bank, dense grass cover away from creek line. Artefacts: 2 mudstone, 1 silcrete
SA5	2	Gully	500 x 10	50% SV 80% AV	Artefact scatter: On creek line, exposures due to erosion along bank, dense grass cover away from creek line. High potential for sub-surface deposit. Artefacts: 11 silcrete, 10 mudstone
SA5	3	Gully	500 x 10	50% Sv 80% AV	Isolated find: On creek line, continuous exposures due to erosion along bank, dense grass cover away from creek line. Artefacts: 1 silcrete
SA5	4	Gully	500 x 10	50% SV 80% AV	Artefact scatter: On creek line, continuous exposures due to erosion along bank, dense grass cover away from creek line. Artefacts: 7 mudstone, 1 volcanic
SA5	5	Gully	500 x 10	50% SV 80% AV	Artefact scatter: On creek line, exposures due to erosion along bank, dense grass cover away from creek line. Artefacts: 6 silcrete, 1 mudstone
SA5	6	Gully	500 x 10	50% SV 80% AV	Artefact scatter: On creek line, exposures due to erosion along bank, dense grass cover away from creek line. Artefacts: 1 silcrete
SA5	7	Gully	500 x 10	50% SV 80% AV	Artefact scatter: On creek line, exposures due to erosion along bank, dense grass cover away from creek line. Artefacts: 2 mudstone, 1 silcrete, 1 quartz
SA5	8	Gully	500 x 10	50% SV 80% AV	Artefact scatter: On creek line, exposures due to erosion along bank, dense grass cover away from creek line. Artefacts: 3 mudstone, 1 silcrete, 1 quartz
SA5	9	Gully	500 x 10	50% SV 80% AV	Scarred tree: Possible. Outside of main study area in area of proposed dam, 3.5m long scar, ironbark, 3m girth, 200mm bark regrowth over scar.
SA5	10	Gully	500 x 10	50% SV	Artefact scatters: On creek bank. Exposures

Unit	Site	Landform	Exposure (Approx. m)	Visibility	Description
				80% AV	caused by erosion along both banks. High potential for sub-surface deposit. Mudstone AF also located further east along bank at 321385 6403640 Artefacts: 21 silcrete, 7 mudstone.
SA5	11	Gully	100 x 50	75%SV 50% AV	Artefact scatter: Along eroded sections of both sides of creek bank. High potential for sub-surface deposits. Artefacts: 10 mudstone, 1 silcrete
SA6	1	Slope	20 x 20	20% S V 50% AV	Artefact scatter. Limited exposure over approx . 20m on slope, 100m above creek line. Scattered replanting of eucalypt in the area. Visibility limited by grass and leaf litter. Shallow A1 horizon washed off exposing artefacts, moderate potential for sub-surface material. Artefacts: 5 mudstone, 1 silcrete.
SA6	2	Slope	35 x 4	90% SV, 10% AV	Artefact scatter. Exposure along wall of dam 20m south of creek line. Visibility away from dam wall limited by grass and leaf litter. Moderate potential for sub-surface material below dam wall on creek bank. Artefacts: 5 mudstone, 3 silcrete, 1 chert.
SA6	3	Slope	22 x 3	25%SV 25%AV	Artefact scatter. Limited exposure (stock trail) along fence line. Heavy grass away from exposure. 40m south of creek. Some potential for sub-surface deposit. Artefacts: 3 mudstone, 1 silcrete
SA6	4	Slope	10 x 6	50% SV 75% AV	Artefact scatter: Exposure in track 20m south of creek line below dam wall. Artefacts: 4 mudstone
SA6	5	Slope	50 X 3	75% SV 25% AV	Artefact scatter: Exposure along contour bank in open eucalypt woodland. Ironstone gravel background. Leaf litter and light grass cover off track. Artefacts: 2 mudstone, 1 silcrete
SA6	6	Slope	20 x 2	75% SV 25% AV	Isolated find: Exposure at base of dam wall. Leaf litter and light grass cover away from exposure. Artefacts: 1 mudstone
SA6	7	Slope	2 x 2	50% SV 50% AV	Isolated find: Exposure near track. Heavy grass cover away from track. Artefacts: 1 mudstone
SA6	8	Slope	15 x 5	80% SV 25% AV	Artefact scatter: Exposure along contour bank running into dam at base of slope. Open paddock with several mature eucalypts along creek at base of slope. Low integrity of site although potential for sub-surface material above contour bank. Artefacts: 6 silcrete, 2 mudstone
SA6	9	Slope	20 x 4	75% SV 75% AV	Isolated find: Exposure along track through cleared paddock. Heavy grass cover away from track. Artefacts: 1 mudstone
SA6	10	Slope	20 x 3	75% SV 25% Av	Artefact scatter: Exposure along track at base of slope. Heavy grass cover away from slope. Artefacts: 3 mudstone, 1 silcrete.
SA6	11	Slope	50 X 3	50% SV	Artefact scatter: Exposure along track leading to

Unit	Site	Landform	Exposure (Approx. m)	Visibility	Description
				50% AV	stock yards, dense grass cover away from track. At toe of slope overlooking Glennies Creek floodplain. High potential for sub-surface deposit. Artefacts: 12 mudstone, 6 silcrete.
SA6	12	Slope	100 x 0.3	75% SV 25% Av	Isolated find: Exposure along narrow stock track. Dense grass cover away from track. In similar locale as previous site – potential for sub-surface material. Artefacts: 1 silcrete
SA7	1	Gully	5 x 3	80% SV 80% AV	Artefact scatter: Exposure on creek bank. Dense grass cover away from bank. Artefacts: 3 silcrete, 1 chert
SA7	2	Gully	10 x 5	80% SV 80% AV	Isolated find : Exposure on creek bank. Dense grass cover away from bank. Artefacts: 1 mudstone
SA7	3	Gully	50 x 20	50% SV 50% AV	Isolated find: Exposure on creek bank under open casuarina woodland. Dense grass cover away from bank. Artefacts: 1 silcrete
SA7	4	Gully	5 x 4	50% SV 50% AV	Isolated find: Exposure on creek bank in ant's nest. Dense grass cover away from bank. Artefacts: 1 mudstone
SA7	5	Gully	3 x 3	50% SV 50% AV	Isolated find: Small exposure on edge of drainage channel near larger exposure. Artefacts: 1 mudstone
SA7	6	Gully	100 x 15	70% SV 60% AV	Artefact scatter: Large exposure (erosion scour) under open eucalypt woodland. B horizon exposed by slope wash. Moderate potential for sub-surface deposit. 6 distinct loci. Artefacts: 12 silcrete, 10 mudstone, 1 volcanic
SA8	1	Slope	20 x 3	80% SV 25% Av	Isolated find: Large exposure around dam – disturbed context. Dense grass cover away from exposure. Artefacts: 1 mudstone
SA8	2	Slope	10 x 5	80%SV 25% AV	Isolated find: Large exposure around dam – disturbed context Artefacts: 1 mudstone
SA8	3	Slope	20 x 4	80% SV 25%AV	Artefact scatter: Exposure along dam overflow channel - disturbed context. Artefacts:2 mudstone, 1 silcrete
SA8	4	Slope	10 x 5	80%SV 25%AV	Artefact scatter: Exposure along dam cut - disturbed context. Moderate potential for sub-surface deposit away adjoining disturbed area. Artefacts: 9 mudstone, 2 volcanic
SA8	5	Slope	30 x 15	40% SV 100%AV	Artefact scatter: Exposure in gravel extraction area. Dense gravel background scatter in otherwise well grassed paddock. Moderate potential for sub-surface deposit. Artefacts: 6 mudstone, 1 silcrete
SA8	6	Slope	80 x 25	40% SV 100%AV	Artefact scatter: Exposed gravels above dam. Moderate potential for sub-surface deposit. Artefacts: 11 mudstone, 3 silcrete
SA8	7	Slope	2 x 2	75%SV 25%AV	Artefact scatter: Small exposure under solitary tree on slope. Artefacts: 1 volcanic, 1 mudstone
SA8	8	Slope	1 x 1	50%SV	Isolated find: Small exposure in grassed

Unit	Site	Landform	Exposure (Approx. m)	Visibility	Description
				25% AV	paddock. Artefacts: 1 mudstone
SA8	9	Slope	30 x 3	75%SV 25%AV	Artefact scatter: Exposure along section of track through grassy paddock. Artefacts: 6 mudstone
SA8	10	Slope	3 x 2	100%Sv 5%AV	Grinding grooves/Isolated find: Two possible grinding grooves in small sandstone exposure. Surrounded by dense grass cover. Artefacts: 1 mudstone
SA8	11	Slope	20 x 10	15% SV 15% AV	Isolated find: Limited exposure along track near southern boundary of study area. Artefact: 1 silcrete
SA8	12	Slope	30 x 20	15% SV 15% AV	Artefact scatter: Low visibility due to dense grass cover, limited exposure along fence line. Moderate potential for sub-surface deposit. Artefacts: 8 mudstone, 2 silcrete, 1 quartz
SA8	13	Slope	15 x 6	70% SV 80% AV	Artefact scatter: Exposure along track near fence approx 50m from creek line. Moderate potential for sub-surface deposit. Artefacts: 5 silcrete, 4 mudstone, 1 FGS 12 silcrete, 8 mudstone (count only)
SA8	14	Slope	10 x 3	75% SV 80% Av	Artefact scatter: Exposure located mid-slope along track. Artefacts: 1 mudstone, 2 silcrete
SA9	1	Gully	1 x 1	50% SV 50% AV	Isolated find: Exposures along creek bank Artefact: 1 mudstone
SA9	2	Gully	150 x 20	80% SV 50% AV	Artefact scatter: Disturbed area around dam and adjacent to eroded creek bank. High potential for sub-surface deposit adjacent to disturbed area. Artefacts: 30 mudstone, 13 silcrete, 7 FGS 32 mudstone, 8 silcrete, 3 FGS, 3 chert (count only)
SA10	1	Ridge crest	500 x 20	75% SV 25% AV	Isolated find: Exposure caused by ripping for new tree planting along New England Highway. Very low visibility away from ripped area. Artefacts: 1 mudstone
SA10	2	Ridge crest	500 x 20	75% SV 25% AV	Artefact scatter: Exposure caused by ripping for new tree planting along New England Highway. Very low visibility away from ripped area. Artefacts: 2 mudstone
SA11	1	Terrace	1 x 1	5% SV 5% AV	Isolated find: In heavy grass cover on river terrace. Low visibility across most of terrace. Artefacts: 1 mudstone
SA11	2	Terrace	4 x 3	80% SV 80% AV	Artefact scatter: Limited exposure near track and gate. Dense grass cover away from track. Deep alluvial soils exposed on creek bank, high potential for sub-surface deposit. 40m east of Glennies Creek. Artefacts: 8 mudstone, 3 silcrete, 1 quartz
SA11	3	Terrace	20 x 4	50% SV 50% AV	Artefact scatter: Exposure near dam and track. Heavy grass cover elsewhere. Deep alluvial soils exposed on creek bank, high potential for sub-surface deposit. Artefacts: 4 mudstone, 1 silcrete 27 mudstone, 7 silcrete (count only).

Unit	Site	Landform	Exposure (Approx. m)	Visibility	Description
SA11	4	Terrace	3 x 3	50% SV 75% AV	Artefact scatter: Small exposure with heavy grass cover surrounding. Deep alluvial soils exposed on creek bank, high potential for sub-surface deposit. Artefacts: 8 mudstone, 1 volcanic 10 mudstone, 3 silcrete (count only).
SA11	5	Terrace	4 x 1	90% SV 90% AV	Artefact scatter: Limited exposure along stock trail on edge of river terrace. Dense grass cover away from trail. Deep alluvial soils across terrace adjacent to old stream bed approx. 50m east of Glennies Creek. Potential for sub-surface deposit although flooding may have disturbed deposit. Artefacts: 2 mudstone.
SA11	6	Terrace	120 x 5	90% SV 75% AV	Artefact scatter: On terrace approx. 100m east of Glennies Creek. Exposure along track and around dam. Dense grass cover away from exposure. Deep alluvial soils with some gravel patches. Likely knapping floors. Some artefact breakage possibly due to vehicular traffic. Note: this site is almost opposite the ' Glennies Creek Site' (NPWS 37-3-0541) and 'Glennies Bluff Site' (37-3-0540) which are located immediately to the west of Glennies Creek. Very high potential for sub-surface material. Artefacts: 314 mudstone, 75 silcrete, 2 quartz, 1 chert, 1 volcanic
SA13	1	Slope	5 x 2	50% SV 50% AV	Artefact scatter: In small exposure on west side of Glennies Creek. Grass cover in cleared paddock. Artefacts: 3 mudstone, 1 chert Highly likely to be part of previoulsy recorded site 37-3-0737 Ashton EWA 77.
SA13	2	Slope	10 x 3	50% SV 50% AV	Artefact scatter: In limited exposure in grassy paddock. Moderate potential for sub-surface deposit Artefacts: 5 mudstone, 3 silcrete, 1 chert Likely to form part of previously recorded site 37-3-0538 (Ashton Glennies Flat 2 site)
SA13	3	Slope	2 x 1	50% SV 50% AV	Artefact scatter: Grass cover in cleared paddock. Artefacts: 2 mudstone

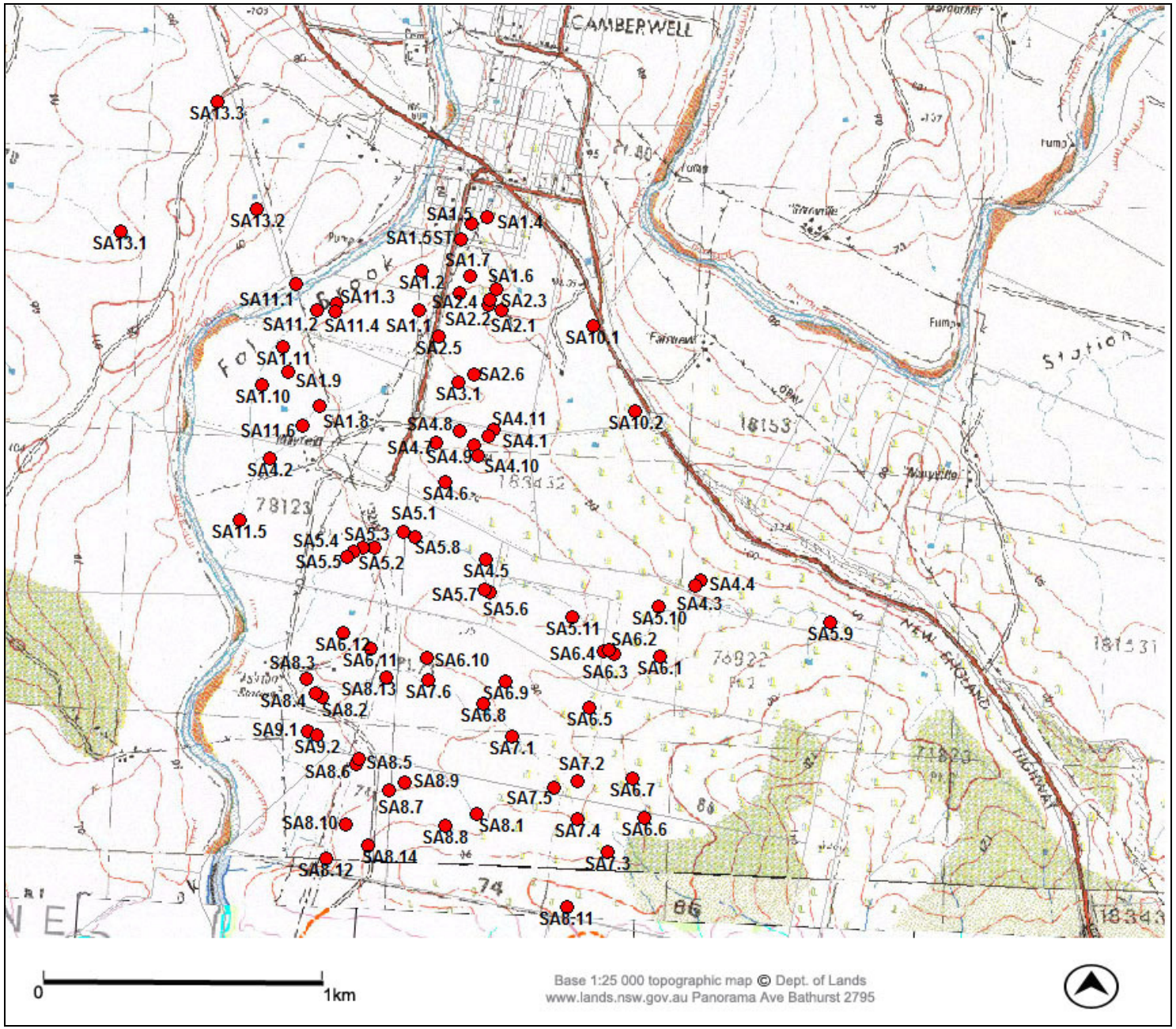


Figure 7 - Location of sites identified by the surve

3.4 Areas Not Surveyed

Adjustments to the study area boundary have occurred since the survey work was undertaken. An additional area has been added to the southern boundary and several power line realignments proposed. The two power lines to be realigned are an 132kV power line and a 66kV power line with multiple local 11kV powerlines to supply local properties.

Two options have been proposed for the power line route. The preferred Option 1, will require the northern 132kV and 66kV lines to be realigned south, parallel to Lowngwall Panel 1 and west of Glennies Creek. The power lines will intersect the southern 132kV line and will then be realigned to the south east, off the top of the ridge and across the creek and floodplain of Glennies Creek. The lines will then follow the existing southern alignment of the SEOC.

The second realignment option, Option 2, proposes that the 132kv and 66kV lines cross the northern end of Glennies Creek and continue along the northern end of the proposed open cut, following the foot of the pit emplacement area across the office and workshop access road and water storage dam and then continue between the SEOC levee and the edge of Glennies Creek. They will then merge with the existing alignment south of the open cut. This option requires two creek crossings and will be more visible from the highway.

The following is a desktop assessment based on existing data from Witter's (2002) assessment, and site patterning found within the study area extrapolated over the additional area.

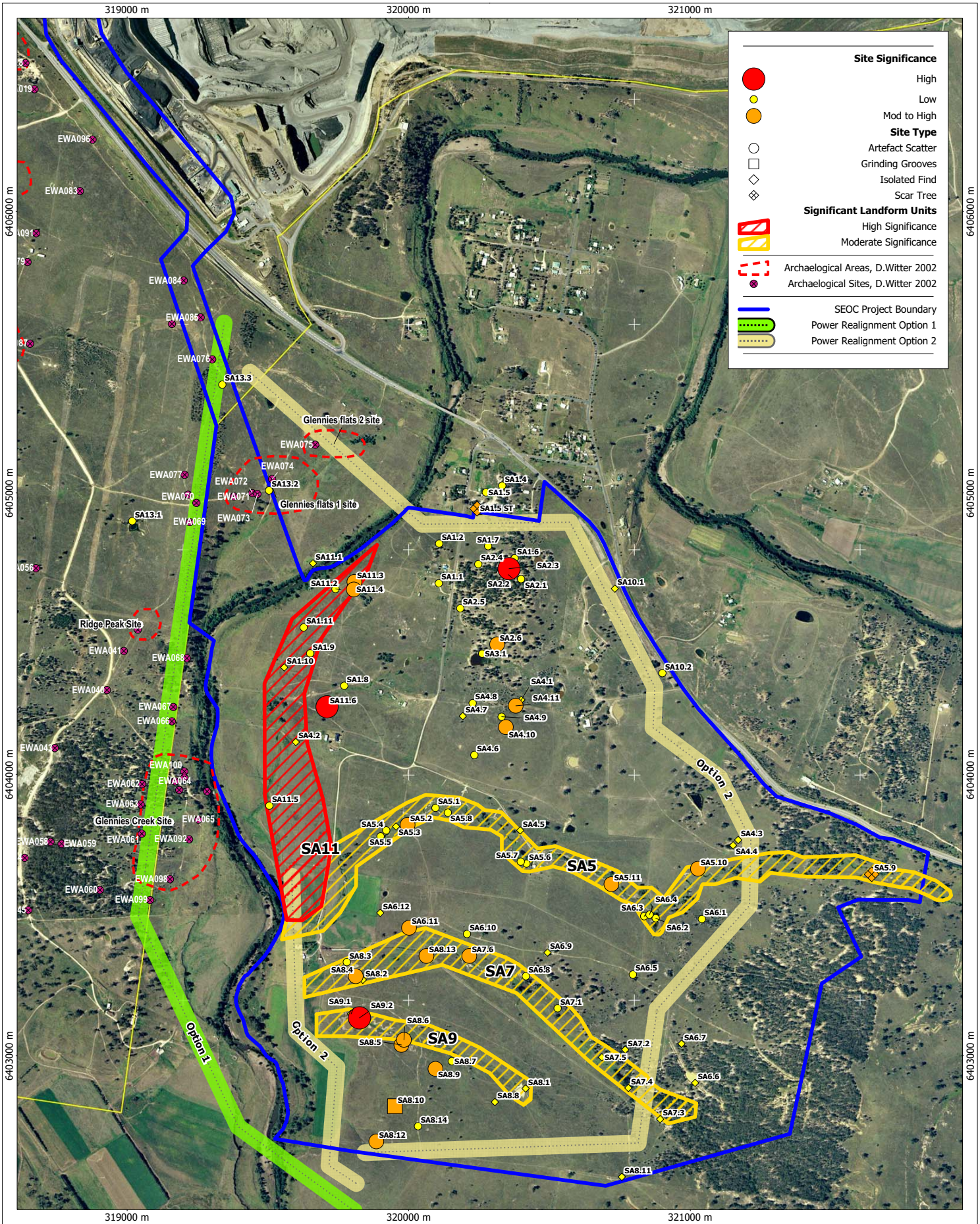
Option 1 – will travel along Asthton Ridge which is characterised by thin soils. On the ridge crest, artefacts were found in 75% of exposures where artefacts occurred as lag deposit on the B soil horizon. Half the exposures on the spur crests and ridge slopes also produced artefacts. The area was interpreted as containing small concentrations and frequent isolated finds, which form part of a relatively dense background scatter.

This option will then cross the floodplain of Glennies Creek and the creek channel before connecting into the existing line. The floodplain has no identified sites at this time, however Pit 15 excavated by the geomorphic assessment conducted by Mitchell (2002) identified that a paleosol is located on the terrace of Glennies Creek, east of the lower dog leg in the proposed realignment option as it follows the ridge.

Option 2 – is likely to encounter similar archaeological contexts as Option 1. The terraces of Glennies Creek are likely to contain artefact scatters which are likely to be covered with a post European alluvial mantle. No geomorphic test pits were excavated on the northern end of the western floodplain so the potential for buried paleosols and the presence /absence of artefacts, would need to be determined as pole locations are chosen.

Once route Option 2 passes over Glennies Creek, the potential for impact on artefacts sites is similar to that of Option 1, as the route traverses the ridge landscape characterised by relatively dense background scatter with some lenses.

Figure 8 shows the location of the power lines in relation to sites recorded during the Witter (2002) and Insite Heritage (2008) surveys.



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ASHTON COAL OPERATIONS PTY LIMITED

Location of proposed power line route options in relation to archaeological sites

Wednesday, 4 November 2009 Drawn: JPB

Figure 8

4.0 Discussion & Interpretation

This survey located over 1,125 artefacts from 85 recorded sites (including both artefact scatters and isolated finds). These sites have been grouped into landscape units and recorded on site recording cards electronically submitted to DECCW, with the exception of the scarred tree at SA5.9 which has been recorded separately (refer Appendix H).

4.1 Site Integrity

Much of the study area has been affected by recent land use (<200 years ago). Vegetative changes have occurred through land clearance and has contributed to erosion, particularly on the upper slopes and ridge crests. Low surface visibility most certainly affected the number of sites located. Exposures with high surface visibility were commonly the result of recent activities and included ground disturbance brought about via dam construction, vehicular tracks, gravels pits and stock treadage. While such activities may reduce site integrity, they increase the likelihood of site identification.

Some areas along creek banks have been subjected to moderate gully erosion with sheet erosion noted on some slopes. Erosion is generally limited in the area. Glennies Creek is subjected to periodic flooding and deep alluvial soils are located along its floodplain. Several overflow channels and/or old streams cut through areas to the east of the creek. Much of this area has been subjected to cultivation for stock feed.

Overall, site disturbance is restricted to agricultural activities which may impact on the spatial integrity of artefacts to a limited degree but not on the site content or site's landscape context. The character of the disturbance is relatively limited in area and in depth therefore it is highly likely that large areas of intact deposit may be found below and around identified sites. There is a high potential for [deep] sub-surface deposits within the study area, particularly on the Glennies Creek floodplain, that are of sufficient integrity to be of research value.

Plates 1 and 2 contain typical examples of the study area, note the lack of surface visibility. Plates 3 to 5 contain examples of typical surface exposures that revealed sites.

Plate 1 - View south to SA6-4 showing typical surface visibility

Plate 2 - View to east across SA8 showing typical grass cover

Plate 3 - View to east across SA6-1, dam wall

Plate 4 - View to east across site SA6-5

Plate 5 - View south across SA1-1 located on a disused driveway.

4.2 Lithic items

873 lithic artefacts were recorded during this survey with a further 252 noted but not recorded in any detail (1125 artefacts in total). The survey objective was to ascertain if the study area contained Aboriginal heritage items and to assess the significance of any such material. This was achieved without detailed recording. Basic recording included raw materials, artefact classification, size class and specific comments where deemed appropriate. The data recorded is sufficient to assess significance and determine whether further, more detailed analysis is warranted. The details of the 873 recorded artefacts can be found in Appendix C.

The major raw materials identified were indurated mudstone (also identified as tuff by some recorders) and silcrete.

Mudstone is a sedimentary material that may become indurated through pressure or heat or a combination of both. When indurated it becomes more brittle and easily flaked. Tuff is a fine grained stone formed after a cloud of ash ejected by volcanic event descends to form a thin layer over the ground surface. After burial some tuff beds become indurated through a metamorphic process in which the stone hardens and recrystallises to a less friable structure. Tuff is generally grey in colour however it is porous enough to absorb various minerals, particularly iron, to give a yellow, red or orange colour. Volcanic tuffs are widespread across the Hunter Valley and along the coast near Newcastle. The study area lies within the Hunter volcanic arc and the late Permian Singleton Coal Measures are made up of coal, tuffs, conglomerates and shales (Drysdale *et al*,200:15-17). It is highly likely that the material variously described as mudstone and tuff is tuffaceous. Tuff/mudstone cobbles can be found amongst river gravels in some areas of the Hunter River and this provides a readily available source.

Silcrete is a brittle, intensely indurate rock composed mainly of quartz clasts cemented by a matrix which may be well crystallised quartz, crypto-crystalline or amorphous (opaline) silica (Langford-Smith, 1978:3). The texture of silcrete reflects that of the host rock (eg sandstone) and clasts may range in size from very fine grains to boulders. Silcrete is normally grey in colour but can be whitish/cream, red, brown, black or yellow. It shatters very readily into sharp, angular pieces with a conchoidal fracture and newly broken rocks have a semi-vitreous sheen (*ibid*: 4). It is an attractive material to the local Aboriginal people because of its flaking properties and availability. Flakes have sharp, reasonably durable edges and implements made from the stone were used for a variety of tasks, including wood-working and spear barbs. Studies have identified a number of sources of silcrete in the Hunter Valley including Saltwater Creek (Koettig & Hughes, 1985), Lemington (Brayshaw *et al*, 1996), Jerrys Plains, Bengalla (Kuskie, 2002), Singleton and Mount Arthur (*pers. obs.*).

Mudstone and silcrete made up over 95% of the assemblage with the remainder consisting of quartz, chert and unidentified volcanic and fine grained siliceous material. Mudstone is almost three times more prevalent than silcrete.

Figure 9 contains a chart with a breakdown and comparison of lithic material and artefact classifications. Plate 6 shows a sample of artefacts recorded from SA11-6, note the colour variation and material variation (mudstone and silcrete shown).

Basic artefact classifications included flakes (incorporating broken flakes, blades, backed blades and scrapers as sub-classes), cores, angular fragments (frequently recorded as flaked pieces), hammer-stones, axes (pre-forms), anvils, grindstones and manuports. Flakes had an average size of 23.2mm (maximum dimension) and cores were an average of 42.8mm (maximum dimension).

There were 288 artefacts classified as broken flakes. Some of these may have been broken during the manufacturing process although, as all artefacts were located on the ground surface, much of the breakage may have been recent - caused by stock treadage, vehicular traffic or ploughing. While detailed analysis was not undertaken, eight flakes were classified as being backed and/or retouched and another eight were classed as scrapers (with steep retouch along one margin). Five artefacts were recorded as being 'utilised', that is they had edge damage or apparent use-wear along a margin. While this is a relatively low number out of a total exceeding 800 artefacts, such attributes cannot always be easily detected in the field. However, it does show that artefacts were utilised within these sites indicating that more than simple knapping went on at the site.

Cores were relatively numerous and knapping floors were identified via the presence of small flakes and fragments of the same material within a given area (eg SA2-6, SA8-9). This is indicative of active camp-sites were tools were being manufactured.

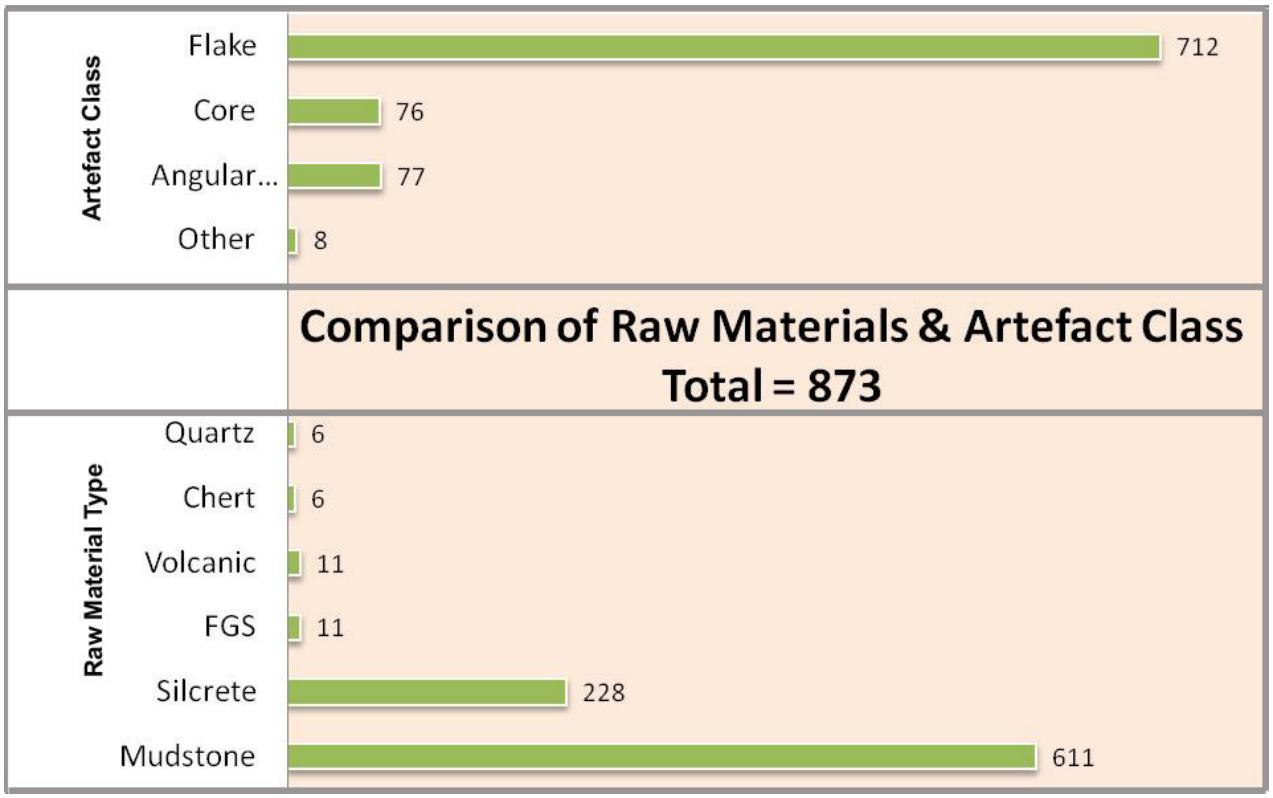


Figure 9- Summary of Recorded Lithic Artefacts

Plate 6 - Sample of artefacts from SA11-6

Plate 7 - View to west across central area of SA11-6.

4.3 Grinding Grooves

Two [potential] grinding grooves were located in a small exposure of sandstone on the slopes above the Glennies Creek terrace (SA8-10). Surface visibility was restricted by a heavy grass cover. The grooves measured 120mm x 15mm which suggests that they were not utilised for grinding the larger axe pre-forms such as those recorded during this survey (SA8-7-1, SA4-4-1). Plate 8 contains a photograph of the exposure and grooves. The sandstone outcrop was a small floater exposed within a cleared pasture area. The exposure is located approximately 2 metres from an unformed vehicle track. The grooves are not deep and may result from a single event.

Plate 8 - SA8-10 Sandstone exposure with grinding grooves

4.4 Scarred Trees

Two possible scarred trees were recorded during the survey (SA5-9 and SA1-5 refer Plates 9 & 10). The first is located in a gully below the New England Highway – outside the main study area but within the area of proposed inundation. The scar was located on a mature Ironbark (*Eucalyptus crebra*). The scar measured 3.5m in length and 500mm in width with over 200mm of bark re-growth covering the edge of the scar. The tree had a 3m girth at its base.

There were no indications that the scar had occurred naturally, however as the lower point of the scar begins at the current ground level there must be some doubt as to whether it was an intentional scar. Clearing of land may have resulted in sheet erosion on the upper slopes that led to the deposition of soil around the trunk of the tree. The scar aspect was north west.

The size of the scar is indicative for its use as a gunyah or shelter piece or canoe. The tree is somewhat distant from the nearest water source so a gunyah would seem to be the most appropriate use. The tree has been subsequently inspected by a qualified arborist (refer to Appendix E for a copy of the report).

The scar at site (SA1-5 ST) was located on the trunk of a dead tree which had been lopped 1.5-2m from the ground. The tree was located adjacent to a fence line on the southern edge of a small stand of trees adjacent to a cleared paddock on the eastern side of Glennies Street and to the west of Camberwell Common. The diameter of tree at breast height was less than 1m and the top portion of scar removed when tree was lopped. Depth of scar re-growth is approx 25mm and the scar was located on the western side of the tree. The tree species was unable to be identified in the field as only the dead stump remained. The scar is an historic surveyor's mark, with a government arrow and date carved into the face of the scar. The full detail of the scar is provided in the report undertaken by UTMA Pty Ltd (see Appendix E).

Plate 9 - Potential Scarred Tree - SA5-9

Plate 10 - Potential Scarred Tree SA 1-5

4.5 Spatial Patterning

The spatial distribution of evidence can be examined, particularly in relation to environmental variables such as slope, landform element and distance to potable water.

The Aboriginal heritage evidence located during this survey occurred in areas of level or gentle slopes in close proximity to permanent sources of water. It should be noted, however, that the study area not only contains permanent water in Glennies Creek but its tributaries contain water-holes and springs that would have provided reliable sources of water for extended periods and a variety of micro climates and ecotones. Thus, there is no point within the study area that is more than 300m from a water source.

Table 5 shows the number of sites and artefacts compared to the landforms they occur in. While slopes provided the highest number of sites, the total included isolated finds. This produced an average of less than four artefacts per site. Gullies had over ten artefacts per site, crests had over 25 and the terrace had over 75 per site. A far higher number of artefacts were located on the terrace and within gullies. Almost three times more artefacts were recorded within gullies and on terraces than on slopes despite there being less than half the number of sites. It should also be noted that visibility was at its lowest on the terrace flanking Glennies Creek.

Table 5 - Comparison of Sites and Artefacts by landform

Landform	No. Sites	No. Artefacts
Creek Bank/Gully	20	225
Terrace	6	470
Slope	51	228
Crest	8	202

The spatial distribution of artefacts within a given site can also be used to discuss and analyse site use and activities. No such recording was undertaken during this survey however clusters of material were noted in some sites and site integrity is sufficient to warrant this form of analysis in any future investigation - in particular sites SA11-6, SA11-3 and SA2-3.

4.6 Site Interpretation

While this survey recorded 85 'sites', it may be more beneficial to consider a lower number of sites that may be continuous through topographic (survey) units. Koettig has suggested that sites located in areas of reduced visibility, as we have here, are merely 'windows' that provided a glimpse of the broader picture of what lies beneath the grass cover, leaf litter or surface soils (Koettig 1990:14).

In this instance, the terrace flanking the east bank of Glennies Creek is likely to be a continuous site, at least across the northern half of the study area. Artefacts were located in virtually all exposures along that portion of the terrace. Witter (2002) and Hardy (2001) found a similar situation to exist on the western side of Glennies Creek. In actual fact, it is possible that sites from both sides of the creek may have been used contemporaneously; the creek being a central focal point with people exploiting areas to both the west and east and returning to a common point where there was permanent water.

This is not to suggest that the terrace is a single site resulting from one or two events over a limited period of time. It is more likely that the terrace was occupied by small encampments, with repeated visits spreading along the corridor over time. The artefacts that have been exposed are evidence of localised events such as knapping, workshops or small camp sites. They may overlap and any assemblage may be the results of a single event or a mixture of many events that have been compressed as artefacts and are re-distributed through both natural and unnatural events.

SA11-6 is centrally located on the Glennies Creek terrace. It is highly unlikely that such occupation intensity is restricted to this specific area. Further testing should be undertaken to determine the nature of occupation beyond this specific area to include the majority of the terrace in general.

Similarly, artefacts located along the creek lines running into Glennies Creek (SA5, SA7 and SA9) may represent continuous sites. Furthermore, sites and higher concentrations of artefacts tended to cluster at the eastern sectors of the gullies, slopes and crests. This pattern may be due to springs which are noted by the present property owners, which feed dams on these lower slopes. Thus the lower ends of these tributaries may have provided a relatively reliable water supply and associated ecotone, as well as being located above the floodplain of Glennies Creek which is known to flood at regular intervals.

The artefact types within the assemblage indicate that the study area was occupied in either sporadic intense occupation or more likely repeated regular and cyclic episodes. The artefact types include tools such as axes, scrapers, backed blades, blades and flakes which at a basic level indicates a variety of activities. Cores indicate stone working as does the frequent presence of cortex on the artefacts. Scraper and backed blades indicate food and resource processing and the clustering of implements suggest camp site loci of domestic and manufacturing activities.

Occupation of the area is likely to date to the Pleistocene, over 10,000 years ago, until recent times. Given the excavation of a hearth elsewhere on Glennies Creek and the presence of a variety of older terraces and meanders on the flood plain area

of this study area, there may be potential for the detection of older occupation sites. Excavation and dating of *in situ* stratified deposits may address these issues.

It is inferred from the evidence within the study area and from other sources that:

Members of the Wonnarua 'tribe' occupied the locality, with the first occupants arriving more than 13,000 years ago;

The locality was suited to long term occupation because of the presence of exploitable resources and its proximity to permanent water;

The locality provided access to both aquatic (riverine and wetland) and terrestrial resources;

The presence of cores and small flake debitage indicates that knapping was undertaken in specific areas;

The presence of axe pre-forms and grinding grooves (in Bowmans Creek) indicates that ground edge implements formed part of their tool-kit;

Utilised flakes showing evidence of use-wear and/or edge damage suggest that food preparation and/or tool manufacture and repair were carried out on the site; and

The stone materials indurated mudstone/tuff and silcrete were favoured for stone-working activities and these materials were obtained from local sources.

There is a very high potential for a great deal more artefactual material to occur within the study area, particularly along the terraces of Glennies Creek, along creek margins and on slopes and crests running into the Glennies Creek valley. In order to understand how the Aboriginal people utilised and interacted with this landscape, further archaeological investigation via surface collections and excavation is warranted. Detailed recommendations follow later in this report.

5.0 Significance of Identified Sites

5.1 Significance Criteria

The basic processes of assessing significance for items of heritage are outlined by *The Australian ICOMOS Charter for the Conservation of Places of Cultural Significance: the Burra Charter* (amended 1999) and its associated *Guidelines*. Sites may be significant according to several criteria, including scientific or archaeological significance, significance to Aboriginal people, aesthetic value, the degree to which a site is representative of archaeological and/or cultural type, and value as an educational resource. In New South Wales the nature of significance relates to historic, aesthetic, social, scientific, cultural or educational criteria and sites are also assessed on the degree to which they exhibit rare or representative characteristics of their type, or whether they exhibit historic or cultural connections.

Scientific Significance

Site significance is rated low, medium and high. In order to determine scientific significance it is necessary to first place sites within a local and regional context. This process enables the assessment of any individual site in terms of merit against other sites of similar nature within similar contexts.

Public Significance

The sites are assessed in terms of their educational value, to enhance community knowledge and appreciation of cultural heritage.

Cultural Significance

Generally, all sites are of significance to the Aboriginal people. It has been recognised however that with the widespread nature of site distribution, sites will eventually be impacted upon by development. It is however necessary to conserve where possible sites which are of high significance to the community.

Representative Significance

The significance of individual sites is determined by factors such as representativeness, rarity, and the sites potential to add scientific data to what is known about past human occupation of the Australian continent. Conservation outcomes are determined by comparison of a site's qualities with known sites in the region that have been protected.

5.2 Significance Assessment

The following significance assessment (refer Table 6) is based on the guidelines listed in the preceding section. For the significance assessment regarding the cultural significance of the sites, please refer to community reports in Appendix D.

Table 6 - Significance Assessment

Unit/ Site	Site Type[2]	Scientific Significance	Public Significance	Representative Significance
SA1/1, SA1/2, SA1/4, SA1/5 SA1/6, SA1/7, SA1/8, SA1/9, SA1/10 SA1/11	AS/IF	Low	Low	Low
SA1/5 ST	ST	Moderate	Moderate	Moderate-High
SA2/1, SA2/2, SA2/4, SA2/5	AS/IF	Low	Low	Low
SA2/3	AS	High	Moderate	Moderate
SA2/6	AS	Moderate	Moderate	Moderate
SA3/1	AS	Low	Low	Low
SA4/1, SA4/2, SA4/3, SA4/4, SA4/5 SA4/6, SA4/7,SA4/8, SA4/9	AS/IF	Low	Low	Low
SA4/10, SA4/11	AS	Moderate	Low	Low
SA5/1, SA5/3, SA5/4, SA5/5, SA5/6, SA5/7, SA5/8	AS/IF	Low	Low	Low
SA5/2	AS	Moderate	Low	Low
SA5/9	ST	Moderate	Moderate	High - rare
SA5/10, SA5/11	AS	Moderate-high	Moderate	Moderate
SA6/1, SA6/2, SA6/3, SA6/4, SA6/5, SA6/6, SA6/7, SA6/8, SA6/9,SA6/10, SA6/12	AS/IF	Low	Low	Low
SA6/11	IF	Moderate	Low-moderate	Low-moderate
SA7/1, SA7/2, SA7/3. SA7/4, SA7/5,		Low	Low	Low
SA7/6	AS	Moderate	Low-Moderate	Low-Moderate
SA8/1, SA8/2, SA8/3, SA8/7, SA8/8, SA8/8, SA8/11, SA8/14	AS/IF	Low	Low	Low
SA8/4, SA8/5, SA8/6, SA8/9, SA8/10, SA8/12, SA8/13	AS/GG	Moderate	Moderate	Moderate
SA9/1	IF	Low	Low	Low
SA9/2	AS	High	Moderate-high	Moderate
SA10/1, SA10/2	AS/IF	Low	Low	Low
SA11/1, SA11/2, SA11/5	AS/IF	Low	Low	Low
SA11/3, SA11/4	AS	Moderate	Moderate	Moderate
SA11/6	AS	High	High	High
SA13/1, SA13/2, SA13/3	AS/IF	Low	Low	Low

[2] AS = artefact scatter, IF = isolated find, GG = grinding grooves, ST = scarred tree

Overall Significance

Three individual sites have been assessed as being of high significance (SA2/3, SA9/2, SA11/6), the site containing the scarred tree (SA5/9) is of high significance if further investigation confirms that it is an Aboriginal scar. These sites have been rated as significant on the basis of artefact densities and whilst further artefacts will be found within surrounding topsoil, these sites do not have potential for stratified deposit.

Several other sites are regarded as being of moderate or moderate-high significance (SA1/5 ST, SA2/6, SA4/10, SA4/11, SA5/2, SA5/10, SA5/11, SA6/11, SA7/6, SA8/4, SA8/5, SA8/6, SA8/9, SA8/10, SA8/12, SA8/13, SA11/3, SA11/4), refer to Figure 10 below. Where these sites are located in close proximity to each other, within specific landscape units (ie. the creek lines, and terrace margins), these landscape units have been rated as of high significance due to the potential to provide comparable spatial data between the various landform units and further refine Witters archaeographic model. Thus, an area of high significance may comprise a variety of low, moderate and high significance artefact scatters.

Of the 85 sites recorded, 65 have been assessed as being of low significance. However, when viewed collectively, their significance increases greatly. In some instances it is likely that individual sites or isolated finds actually relate to continuous sites particularly along gullies and terraces. Likewise, sites located on slopes and crests linking gullies or overlooking Glennies Creek may be contiguous across landform units. The results of this survey have indicated that the entire study area has been well utilised by Aboriginal people over a period of time. Thus the site is of very high cultural significance, and stakeholders have indicated that the area remains important to the contemporary community. Though there is no indication of any stratigraphy within sites, several sites have high scientific potential for the investigation of horizontal spatial distribution.

The following points support such an assessment:

The horizontal integrity of many of the sites located is good and conducive to further detailed archaeological investigation;

A site located about ten kilometres upstream on Glennies Creek has evidence of Pleistocene occupation (Koettig, 1990), an uncommon occurrence in the Hunter Valley. Two small areas of potential for late Pleistocene landscapes were identified by Witter on the western side of Glennies and Bowmans Creeks. The potential for a similar landform to occur in this study area has been addressed by Dr Philip Hughes and no potential Pleistocene areas have been identified (Appendix G).

Sites are spread broadly across the entire study area including all topographic units. Spatial analysis of sites and artefacts would provide a better understanding of how Aboriginal inhabitants interacted with and utilised the landscape and provide data for additional analysis based on work carried out in the Ashton Lease Area.

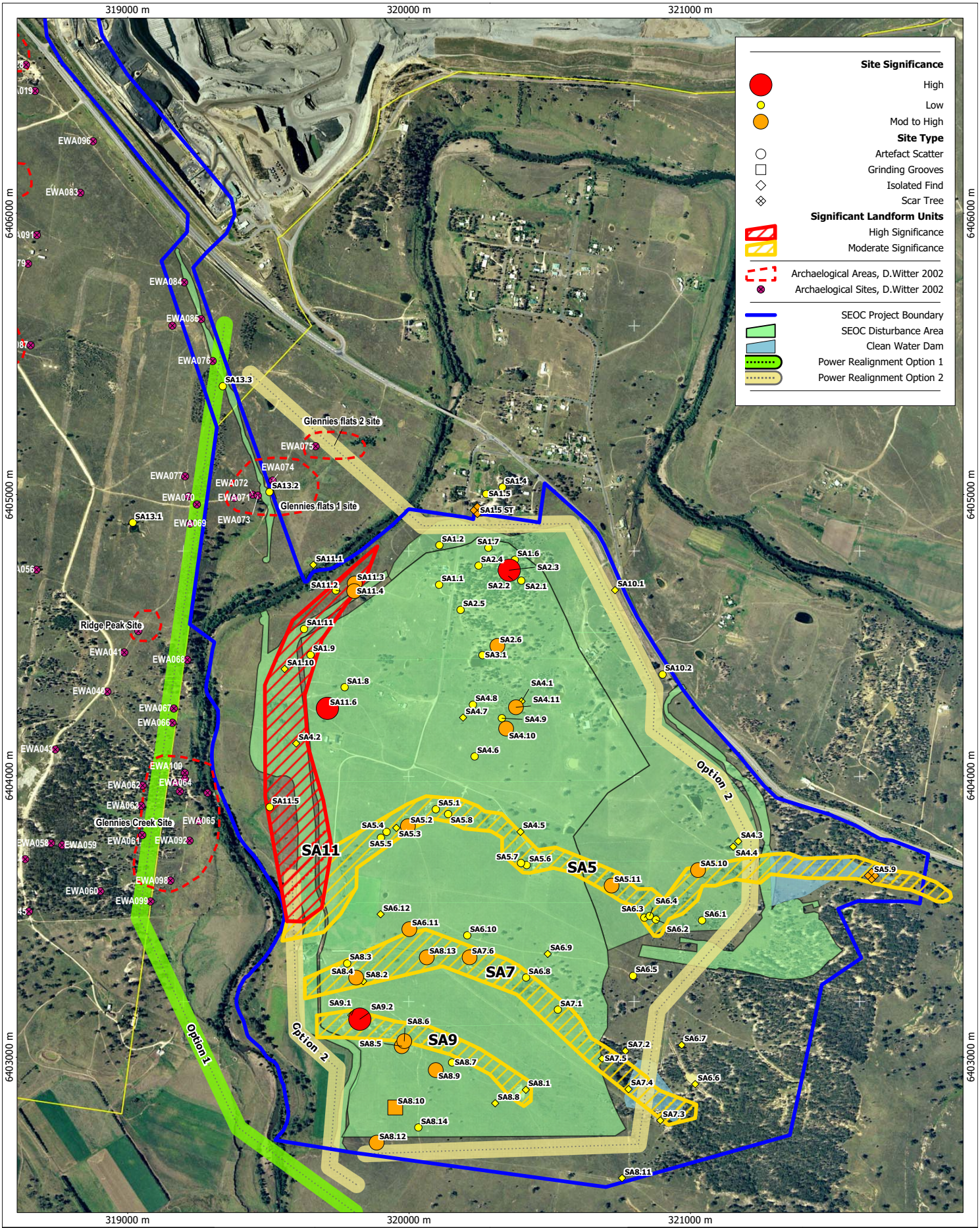
Several sites (eg SA2/3, SA9/2, SA11/6) have high concentrations of artefacts (19 recorded 139 noted, 50 recorded 46 noted, and 393 recorded respectively);

SA 2/3 is located in the Central Ridge System according to Witters model and full recording will enable comparison between assemblages between the two study areas. SA 9/2 and 11/6 are located in the Brook Valley System and these too shall be subject to further analysis in this context.

The range of raw materials and artefact characteristics will provide an ideal base for further, detailed investigation;

The local Aboriginal community representatives have indicated that they believe this area to be of high cultural significance and desire further investigation to be undertaken;

Further investigation would enhance works previously undertaken in adjoining areas (Hardy, 2001; Witter, 2002).



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ASHTON COAL OPERATIONS PTY LIMITED

SOUTH EAST OPEN CUT
Archaeological Sites and Impact Zones

Wednesday, 4 November 2009 Drawn: JPB

Figure 10

6.0 Legislation

THE ENVIRONMENTAL PLANNING AND ASSESSMENT ACT (1979)

This project is being assessed by the Department of Planning under Part 3(A) of the EP&A Act 1979. This Act overrides other state legislation as the project is considered State significant. The guidelines on the preparation of planning instruments specifically state that Aboriginal heritage should be assessed as an integral part of these studies.

Part 4 of the Act determines the way in which consent authorities make decisions regarding development applications. Section 79C (b) states that;

"The impact of development on the natural or built environment should be considered before consent is granted."

Part 5 of the EP&A Act points out that State government agencies which act as determining authorities must also conduct reviews of their own or other agencies activities in terms of impact on the environment. Where these impacts are deemed to be minimal a Review of Environmental Factors is required, although where impacts are greater an EIS would be generated. This part of the Act requires that;

"any impacts on a locality having aesthetic, anthropological, architectural, cultural, historic, scientific, recreational, scenic or social significance or other special value for present or future generations be accounted for'". (DUAP 1995).

THE NATIONAL PARKS AND WILDLIFE ACT 1974

Pursuant to the Section 75u of the EP&A Act 1979 a permit under Section 87 or a consent under Section 90 of the National Parks and Wildlife Act 1974 (NPW Act 1974) is not required. However, it forms the basis on which Department of Environment & Climate Change (DECC) provide their recommendations to the Department of Planning upon their review of the project. The NPW Act (section 90) provides statutory protection for all material evidence of Aboriginal occupation of NSW. Aboriginal places, which are areas of cultural significance to the Aboriginal community, are also protected by (section 84) of the NPW Act . The Act it states:

"The Minister may declare lands to be 'protected archaeological areas' to preserve Aboriginal places and relics; and

It is an offence to disturb or destroy an Aboriginal place or relic without first obtaining written consent from the Director of National Parks and Wildlife Service NSW."

The National Parks and Wildlife Act 1974 requires the obtaining of a Section 87 Permit if a person wishes to excavate land to disturb or discover an Aboriginal object (relic) or disturb or move an Aboriginal object.

A Section 90 Heritage Impact Permit is required if an activity will or is likely to destroy, damage, desecrate or deface an Aboriginal object or Aboriginal place.

A relic is defined as: “any deposit, object or material evidence (not being a handicraft made for sale) relating to indigenous and non-European habitation of the area that comprises NSW, being habitation both prior to and concurrent with the occupation of that area by persons of European extraction, and includes Aboriginal remains” (NPW A s.5(1)).

7.0 Management Recommendations

The following management recommendations are applicable to the study area as delineated by the plans provided. Any changes to the areas to be developed may require further survey. Please also refer to Appendix D - Community Reports.

Open cut mining is a very destructive process and any heritage items located therein will be totally destroyed and peripheral infrastructure will impact on outlying areas. The following recommendations are based on the assumption that the entire study area will be impacted upon by the proposed development.

As the project is to be assessed under Part 3(A) and the approval body is the NSW Department of Planning, approvals under Section 90 of the *NP&W Act* are not required. However, in order to apply the spirit of the Act, the following recommendations are made to mitigate against the impact of the proposed open cut mine.

Given the high significance of a number of specific sites and the overall significance of the combined sites and assemblage and that these sites will be impacted by the proposed works, it is recommended that an artefact salvage and further detailed archaeological investigations be undertaken prior to and or concurrently to the project commencing.

The following recommendations are provided:

Collection of all artefacts located during this survey, including more detailed recording where necessary to allow spatial analysis of assemblage;

Undertake test excavations of specific sites (as identified in Table 6 and subject to Aboriginal community review). The methodology for the work will include test excavations in areas of high significance to determine to spatial extent of sites where this is cannot be ascertained by surface exposure. Once spatial extent is determined open area excavations will be undertaken to retrieve the maximum number of artefacts possible and to provide further detailed information regarding inter and intra site patterning. The determination of open area salvage excavations will be determined in consultation with the Aboriginal community, geomorphology results, test excavations and more detailed recordings. This process may be conditioned as a stage two to the above process to allow continuity in the field work.

The salvage of sites within the corridor of the coal conveyor will be refined to address detailed impacts. These are anticipated to include, but not confined too, the footprint of the conveyor supports and access roads. Where these impacts intercept sites, the sites will be salvaged by collection (where sub surface deposits are negligible) and excavation where sub surface deposits are evident.

Complete a detailed analysis of all materials retrieved and appropriately report all works undertaken. Provide copies of reports to relevant authorities and stakeholders;

Liaise with the Aboriginal community to ascertain whether full monitoring and collection of artefacts will be required as works commence.

Site specific recommendations are contained in the Table 7 however detail may be added or amended following consultation between Ashton Coal, Aboriginal community members and the DECCW as the formal project application process proceeds.

An area in the southern portion of the study area has not been covered by the assessment due to a subsequent realignment of the project boundary (refer to Figures 2 & 6). The potential for sites to occur in this area has been extrapolated from the survey area (see Section 3,4 and 4.0). This area will be included in the cultural heritage management plan should the project be approved and will be surveyed with the community stakeholders and any management recommendations developed prior to development.

Table 7 - Site Specific Management Recommendations

Sites	Significance	Management Recommendations
SA11/6, SA2/3, SA9/2,	High	Record location and collect all artefacts from the surface. Undertake manual salvage excavation to determine the extent of the site in both area and depth. Full extent and methodology of excavation to be determined.
SA1/5 (ST), SA2/6, SA4/10, SA4/11, SA5/2, SA5/9, SA5/10, SA5/11, SA6/11, SA7/6, SA8/4, SA8/5, SA8/6, SA8/9, SA8/10, SA8/12, SA8/13, SA11/3, SA11/4,	Moderate to High	Record location and collect all artefacts from the surface. Undertake manual salvage excavation to determine the extent of the sites in both area and depth. Full extent and methodology of excavation to be determined. Further investigation into possible scarred trees, develop mitigation measures accordingly.
SA1/1, SA1/2, SA1/4, SA1/5, SA1/6, SA1/7, SA1/8, SA1/9, SA1/10, SA1/11, SA2/1, SA2/2, SA2/4, SA2/5, SA3/1, SA4/1, SA4/2, SA4/3, SA4/4, SA4/5 SA4/6, SA4/7,SA4/8, SA4/9, SA5/1, SA5/3, SA5/4, SA5/5, SA5/6, SA5/7, SA5/8, SA6/1, SA6/2, SA6/3, SA6/4, SA6/5, SA6/6, SA6/7, SA6/8, SA6/9,SA6/10, SA6/12, SA7/1, SA7/2, SA7/3. SA7/4, SA7/5, SA8/1, SA8/2, SA8/3, SA8/7, SA8/8, SA8/11, SA8/14, SA9/1, SA10/1, SA10/2, SA11/1, SA11/2, SA11/5, SA13/1, SA13/2, SA13/3	Low	Record location and collect all artefacts from the surface. At sites where potential for subsurface material has been indicated, these should be considered for salvage by excavation.
SA11 (entire survey unit)	High	Undertake grader scrapes at predetermined sections of the terrace to ascertain artefact and feature distribution across this specific landform. Manual excavation of any features or high concentrations of artefacts. Full extent and methodology to be determined.
SA5, SA7, SA9 (entire survey units)	Moderate	Excavate test pits at predetermined sections of the terrace to ascertain artefact and feature distribution across this specific landform. Manual excavation of any features or high concentrations of artefacts. Full extent and methodology to be determined.

8.0 General Photographs

Plates 11 – 26 Shows various views, sites and artefacts located within the study area.

Plate 11 - View south along Glennies Creek – SA12

Plate 12 - View north across dam in SA9

Plate 13 - View north across ploughed area of SA10

Plate 14 - View to South-west across lower reach of SA5

Plate 15 - View to north-west across SA13

Plate 16 - View east across SA2

Plate 17 - SA5/2 view along south bank across

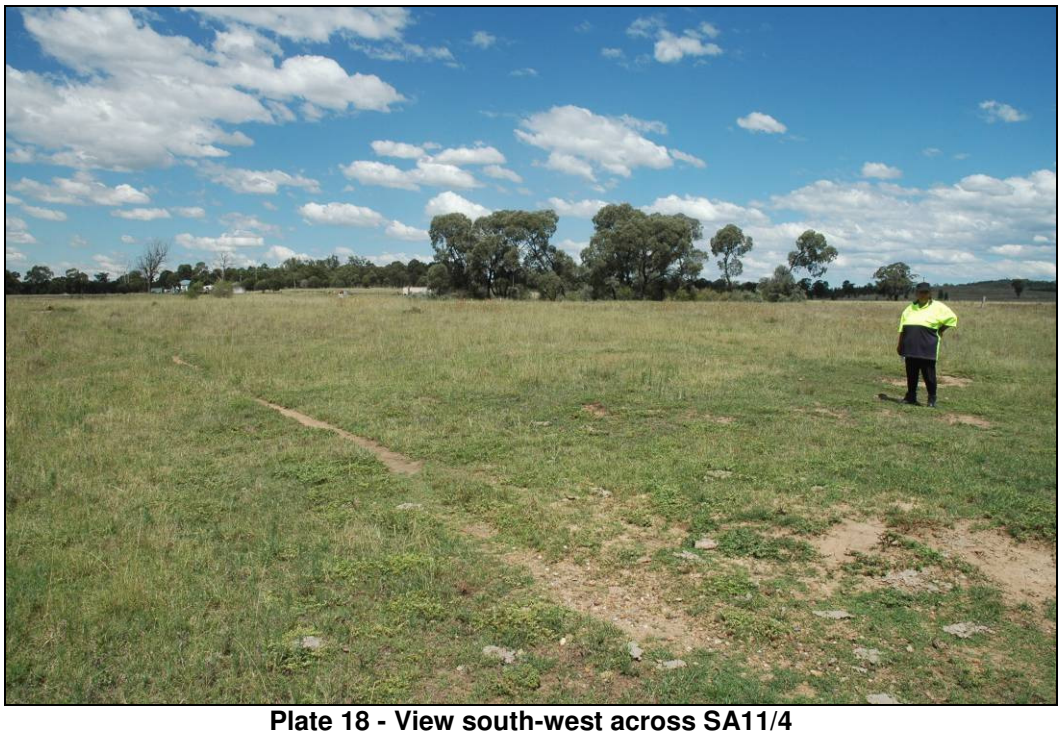

Plate 18 - View south-west across SA11/4

Plate 19 - View to north across SA11/6

Plate 20 - View south across SA6

Plate 21 - Axe pre-form from SA4/4

Plate 22 – Sample of artefacts from SA8/7

Plate 23 - Hammerstone from SA5/2

Plate 24 – Backed point from SA2/2

Plate 25 - Hammerstone and possible anvil identified at site SA7.6

Plate 26 - Artefacts identified at site 8.13 in vehicle track way.

9.0 Glossary

Angular Fragment: Flaking debris that lacks diagnostic features. Also referred to as a flaked piece (Holdaway & Stern 2004:113).

Artefact: Any object, usually portable, that has been made or shaped by human hand (Mulvaney & Kamminga 1999:425).

Assemblage: A set of artefacts found in close association with each other (Flood 1989: 281).

Backed/Backing: Unidirectional or bi-directional retouch located on one lateral margin of a tool (Holdaway & Stern 2004:159).

Backed Blade: A blade with one margin deliberately blunted to form a penknife-like back (Flood 1989:281).

Basalt: Volcanic igneous rock dark in colour (black – dark grey). Fine grained containing 45-55% silica, iron and magnesium. (Holdaway & Stern 2004:22).

Bioturbation: Reworking of sediments through the action of ground dwelling life forms such as ants, termites, and earthworms (Mulvaney & Kamminga 1999:425).

Blade: A parallel sided flake, twice as long as it is wide (Flood 1989:282).

Broken Flake: A flake fragment which displays only part of the diagnostic features of a complete flake. Broken flakes are classed are classed as either proximal flakes, medial flakes, lateral and distal flakes depending on their visible attributes (Holdaway & Stern 2004:111).

Chert: A fine grained crystalline aggregate of silica (Flood 1989:82).

Clay: Sediment that contains particles less than 4 µm in size (Kearey 2001:49).

Coal: Combustible sedimentary rock, greater than 50% carbonaceous material (Kearney 2001:51).

Colluvial: Transported by non fluvial processes (Kearey 2001:53).

Conglomerate: Sedimentary rock containing rounded clasts greater than 2 mm in size (Kearey 2001:56).

Core: A piece of stone, often a cobble or pebble but also quarried stone, from which flakes have been struck for toolmaking (Mulvaney & Kamminga 1999:426).

Core Tool: A core bearing trimming or use wear indicating its use as an implement (Flood 1989:282).

Cortex: Outer weathered surface of a rock or mineral (Holdaway & Stern 2004:144).

Debitage: The waste product from tool manufacture (Holdaway & Stern 2004:154).

Distal Flake: Flakes which have a termination but do not show a platform or evidence of an impact point (Holdaway & Stern 2004:111).

Dorsal Surface: Retains part of the original surface of the core or scars from earlier flake removals (Holdaway & Stern 2004:143).

Erosion: Process where particles are detached from rock or soil and transported away principally via water, wind, ice and air (Kearey 2001:88).

Flake: A piece of stone detached by striking a core with another stone (Flood 1989:283).

Flake piece/s: Refer to angular fragment.

Geometric Microlith: A microlith of triangular, trapezoidal or other geometric shape, with an abruptly trimmed thick margin (Flood 1989: 283).

Geomorphology: The description and interpretations of landforms (Mulvaney & Kamminga 1999:426).

Hearth: The site of a campfire (Flood 1989:284).

Heat Treatment: Also referred to as heat shatter. The natural or human induced process of heating raw materials to change their properties prior to tool manufacture. Observable changes include alterations in colour, lustre and crystalline structure (Holdaway & Stern 2004:29).

Loam: A soil which contains approximately equal proportions of sand, silt and clay (Kearey 2001:156).

Medial flake: Flake or flake fragment with an identifiable ventral surface but lacking proximal and distal margins (Holdaway & Stern 2004:111).

Microlith: A variety of small, less than 30mm in size, retouched implements of various shapes (Mulvaney & Kamminga 1999: 427, Flood 1989:285).

Microblade Cores: Provide the blanks for the small –tool tradition – Bondi points and geometric microliths. Less than 100mm in maximum dimension. Flake scars are parallel and elongate and long relative to core size (Holdaway & Stern 2004:204).

Midden: Aboriginal occupation site consisting chiefly of shells with minor components of other refuse such as ash, stone artifacts and animal bones (Mulvaney & Kamminga 1999:427).

Mudstone: Used to refer to the fine to very fine grained sedimentary rocks of siltstones and mudstones (Holdaway & Stern 2004:20).

Open Campsite: A surface of stone and other artefacts exposed on the ground surface (Flood 1989:285).

Permian: Geological time period from 290 – 245 Ma (Kearey 2001:200).

Platform: The area on a stone core on which a blow is struck to detach a flake. The detached flake bears on its butt end the original striking platform (Flood 1989: 287).

Podzolic: Acid soils with strong texture contrast between sandy or loamy topsoils and clay subsoils (Matthei 1995:319).

Porcellanite: A rock formed by the thermal metamorphism of a soil horizon in basalt (Kearey 2001:208).

Proximal flake: broken flakes that do not have a termination but exhibit features from where the flake was struck from the core such as a platform, bulb of percussion, impact point (Holdaway & Stern 2004:110).

Quartz: Common mineral with naturally sharp edges and poor fracturing properties. Colour ranging from clear, to milky white and pink (Flood 1989:286).

Quartzite: Homogenous medium to coarse grained metamorphosed sandstone (Flood 1989:286).

Retouch: To shape, sharpen or blunt a stone tool by flaking (Mulvaney & Kamminga 1999:428).

Retouched flake: Flakes removed during retouching of a tool (Holdaway & Stern 2004:173).

Sandstone: A sedimentary rock comprised of greater than 25% clasts of sand grains 0.625-2mm in diameters (Kearey 2001:234).

Scarred tree: Trees which have had portions of their barked removed (Mulvaney & Kamminga 1999:32).

Scraper: A flake with one or more margins displaying retouch along the entire margin (Holdaway & Stern 2004:227).

Shale: A sedimentary rock with particles less than 4µm in diameter (Kearey 2001:242).

Silcrete: A sedimentary rock comprising of quartz grains in a matrix of fine grained – amorphous silica (Holdaway & Stern 2004:24).

Soloth (or Solodic): Acid soils with strong texture contrast between pale topsoil and clay subsoil with coarse blocky or columnar structure (Matthei 1995:319).

Stratigraphy: The study of natural and cultural sedimentary strata (Mulvaney & Kamminga 1999: 428).

Symmetrical backed artefact: see geometric microlith.

Thumbnail Scraper: A small flake with a convex scraper edge opposite the platform of the flake and with a shape similar to a thumbnail (Holdaway & Stern 2004:234).

Tuff: Fine grained stone formed after a cloud of ash ejected by volcanic event descends to form a thin layer over the ground surface. After burial some tuff beds become indurated through a metamorphic process in which the stone hardens and recrystallises to a less friable structure.

Use-wear: Alteration of an artefact caused by its use (Holdaway & Stern 2004:41).

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Appendix A – Community Consultation Log

AshtonCoal

ASHTON COAL OPERATIONS PTY LIMITED
ABN 22 078 556 500

GLENNIES CREEK ROAD
CAMBERWELL NSW 2330

TEL: 02 6576 1111
FAX: 02 6576 1122

PO Box 699
SINGLETON NSW 2330

Our Ref: J162_Pt08_Arch

17 October 2008

Wanaruah Custodians
35 Acacia Circuit
SINGLETON NSW 2330

Dear Sir/Madam

Re: Proposed South East Open Cut Project – Ashton Coal Operations Pty Limited.

I wish to advise that Wells Environmental Services Pty Limited have been engaged by Ashton Coal Operations Pty Limited to prepare an Environmental Assessment Report for the proposed development of an open cut coal mine to be known as the South East Open Cut. The proposed South East Open Cut is located within Exploration Licences 5860 and 4918 and Coal Authorisation 81 held by Navidale Pty Limited. A plan showing the location of the proposed South East Open Cut is attached for your information.

We are seeking input from individuals and/or Aboriginal communities to participate and/or be consulted with regarding archaeological investigations for the proposed South East Open Cut project in accordance with the Department of Environment and Climate Change – Interim Community Consultation Requirements.

You are invited to register your interest in this project.

Registrations of Interest will be used to compile an Aboriginal Stakeholder Register. Groups and individuals listed on the Aboriginal Stakeholder Register may be invited to participate and comment on the Aboriginal Cultural Heritage Assessment being prepared in respect to the project.

To register your interest, please forward correspondence or contact:

Mr Alan Wells
Wells Environmental Services
P.O Box 205
East Maitland NSW 2323
Telephone: (02) 4934 6588
Fax: (02) 4934 6788
Email: akwells@pacific.net.au

Registrations of Interest close at 5.00pm on Friday 31 October, 2008.

Yours faithfully

Lisa Richards

Environment and Community Relations Manager.

Attached: Ashton Coal SEOC Plan No. 03447D.dwg

AshtonCoal

ASHTON COAL OPERATIONS PTY LIMITED
ABN 22 078 556 500

GLENNIES CREEK ROAD
CAMBERWELL NSW 2330

TEL: 02 6576 1111
FAX: 02 6576 1122

PO Box 699
SINGLETON NSW 2330

Our Ref: J162_Pt08_Arch

17 October 2008

The General Manager
Singleton Shire Council
P.O Box 314
SINGLETON NSW 2330

Attention: Ms E Duffy

Dear Erica

Re: Development of an Aboriginal Stakeholder Register – Liaison and Conduct of Archaeological Survey – South East Open Cut Project – Ashton Coal Mine

We are seeking input from individuals and/or Aboriginal communities to participate and/or be consulted with regarding archaeological investigations associated with the proposed development of an open cut coal mine to be known as the South East Open Cut. The proposed South East Open Cut is located within Exploration Licences (EL) 5860 and 4918 and Coal Authorisation 81 held by Navidale Pty Limited.

In accordance with the NSW Department of Environment and Climate Change (DECC) – Interim Community Consultation Requirements we hereby notify you that we have placed notices in the Singleton Argus and Sydney Morning Herald newspapers to appear on the 7th and 17th October, 2008 editions.

A plan showing the location of the proposed South East Open Cut coal mine is attached for your information.

Should you wish to discuss this matter please feel free to contact me.

Yours faithfully

Lisa Richards
Environment and Community Relations Manager.
Attached: Ashton Coal SEOC Plan No. 03447D.dwg

Sydney Office: Level 14, 213 Miller Street, North Sydney, NSW, 2060 – Tel: (02) 9922 3777 Fax: (02) 9923 2427
Brisbane Office: Level 6, 316 Adelaide Street, Brisbane, QLD, 4000 – Tel: (07) 3248 7900 Fax: (07) 3211 7328

Ref: letterhead template

02.10.2008
Notification of project and request for details of registered Aboriginal stakeholder groups sent to DECC, Singleton Council, Office of the Registrar, NSW Native Title Services.

09.10.08 & 17.10.08
Advertisements placed in the public notices section of The Sydney Morning Herald and The Singleton Argus.

October – December 2008
Following responses from the above agencies the following groups were invited to register their interest in the project (inclusive of groups already registered on Ashton Coal Operations community register):

Aboriginal Stakeholder Group	Address
Hunter Valley Cultural Surveying	297 Pioneer Road SINGLETON NSW 2330
Hunter Valley Cultural Consultants	40 Humphries Street MUSWELLBROOK NSW 2333
Hunter Valley Aboriginal Corporation	P.O Box 579 MUSWELLBROOK NSW 2333
Wanaruah Custodians	35 Acacia Circuit SINGLETON NSW 2330
Valley Culture	140 Sydney Street MUSWELBROOK NSW 2333
Wonnaruah Elders Council	P.O Box 814 SINGLETON NSW 2330
St Clair Singleton Aboriginal Corporation	P.O Box 710 SINGLETON NSW 2330
Mimagen Wajaar Pty Ltd	7 Wybalena Close KILABEN BAY NSW 2283
Lower Hunter Wonnarua Council Inc.	142 Northcote Street KURRI KURRI NSW 2327
Junburra Consulting	P.O Box 3043 SINGELTON NSW 2330
Wonnarua Aboriginal Custodians Corporation	9 Lachlan Avenue SINGELTON NSW 2330
Wonnarua Local Aboriginal Land Council	P.O Box 127 MUSWELLBROOK NSW 2333
Wattaka Wonnarua C.C Service	4 Kennedy Street SINGLETON NSW 2330
Ungooroo Aboriginal Corporation	P.O Box 3095 SINGLETON NSW 2330
Lower Wonnarua Tribal Council	156 The Inlet Road BULGA NSW 2330
Aboriginal Native Title Heritage Consultants	16A mahogany Ave MUSWELLBROOK NSW 2333

Aboriginal Stakeholder Group	Address
Biami Pty Ltd	P.O Box 1502 NORTH SYNDYE NSW 2059
Mur-Roo-Ma Inc	7 Vardon Road FERN BAY NSW 2295
Yamuloong Group Initiatives Ltd	P.O box 487 CARDIFF NSW 2285
Wonnarua Nations Aboriginal Corporation	P.O Box 3066 SINGELTON DELIVERY NSW 2330
Wonnarua Cultural Heritage	19 O'Donnell Crescent METFORD NSW 2323
Girwirr Consultants	8 Fitzgerald Avenue MUSWELLBROOK NSW 2333
Upper Hunter Heritage Consultants	160 Sydney Street MUSWELLBROOK NSW 2333
Black Creek Aboriginal Corporation	P.O Box 168 KURRI KURRI NSW 2328
Barkuma Neighbourhood Centre Inc	76 Lang Street KURRI KURRI NSW 2327
David French	Flat 3/60 Tinsdale Street
David French	10 Mill Street MUSWELLBROOK NSW 2333
Tracey Skene	7 Crawford Place MILLFIELD NSW 2325

The following groups registered their interest in the project:

Aboriginal Stakeholder Group	Date of Registration
MrsTracey Skene Culturally Aware	8/10/2008
Ungooroo Cultural and Community Services Inc	21/10/2008
Wattaka Cultural Consultants Services	21/10/2008
Wanaruah Local Aboriginal Land Council	28/10/2008
Wonnarua Culture Heritage	22/10/2008
Aboriginal Native Title Consultants	1/12/2008
Ungooroo Aboriginal Corporation	23/10/2008
Giwiirr Consultants	27/10/2008
Upper Hunter Heritage Consultants	28/11/2008

Aboriginal Stakeholder Group	Date of Registration
Gidawaa Walang	23/10/2008
Cacatua Culture Consultants	28/10/2008
Hunter Valley Aboriginal Corporation	29/10/2008
Wonn 1 Contracting	29/10/2008
Hunter Valley Cultural Consultants	31/10/2008
Wonnarua Nations Aboriginal Coporation	25/11/2008
Lower Hunter Wonnarua Council Inc.	28/11/2008
Hunter Valley Cultural Surveying	28/11/2008
Biamia Pty Ltd	24/10/2008
Yarrawalk Enterprises	23/10/2008
Warren Taggart	9/10/2008
Hunter Valley Natural and Cultural Resource Management	25/11/2008

November – December 2008
Registered groups contacted regarding field work, provision of insurances etc and preferred dates for field work.

15.12.08 – 19.12.09
Field work conducted and was attended by the following groups:

Culturally Aware	Ungooroo Aboriginal Corp.	Hunter Valley Cultural Consultants
Ungooroo C.C. Services	Giwiir Consultants	Wonnarua Nations Aboriginal Corp.
Wattaka Cultural Consultants Services	Upper Hunter Heritage Consultants	Lower Hunter Wonnarua Council Inc.
Wanaruah Local Aboriginal Land Council	Cacatua Culture Consultants	Hunter Valley Cultural Surveying
Wonnarua Culture Heritage	Hunter Valley Aboriginal Corp.	Yarrawalk Enterprises
Aboriginal Native Title Consultants	Wonn1 Contracting	

20.5.09

Draft report supplied to all stakeholders by email in pdf format.
Hard copies sent to those without email via registered post. Close of review and comment period 12th June 2009.

Method	Stakeholder Group	Email
Draft sent to the following groups as an email - link and password provided to access report from download site (www.yousendit.com.au) due to file size. Close of registration 12th June 2009. Also emailed pdf copy of report to all groups as some groups were having difficulty accessing the upload site.	Ms Tracey Skene Culturally Aware	anigunya@hotmail.com
	Warren Taggart	warrentaggart@bigpond.com.au
	Wattaka Wonnarua Cultural Consultants Services	deshickey@bigpond.com
	Gidawaa Walang	barkumanc@bigpond.com
	Ungooroo Aboriginal Corporation	taasha@ungooroo.com.au
	Biamia Pty Ltd	info@biami.com.au
	Yarrawalk Enterprises	abco@bordernet.com.au
	Cacatua Culture Consultants	cacatua@resetdsl.net.au
	Wanaruah Local Aboriginal Land Council	Culture.Heritage@wanarua.bigpond.net.au
	Wonn 1 Contracting	wonn1sites@gmail.com
	Wonnarua Nations Aboriginal Corporation	lperry@coscom.net wonnarua@bigpond.com
	Lower Hunter Wonnarua Coucnil Inc.	email lea5972@hotmail.com
	Hunter Valley Cultural Surveying	hvcs@bigpond.com

Mailed a hard copy of the report via registered post as do not have active email addresses	Stakeholder Group	Address	Post Office Reference No.	Delivered
	Ungooroo Cultural and Community Services Inc	8 Blaxland Avenue SINGLETON NSW 2330	530478787016	25.05.09
	Wonnarua Culture Heritage	19 O'Donnel Cr Metford NSW 2323	530478786019	22.05.09
	Giwiirr Consultants	8 Fitzgerald Ave MUSWELLBROOK NSW 2333	530478785012	25.05.09
	Hunter Valley Cultural Consultants	40 Humphries Street Muswellbrook NSW 2333 Christine Archabold	530478784015	Awaiting pick up as at 04.06.09 . RTS 11.06.09
	Hunter Valley Aboriginal Corporation	180 - 182 Bridge Street P.O Box 579 MUSWELLBROOK NSW 2323	530478783018	25.05.09
	Upper Hunter Heritage Consultants	14 Edinglassie Drive MUSWELLBROOK NSW 2333 Darrel Mathews	530478782011	Awaiting pick up as at 04.06.09. 11.06.09 RTS
	Aboriginal Native Title Consultants	16A Mahogany Avenue MUSWELLBROOK NSW 2333	530478781014	22.05.09
	Hunter Valley Natural and Cultural Resource Management	Flat 3/60 Tinsdale Street Muswellbrook NSW 2333 David French	530478774016	25.05.09

22.05.2009	Telephone call from Warren Taggart requested copy of report on CD		
25.05.2009	Telephone call from Kathleen Stuart-Kinchella Yinarr Cultural Services. Would like to be included on the SEOC register, did provide details in January. David French HVNCRM was in same room as Kathleen at time of conversation and he confirmed he had received a copy of the report	Sent draft report to email she provided kathleen.stewart@bigpond.com	
25.05.2009	Mailed CD copy of report to Warren Taggart		
28.05.2009	Luke Hickey HVCS called - requested a copy of the draft report on disk		
02.06.2009	Response received via fax from Barry Stair - Hunter valley Aboriginal Corp.		
03.06.2009	Express posted CD with copy of draft report to Luke Hickey HVCS		
03.06.2009	Sent an email to the following groups to check if they received a copy of the report	Wattaka Wonnarua Cultural Consultants Services Ungooroo Aboriginal Corporation Wanaruah Local Aboriginal Land Council Wonnarua Nations Aboriginal Corporation Lower Hunter Wonnarua Council Inc.	
04.06.09	Received telephone call from Des Hickey WWCCS. Has received copy of the report		
04.06.2009	Telephoned the following groups to check if they had received their copy of the draft report	Ungooroo Aboriginal Corporation	12.45pm Spoke to Alan. Will check if they have received document. 12.47pm Alan telephoned back, can not find document in inbox. Said we had sent it through on the 25th, to Tasha's email. He said Tasha, the director was off sick today, its possibly in her mail inbox on her computer. Could we please resend to ungooroo@bigpond.com. Resent draft to new address 12.50pm

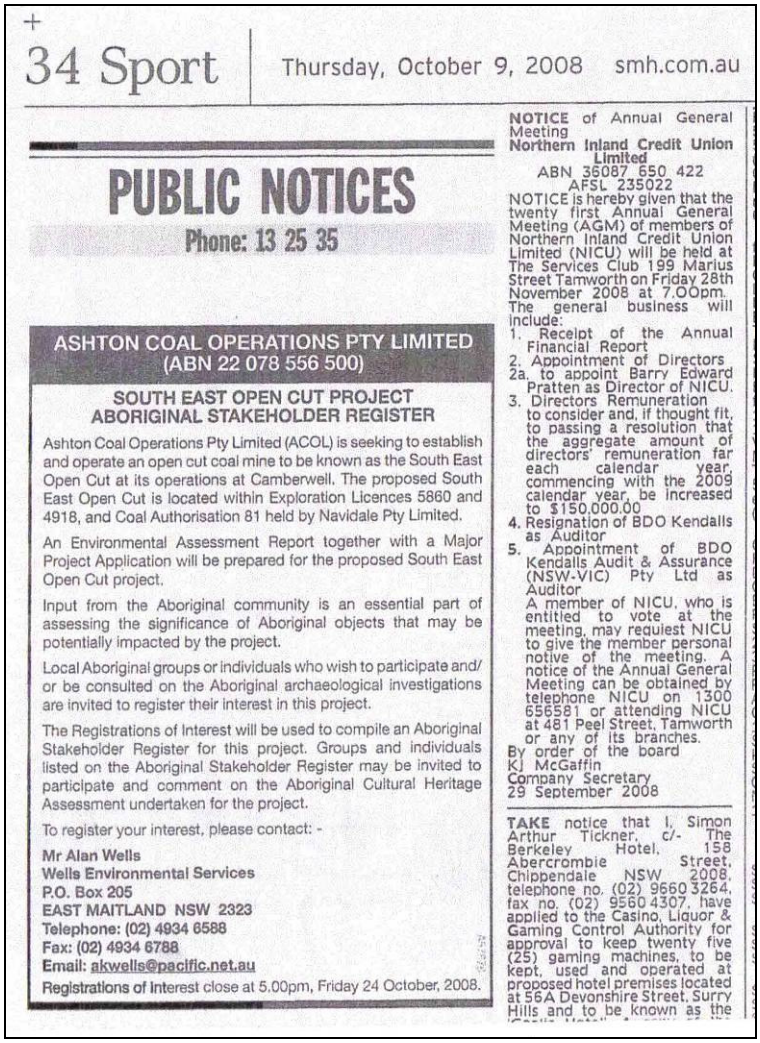
		Wanaruah Local Aboriginal Land Council	12.40 Suzie is in a meeting and will return call. 1.35pm Suzie called the office. Said could not see report. Explained that sometimes if she is out of the office and the inbox gets full it may be accidently deleted to clear space. Asked if we could resend. Resent at 1.40pm. c.3.40pm Suzie telephoned to say she had received copy of the report.
		Wonnarua Nations Aboriginal Corporation	12.40pm Spoke with Laurie Perry. Advised that he doesn't check the Nation's email account, but is still their representative. Asked if we could send email to yunaga@optusnet.com.au. Resent draft to new address 12.50pm
		Biamia Pty Ltd/Yarrawalk	1.45pm Spoke with Scott Franks who confirmed he had received copy of the report. Said he would try and get a response by the end of the week.
04.06.2009	Received response from Rhonda Ward Ungooroo C.C. Services via mail		
04.06.2009	Noticed discrepancy between register and field work list. Noted Mingga Consultants , who attended field had not received a copy of the draft report.	Forwarded hard copy via registered mail with amended response date (25th June). Reference no 557197755010. Not yet collected 19.6.09	
04.06.09	Rang Christine Archbold HVCC to let her know that her registered mail had not been collected yet. Christine said she had collected it this morning. 3.30pm. Also mentioned that Darrel Mathews UHHC had also not collected. She said she would be seeing Darrel this afternoon and will let him know.		
04.06.09	Tried to call Darrell Mathews UHHC on mobile (only contact no we have) Mobile diverted to answering machine belonging to a different person. Did not leave message		

04.06.09	3.40pm telephone from Suzie WLALC - she has received email copy of report	
11.06.09	Received response from Annie Hickey - Gidawaa Walang via fax	
11.06.09	Received from Australia Post unclaimed registered mail- draft reports from Hunter Valley Cultural consultants despite being told by Christine last week that she collected the report last week) and Upper Hunter Heritage Consultants - Darrel Mathews	
11.06.09	Response received from Gidawaa Walang via fax	
02.06.09	Response received from HVAC via fax	
12.06.09	Email reminder sent to groups who had not yet responded via email and sms, responses close today, please try and get a response in by close of business on Monday	Email: UAC, Culturally Aware, WWCCS, WLALC, wonn1, Warren Taggart, HVAC, LWTC, HVCS, Yinarr, Cacatua, Yarrawalk, Wonnarua Nation, Junburra SMS: WCH,Giwiir, HVCC, HVCS, ANTC, HVNCRM
12.06.09	5pm Telephone call from Gordon Griffiths WCH, said he will try and get a response in today.	
12.06.09	Response received from Culturally Aware via email	
14.06.09	Response received via email from HVAC-Barry Stair	
15.06.09	Response received from WWCCS via fax	
15.06.09	Response received from Wonn1 via fax	
14.06.09	Response received from Yinarr via fax	
14.06.09	Response received from Cacatua via email	

15.06.09	15.6 Telephoned Margaret Mathews - ANTC, approx. 4pm Re: SEOC Response. Margret would like to see a salvage take place and a meeting to discuss the methodology, she is unable to comment in writing due to several issues she is currently dealing with and would appreciate a phone log of her comments. 5.10pm Answering machine message from Margret with an additional comment; ANTC would also like to request that wet sieving be used during the excavation works.
15.06.09	Telephoned UAC and left a message with Denise to ask Alan Re: commenting on the draft report.
15.06.09	Telephoned Alan Paget UAC on his mobile, said he would try and do a response asap.
15.06.09	Telephoned Suzie Worth - WLALC. Suzie is out of the office. Left a message for her to return call.
16.06.09	Telephoned Suzie Worth - WLALC. Informed that Suzie is out of the offie and will return tomorrow.
17.06.09	Response received from Luke Hickey HVCS via email
19.06.09	1.20pm rang WLALC no answer, Telephoned Suzie Worth on her mobile, will have something to us this afternoon. Received response from WLALC via fax
19.06.09	AM telephoned spoke to Lea-Anne Miller- LWTC said will get report to us this afternoon. Is having difficulty with her email due to a virus.

25.06.09	PM Telephoned UAC. Denise informed that Alan is out on field work, and gave his mobile no. to contact. Called Alan on mobile. Due to field work commitments he has been unable to thoroughly review the report. Alan's main concern is in relation to the Aboriginal scarred tree and would like to ensure it's preservation. Will have a look at report once field work is completed and will call to discuss any issues he may have.
19.10.09	Letters sent to all registered stakeholders inviting them too attend a half day at the SEOC site to discuss the geomorphology findings with Dr Phillip Hughes.
27.10.09	The site inspection and geomorphic discussion held at the SEOC was attended by (name then group): Margaret Matthews ANTC; John Matthews UHHC; George Sampson CCC; Tony Matthews Bullen Bullen (not registered ???) ; Annie Hickey GWCHC; Arthur C Fletcher Wonn1; Barry Stair Gwiirr; Colleen Stair HVCC; Justin Matthews CC??; Cliff Matthews Miinga; Michael Matthews MCC; Maree Waugh WNAC; Allen Paget Ungooroo; Gordon Griffiths WCH; Luke Hickey HVCS; Katrina Cavanagh WLALC; Danny Franks – Scott Franks. The day centred around the inspection of geomorph pits which were left open to allow Dr Hughes to explain to the stakeholders the information derived from each pit and its implications in terms of dating the deposit and the probable end depth of artefact bearing deposits .

Appendix B – Project Advertisements



34 Sport | Thursday, October 9, 2008 smh.com.au

PUBLIC NOTICES

Phone: 13 25 35

ASHTON COAL OPERATIONS PTY LIMITED
(ABN 22 078 556 500)

SOUTH EAST OPEN CUT PROJECT
ABORIGINAL STAKEHOLDER REGISTER

Ashton Coal Operations Pty Limited (ACOL) is seeking to establish and operate an open cut coal mine to be known as the South East Open Cut at its operations at Camberwell. The proposed South East Open Cut is located within Exploration Licences 5860 and 4918, and Coal Authorisation 81 held by Navidale Pty Limited.

An Environmental Assessment Report together with a Major Project Application will be prepared for the proposed South East Open Cut project.

Input from the Aboriginal community is an essential part of assessing the significance of Aboriginal objects that may be potentially impacted by the project.

Local Aboriginal groups or individuals who wish to participate and/or be consulted on the Aboriginal archaeological investigations are invited to register their interest in this project.

The Registrations of Interest will be used to compile an Aboriginal Stakeholder Register for this project. Groups and individuals listed on the Aboriginal Stakeholder Register may be invited to participate and comment on the Aboriginal Cultural Heritage Assessment undertaken for the project.

To register your interest, please contact: -

Mr Alan Wells
Wells Environmental Services
P.O. Box 205
EAST MAITLAND NSW 2323
Telephone: (02) 4934 6588
Fax: (02) 4934 6788
Email: akwells@pacific.net.au

Registrations of Interest close at 5.00pm, Friday 24 October, 2008.

NOTICE of Annual General Meeting
Northern Inland Credit Union Limited
ABN 36087 650 422
AFSL 235022

NOTICE is hereby given that the twenty first Annual General Meeting (AGM) of members of Northern Inland Credit Union Limited (NICU) will be held at The Services Club 199 Marius Street Tamworth on Friday 28th November 2008 at 7.00pm. The general business will include:

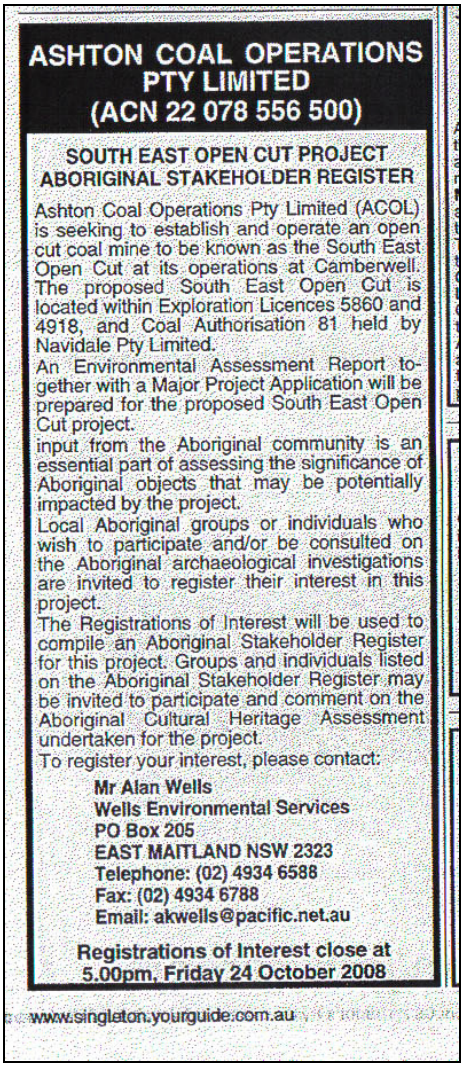
1. Receipt of the Annual Financial Report
2. Appointment of Directors
2a. to appoint Barry Edward Pratten as Director of NICU.
3. Directors Remuneration to consider and, if thought fit, to passing a resolution that the aggregate amount of directors' remuneration far each calendar year, commencing with the 2009 calendar year, be increased to $150,000.00
4. Resignation of BDO Kendalls as Auditor
5. Appointment of BDO Kendalls Audit & Assurance (NSW-VIC) Pty Ltd as Auditor

A member of NICU, who is entitled to vote at the meeting, may request NICU to give the member personal notive of the meeting. A notice of the Annual General Meeting can be obtained by telephone NICU on 1300 656581 or attending NICU at 481 Peel Street, Tamworth or any of its branches.

By order of the board
KJ McGaffin
Company Secretary
29 September 2008

TAKE notice that I, Simon Arthur Tickner, c/- The Berkeley Hotel, 158 Abercrombie Street, Chippendale NSW 2008, telephone no. (02) 9660 3264, fax no. (02) 9560 4307, have applied to the Casino, Liquor & Gaming Control Authority for approval to keep twenty five (25) gaming machines, to be kept, used and operated at proposed hotel premises located at 56A Devonshire Street, Surry Hills and to be known as the

Advertisement placed in the Sydney Morning Herald 09.10.08 & 17.10.08



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To register your interest, please contact:

Mr Alan Wells
Wells Environmental Services
PO Box 205
EAST MAITLAND NSW 2323
Telephone: (02) 4934 6588
Fax: (02) 4934 6788
Email: akwells@pacific.net.au

Registrations of Interest close at 5.00pm, Friday 24 October 2008

www.singleton.yourguide.com.au

Advertisement placed in the Singleton Argus 09.10.08 & 17.10.08

Appendix C – Artefact Details

Unit	Site	No	Material	Colour	Class	Sub	L	W	T	Comments
SA1	1	1	Mudstone	Yellow	Flake		16	11	3	
SA1	1	2	Silcrete	Grey	Core		72	45	34	40% pebble cortex, 3 negative scars, 2 platforms
SA1	1	3	Silcrete	Pink	Core		40	27	20	6 negative scars, 3 platforms
SA1	1	4	Silcrete	Pink	Flake		31	17	10	
SA1	1	5	Silcrete	Pink	Flake		16	14	4	
SA1	1	6	Silcrete	Red	Angular fragment		42	18	17	
SA1	1	7	Mudstone	Yellow	Flake		35	37	13	5% tabular cortex
SA1	2	1	Mudstone	Red	Flake		42	25	7	5% tabular cortex
SA1	2	2	Mudstone	Yellow	Flake		17	12	4	
SA1	4	1	Silcrete	Pink	Flake		11	14	2	
SA1	4	2	Silcrete		Flake		30	65	15	
SA1	4	3	Mudstone		Core		35	65	35	
SA1	5	1	Mudstone		Flake		35	40	4	
SA1	5	2	Mudstone		Flake		25	20	4	
SA1	6	1	Mudstone		Flake		30	30	10	
SA1	6	2	Mudstone		Flake		30	25	8	
SA1	7	1	Mudstone		Flake		30	25	10	
SA1	7	2	Mudstone		Flake		35	25	8	
SA1	8	1	Silcrete	Yellow	Flake		60	43	10	
SA1	8	2	Mudstone	Red	Core		52	42	25	
SA1	8	3	Mudstone		Flake		30	15	6	
SA1	8	4	Mudstone		Flake	Portion	18	13	3	
SA1	8	5	Mudstone		Flake	Portion	21	15	4	
SA1	8	6	Mudstone		Flake	Portion	49	30	15	
SA1	9	1	Mudstone		Flake	Portion	22	18	5	
SA1	9	2	Silcrete	Red	Flake		40	36	15	
SA1	9	3	Mudstone		Flake	Portion	17	15	1	
SA1	9	4	Mudstone		Flake		60	40	16	
SA1	9	5	Silcrete		Core		108	94	30	
SA1	9	6	Mudstone		Flake	Portion	40	18	5	
SA1	9	7	Mudstone		Flake	Portion	58	40	6	
SA1	9	8	Silcrete	Red	Core		50	54	13	
SA1	10	1	FGS		Flake		35	30	2	
SA1	11	1	Mudstone		Flake		75	62	20	
SA1	11	2	Mudstone		Flake		10	10	5	
SA2	1	1	Silcrete	Pink	Angular fragment		38	22	18	
SA2	1	2	Mudstone	Red	Flake	Portion	35	22	8	

Unit	Site	No	Material	Colour	Class	Sub	L	W	T	Comments
SA2	2	1	Mudstone	Grey	Flake	Portion	20	18	4	Distal, 50% pebble cortex, 2 tranverse dorsal scars
SA2	3	1	Silcrete	Red	Angular fragment		28	22	14	
SA2	3	2	Silcrete	Red	Flake		30	39	7	
SA2	3	3	Silcrete	Red	Flake		30	25	9	
SA2	3	4	Silcrete	Red	Flake	Portion	17	12	4	
SA2	3	5	Silcrete	Red	Flake	Portion	20	12	4	Mid
SA2	3	6	Mudstone	Red	Flake		21	18	9	Proximal
SA2	3	7	Silcrete	Red	Core		28	21	18	2 longitudinal dorsal scars
SA2	3	8	Mudstone	Yellow	Angular fragment		45	21	17	3 blade scars, 2 platforms
SA2	3	9	Mudstone	Cream	Flake		17	9	6	10% tabular cortex
SA2	3	10	Mudstone	Grey	Angular fragment		28	17	12	
SA2	3	11	Mudstone	Red	Flake	Portion	17	12	6	
SA2	3	12	Mudstone	Red	Flake	Utilised	15	10	4	Mid
SA2	3	13	Mudstone	Red	Core		62	35	22	Use-wear/edge damage along distal margin
SA2	3	14	Mudstone	Red	Flake		55	25	8	60% pebble cortex, 5 negative scars, 2 platforms
SA2	3	15	Mudstone	Pink	Angular fragment		28	18	15	
SA2	3	16	Silcrete	Red	Flake		16	15	3	
SA2	3	17	Mudstone	Yellow	Flake		45	50	16	
SA2	3	18	Silcrete	Red	Flake		35	25	9	
SA2	3	19	Mudstone	Red	Flake		28	18	7	
SA2	4	1	Mudstone	Yellow	Core		75	35	22	
SA2	4	2	Silcrete	Grey	Flake		30	18	15	4 negative scars, 3 platforms
SA2	4	3	Silcrete	Grey	Flake	Backed	22	9	7	
SA2	4	4	Mudstone	Grey	Flake	Portion	17	9	2	
SA2	4	5	Mudstone	Pink	Flake	Portion	12	9	5	Mid
SA2	4	6	Mudstone	Pink	Flake	Portion	10	6	2	Lateral
SA2	5	1	Mudstone	Red	Angular fragment		19	15	12	Distal
SA2	5	2	Volcanic	Grey	Flake		55	35	13	
SA2	6	1	Mudstone	Yellow	Flake	Portion	9	5	2	40% pebble cortex, edge damage

Unit	Site	No	Material	Colour	Class	Sub	L	W	T	Comments
SA2	6	2	Mudstone	Yellow	Flake	Portion	8	4	1	Distal
SA2	6	3	Mudstone	Yellow	Flake	Portion	18	7	3	Distal
SA2	6	4	Mudstone	Yellow	Angular fragment		9	6	4	Lateral
SA2	6	5	Mudstone	Yellow	Flake		26	18	8	
SA2	6	6	Silcrete	Pink	Flake	Portion	12	7	3	
SA2	6	7	Mudstone	Yellow	Flake		16	9	3	Lateral
SA2	6	8	Silcrete	Pink	Core		28	18	12	
SA2	6	9	Silcrete	Pink	Angular fragment		32	19	15	4 negative scars, 2 platforms
SA2	6	10	Mudstone	Pink	Flake		38	25	15	
SA2	6	11	Mudstone	Pink	Flake		21	9	4	
SA2	6	12	Mudstone	Yellow	Flake		18	13	4	
SA2	6	13	Mudstone	Pink	Flake	Portion	32	20	8	
SA2	6	14	Mudstone	Yellow	Flake		16	9	4	Lateral
SA2	6	15	Mudstone	Yellow	Flake	Portion	18	14	4	
SA2	6	16	Mudstone	Yellow	Flake	Portion	12	9	3	Distal
SA2	6	17	Mudstone	Yellow	Flake		15	20	3	Lateral
SA2	6	18	Mudstone	Yellow	Flake		22	14	3	
SA2	6	19	Mudstone	Grey	Flake		24	18	6	
SA2	6	20	Mudstone	Yellow	Flake		21	15	6	
SA2	6	21	Mudstone	Pink	Flake		22	15	5	
SA2	6	22	Mudstone	Yellow	Flake		18	10	6	
SA2	6	23	Mudstone	Yellow	Flake		14	9	2	
SA2	6	24	Mudstone	Yellow	Flake		9	6	2	
SA2	6	25	Mudstone	Pink	Flake	Portion	12	7	4	
SA2	6	26	Mudstone	Pink	Core		32	20	14	
SA2	6	27	Mudstone	Pink	Flake		9	5	4	4 negative scars, 2 platforms
SA2	6	28	Mudstone	Yellow	Angular fragment		19	15	12	
SA2	6	29	Mudstone	Pink	Flake		6	5	2	
SA3	1	1	Mudstone	Yellow	Core		65	42	25	
SA3	1	2	Mudstone	Red	Flake		35	24	8	25% pebble cortex, 4 negative scars, 2 platforms
SA4	1	1	Mudstone	Orange	Flake		44	28	17	
SA4	2	1	Mudstone	Brown	Flake		25	15	6	2 transverse dorsal scars
SA4	3	1	Mudstone	Red	Flake	Scraper	35	28	12	
SA4	4	1	Volcanic	Grey	Axe	Pre- form	120	90	23	45% pebble cortex
SA4	5	1	Mudstone	Red	Flake	Portion	57	35	9	
SA4	6	1	Mudstone		Core		35	25	15	

Unit	Site	No	Material	Colour	Class	Sub	L	W	T	Comments
SA4	6	2	Silcrete		Flake	Portion	35	2	15	
SA4	7	1	Mudstone		Flake		30	25	4	
SA4	8	1	Mudstone		Flake	Portion	35	16	4	
SA4	8	2	Mudstone		Flake	Portion	32	16	9	
SA4	9	1	Mudstone		Core		35	18	4	
SA4	9	2	Silcrete		Flake		25	15	2	
SA4	9	3	Silcrete	Yellow	Flake		30	29	9	
SA4	10	1	FGS	Yellow	Flake	Portion	40	20	15	
SA4	10	2	Mudstone	Red	Flake		25	20	5	
SA4	10	3	Silcrete	Pink	Flake		35	15	2	
SA4	10	4	FGS		Flake	Portion	20	10	2	
SA4	10	5	Mudstone		Flake	Portion	30	25	4	
SA4	10	6	Mudstone		Flake		32	25	4	
SA4	10	7	Mudstone		Flake		11	10	1	
SA4	10	8	Chert		Flake		11	10	1	
SA4	10	9	Mudstone	Cream	Flake		15	15	2	
SA4	10	10	Mudstone	Yellow	Flake	Portion	10	11	2	
SA4	11	1	Silcrete	Pink	Core		30	24	15	
SA4	11	2	Silcrete	Cream	Core		30	30	15	
SA4	11	3	Silcrete	grey	Core		30	20	20	
SA4	11	4	Silcrete		Flake	Portion	20	15	3	
SA4	11	5	Silcrete		Flake		15	8	2	
SA4	11	6	Mudstone	Yellow	Flake		40	30	1	
SA4	11	7	Mudstone	Yellow	Flake		38	41	15	
SA4	11	8	Silcrete	Grey	Core		30	26	21	40% cortex
SA4	11	9	Silcrete		Flake	Portion	15	15	3	
SA4	11	10	Silcrete		Flake	Portion	20	15	2	
SA4	11	11	Silcrete		Flake	Portion	10	20	3	
SA5	1	1	Mudstone	Cream	Flake		7	5	2	
SA5	1	2	Silcrete	Red	Flake		9	6	4	
SA5	1	3	Mudstone	Pink	Flake		12	6	3	
SA5	2	1	Mudstone	Cream	Flake		52	24	5	
SA5	2	2	Silcrete	Cream	Flake		20	10	5	
SA5	2	3	Mudstone	Yellow	Flake	Portion	40	20	10	
SA5	2	4	Silcrete	Red	Angular fragment		55	45	10	Mid
SA5	2	5	Silcrete	Red	Angular fragment		40	30	15	
SA5	2	6	Mudstone	Grey	Flake		35	20	8	
SA5	2	7	Mudstone	Yellow	Flake	Backed	20	10	4	
SA5	2	8	Mudstone	Red	Flake	Portion	21	10	4	
SA5	2	9	Mudstone	Grey	Flake		25	40	10	Mid

Unit	Site	No	Material	Colour	Class	Sub	L	W	T	Comments
SA5	2	10	Volcanic	Grey	Hammerstone		80	70	60	Banded grey/yellow, redirecting flake
SA5	2	11	Mudstone	Yellow	Angular fragment		10	8	3	Pitting to ends
SA5	2	12	Mudstone	Yellow	Angular fragment		9	4	2	
SA5	2	13	Mudstone	Yellow	Angular fragment		35	20	12	
SA5	2	14	Silcrete	Grey	Flake		10	8	3	
SA5	2	15	Silcrete	Grey	Flake		9	4	2	
SA5	2	16	Silcrete	Grey	Flake		5	8	4	
SA5	2	17	Silcrete	Grey	Flake		4	6	2	
SA5	2	18	Silcrete	Grey	Flake		8	5	4	
SA5	2	19	Silcrete	Grey	Flake		8	4	2	
SA5	2	20	Silcrete	Grey	Flake		5	4	3	
SA5	2	21	Silcrete	Grey	Flake		11	5	3	
SA5	3	1	Silcrete	Yellow	Angular fragment		20	30	6	
SA5	4	1	Volcanic	Red	Flake		35	25	10	Coarse grained
SA5	4	2	Mudstone	Yellow	Flake		50	60	15	
SA5	4	3	Mudstone	Yellow	Flake	Backed	30	19	10	10% pebble cortex
SA5	4	4	Mudstone	Yellow	Flake		35	44	7	Scraper
SA5	4	5	Mudstone	Purple	Flake	Redirecting	45	25	18	50% pebble cortex
SA5	4	6	Mudstone	Red	Flake		25	22	8	
SA5	4	7	Mudstone	Red	Flake	Portion	10	14	4	40% pebble cortex
SA5	4	8	Mudstone	Grey	Flake		40	27	7	Distal
SA5	5	1	Silcrete	Red	Flake		22	20	4	5% pebble cortex
SA5	5	2	Silcrete	Red	Flake	Blade	25	4	3	?heat treated
SA5	5	3	Silcrete	Red	Flake		30	30	15	
SA5	5	4	Silcrete	Red	Flake		28	15	10	
SA5	5	5	Silcrete	Red	Flake	Blade	25	7	4	
SA5	5	6	Mudstone	Brown	Flake		20	18	7	
SA5	5	7	Silcrete	Red	Angular fragment		60	40	30	
SA5	6	1	Silcrete	Grey	Flake		25	20	4	
SA5	7	1	Mudstone	Yellow	Flake	Portion	34	30	6	
SA5	7	2	Quartz	White	Angular fragment		15	12	6	Proximal
SA5	7	3	Mudstone	Yellow	Flake		20	10	5	
SA5	7	4	Silcrete	Grey	Flake		15	12	7	
SA5	8	1	Mudstone	Yellow	Flake		30	20	7	
SA5	8	2	Quartz	White	Flake		20	10	3	
SA5	8	3	Mudstone	Yellow	Flake		10	7	4	

Unit	Site	No	Material	Colour	Class	Sub	L	W	T	Comments
SA5	8	4	Mudstone	Red	Flake		8	5	3	
SA5	8	5	Silcrete	Yellow	Flake	Scraper	45	50	20	
SA5	10	1	Silcrete	Yellow	Flake		35	33	8	Steep retouch to distal margin
SA5	10	2	Silcrete	Red	Angular fragment		39			
SA5	10	3	Silcrete	Red	Flake	Portion	40	30	12	
SA5	10	4	Silcrete	Red	Flake	Portion	28	11	7	
SA5	10	5	Silcrete	Red	Angular fragment		35			
SA5	10	6	Silcrete	Red	Angular fragment		26			
SA5	10	7	Silcrete	Red	Flake		41	23	6	
SA5	10	8	Mudstone	Yellow	Flake	Portion	45	32	11	
SA5	10	9	Mudstone	Yellow	Flake		30	36	9	
SA5	10	10	Mudstone	Yellow	Flake	Portion	18	14	3	
SA5	10	11	Mudstone	Yellow	Flake	Portion	15	8	2	
SA5	10	12	Silcrete	Red	Flake		40	35	20	
SA5	10	13	Silcrete	Yellow	Flake		38	29	6	
SA5	10	14	Mudstone	Brown	Core		30	38	24	
SA5	10	15	Silcrete	Red	Flake	Portion	20	10	3	
SA5	10	16	Silcrete	Red	Flake		19	13	2	
SA5	10	17	Silcrete	Pink	Flake	Portion	12	13	2	
SA5	10	18	Silcrete	Pink	Flake	Portion	28	15	6	
SA5	10	19	Silcrete	Pink	Core		35			
SA5	10	20	Silcrete	Red	Angular fragment		16			
SA5	10	21	Silcrete	Yellow	Flake		10	14	7	
SA5	10	22	Silcrete	Yellow	Flake	Portion	24	10	3	
SA5	10	23	Silcrete	Red	Flake	Portion	23	10	3	
SA5	10	24	Silcrete	Brown	Flake	Portion	13	8	2	Proximal
SA5	10	25	Mudstone	Brown	Flake	Portion	23	18	7	
SA5	10	26	Mudstone		Flake		13	12	11	Proximal
SA5	10	27	Silcrete		Flake	Portion	16	9	1	
SA5	10	28	Silcrete	Red	Flake		25	2	5	
SA5	11	1	Mudstone	Yellow	Flake	Portion	27	35	8	
SA5	11	2	Mudstone	Brown	Flake		32	12	10	
SA5	11	3	Mudstone	Red	Flake	Portion	26	18	3	
SA5	11	4	Mudstone	Red	Flake		26	17	2	
SA5	11	5	Mudstone		Flake		11	11	2	
SA5	11	6	Mudstone		Flake	Portion	29	27	6	
SA5	11	7	Mudstone	White	Angular fragment		30			

Unit	Site	No	Material	Colour	Class	Sub	L	W	T	Comments
SA5	11	8	Mudstone	Yellow	Flake		20	18	3	
SA5	11	9	Silcrete	Red	Flake		20	25	3	
SA5	11	10	Mudstone		Flake	Portion	19	8	5	
SA5	11	11	Mudstone	Red	Flake		9	8	1	
SA6	1	1	Mudstone	Orange	Flake	Portion	14	12	3	Proximal, 25% tabular cortex
SA6	1	2	Mudstone	Yellow	Flake		30	21	9	5% tabular cortex
SA6	1	3	Mudstone	Orange	Angular fragment		18	10	8	
SA6	1	4	Mudstone	Orange	Flake		30	21	8	5% tabular cortex
SA6	1	5	Silcrete	Yellow	Flake		14	7	2	Longitudinal dorsal ridge
SA6	1	6	Mudstone	Red	Flake		27	22	6	Longitudinal dorsal scar
SA6	2	1	Mudstone	Yellow	Angular fragment		23	15	12	
SA6	2	2	Mudstone	Brown	Flake		42	26	8	10% tabular cortex
SA6	2	3	Mudstone	Cream	Flake		26	16	4	Longitudinal dorsal ridge
SA6	2	4	Silcrete	Grey	Angular fragment		22	11	8	20% weathered cortex
SA6	2	5	Silcrete	Red	Flake		40	30	12	25% weathered cortex
SA6	2	6	Mudstone	Yellow	Angular fragment		26	16	12	
SA6	2	7	Silcrete	Grey	Flake	Portion	15	10	2	Distal
SA6	2	8	Mudstone	Yellow	Flake	Portion	15	8	5	Mid
SA6	2	9	Chert	Grey	Flake		25	19	9	10% pebble cortex
SA6	3	1	Mudstone	Red/orange	Flake		33	27	7	
SA6	3	2	Silcrete	Grey	Angular fragment		31	15	11	
SA6	3	3	Mudstone	Yellow	Flake	Portion	22	13	7	Distal
SA6	3	4	Mudstone	Grey	Flake	Backed	25	11	6	
SA6	4	1	Mudstone	Red	Flake		45	30	10	
SA6	4	2	Mudstone	Yellow	Flake		17	11	3	
SA6	4	3	Mudstone	Yellow	Angular fragment		80			
SA6	4	4	Mudstone	Yellow	Flake	Portion	12	8	2	
SA6	5	1	Mudstone	Grey	Flake		14	9	3	5% tabular cortex
SA6	5	2	Silcrete	Grey	Core		52	40	27	4 negative scars, 2 platforms
SA6	5	3	Mudstone	Yellow	Flake		19	12	4	50% pebble cortex
SA6	6	1	Mudstone	Yellow	Core		33	31	19	40% pebble cortex, 4 negative scars, 2

Unit	Site	No	Material	Colour	Class	Sub	L	W	T	Comments
										platforms
SA6	7	1	Mudstone	Red	Core		38	29	17	30% pebble cortex, 3 negative scars, 2 platforms
SA6	8	1	Silcrete	Pink	Flake	Portion	36	28	7	Proximal, transverse & longitudinal dorsal scars
SA6	8	2	Silcrete	Pink	Flake	Portion	17	19	6	Proximal, 2 longitudinal dorsal scars
SA6	8	3	Mudstone	Orange	Core		32	27	18	5 negative scars, 3 platforms
SA6	8	4	Silcrete	Yellow	Flake	Portion	25	11	4	Distal, longitudinal dorsal scar
SA6	8	5	Silcrete	Pink	Flake		25	32	9	20% weathered cortex
SA6	8	6	Mudstone	Red	Core		26	17	14	3 negative scars, 2 platforms
SA6	8	7	Silcrete	Pink	Flake	Portion	15	9	7	Mid, Longitudinal dorsal ridge
SA6	8	8	Silcrete	Pink	Flake		32	27	9	25% weathered cortex
SA6	9	1	Mudstone	Yellow	Flake		32	28	15	30% pebble cortex
SA6	10	1	Silcrete	Pink	Flake		29	14	7	Blade
SA6	10	2	Mudstone	Yellow	Flake	Portion	12	11	4	Mid
SA6	10	3	Mudstone	Cream	Flake		26	27	8	2 transverse dorsal scars
SA6	10	4	Mudstone	Red	Flake		12	4	3	
SA6	11	1	Mudstone	Red	Flake	Portion	16	14	6	Lateral
SA6	11	2	Mudstone	Pink	Angular fragment		32	18	8	
SA6	11	3	Mudstone	Cream	Flake		31	20	7	5% tabular cortex, longitudinal dorsal scar
SA6	11	4	Mudstone	Red	Flake		12	6	3	Longitudinal dorsal ridge
SA6	11	5	Mudstone	Orange	Flake		8	4	2	
SA6	11	6	Mudstone	Red	Flake	Portion	17	17	9	Distal
SA6	11	7	Mudstone	Orange	Flake		35	26	13	Longitudinal dorsal ridge & scar
SA6	11	8	Silcrete	Red	Flake		28	26	14	Longitudinal dorsal scar
SA6	11	9	Mudstone	Orange	Flake		12	4	2	
SA6	11	10	Silcrete	Red	Flake		14	6	3	
SA6	11	11	Silcrete	Pink	Angular		40	27	18	

Unit	Site	No	Material	Colour	Class	Sub	L	W	T	Comments
					fragment					
SA6	11	12	Mudstone	Yellow	Flake		17	12	4	
SA6	11	13	Silcrete	Pink	Flake		29	17	9	
SA6	11	14	Mudstone	Yellow	Flake		37	39	11	
SA6	11	15	Silcrete	Pink	Flake		28	18	9	
SA6	11	16	Silcrete	Pink	Flake		25	16	7	
SA6	11	17	Mudstone	Yellow	Flake		28	20	14	
SA6	11	18	Mudstone	Orange	Flake		6	4	3	
SA6	12	1	Silcrete	Pink	Flake	Portion	22	16	4	
SA7	1	1	Chert		Flake	Portion	25			
SA7	1	2	Silcrete		Flake	Portion	18			50% cortex
SA7	1	3	Silcrete	Yellow	Flake	Portion	33			
SA7	1	4	Silcrete	Yellow	Flake	Portion	26			
SA7	2	1	Mudstone		Flake	Portion	16			
SA7	3	1	Silcrete	Pink	Flake		20	15	3	
SA7	4	1	Mudstone	Red	Flake		50	42	20	
SA7	5	1	Mudstone		Core		70	60	30	
SA7	6	1	Mudstone		Flake	Portion	30	15	3	
SA7	6	2	Mudstone	Yellow	Flake		60	40	25	
SA7	6	3	Silcrete	Red	Flake		40	16	5	
SA7	6	4	Silcrete	Red	Flake	Portion	18			
SA7	6	5	Mudstone	White	Flake	Portion	12			
SA7	6	6	Silcrete		Flake	Portion	19			
SA7	6	7	Mudstone		Flake	Blade	35	12	14	
SA7	6	8	Mudstone		Flake		35	22	4	
SA7	6	9	Mudstone		Flake		35	15	3	
SA7	6	10	Mudstone		Flake		40	50	5	
SA7	6	11	Silcrete	Yellow	Anvil		250	150	45	Shallow hollow scar noted on one face
SA7	6	12	volcanic	Black	Hammerstone		110			
SA7	6	13	Silcrete		Flake		26	28	6	
SA7	6	14	Mudstone	Yellow	Flake		2	12	3	
SA7	6	15	Mudstone		Flake		15	12	3	
SA7	6	16	Silcrete		Flake		37	24	5	
SA7	6	17	Silcrete		Flake	Portion	15	20	3	
SA7	6	18	Silcrete	Pink	Flake	Portion	22			
SA7	6	19	Silcrete	Pink	Flake	Scraper	25	40	5	
SA7	6	20	Silcrete		Flake		34	25	5	
SA7	6	21	Mudstone		Flake		30	20	3	
SA7	6	22	Silcrete		Flake		30	20	3	
SA7	6	23	Silcrete		Flake		30	20	3	
SA8	1	1	Mudstone	Yellow	Flake		42	45	10	

Unit	Site	No	Material	Colour	Class	Sub	L	W	T	Comments
SA8	2	1	Mudstone	Red	Core		54	46	12	90% pebble cortex, 1 negative scar
SA8	3	1	Mudstone	Red	Flake		40	50	5	
SA8	3	2	Silcrete	Red	Flake	Portion	30	20	10	Proximal
SA8	3	3	Mudstone	Orange	Flake		25	12	7	
SA8	4	1	Volcanic	Black	Flake		22	10	4	
SA8	4	2	Volcanic	Red	Manuport		100	90	35	
SA8	4	3	Mudstone	Red	Flake		25	15	5	
SA8	4	4	Mudstone	Red	Flake	Recdirecting	45	32	15	
SA8	4	5	Mudstone	Red	Flake		22	15	3	
SA8	4	6	Mudstone	Yellow	Angular fragment		47	20	10	
SA8	4	7	Mudstone	Yellow	Core		25	24	15	16 negative scars
SA8	4	8	Mudstone	Yellow	Flake	Retouched	25	20	5	
SA8	4	9	Mudstone	Yellow	Angular fragment		24	10	2	
SA8	4	10	Mudstone	Yellow	Flake		24	20	2	
SA8	4	11	Mudstone	Yellow	Angular fragment		20	15	4	
SA8	5	1	Silcrete	Grey	Core		100	50	45	4 negative scars
SA8	5	2	Mudstone	Yellow	Flake		20	15	9	
SA8	5	3	Mudstone	Red	Flake		40	30	15	
SA8	5	4	Mudstone	Red	Angular fragment		35	25	25	
SA8	5	5	Mudstone	Yellow	Flake		40	18	6	Longitudinal dorsal scar
SA8	5	6	Mudstone	Orange	Flake	Scraper	42	28	11	5% pebble cortex
SA8	5	7	Mudstone	Grey	Core		46	33	28	20% tabular cortex, 4 negative scars, 2 platforms
SA8	6	1	Mudstone	Red	Flake		42	30	15	Longitudinal dorsal scar
SA8	6	2	Mudstone	Yellow	Flake		20	10	5	
SA8	6	3	Mudstone	Yellow	Flake		12	25	5	2 transverse dorsal scars
SA8	6	4	Silcrete	Grey	Flake		30	17	7	
SA8	6	5	Mudstone	Yellow	Flake		36	28	16	Longitudinal dorsal scar
SA8	6	6	Mudstone	Yellow	Flake	Portion	20	35	15	20% pebble cortex, proximal
SA8	6	7	Silcrete	Red	Flake		30	25	15	
SA8	6	8	Silcrete	Grey	Flake		60	35	10	Longitudinal dorsal scar

Unit	Site	No	Material	Colour	Class	Sub	L	W	T	Comments
SA8	6	9	Mudstone	Red	Flake		27	25	5	3 longitudinal dorsal scars
SA8	6	10	Mudstone	Red	Flake	Portion	27	17	10	Proximal, lateral retouch
SA8	6	11	Mudstone	Red	Flake		15	24	8	5% pebble cortex
SA8	6	12	Mudstone	Red	Core		35	40	20	30% pebble cortex, 4 negative scars
SA8	6	13	Mudstone	Red	Core		60	45	25	30% tabular cortex, 7 negative scars
SA8	6	14	Mudstone	Red	Flake	Portion	37	20	21	lateral
SA8	7	1	Volcanic	Grey	Axe		125	75	30	unifacial flaked edge
SA8	7	2	Mudstone	Orange	Flake		35	25	5	15% pebble cortex
SA8	8	1	Mudstone	Yellow	Flake		22	31	5	
SA8	9	1	Mudstone	Red	Core		60	60	34	45% cortex, 12 negative scars, rotated
SA8	9	2	Mudstone	Red	Core		50	20	10	Blade core, 4 negative scars
SA8	9	3	Mudstone	Red	Flake	Scraper	25	20	10	
SA8	9	4	Mudstone	Red	Core		45	50	15	45% weathered cortex, 8 negative scars, facetted
SA8	9	5	Mudstone	Yellow	Core		40	34	15	10 negative scars
SA8	9	6	Mudstone	Yellow	Flake		25	25	7	
SA8	10	1	Mudstone	Yellow	Core		50	40	20	45% cortex, 16 negative scars, ?usewear
SA8	11	1	Silcrete	Red	Flake		55	35	5	
SA8	12	1	Mudstone	Red	Flake	Portion	60			
SA8	12	2	Mudstone	Yellow	Flake	Portion	22			
SA8	12	3	Mudstone	Yellow	Flake	Portion	18			
SA8	12	4	Mudstone	Red	Flake	Portion	13			
SA8	12	5	Silcrete	Pink	Flake	Portion	30			
SA8	12	6	Mudstone		Flake		16	5	3	
SA8	12	7	Silcrete		Flake	Portion	15			
SA8	12	8	quartz		Flake	Portion	18			
SA8	12	9	Mudstone	Yellow	Flake	Portion	33			Retouched,
SA8	12	10	Mudstone	Yellow	Flake	Portion	20			Proximal, 10% cortex
SA8	12	11	Mudstone	Red	Flake	Portion	26			
SA8	13	1	Silcrete		Flake		20	10	2	
SA8	13	2	Mudstone		Flake	Portion	23			
SA8	13	3	FGS		Flake		18	22	3	
SA8	13	4	Mudstone	Red	Flake	Backed	18	22	3	

Unit	Site	No	Material	Colour	Class	Sub	L	W	T	Comments
						blade				
SA8	13	5	Mudstone		Flake		8	5	3	
SA8	13	6	Mudstone		Flake	Backed blade	18			
SA8	13	7	Silcrete	Grey	Flake		35	20	5	
SA8	13	8	Silcrete	Pink	Core		30	35	3	
SA8	13	9	Silcrete	Pink	Core		40	45	20	
SA8	13	10	Silcrete	Grey	Core		26	35	20	
SA8	14	1	Silcrete		Flake	Portion	35			
SA8	14	2	Mudstone		Flake	Portion	25			
SA8	14	3	Silcrete		Flake		15	12	3	
SA9	1	1	Mudstone	Red/brown	Flake	Portion	11	8	2	Distal
SA9	2	1	Mudstone	Yellow	Flake		45	40	5	
SA9	2	2	Mudstone		Flake	Portion	15	10	2	
SA9	2	3	Mudstone	Yellow	Flake	Portion	14			
SA9	2	4	Mudstone	Yellow	Flake	Portion	24			
SA9	2	5	Mudstone	Yellow	Flake	Portion	16			
SA9	2	6	Mudstone	Yellow	Flake	Portion	27			Proximal
SA9	2	7	Mudstone	Yellow	Flake		20	18	4	
SA9	2	8	Mudstone	Red	Flake	Portion	20			
SA9	2	9	Mudstone	Yellow	Flake	Portion	27			
SA9	2	10	Mudstone	Red	Flake		19	13	3	
SA9	2	11	Mudstone	Yellow	Flake		42	21	3	
SA9	2	12	Mudstone	Yellow	Flake		29	26	2	
SA9	2	13	Mudstone	Red	Flake	Portion	40			
SA9	2	14	Silcrete	Pink	Flake	Portion	18			
SA9	2	15	Mudstone	Yellow	Flake		35			
SA9	2	16	Mudstone		Flake	Portion	22			
SA9	2	17	Silcrete	Grey	Flake	Portion	30			Mid
SA9	2	18	Mudstone		Flake		27	28	3	Usewear on lateral margin
SA9	2	19	Mudstone		Angular fragment		50			50% cortex
SA9	2	20	Mudstone		Flake		64	20	5	
SA9	2	21	Mudstone		Flake		16	27	2	
SA9	2	22	Mudstone	Yellow	Flake		48	35	9	
SA9	2	23	Mudstone	Yellow	Flake		39	25	13	
SA9	2	24	Mudstone	Yellow	Flake	Portion	45	48	15	Proximal
SA9	2	25	Mudstone	Red	Flake	Portion	30			
SA9	2	26	Mudstone	white	Flake	Portion	20			
SA9	2	27	FGS	Grey	Flake		40	25	7	15% cortex
SA9	2	28	FGS		Flake	Portion	39	25	6	Proximal

Unit	Site	No	Material	Colour	Class	Sub	L	W	T	Comments
SA9	2	29	Silcrete		Flake	Scraper	30	30	3	
SA9	2	30	Silcrete		Flake	Portion	25			
SA9	2	31	Silcrete		Flake	Portion	20	20	5	
SA9	2	32	Silcrete		Flake	Portion	27			
SA9	2	33	Silcrete		Flake	Portion	28			
SA9	2	34	Silcrete		Flake	Portion	30			
SA9	2	35	Silcrete		Flake	Portion	21			
SA9	2	36	Silcrete		Flake	Portion	26			
SA9	2	37	Silcrete		Flake	Portion	30			
SA9	2	38	FGS	Grey	Core		56	33	25	
SA9	2	39	Silcrete	Grey	Axe		75	70	15	
SA9	2	40	Silcrete	Pink	Flake	Portion	25			
SA9	2	41	Mudstone		Flake		40	40	13	
SA9	2	42	Mudstone		Flake	Portion	25			Proximal
SA9	2	43	Mudstone	Yellow	Flake	Portion	25			
SA9	2	44	FGS		Flake	Portion	17			
SA9	2	45	Mudstone	Yellow	Flake	Portion	16			
SA9	2	46	FGS	Grey	Flake	Portion	28			
SA9	2	47	FGS	Grey	Flake		31	25	8	
SA9	2	48	FGS	Grey	Flake		20	20	3	
SA9	2	49	Mudstone		Flake	Scraper	50			
SA9	2	50	Mudstone		Flake	Backed blade	25			
SA10	1	1	Mudstone	Yellow	Flake		46	32	12	
SA10	2	1	Mudstone	Yellow	Flake		35	39	8	
SA10	2	2	Mudstone	Red	Flake		35	30	7	10% tabular cortex, longitudinal dorsal ridge
SA11	1	1	Mudstone	Yellow	Flake	Portion	56	34	13	Distal, 40% weathered cortex
SA11	2	1	Silcrete	Black	Flake		23	20	5	
SA11	2	2	Silcrete	Grey	Flake		21	15	3	
SA11	2	3	Mudstone	Pink	Flake		22	22	6	
SA11	2	4	Mudstone	Yellow	Flake		15	8	3	
SA11	2	5	Mudstone	Yellow	Flake		21	14	8	
SA11	2	6	Mudstone	Yellow	Flake		20	16	6	
SA11	2	7	Mudstone	Yellow	Flake		12	12	4	
SA11	2	8	Mudstone	Red	Flake		25	20	6	
SA11	2	9	Silcrete	Grey	Angular fragment		27	24	12	
SA11	2	10	Quartz	White	Flake		28	21	12	
SA11	2	11	Mudstone	Red	Flake		26	28	7	

Unit	Site	No	Material	Colour	Class	Sub	L	W	T	Comments
SA11	2	12	Mudstone	Yellow	Flake		15	12	3	
SA11	3	1	Mudstone	Pink	Flake	Portion	30	28	15	Proximal
SA11	3	2	Mudstone	Yellow	Flake		45	40	10	
SA11	3	3	Silcrete	Yellow	Flake	Portion	75	40	10	Lateral
SA11	3	4	Mudstone	Yellow	Flake		4	3	3	
SA11	3	5	Mudstone	Yellow	Flake	Backed	20	18	5	
SA11	4	1	Mudstone	Yellow	Angular fragment		21	10	7	
SA11	4	2	Mudstone	Yellow	Flake		20	15	12	
SA11	4	3	Volcanic	Grey	Flake		25	15	11	
SA11	4	4	Mudstone	Yellow	Flake		70	40	30	
SA11	4	5	Mudstone	Orange	Flake		30	22	5	
SA11	4	6	Mudstone	Yellow	Flake		35	25	7	
SA11	4	7	Mudstone	Yellow	Flake		15	10	7	
SA11	4	8	Mudstone	Yellow	Flake	Portion	10	20	4	Mid
SA11	4	9	Mudstone	Yellow	Flake		40	23	5	20% pebble cortex
SA11	5	1	Mudstone	Orange	Flake		80	62	28	30% pebble cortex
SA11	5	2	Mudstone	Orange	Flake		52	37	15	5% pebble cortex
SA11	6	1	Mudstone	Yellow	Core		69	36	26	40% pebble cortex, 2 negative scars, 2 platforms
SA11	6	2	Silcrete	Grey	Flake	Portion	32	30	11	Distal
SA11	6	3	Mudstone	Yellow	Flake	Portion	13	6	2	Mid
SA11	6	4	Mudstone	Yellow	Angular fragment		22	10	7	
SA11	6	5	Mudstone	Red	Flake		22	16	6	10% pebble cortex
SA11	6	6	Silcrete	Yellow	Flake	Portion	10	10	3	Distal
SA11	6	7	Mudstone	Yellow	Flake		9	6	2	
SA11	6	8	Mudstone	Yellow	Flake		12	7	2	
SA11	6	9	Mudstone	Red	Angular fragment		39	25	9	
SA11	6	10	Silcrete	Grey	Flake		21	11	6	
SA11	6	11	Silcrete	Grey	Flake		26	20	7	
SA11	6	12	Mudstone	Grey	Flake	Portion	15	13	6	Distal
SA11	6	13	Mudstone	Yellow	Flake	Portion	31	17	9	3 longitudinal dorsal scars
SA11	6	14	Silcrete	Grey	Core		29	21	16	5 negaitve scars, 3 platforms, rotated
SA11	6	15	Mudstone	Yellow	Flake	Portion	13	6	3	Mid
SA11	6	16	Mudstone	Yellow	Core		36	26	9	5 negative scars, 4 platforms
SA11	6	17	Mudstone	Yellow	Angular fragment		9	7	4	

Unit	Site	No	Material	Colour	Class	Sub	L	W	T	Comments
SA11	6	18	Silcrete	Cream	Flake		37	21	13	
SA11	6	19	Mudstone	Yellow	Flake		11	6	3	
SA11	6	20	Mudstone	Orange	Flake	Portion	16	15	4	Proximal
SA11	6	21	Mudstone	Yellow	Flake		24	19	6	3 longitudinal dorsal scars
SA11	6	22	Mudstone	Yellow	Flake		30	26	13	50% pebble cortex
SA11	6	23	Silcrete	Cream	Flake	Portion	23	21	7	Proximal
SA11	6	24	Mudstone	Orange	Flake	Portion	16	8	3	Lateral
SA11	6	25	Mudstone	Yellow	Angular fragment		24	19	8	50% pebble cortex
SA11	6	26	Mudstone	Yellow	Angular fragment		20	19	9	
SA11	6	27	Silcrete	Cream	Flake	Portion	29	25	9	Distal
SA11	6	28	Silcrete	Pink	Flake	Portion	22	11	3	Lateral
SA11	6	29	Mudstone	Yellow	Flake	Portion	22	14	4	Lateral
SA11	6	30	Silcrete	Pink	Flake	Portion	12	11	3	Mid
SA11	6	31	Silcrete	Pink	Flake	Portion	16	10	2	Lateral
SA11	6	32	Mudstone	Yellow	Angular fragment		12	9	3	
SA11	6	33	Mudstone	Yellow	Angular fragment		22	19	13	
SA11	6	34	Mudstone	Brown	Flake	Portion	17	25	10	Distal, 25% pebble cortex
SA11	6	35	Mudstone	Orange	Flake	Portion	32	20	6	Lateral
SA11	6	36	Mudstone	Yellow	Angular fragment		11	6	5	
SA11	6	37	Silcrete	Yellow	Flake	Portion	15	11	3	Lateral
SA11	6	38	Silcrete	Red	Flake	Portion	19	11	3	Mid, 10% pebble cortex
SA11	6	39	Silcrete	Yellow	Flake		14	12	3	
SA11	6	40	Mudstone	Yellow	Flake	Portion	14	20	7	Mid
SA11	6	41	Silcrete	Orange	Flake	Portion	20	9	7	
SA11	6	42	Mudstone	Yellow	Flake		14	9	3	
SA11	6	43	Mudstone	Yellow	Flake	Portion	11	14	3	Proximal
SA11	6	44	Mudstone	Yellow	Angular fragment		9	8	3	
SA11	6	45	Mudstone	Yellow	Flake		6	5	2	
SA11	6	46	Mudstone	Yellow	Flake	Portion	15	9	3	Mid
SA11	6	47	Mudstone	Yellow	Flake	Portion	8	6	3	Mid
SA11	6	48	Mudstone	Yellow	Core		30	25	15	5 negative scars, 3 platforms
SA11	6	49	Mudstone	Red	Flake		36	30	8	
SA11	6	50	Mudstone	Yellow	Flake		9	6	3	

Unit	Site	No	Material	Colour	Class	Sub	L	W	T	Comments
SA11	6	51	Mudstone	Red	Flake		21	15	7	Longitudinal dorsal scar
SA11	6	52	Mudstone	Red	Flake	Portion	20	12	5	Mid
SA11	6	53	Mudstone	Red	Flake	Portion	15	10	3	Mid
SA11	6	54	Mudstone	Red	Flake		25	15	6	40% pebble cortex
SA11	6	55	Mudstone	Yellow	Flake		21	12	6	
SA11	6	56	Mudstone	Orange	Flake		23	13	4	
SA11	6	57	Mudstone	Yellow	Angular fragment		58	21	15	30% pebble cortex
SA11	6	58	Mudstone	Yellow	Flake	Portion	27	18	10	Mid
SA11	6	59	Mudstone	Yellow	Flake	Portion	9	6	3	Lateral
SA11	6	60	Mudstone	Yellow	Angular fragment		19	13	10	
SA11	6	61	Mudstone	Yellow	Core		22	16	14	7 negative scars, 3 platforms
SA11	6	62	Mudstone	Red	Flake		32	22	8	25% pebble cortex, 2 longitudinal dorsal scars
SA11	6	63	Mudstone	Red	Core		30	20	15	15% pebble cortex, 3 blade scars, 2 platforms
SA11	6	64	Mudstone	Brown	Flake		16	13	4	Longitudinal dorsal scar
SA11	6	65	Mudstone	Orange	Flake		20	12	7	
SA11	6	66	Mudstone	Orange	Angular fragment		16	7	4	
SA11	6	67	Mudstone	Yellow	Angular fragment		34	14	14	
SA11	6	68	Mudstone	Orange	Angular fragment		22	12	4	
SA11	6	69	Mudstone	Brown	Flake	Portion	11	5	3	Mid
SA11	6	70	Mudstone	Red	Flake	Portion	25	22	11	25% Weathered cortex, mid
SA11	6	71	Mudstone	Red	Flake	Portion	18	12	3	Proximal
SA11	6	72	Mudstone	Yellow	Flake		42	20	6	Longitudinal dorsal ridge
SA11	6	73	Mudstone	Yellow	Flake	Portion	39	32	9	Proximal, longitudinal dorsal scar
SA11	6	74	Mudstone	Orange	Flake	Portion	19	13	3	Mid
SA11	6	75	Mudstone	Orange	Flake	Portion	22	15	4	Lateral
SA11	6	76	Mudstone	Orange	Flake	Portion	15	7	2	Lateral
SA11	6	77	Mudstone	Orange	Flake		6	5	2	
SA11	6	78	Mudstone	Orange	Flake	Portion	9	6	5	Lateral

Unit	Site	No	Material	Colour	Class	Sub	L	W	T	Comments
SA11	6	79	Mudstone	Red	Flake	Portion	18	14	4	Lateral
SA11	6	80	Mudstone	Yellow	Flake	Portion	18	22	5	Proximal, 4 longitudinal dorsal scars
SA11	6	81	Mudstone	Yellow	Angular fragment		18	7	7	
SA11	6	82	Mudstone	Orange	Flake	Portion	18	12	5	Mid
SA11	6	83	Mudstone	Yellow	Core		25	22	15	9 negative scars, 4 platforms
SA11	6	84	Mudstone	Yellow	Flake		35	30	7	
SA11	6	85	Mudstone	Orange	Angular fragment		30	16	9	
SA11	6	86	Mudstone	Yellow	Flake	Portion	45	26	9	Distal
SA11	6	87	Mudstone	Cream	Flake		25	40	6	Retroflex hinge termination
SA11	6	88	Mudstone	Red	Flake	Portion	21	12	8	Lateral
SA11	6	89	Mudstone	Yellow	Flake		30	12	6	5% pebble cortex
SA11	6	90	Mudstone	Yellow	Flake	Portion	18	24	6	Proximal
SA11	6	91	Mudstone	Yellow	Angular fragment		17	12	7	
SA11	6	92	Mudstone	Orange	Flake	Portion	11	15	5	Mid, Longitudinal dorsal ridge
SA11	6	93	Mudstone	Orange	Flake		9	6	5	
SA11	6	94	Silcrete	Red	Flake		15	12	3	
SA11	6	95	Mudstone	Yellow	Angular fragment		15	10	6	
SA11	6	96	Mudstone	Yellow	Angular fragment		19	9	8	
SA11	6	97	Mudstone	Yellow	Flake	Portion	16	14	4	Proximal
SA11	6	98	Mudstone	Yellow	Angular fragment		15	7	6	
SA11	6	99	Mudstone	Brown	Flake	Portion	11	9	3	Proximal
SA11	6	100	Mudstone	Orange	Angular fragment		12	9	3	
SA11	6	101	Mudstone	Yellow	Flake		30	25	6	50% pebble cortex
SA11	6	102	Mudstone	Yellow	Flake		24	16	3	Longitudinal dorsal ridge
SA11	6	103	Mudstone	Yellow	Angular fragment		17	13	7	
SA11	6	104	Mudstone	Yellow	Flake	Portion	20	13	5	Lateral
SA11	6	105	Mudstone	Orange	Flake		11	7	2	
SA11	6	106	Mudstone	Orange	Flake		11	8	2	
SA11	6	107	Mudstone	Cream	Flake		11	11	3	

Unit	Site	No	Material	Colour	Class	Sub	L	W	T	Comments
SA11	6	108	Mudstone	Orange	Flake		10	6	2	
SA11	6	109	Mudstone	Brown	Flake	Portion	9	7	3	Mid
SA11	6	110	Mudstone	Brown	Core		19	11	10	4 negative scars, 2 platforms
SA11	6	111	Mudstone	Orange	Flake	Portion	16	10	7	Mid
SA11	6	112	Mudstone	Brown	Flake		12	10	2	
SA11	6	113	Mudstone	Yellow	Flake		5	5	2	
SA11	6	114	Mudstone	Orange	Flake		15	8	2	
SA11	6	115	Mudstone	Yellow	Flake		14	5	3	
SA11	6	116	Mudstone	Orange	Flake		6	5	2	
SA11	6	117	Mudstone	Orange	Flake		6	4	3	
SA11	6	118	Mudstone	Orange	Flake		8	5	2	
SA11	6	119	Mudstone	Brown	Flake	Portion	12	12	4	Proximal, longitudinal dorsal ridge
SA11	6	120	Mudstone	Orange	Core		37	17	15	9 negative scars, 3 platforms, rotated
SA11	6	121	Mudstone	Yellow	Flake	Portion	25	21	8	Proximal
SA11	6	122	Mudstone	Yellow	Core		25	15	9	5 negative scars, 3 platforms, rotated
SA11	6	123	Mudstone	Red	Core		28	22	11	5 negative scars, 3 platforms, rotated
SA11	6	124	Mudstone	Brown	Flake	Portion	13	13	3	Mid
SA11	6	125	Mudstone	Yellow	Flake	Portion	12	11	3	Mid
SA11	6	126	Mudstone	Yellow	Flake	Portion	9	8	3	Mid
SA11	6	127	Mudstone	Yellow	Flake	Portion	8	4	2	Mid
SA11	6	128	Mudstone	Yellow	Core		66	53	29	70% pebble cortex, 6 negative scars, 2 platforms
SA11	6	129	Mudstone	Yellow	Flake	Utilised	50	32	14	40% pebble cortex, usewear on lateral margin
SA11	6	130	Mudstone	Pink	Flake		14	12	3	
SA11	6	131	Mudstone	Orange	Flake		16	12	6	
SA11	6	132	Mudstone	Orange	Flake		19	12	7	
SA11	6	133	Silcrete	Red	Flake		18	9	6	
SA11	6	134	Mudstone	Cream	Flake	Portion	12	18	6	Mid, Longitudinal dorsal ridge
SA11	6	135	Silcrete	Red	Angular fragment		48	33	14	30% weathered cortex
SA11	6	136	Silcrete	Red	Angular fragment		36	30	22	20% weathered cortex
SA11	6	137	Silcrete	Red	Core		58	42	22	4 negative scars, 2 platforms

Unit	Site	No	Material	Colour	Class	Sub	L	W	T	Comments
SA11	6	138	Silcrete	Red	Core		42	38	20	5 negative scars, 2 platforms
SA11	6	139	Mudstone	Yellow	Flake	Portion	14	12	6	Lateral
SA11	6	140	Mudstone	Red	Flake	Portion	28	14	10	Transverse dorsal scar
SA11	6	141	Mudstone	Red	Angular fragment		24	15	10	
SA11	6	142	Silcrete	Red	Flake		17	11	3	
SA11	6	143	Mudstone	Orange	Flake		17	12	4	
SA11	6	144	Mudstone	Yellow	Flake		9	5	3	
SA11	6	145	Mudstone	Red	Core		24	16	11	4 negative scars, 2 platforms
SA11	6	146	Silcrete	Red	Flake	Portion	11	9	6	Mid
SA11	6	147	Mudstone	Red	Flake	Utilised	30	26	6	Longitudinal dorsal ridge, usewear lateral margin
SA11	6	148	Mudstone	Yellow	Flake	Portion	31	25	8	Lateral
SA11	6	149	Mudstone	Yellow	Flake	Portion	10	8	2	Mid
SA11	6	150	Mudstone	Red	Flake	Portion	11	9	6	Distal, longitudinal dorsal ridge
SA11	6	151	Mudstone	Yellow	Flake	Portion	16	16	7	Proximal
SA11	6	152	Mudstone	Yellow	Flake	Portion	18	10	2	Lateral
SA11	6	153	Mudstone	Yellow	Flake		34	15	11	Transverse dorsal scar
SA11	6	154	Silcrete	Red	Flake	Portion	36	23	12	Lateral, longitudinal dorsal scar
SA11	6	155	Silcrete	Red	Flake	Portion	28	18	7	!lateral, conjoin
SA11	6	156	Silcrete	red	Flake	Portion	38	17	11	!lateral, conjoin
SA11	6	157	Mudstone	Orange	Flake		18	11	8	
SA11	6	158	Mudstone	Yellow	Flake	Portion	21	18	7	Proximal
SA11	6	159	Mudstone	Orange	Flake	Portion	19	10	4	Lateral
SA11	6	160	Mudstone	Yellow	Flake	Portion	14	22	8	Proximal
SA11	6	161	Silcrete	Pink	Flake	Portion	20	13	6	Lateral
SA11	6	162	Mudstone	Yellow	Flake	Portion	17	12	9	Mid
SA11	6	163	Mudstone	Yellow	Flake	Portion	11	11	7	Mid, longitudinal dorsal ridge
SA11	6	164	Silcrete	Pink	Flake		12	9	2	
SA11	6	165	Mudstone	Red	Flake	Portion	10	10	3	Proximal
SA11	6	166	Mudstone	Yellow	Flake	Portion	25	16	7	Proximal
SA11	6	167	Mudstone	Orange	Flake		8	4	1	
SA11	6	168	Mudstone	Orange	Flake		11	9	3	
SA11	6	169	Mudstone	Orange	Flake	Portion	18	11	5	Proximal
SA11	6	170	Mudstone	Yellow	Flake	Portion	18	23	9	Lateral

Unit	Site	No	Material	Colour	Class	Sub	L	W	T	Comments
SA11	6	171	Silcrete	Pink	Flake		28	22	6	
SA11	6	172	Mudstone	Orange	Flake		7	6	2	
SA11	6	173	Mudstone	Orange	Flake	Portion	18	12	8	Lateral
SA11	6	174	Mudstone	Cream	Flake		14	11	6	
SA11	6	175	Mudstone	Orange	Angular fragment		17	9	7	
SA11	6	176	Mudstone	Orange	Flake		12	9	4	
SA11	6	177	Mudstone	Yellow	Flake	Portion	15	20	6	Proximal, longitudinal dorsal scar
SA11	6	178	Mudstone	Cream	Flake		28	32	12	40% pebble cortex
SA11	6	179	Mudstone	Yellow	Flake	Portion	14	20	5	Mid, 3 longitudinal dorsal scars
SA11	6	180	Mudstone	Red	Angular fragment		18	12	5	
SA11	6	181	Mudstone	Red	Flake	Portion	15	8	4	
SA11	6	182	Mudstone	Red	Flake	Portion	21	14	6	
SA11	6	183	Mudstone	Yellow	Flake	Portion	9	6	2	Mid
SA11	6	184	Silcrete	Pink	Flake	Portion	20	17	6	Proximal
SA11	6	185	Mudstone	Yellow	Flake		14	11	4	
SA11	6	186	Mudstone	Yellow	Flake	Portion	40	28	14	10% pebble cortex, 2 longitudinal dorsal scars
SA11	6	187	Mudstone	Yellow	Core		50	45	30	20% pebble cortex, 10 negative scars, 3 platforms
SA11	6	188	Mudstone	Red	Flake		20	14	4	
SA11	6	189	Silcrete	Pink	Flake	Portion	24	15	9	Lateral
SA11	6	190	Mudstone	Yellow	Flake	Portion	12	9	4	Proximal
SA11	6	191	Mudstone	Red	Flake	Portion	15	11	6	Distal
SA11	6	192	Mudstone	Red	Core		41	32	15	40% pebble cortex, 4 negative scars,3 platforms
SA11	6	193	Mudstone	Pink	Flake		26	18	8	
SA11	6	194	Mudstone	Pink	Flake		12	7	1	
SA11	6	195	Mudstone	Yellow	Flake	Utilised	50	36	22	Longitudinal dorsal ridge, usewear lateral margin
SA11	6	196	Mudstone	Red	Flake		11	8	3	
SA11	6	197	Mudstone	Orange	Flake	Portion	14	8	3	Distal
SA11	6	198	Mudstone	Cream	Flake	Portion	9	10	3	Distal
SA11	6	199	Mudstone	Yellow	Flake		29	18	6	30% pebble cortex
SA11	6	200	Mudstone	Yellow	Flake		6	5	2	
SA11	6	201	Mudstone	Orange	Flake	Portion	15	11	3	Proximal, 2

Unit	Site	No	Material	Colour	Class	Sub	L	W	T	Comments
										longitudinal dorsal scars
SA11	6	202	Mudstone	Yellow	Flake		18	13	9	
SA11	6	203	Mudstone	Yellow	Flake	Portion	18	24	12	Proximal
SA11	6	204	Mudstone	Yellow	Flake		18	14	6	40% pebble cortex
SA11	6	205	Silcrete	Pink	Core		56	32	18	10 negative scars, 3 platforms
SA11	6	206	Silcrete	Pink	Flake	Portion	21	18	10	Proximal
SA11	6	207	Mudstone	Orange	Flake	Portion	5	11	2	Mid
SA11	6	208	Mudstone	Cream	Core		35	30	22	30% pebble cortex, 11 negative scars, 3 platforms
SA11	6	209	Mudstone	Cream	Flake		20	17	10	5% pebble cortex
SA11	6	210	Mudstone	Cream	Flake	Portion	25	20	6	Proximal
SA11	6	211	Silcrete	Pink	Flake	Portion	9	15	3	Proximal
SA11	6	212	Mudstone	Orange	Flake	Portion	7	11	3	Mid
SA11	6	213	Mudstone	Orange	Flake	Portion	14	9	3	Lateral
SA11	6	214	Mudstone	Orange	Core		18	11	10	4 negative scars, 1 platform
SA11	6	215	Silcrete	Red	Flake	Portion	14	13	4	Proximal
SA11	6	216	Mudstone	Grey	Flake	Portion	14	12	4	Lateral
SA11	6	217	Mudstone	Yellow	Angular fragment		48	32	18	25% pebble cortex
SA11	6	218	Mudstone	Red	Flake		25	15	4	20% pebble cortex
SA11	6	219	Volcanic	Grey	Flake		32	42	10	10% pebble cortex
SA11	6	220	Silcrete	Red	Flake	Portion	18	15	5	Proximal, longitudinal dorsal scar
SA11	6	221	Mudstone	Yellow	Flake	Portion	13	19	5	Mid
SA11	6	222	Mudstone	Red	Flake		20	35	9	2 longitudinal dorsal scars
SA11	6	223	Mudstone	Cream	Flake		17	13	5	
SA11	6	224	Mudstone	Orange	Flake		17	13	5	
SA11	6	225	Silcrete	Yellow	Flake	Portion	28	20	8	Lateral
SA11	6	226	Silcrete	Grey	Flake	Portion	12	10	5	Mid
SA11	6	227	Silcrete	Yellow	Flake	Portion	12	20	5	Mid, longitudinal dorsal ridge
SA11	6	228	Mudstone	Red	Flake		44	36	14	
SA11	6	229	Mudstone	Orange	Flake		12	10	4	
SA11	6	230	Silcrete	Pink	Flake		34	18	9	longitudinal dorsal ridge, 2 transverse scars
SA11	6	231	Mudstone	Yellow	Flake		18	12	6	
SA11	6	232	Mudstone	Yellow	Core		48	33	29	40% pebble cortex, 8

Unit	Site	No	Material	Colour	Class	Sub	L	W	T	Comments
										negative scars, 3 platforms
SA11	6	233	Silcrete	Pink	Flake		14	12	4	
SA11	6	234	Silcrete	Pink	Flake		18	12	9	
SA11	6	235	Mudstone	Red	Flake	Portion	17	24	5	Mid
SA11	6	236	Silcrete	Yellow	Flake		32	32	9	Transverse dorsal scar
SA11	6	237	Mudstone	Yellow	Flake		14	12	5	
SA11	6	238	Mudstone	Yellow	Flake	Portion	12	9	3	
SA11	6	239	Mudstone	Yellow	Flake	Portion	10	14	4	Mid, transverse dorsal scar
SA11	6	240	Mudstone	Yellow	Core		48	39	38	50% pebble cortex, 5 negative scars, 2 platforms
SA11	6	241	Silcrete	Pink	Flake	Portion	11	11	3	Mid
SA11	6	242	Mudstone	Yellow	Flake		34	22	9	25% weathered cortex
SA11	6	243	Mudstone	Yellow	Flake	Portion	17	10	3	Prooxmal, 3 longitudinal dorsal scars
SA11	6	244	Silcrete	Red	Flake		32	29	9	
SA11	6	245	Silcrete	Red	Flake	Portion	35	25	12	Proximal
SA11	6	246	Silcrete	Yellow	Angular fragment		18	9	7	
SA11	6	247	Mudstone	Red	Angular fragment		12	10	6	
SA11	6	248	Mudstone	Red	Flake	Portion	35	25	11	Lateral
SA11	6	249	Mudstone	Yellow	Flake	Portion	12	20	6	Mid, longitudinal dorsal ridge
SA11	6	250	Mudstone	Orange	Flake	Portion	15	20	9	Mid, longitudinal dorsal ridge
SA11	6	251	Mudstone	Grey	Flake		34	24	11	
SA11	6	252	Mudstone	Grey	Flake		21	11	2	40% pebble cortex
SA11	6	253	Mudstone	Orange	Angular fragment		15	11	9	
SA11	6	254	Silcrete	Red	Flake		50	35	25	2 longitudinal dorsal scars
SA11	6	255	Mudstone	Grey	Flake	Portion	16	18	6	Mid, 3 longitudinal dorsal scars
SA11	6	256	Mudstone	Yellow	Flake		28	21	5	
SA11	6	257	Mudstone	Orange	Flake		23	15	6	
SA11	6	258	Mudstone	Orange	Flake		19	9	3	
SA11	6	259	Mudstone	Yellow	Flake	Portion	20	12	5	Lateral
SA11	6	260	Mudstone	Red	Core		30	23	18	30% pebble cortex, 7

Unit	Site	No	Material	Colour	Class	Sub	L	W	T	Comments
										negative scars, 2 platforms
SA11	6	261	Silcrete	Pink	Core		36	26	30	10 negative scars, 4 platforms
SA11	6	262	Silcrete	Red	Flake	Portion	15	18	4	Mid
SA11	6	263	Silcrete	Grey	Core		45	35	26	10 negative scars, 4 platforms
SA11	6	264	Mudstone	Yellow	Angular fragment		24	12	5	30% pebble cortex
SA11	6	265	Mudstone	Red	Flake		20	28	5	
SA11	6	266	Mudstone	Red	Flake	Portion	20	22	9	Proximal, 5% pebble cortex
SA11	6	267	Silcrete	Red	Angular fragment		34	20	17	
SA11	6	268	Mudstone	Red	Flake		50	48	23	25% pebble cortex, 2 longitudinal dorsal scars
SA11	6	269	Mudstone	Orange	Flake		36	30	13	2 longitudinal dorsal scars, 2 transverse scars
SA11	6	270	Silcrete	Grey	Core		20	15	11	3 negative scars, 2 platforms
SA11	6	271	Mudstone	Grey	Flake		11	10	5	
SA11	6	272	Silcrete	Yellow	Flake	Portion	20	15	5	Proximal
SA11	6	273	Silcrete	Yellow	Flake		42	28	12	10% pebble cortex
SA11	6	274	Mudstone	Yellow	Flake		15	5	3	
SA11	6	275	Mudstone	Grey	Flake	Utilised	25	23	7	3 longitudinal dorsal scars,usewear lateral margin
SA11	6	276	Mudstone	Yellow	Flake		22	26	8	3 longitudinal dorsal scars, 2 transverse scars
SA11	6	277	Silcrete	Red	Flake		42	31	9	2 longitudinal dorsal scars
SA11	6	278	Silcrete	Yellow	Flake		18	14	3	longitudinal dorsal scar
SA11	6	279	Mudstone	Red	Flake		26	18	8	2 longitudinal dorsal scars, 2 transverse scars
SA11	6	280	Mudstone	Orange	Flake	Portion	14	11	3	Mid
SA11	6	281	Mudstone	Yellow	Flake	Portion	21	14	7	Distal
SA11	6	282	Mudstone	Red	Flake		12	9	3	
SA11	6	283	Silcrete	Red	Flake	Portion	6	11	3	Mid

Unit	Site	No	Material	Colour	Class	Sub	L	W	T	Comments
SA11	6	284	Mudstone	Red	Flake		9	11	3	Proximal, 3 longitudinal dorsal scars
SA11	6	285	Mudstone	Orange	Angular fragment		12	8	6	
SA11	6	286	Mudstone	Orange	Flake		18	11	3	
SA11	6	287	Mudstone	Red	Flake		12	6	4	
SA11	6	288	Mudstone	Cream	Flake	Portion	15	12	6	Distal
SA11	6	289	Mudstone	Yellow	Core		45	20	14	6 negative scars, 2 platforms
SA11	6	290	Mudstone	Red	Flake		20	15	4	
SA11	6	291	Silcrete	Yellow	Flake	Portion	15	28	4	Proximal
SA11	6	292	Mudstone	Yellow	Flake		16	11	10	
SA11	6	293	Silcrete	Red	Flake	Portion	10	17	3	Proximal, longitudinal dorsal scar
SA11	6	294	Silcrete	Yellow	Flake		34	25	6	2 longitudinal dorsal scars, 2 transverse scars
SA11	6	295	Chert	Grey	Core		36	30	11	banded, 5 negative scars, 3 paltforms
SA11	6	296	Mudstone	Grey	Flake		32	28	13	
SA11	6	297	Mudstone	Grey	Flake	Portion	16	25	6	Distal, retroflex hinge trermination
SA11	6	298	Mudstone	Yellow	Core		28	15	13	5 negative scars, 3 platforms
SA11	6	299	Silcrete	Pink	Angular fragment		18	12	12	
SA11	6	300	Silcrete	Pink	Angular fragment		20	13	7	15% pebble cortex
SA11	6	301	Mudstone	Orange	Flake	Portion	17	16	6	Distal
SA11	6	302	Mudstone	Grey	Flake		22	16	12	
SA11	6	303	Mudstone	Yellow	Flake		11	12	3	
SA11	6	304	Mudstone	Orange	Flake	Portion	7	10	4	Mid
SA11	6	305	Mudstone	Orange	Flake		7	10	3	
SA11	6	306	Silcrete	Red	Flake		12	8	3	
SA11	6	307	Mudstone	Orange	Flake	Portion	9	7	3	Mid
SA11	6	308	Quartz	White	Flake		11	6	2	
SA11	6	309	Quartz	White	Flake		9	5	3	
SA11	6	310	Silcrete	Red	Flake		26	22	4	Longitudinal dorsal scar
SA11	6	311	Mudstone	Red	Flake	Portion	19	10	5	Lateral
SA11	6	312	Mudstone	Yellow	Flake		24	19	9	Longitudinal dorsal ridge

Unit	Site	No	Material	Colour	Class	Sub	L	W	T	Comments
SA11	6	313	Mudstone	Yellow	Flake	Portion	20	19	6	Mid, longitudinal dorsal ridge
SA11	6	314	Mudstone	Yellow	Flake		19	15	3	
SA11	6	315	Mudstone	Yellow	Flake	Portion	12	9	3	Distal
SA11	6	316	Silcrete	Grey	Flake		22	14	7	
SA11	6	317	Silcrete	Grey	Flake		22	13	6	
SA11	6	318	Silcrete	Yellow	Flake		45	29	12	30% pebble cortex, longitudinal dorsal scar
SA11	6	319	Mudstone	Yellow	Flake	Portion	27	18	8	Lateral
SA11	6	320	Mudstone	Yellow	Core		76	70	30	30% pebble cortex, 10 negative scars, 3 platforms
SA11	6	321	Silcrete	Pink	Flake	Portion	22	26	7	Lateral, 2 transverse scars
SA11	6	322	Mudstone	Yellow	Flake		10	8	2	
SA11	6	323	Mudstone	Orange	Flake		9	7	3	
SA11	6	324	Silcrete	Pink	Flake		36	30	13	Longitudinal dorsal ridge
SA11	6	325	Mudstone	Yellow	Flake		9	9	3	
SA11	6	326	Mudstone	Red	Flake		25	20	8	3 longitudinal dorsal scars
SA11	6	327	Mudstone	Cream	Flake	Portion	23	17	4	!lateral, conjoin
SA11	6	328	Mudstone	Cream	Flake	Portion	20	16	4	!lateral, conjoin
SA11	6	329	Mudstone	Cream	Flake		11	14	3	
SA11	6	330	Mudstone	Red	Flake	Portion	14	12	3	Lateral
SA11	6	331	Mudstone	Red	Flake		35	20	11	2 longitudinal dorsal scars
SA11	6	332	Mudstone	Yellow	Flake		18	8	4	
SA11	6	333	Mudstone	Red	Flake		22	15	6	1 longitudinal dorsal scar
SA11	6	334	Mudstone	Red	Flake		16	12	5	
SA11	6	335	Mudstone	Red	Flake		22	11	4	
SA11	6	336	Mudstone	Yellow	Flake		12	9	3	
SA11	6	337	Mudstone	Red	Flake	Portion	12	6	2	Distal
SA11	6	338	Mudstone	Red	Flake	Portion	17	11	6	Proximal
SA11	6	339	Silcrete	Pink	Flake		25	20	5	
SA11	6	340	Mudstone	Brown	Flake		16	14	5	
SA11	6	341	Silcrete	Pink	Flake		10	14	4	Longitudinal dorsal ridge
SA11	6	342	Mudstone	Orange	Flake	Portion	22	20	6	Mid
SA11	6	343	Mudstone	Cream	Flake	Portion	15	19	4	Mid
SA11	6	344	Mudstone	Yellow	Flake		10	7	3	

Unit	Site	No	Material	Colour	Class	Sub	L	W	T	Comments
SA11	6	345	Mudstone	Yellow	Flake		9	10	4	
SA11	6	346	Mudstone	Grey	Flake	Portion	18	4	3	Mid, longitudinal dorsal ridge
SA11	6	347	Mudstone	Yellow	Flake		34	24	12	
SA11	6	348	Mudstone	Red	Flake		37	22	6	
SA11	6	349	Mudstone	Red	Flake		11	10	2	
SA11	6	350	Mudstone	Yellow	Flake		18	18	8	2 transverse scars
SA11	6	351	Mudstone	Yellow	Flake		11	14	3	
SA11	6	352	Mudstone	Orange	Flake	Portion	12	15	3	Mid
SA11	6	353	Mudstone	Yellow	Flake	Portion	10	8	2	Mid
SA11	6	354	Mudstone	Grey	Flake		25	18	10	
SA11	6	355	Mudstone	Yellow	Flake		12	18	6	2 longitudinal dorsal scars
SA11	6	356	Mudstone	Red	Flake		34	32	9	10% pebble cortex
SA11	6	357	Mudstone	Red	Flake		24	16	6	longitudinal dorsal scar
SA11	6	358	Mudstone	Red	Flake		21	18	3	
SA11	6	359	Mudstone	Red	Flake	Portion	18	19	7	Proximal
SA11	6	360	Mudstone	Yellow	Flake		21	15	8	
SA11	6	361	Mudstone	Orange	Flake	Portion	42	27	9	!lateral, conjoin, 40% pebble cortex
SA11	6	362	Mudstone	Orange	Flake	Portion	34	20	11	!lateral, conjoin, 30% pebble cortex
SA11	6	363	Mudstone	Yellow	Flake		12	10	3	
SA11	6	364	Mudstone	Orange	Flake		24	17	8	20% pebble cortex
SA11	6	365	Mudstone	Cream	Flake		28	18	7	
SA11	6	366	Mudstone	Grey	Flake	Portion	10	16	2	Distal
SA11	6	367	Mudstone	Yellow	Flake		20	14	7	
SA11	6	368	Mudstone	Grey	Flake	Portion	20	14	9	Distal
SA11	6	369	Mudstone	Grey	Flake	Portion	15	10	5	Mid
SA11	6	370	Mudstone	Yellow	Flake		12	9	4	
SA11	6	371	Mudstone	Red	Angular fragment		26	19	14	10% pebble cortex
SA11	6	372	Mudstone	Yellow	Flake	Portion	9	15	5	Mid
SA11	6	373	Mudstone	Orange	Flake		9	14	5	
SA11	6	374	Mudstone	Grey	Flake		18	15	6	
SA11	6	375	Mudstone	Orange	Flake	Portion	21	16	9	Lateral
SA11	6	376	Mudstone	Orange	Flake	Portion	15	8	5	Lateral
SA11	6	377	Mudstone	Yellow	Flake		10	14	5	Longitudinal dorsal ridge
SA11	6	378	Silcrete	Yellow	Core		45	33	33	7 negative scars, 2 platforms
SA11	6	379	Silcrete	Yellow	Flake		24	19	9	

Unit	Site	No	Material	Colour	Class	Sub	L	W	T	Comments
SA11	6	380	Mudstone	Red	Flake		32	16	7	3 longitudinal dorsal scars
SA11	6	381	Mudstone	Red	Flake		22	16	6	longitudinal dorsal ridge
SA11	6	382	Mudstone	Red	Flake	Portion	18	24	8	Proximal
SA11	6	383	Mudstone	Red	Flake		26	16	4	
SA11	6	384	Mudstone	Red	Flake		16	13	4	
SA11	6	385	Mudstone	Red	Core		52	42	26	6 negative scars, 3 platforms
SA11	6	386	Mudstone	Red	Flake		45	34	14	2 transverse scars
SA11	6	387	Silcrete	Pink	Flake	Portion	12	13	3	Proximal
SA11	6	388	Mudstone	Orange	Flake		15	12	3	
SA11	6	389	Mudstone	Orange	Flake	Portion	12	14	6	Mid
SA11	6	390	Mudstone	Red	Flake		10	19	6	
SA11	6	391	Mudstone	Yellow	Flake	Portion	13	11	4	Mid
SA11	6	392	Mudstone	Orange	Flake		41	28	14	25% pebble cortex
SA11	6	393	Mudstone	Red	Flake		39	29	12	5% pebble cortex
SA13	1	1	Mudstone	Yellow	Flake	Portion	25	15	5	Lateral, retouched, usewear
SA13	1	2	Mudstone	Yellow	Angular fragment		20	10	5	
SA13	1	3	Chert	Grey	Core		60	30	30	80% pebble cortex, 2 negative scars, banded
SA13	1	4	Mudstone	Yellow	Angular fragment		60	35	20	
SA13	2	1	Mudstone	Red	Angular fragment		20	15	10	
SA13	2	2	Silcrete	Yellow	Flake	Portion	40	35	10	Distal
SA13	2	3	Mudstone	Yellow	Flake		20	15	5	?usewear
SA13	2	4	Silcrete	Pink	Flake		30	15	12	
SA13	2	5	Chert	Grey	Core		35	20	15	8 negative scars, facetted platform
SA13	2	6	Mudstone	Red	Core		54	40	30	
SA13	2	7	Mudstone	Red	Angular fragment		35	25	12	
SA13	2	8	Mudstone	Red	Flake		37	25	10	retouched
SA13	2	9	Silcrete	Pink	Flake		20	15	3	
SA13	3	1	Mudstone	Yellow	Flake	Scraper	80	40	15	steeply retouched, usewear along lateral margin
SA13	3	2	Mudstone	Yellow	Flake		25	30	12	10% pebblec ortex

Artefacts not recorded in detail (count only)

Unit	Site	No	Material	Colour	Class	Sub	L	W	T	Comments
SA2	3	91	Mudstone							
		47	Silcrete							
		1	Quartz							
SA8	13	12	Silcrete							
		8	Mudstone							
SA9	2	32	Mudstone							
		8	Silcrete							
		3	FGS							
		3	Chert							
SA11	3	27	Mudstone							
		7	Silcrete							
SA11	4	10	Mudstone							
		3	Silcrete							

Appendix D – Community Reports

Only available on request and with the approval of the interviewee.

Appendix E – Arborist Report of Identified Scarred Trees

URBAN TREE MANAGEMENT

CONSULTING
ARBORICULTURISTS
& HORTICULTURISTS

Urban Tree Management
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MEMBER OF
INSTITUTE OF AUSTRALIAN
CONSULTING ARBORICULTURISTS

REPORT:

ARBORICULTURAL ASSESSMENT

OF

Scarred Trees ref. (SA1.5 and SA5.9)

AT

Glennies Creek Road
Camberwell
New South Wales

FOR

Ashton Coal Operations

Prepared 5 May 2009
Reference 11174

Contents

SUMMARY

Tree 1 reference SA1.5 a dead stump considered to be ***Eucalyptus paniculata*** Smith – **Grey Ironbark** and Tree 2 reference SA5.9 an overmature ***E. paniculata*** Smith – **Grey Ironbark** (*the trees*), located within or adjacent to the area of Ashton Coal Operations P/L, Camberwell NSW within the traditional lands of the Wonnarua people, Map 1.0 and 2.0.

Tree 1 reference SA1.5 was a dead stump cut by a chainsaw, estimated to have died 50-75 years ago and cut down 40-<65 years ago, with a trunk wound on its west side formed by a surveyors blaze in 1885, when the tree was 150 years old approximately. The scar on Tree 1 appeared not to be Aboriginal in origin.

Tree 2 reference SA5.9 was an overmature live specimen with a basal trunk wound on its north side, wound estimated to be formed by deliberate incision and laceration as opposed to mechanical wounding by an abrasion impact event from a motor vehicle or from a falling tree of branch tear, tree estimated to be 200-<250 years old and the wound approx 150-200 years. The scar on Tree 2 is likely to be Aboriginal in origin.

1.0 PREFACE

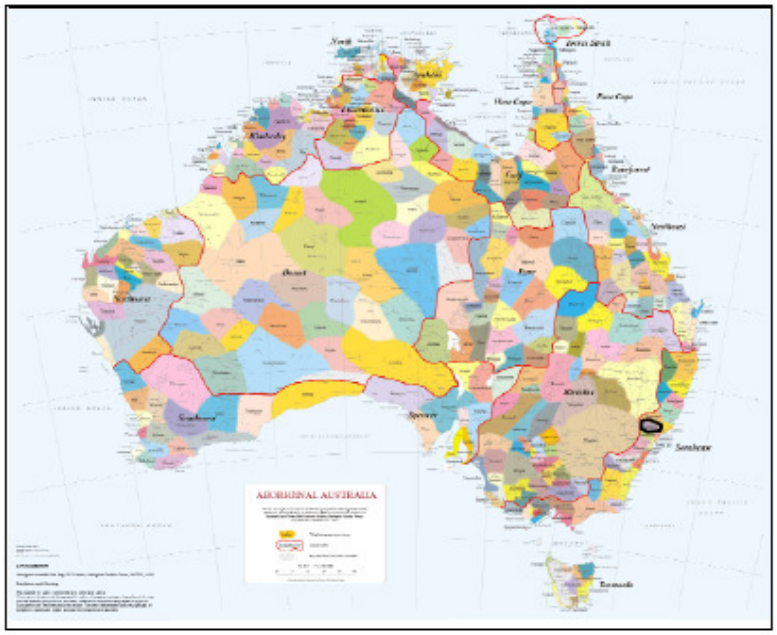
URBAN TREE MANAGEMENT © was engaged to prepare this report for Lisa Richards, Environment and Community Relations Manager on behalf of Ashton Coal Operations P/L, PO Box 699, Singleton NSW 2330.

This report has been undertaken to assist in determining the following information for *each tree* examined: age of tree, age of wounding event/s, likely causation, condition of each tree, possible remaining lifespan or risk to live/dead tree/s and requirements to conserve each artefact. This to include termite, anti-fungal treatment, pruning and possible further consultation with the Local Aboriginal Land Council (LALC) regarding preservation of the fragile tree remains off site and likely remaining lifespan of scar tree/s if conservation measures undertaken.

2.0 INTRODUCTION

Mr Danny Draper *(the author)* attended the site containing scarred trees (SA1.5 and SA5.9), Camberwell NSW (*the site*), on Wednesday 30 April 2009, in the company of Liz Wyatt – Archaeologist, Insite Heritage and Adam Spardo, Environmental Co-ordinator- Ashton Coal Operations and the trees and their growing environment and wounding were examined to determine the likely cause and age of scarring and the wounds longevity subject to proposed works nearby.

The dimensions of the tree wound/s were recorded and the wound/s photographed by the author. The age of each tree provided is an estimate only and offered within a range due to the uncertainty of such unsubstantiated field observations without the application of Dendrochronology or other records. Without such precise data the age of trees are usually considered in stages of life span against their biomass *in situ* as Young (0-20%), Mature (20-80%) and Over-mature (senescent) (80-100%).



Map 1.0

Aboriginal Australia Wall Map, D R Horton, Aboriginal Studies Press, AIATSIS 1996, sourced Government of South Australia Department of Education and Children's Services 2008.

Bold (black) encircled area showing the lands of the Wonnarua people.

Map 2.0

Aboriginal Australia Wall Map - Detail, D R Horton, Aboriginal Studies Press, AIATSIS 1996, sourced Government of South Australia Department of Education and Children's Services 2008.

Bold (black) encircled area showing the lands of the Wonnarua people with arrow showing indicative location of Trees SA1.5 and SA5.9, near Singleton NSW.

3.0 METHODOLOGY

It is understood that due to the sensitivity of the location of each tree to secure their existence a plan or map of their location was not issued and is therefore not included herein as would otherwise be normal practice for an Arboricultural Assessment report, but recorded elsewhere such as by Global Positioning System (GPS) coordinates and recorded by the archaeologist/s.

The inspection/s was undertaken by a visual assessment from the ground and considers as part of the assessment/s the remaining lifespan of a live tree or durability of the remains of a dead tree where the artifact is to be preserved.

A glossary of terms is included as Appendix C covering the description of the tree/s.

Assessment of Trees

The following criteria were recorded to reflect the current status of the trees being: Age class, Condition class, Form class, Dimensions, Crown cover (live foliage as %), Crown density (density of live foliage evident as %), vigour class and Sustainable Retention Index Value (SRIV) version 3 (IACA, 2009) of each live tree (Appendix A), where appropriate.

The age of the trees was estimated from a sound professional knowledge or research of the individual tree taxa, growth of trees within the region based on habitat, rainfall, soil type and land use practices and considered against the dimensions of each tree encountered and the limitations of its growing environment *in situ*. A tree may be described in greater detail than others where it was considered appropriate to more accurately describe the location of the wound or the circumstances which may have lead to its formation.

Assessment of Wounds to determine Archaeological status as Scarred Trees

As a tree grows vascular cambium produces wood fibres along the trunk, stems and roots which are laid down as rings when a new growth increment layer is developed. The vascular cambium translocates nutrients in solution from the roots to the leaves through the xylem and sugars produced in the leaves as photosynthates through the phloem and ray cells and to the roots. Their structural importance allows for strength and flexibility and for energy movement along the stem from the distal to proximal end to dissipate and diminish through damping down through the trunk and roots and out into the ground. If the vascular cambium is severed to a sufficient depth fibres above and below will become desiccated and die forming a wound with the extent of dieback often unpredictable extending beyond the point of wounding initially.

When wounding occurs the trees biomechanics predispose it to attempt to restore the alignment of its fibres and to protect it from pathogens by the growth of new wood and to isolate the wound through 4 walls of defence as provided by (CODIT) Compartmentalization of Decay In Trees (Shigo 1989, p. 45) by chemically altering surrounding wood and walling off the damage using barriers provided by existing cellular structures as Walls 1-3 and finally to conceal the wound separating it from the damage caused at the time of wounding beneath layers of new wood as Wall 4. At the time of wounding Wall 1 is formed by plugging xylem vessels vertically above and below the wound. Wall 2 is formed tangentially in growth rings by the concentration of lignin in the cells of late season's growth acting to prevent the inward spread of pathogens. Wall 3 forms at the sides of the wound from ray cells producing toxins which limits spread laterally. Wall 4 is the new wood separating the initial wound site from new growth.

The sides of the wound are *wound margin left* and *wound margin right* which slowly converge and usually form an oblong, circular or elliptic shape. The distal and proximal ends of a wound are the *wound apex* and *wound base* respectively and may be irregular, jagged, obtuse, rounded, truncate to acute (<90^{O}) where the margins converge often forming a wound seam or partial occlusion. The wood exposed by the removal of the bark is the *wound face* although this may be absent if a void is evident as a *cavity* or a larger void as a *hollow*.

No matter what the shape of the wound the tree will ultimately attempt to align the fibres to grow over and conceal the wound to restore the cover of living wood around and along the stem to return the stem to its structural optimum, capable of receiving a uniform stress loading. Ultimately most margins converge and graft to conceal the wound face and it is then that the wound is occluded. The living tissue disrupted at the time of wounding will always die, remain damaged and continue to deteriorate even when a wound is occluded by successive growth rings because trees do not heal they can only conceal the damaged cells with consecutive layers of seasonal growth.

Margins encroach over the wound face as new growth increments are added around the tree and the *wound margin depth* on the left and right sides usually deepens and can be measured perpendicular from the wound face to the outer edge of the trunk or from the outer edge of the trunk to the inner edge of the void if the wound face is absent. It is not uncommon for the depth of the left and right wound margins or the distances from the *initial wound margin* to the *wound margin* to be different because of adaptive growth stimulated by differential loading along the stem in compression, tension or torsion. Where margins are of a similar width and depth they are usually equally loaded or may both be neutrally loaded.

As the wound wood margins grow across the wound face from the point of initial wounding a general differentiation in the colour of bark and its texture from surrounding unwounded tissue will usually indicate the extent of the width of the wound and the *initial wound margin*. However this may become less apparent over time with wounds that have been *occluded* for long periods due to the successive growth increments added sometimes concealing the wound entirely, or on trees with thick bark.

It is understood that most wounds initiated by Aboriginals would have been symmetrical in shape and generally in a location readily accessed due to the nature of the implements being extracted and the plentiful supply of suitable trees and the trees required to have been at a sufficient size at the time of the wounding to be suitable for selection. However, trees used as markers may have wounds located higher on the trunk and not readily accessible from the ground allowing it to be visible from a greater distance.

In measuring the width of the wound between the left and right *initial wound margin* the diameter of the trunk at the time of wounding and the approximate age of the tree can be estimated. The location of a wound on a trunk is static although the diameter of the stem is increased circumferentially by rings as growth increments, hence the wound margins and wound occlusion. The circumference of the trunk and stems of large old trees increases with age and the layers may be slightly thinner over a radial distance where such growth has slowed, than for younger trees.

Therefore the formation of asymmetrical wounds in positions not readily accessed on trees that would have been too small to be selected at the time when the Aboriginals were present in the area and living a more traditional life style or were likely to have arisen after that time can generally be discounted. The trees in the area are expected to grow at a relatively medium pace due to an average rainfall of 722.3 mm as mean average annual rainfall recorded at the nearby Singleton Army Base, collected from 1969-1990, Latitude: 32.61 °S Longitude: 151.17 °E, Elevation: 73 m (Australian Government Bureau of Meteorology 2009), approximately 20 km away.

Tree 1 appears to have developed in a forest with a slight lean to south away from another tree, no longer evident, with stem flattening on the tension wood side and buttress roots indicative of a taller tree in a forest environment. The tree is expected to have had a codominant crown form indicative of the influence of a larger tree to the north. The tree was mature when marked with a surveyor's blaze to west on its lower trunk in 1885 and at that time expected to be approximately 150 years old, predating European colonisation. The wound is not expected to be a re-used pre-existing wound as the wood that has grown around the trunk since wounding has delaminated from the trunk forming a separating void in a single continuous layer able to be viewed across the pruning wound of the trunk, with no previous separating layers beneath.

On Tree 1 other than the primary large wound a minor wound was evident on the north side of the lower trunk in the *interbuttress zone* expected to be almost as old as the surveyor's blaze but unable to determine whether of Aboriginal origin and not considered further by this report.

Tree 2 appears to have developed in a forest with the trunk straight extending to approximately 6 m with a long linear basal wound evident on the north side of the trunk facing a slight grade upslope along the creek bank. The wound shows minimal weathering across the wound face but is likely to be of Aboriginal origin. No other large trees or stumps of such trees are proximate to indicate an abrasion impact event from a collapse or failure or from felling. The wound appears to be too large to have derived from a branch tear wound and the wound face appears uniformly convex distally, further supporting this view.

The crown was derived from the dominant upright stem and an inferior first order structural branch (FOSB) that most likely originated from a basal epicormic shoot, from a stress event, to south and has grown to form an upright secondary stem with a wound forming from a branch bark inclusion where the interface of the trunk and branch have flattened forming a non-grafted union. The non-grafted union later opening when the inferior FOSB became divergent and descending, most likely under its own increasing mass and possibly contributed to by the force of a lightning strike.

Anecdotal evidence indicates that lightening activity is known to be common in the locality of this tree and the localised fire damage is consistent with such damage. The interface of the non-grafted union has been affected by fire with charcoal evident and continuing along the seam of the remaining branch bark inclusion on the west side of the lower trunk. Such non–grafted unions often accumulate moisture and leaf litter at their interface with humus developing over time. In the mid crown to east a dead branch with diameter 150 mm approx and a fine linear lesion appears to connect along the trunk to the non-grafted union and is the likely path of the energy from a lightning strike following the accumulated moist material at the interface of the trunk and inferior FOSB resulting in the localised fire which has charcoal concentrated and restricted to this area.

To differentiate between Aboriginal *cultural scarring*, historical scarring, recent mechanical damage or natural causes, the following were considered:

1. Age class
2. Ease of access to the location of wounding
3. Tree and its dimensions at the time of wounding
4. Extent of wounding, its symmetry (symmetrical / asymmetrical)
5. Extent of growth around wound site since initial wounding whether tree alive/dead
6. Impact of that wounding on the tree since the wounding event
7. Land use history
8. Condition class
9. Vigour class
10. Influence of its growing environment and its constraints
11. Proximity to other trees, shape and growth habit
12. Crown form
13. Shading
14. Rainfall
15. Insect damage
16. Fire
17. Soil
18. Aspect
19. Slope
20. Drainage

This Arboricultural assessment will assist archaeologists and Aboriginal community members determine the status of Aboriginal scarred trees and to manage the tree, through eliminating natural or mechanical causes of wounding and determining the estimated remaining safe life span or works to prolong a live tree *in situ* or to conserve and protect the remaining dead tree or relevant section/s where required.

4.0 TREE ASSESSMENT

4.1 Assessment of Tree/s – Tree 1

Tree No. / ***Genus & species*** **Common Name**	**Age Class** **Y** = Young **M** = Mature **O** = Over-mature (Senescent) / **Age range of tree** in yrs. approx. / **Age range of wound** in yrs. approx.	**Condition** **G** = Good **F** = Fair **P** = Poor **D** = Dead	**Form** **D** = Dominant **C** = Co-dominant **I** = Intermediate **S** = Suppressed **F** = Forest **E** = Emergent	**Height** in metres approx. / **Crown spread** approx. length x breadth metres / **Crown spread orientation.**	**Trunk diameter** in mm @ 1.4m, or as stated / **Trunk diameter orientation.**	**Crown cover / Crown density** approx. %	**SRIV** Age, Vigour, Condition / Index Rating App A.
1. ***Eucalyptus paniculata*** Smith **Grey Ironbark**	M (when died) >250 – <275 1. 124	D	C	N/A N/A E/W?	570 R	N/A N/A	N/A

Description

Dead stump to 1730 mm, cut with a chainsaw 40 - 65 years ago. Use of chainsaw evident by the thickness of overlapping cutting edges ≤10 mm. 5 first order roots (FOR) as buttresses were evident, radially distributed around the trunk. The tree had grown between a ring of 4 small sandstone rocks that touched its trunk on all sides, were flat and slightly proud of the ground surface, and the tree possibly chosen as these features would improve its visibility inhibiting the growth of vegetation around its trunk. A small section of bark remained on the northeast buttress with characteristics indicative of *Eucalyptus paniculata* – Grey Ironbark, commonly occurring in the area and bark typically comprised of many fine flakey layers evident in profile. The wound examined was evident on the W side of the trunk and was a surveyor's blaze. A second wound occurred in the interbuttress zone on the lower trunk to north between two FOR growing to N and NE and was roughly circular, approximately 200 mm diameter located approximately 300 mm above ground however its origin was unable to be determined.

Wound 1

Ovate to elliptical, symmetrical, truncated distally at 1730 mm, located on W side of trunk. Wound extending from 500 - 1730 mm and 450 mm at widest at 1300 mm. Wound face extending 500 – 1730 mm where truncated at top of stump (see Photograph 1.0). Remaining wound margins entire. Depth of margins: right 50 mm and left 40 mm. Apex absent, base acute with partial occlusion seam. Wound face entire to dead sapwood with carved figures distally, consistent with a surveyor's blaze. The blaze showed an upwardly pointing arrow with 2 separate blades converging at the apex at an acute angle and a separate pointed symmetrical stem, distally. Below the arrow were the weathered numbers '85' with some sections obscured by small connecting sections being sloughed away. Proximally, a stepped incision was evident from 850 mm. Initial wound base was truncate, near horizontal at 850 mm, expected to be created by incisions below the *stepped incision* (see Photograph 2.0). Wound face weathered with delignification, localized sections of delamination and sloughing assisted by fungal decay. Initial wound margins right and left unable to be determined.

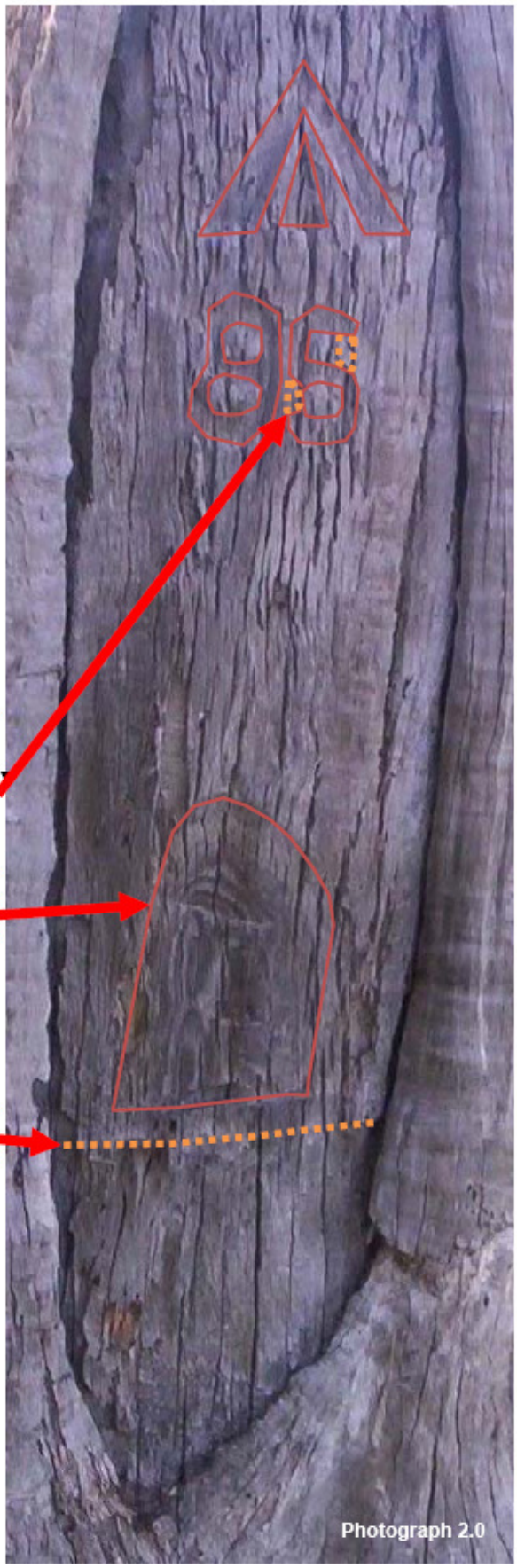
Initial wound is expected to have affected approximately 15 - <20% of trunk circumference *in situ*. The tree is expected to have been approximately 150 years old when wounded in 1885 and continued to grow for 50 - <75 years making it >250 - <275 years old, estimated to have died between 1935-1960 and cut down to a stump only after it died within approximately the last 40-65 years since the introduction of light weight chainsaws into Australia post 1945, and the seemingly gradual rate of weathering of wood across the pruning wound and exposed radial trunk section. Also the height of the stump is indicative of an attempt by the cutter to preserve the blaze.

Wood formed as incomplete growth rings after wounding, evident as wound margins, have delaminated as a single continuous mass separated by a void from the trunk at time of wounding, evident distally at the pruning wound on the trunk. The continuous mass of wood after wounding and no previous separating rings further within the tree indicates the wound was new and did not re-use a previous wound of Aboriginal or other origin. When the surveyor's blaze was made in 1885 the tree was estimated to be 150 years old with the wound not Aboriginal in origin.

Risks to tree

Damage from fire, fungal decay, and physical damage from abrasion or collision impact events as relict remains containing the artifact become increasingly fragile as weathering continues.

Photograph 1.0 View to east of Tree 1 ***Eucalyptus paniculata*** Smith – **Grey Ironbark**, stump showing blaze, with arrow (top), '85' (below), stepped incision (lower center) and initial truncate wound base (below).



Photograph 2.0 View to east showing Photograph 1.0 (detail) with the figures and stepped incision outlined and initial wound base shown dotted. The wound face below the initial wound base indicates the extent of dieback in response to wounding with margins showing new growth that formed after wounding and dieback had stopped.

Wound face extensively weathered by delignification, delamination and fungal activity.

4.1 Assessment of Tree/s – Tree 2

Tree No. / ***Genus & species*** **Common Name**	**Age Class** **Y** = Young **M** = Mature **O** = Over-mature (Senescent) / **Age range of tree** in yrs. approx. / **Age range of wound** in yrs. approx.	**Condition** **G** = Good **F** = Fair **P** = Poor **D** = Dead	**Form** **D** = Dominant **C** = Co-dominant **I** = Intermediate **S** = Suppressed **F** = Forest **E** = Emergent	**Height** in metres approx. / **Crown spread** approx. length x breadth metres / **Crown spread orientation.**	**Trunk diameter** in mm @ 1.4m, or as stated / **Trunk diameter orientation.**	**Crown cover / Crown density** approx. %	**SRIV** Age, Vigour, Condition / Index Rating App A.
2. ***Eucalyptus paniculata*** Smith **Grey Ironbark**	O 200 – <275 1. >150 - <200	F	D	21 12x12 Radial	950x700, 825 AV E/W	80 85	MGVG - 9

Description

Acaulescent, deliquescent, crown comprised of 2 co-dominant first order structural branches (FOSB); orientation N/S; 1 superior to N, formed by the trunk, erect; 1 inferior to S, basal, acutely divergent and ascending; supporting approximately 60% and 40% of the live crown, respectively. Branch bark included in the crotches of the unions of the first order structural branches (FOSB). Tree appeared to be structurally deteriorated but stable with the wound of a non-grafted union between the trunk and inferior FOSB to south, with both stem surfaces flattened at the interface but the inferior FOSB has become divergent and the interface is exposed with some charcoal evident from an expected lightning strike event. The tree has high volume large deadwood in the mid-upper crown. A dead branch in the lower crown to E is connected by a fine lesion to the interface of the non-grafted union along the trunk and is the likely path of force flow of a lightning strike into and around the interface of the non-grafted union where moisture, leaf litter and humus can be expected to have accumulated. The lightning event is expected to have caused the non-grafted union to explode and catch fire. The charcoal was mainly evident in and around the interface of the non-grafted union, and seams of the branch bark inclusion, where the lightning travelled dissipating into the ground (see Photographs 6.0 and 7.0). The diameter of the basal inferior FOSB to S was 470x600 mm, therefore 535 mm average, orientation E/W. The growth of this branch when added to the diameter of the trunk assisted to formulate the approximate age of the tree.

The trunk has a large basal wound to N and its left margin is a narrow *increment strip* where it also forms the right margin at the interface of the non-grafted union (see Photograph 7.0).

Wound 1

Linear, narrow lanceolate, symmetrical, basal, located on N side of trunk extending from ground to 3500 mm and 560 mm at widest at 1600 mm and 350 mm wide at base (see Photographs 3.0 and 4.0) Initial wound margins obscured. Margins entire save for base which was absent. Depth of margins: right 160 mm and left 150 mm. Apex acute, base absent. Wound face entire to dead sapwood with minimal weathering, save for charcoal and superficial shallow fire damage proximally to 300 mm. Initial wound margins right and left unable to be determined.

Initial wound is expected to have affected approximately 40% of trunk circumference *in situ*. The wound is expected to be >150 - <200 years old. From the age of the tree, large proportions of the initial wound, depth of its margins and its location in a readily accessible position on the trunk with no abrasion wounds as striations from a falling tree, concave sections of the wound face from a branch tear wound, delamination from collision with a motor vehicle, minimal fire damage and closeness to a gentle slope on the upper bank of a stream in a position easily viewed for a fair distance; the wound is likely to be that of a marker and Aboriginal in origin.

Risks to tree

The growing environment of the tree above and below ground for viability and stability from disturbance. The tree will require a tree protection zone with a setback radius of 10 m from the center of trunk.

Photograph 3.0 View to south of Tree 2 ***Eucalyptus paniculata*** Smith – **Grey Ironbark**, showing basal trunk wound on north side of trunk.

Photograph 4.0 View to south southeast of Tree 1, showing basal trunk wound with deep wound margins, entire wound face with superficial fire damage with charcoal proximally. Wound face shows strong resistance to weathering. Wound margin left forms an *increment strip* as the left margin of the basal trunk wound and right margin of the interface of the non-grafted union.

Orange area at base of right wound margin is an extension of a buttress root with new adaptive wood and new bark before discoloration and darkening after impregnation with kino and tannins as it ages.

Photograph 6.0 View to southeast of Tree 2, showing branch bark inclusion and arrow showing charcoal around the right margin of the interface of the non-grafted union with the trunk (left) and basal inferior first order structural branch to south (center right).

Photograph 5.0 View to southwest of Tree 2 ***Eucalyptus paniculata*** Smith – **Grey Ironbark**, showing basal trunk wound on north side and basal inferior first order structural branch to south (center left).

Photograph 7.0 View to southwest of Tree 2, showing Photograph 5.0 (detail) with wound margin left and charcoal around the margins of the interface of the non-grafted union of the basal inferior first order structural branch to south (center right) and trunk (right) showing an *increment strip* as the left margin of the basal trunk wound and right margin of the interface of the non-grafted union.

5.0 CONCLUSION

This is provided in table form and summarizes the key information

Tree No.	Age of Tree **Age range of tree** in yrs. approx.	Age of Scar **Age range of wound** in yrs. approx.	Likely cause of Scar
1	>200 - <225 (when died 1930-1960c.)	1) 124	1) Incision from surveyor's blaze dated 1885 and not expected to be a reworking of a wound of Aboriginal origin.
2	200 - <275	1) >150 - <200	1) Incision or laceration likely to be of Aboriginal origin.

5.1 The wound on Tree 1 is not of Aboriginal origin however the wound on Tree 2 is highly likely to be of Aboriginal origin as a marker tree along the gentle grade of the creek line and should be preserved *in situ*.

6.0 RECOMMENDATIONS

6.1 Tree 1, Wound 1, should be preserved *in situ* for as long as possible and protected by fencing to restrict access.

6.2 Tree 2, Wound 1 should be preserved *in situ* for as long as possible within a 10 m radial exclusion zone to sustain its growing environment above and below ground, for its viability and stability and protected by fencing to restrict access.

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Appendix A

Matrix - Sustainable Retention Index Value (S.R.I.V.)©

Version 3, 2009
Developed by IACA – Institute of Australian Consulting Arboriculturists www.iaca.org.au

To be used with the values defined in the Glossary.
An Index value as indicated where ten (10) is the highest value.

Age Class	Vigour Class and Condition Class					
	Good Vigour & Good Condition (GVG)	Good Vigour & Fair Condition (GVF)	Good Vigour & Poor Condition (GVP)	Low Vigour & Good Condition (LVG)	Low Vigour & Fair Condition (LVF)	Low Vigour & Poor Condition (LVP)
	Able to be retained if sufficient space available above and below ground for future growth. No remedial work or improvement to growing environment required. May be subject to high vigour. Retention potential - Medium – Long Term.	Able to be retained if sufficient space available above and below ground for future growth. Remedial work may be required or improvement to growing environment may assist. Retention potential - Medium Term. Potential for longer with remediation or favourable environmental conditions.	Able to be retained if sufficient space available above and below ground for future growth. Remedial work unlikely to assist condition, improvement to growing environment may assist. Retention potential - Short Term. Potential for longer with remediation or favourable environmental conditions.	May be able to be retained if sufficient space available above and below ground for future growth. No remedial work required, but improvement to growing environment may assist vigour. Retention potential - Short Term. Potential for longer with remediation or favourable environmental conditions.	May be able to be retained if sufficient space available above and below ground for future growth. Remedial work or improvement to growing environment may assist condition and vigour. Retention potential - Short Term. Potential for longer with remediation or favourable environmental conditions.	Unlikely to be able to be retained if sufficient space available above and below ground for future growth. Remedial work or improvement to growing environment unlikely to assist condition or vigour. Retention potential - Likely to be removed immediately or retained for Short Term. Potential for longer with remediation or favourable environmental conditions.
Young (Y)	**Index Value 9** Retention potential - Long Term. Likely to provide minimal contribution to local amenity if height <5m. High potential for future growth and adaptability. Retain, move or replace.	**Index Value 8** Retention potential - Short – Medium Term. Potential for longer with improved growing conditions. Likely to provide minimal contribution to local amenity if height <5m. Medium-high potential for future growth and adaptability. Retain, move or replace.	**Index Value 5** Retention potential - Short Term. Potential for longer with improved growing conditions. Likely to provide minimal contribution to local amenity if height <5m. Low-medium potential for future growth and adaptability. Retain, move or replace.	**Index Value 4** Retention potential - Short Term. Potential for longer with improved growing conditions. Likely to provide minimal contribution to local amenity if height <5m. Medium potential for future growth and adaptability. Retain, move or replace.	**Index Value 3** Retention potential - Short Term. Potential for longer with improved growing conditions. Likely to provide minimal contribution to local amenity if height <5m. Low-medium potential for future growth and adaptability. Retain, move or replace.	**Index Value 1** Retention potential - Likely to be removed immediately or retained for Short Term. Likely to provide minimal contribution to local amenity if height <5m. Low potential for future growth and adaptability.
Mature (M)	**Index Value 10** Retention potential - Medium - Long Term.	**Index Value 9** Retention potential - Medium Term. Potential for longer with improved growing conditions.	**Index Value 6** Retention potential - Short Term. Potential for longer with improved growing conditions.	**Index Value 5** Retention potential - Short Term. Potential for longer with improved growing conditions.	**Index Value 4** Retention potential - Short Term. Potential for longer with improved growing conditions.	**Index Value 2** Retention potential - Likely to be removed immediately or retained for Short Term.
Over-mature (O)	**Index Value 6** Retention potential - Medium - Long Term.	**Index Value 5** Retention potential - Medium Term.	**Index Value 4** Retention potential - Short Term.	**Index Value 3** Retention potential - Short Term. Potential for longer with improved growing conditions.	**Index Value 2** Retention potential - Short Term.	**Index Value 0** Retention potential - Likely to be removed immediately or retained for Short Term.

Appendix B

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Appendix C

Glossary

From
Dictionary for Managing Trees in Urban Environments
Institute of Australian Consulting Arboriculturists (IACA) 2009.

Wounds

Abrasion Wound *Mechanical wound* causing *laceration* of tissue by an abrasive impact *episode* e.g. grazed by a motor vehicle or the continuous action of the rubbing of *crossed branches* or stems where no graft has formed.

Basal Trunk Wound A wound on the trunk extending to the *root crown* where the base of the wound is open at the ground and usually truncated. Dependant upon the width of its base such a wound may not become *occluded*.

Blaze A wound cut into a tree usually to the sapwood and sometimes extending to heartwood to create a marker point e.g. by a surveyor, the *wound face* may be further incised or painted to denote additional information.

Branch Tear *See Branch Tear Out.*

Branch Tear Out Dislodging of a branch from its point of attachment where it is torn away from the *branch collar* snapping the *branch tail* causing a *laceration*, usually to the underside of the *branch union* of the branch or trunk to which it was attached forming a *tear out wound*.

Branch Tear Wound *See Tear Out Wound.*

Callus Wood Undifferentiated and unlignified wood that forms initially after wounding around the margins of a wound separating damaged existing wood from the later forming lignified wood or *wound wood*.

Canker A *wound* created by repeated localised killing of the *vascular cambium* and bark by wood *decay* fungi and bacterium usually marked by concentric disfiguration. The wound may appear as a depression as each successive *growth increment* develops around the *lesion* forming a *wound margin* (Shigo 1991, p. 140, Keane *et al* 2000, p. 332).

Cavity A usually shallow void often localized initiated by a *wound* and subsequent *decay* within the trunk, branches or roots, or beneath bark, and may be enclosed or have one or more opening.

Decay Process of degradation of wood by microorganisms (Australian Standard 2007, p. 6) and fungus.

Delaminate A *mechanical wound* caused when the bark is stripped from a tree, usually from the trunk as a continuous sheet back to the vascular cambium. This may occur from an impact or abrasion *episode* such as a collision with a motor vehicle and the tree may become *ringbarked*. See also *Partially Delaminated*.

Delamination The separation of fibres often evident as longitudinal splitting of wood (Lonsdale 1999, p. 313).

Delignification The decomposition of *lignin* from *wood* by chemical deterioration, resulting in loss of strength, evident by separation of fibres into hair like strands. See also *Lignification*.

Depth of Margin Distance from outer trunk perpendicular to the *wound face*. This may assist in determining the age of a wound.

Dieback Wound Wounding where *dieback* extends beyond a branch collar as with *natural pruning* and extends to other branches, trunk or roots. See also *Secondary Crown* and *Stag-headed*.

Enclosed Wound Wound with a perimeter of *wound wood* with a well-defined apex, base and margins and often evident on an older wound. On a pruned branch that is rounded the enclosing wound wood from the branch collar may be circular with no definite apex or base evident. However, on a pruned branch where the *wound face* is oval in shape due to *reaction wood*, the enclosing *wound wood* from the branch collar may form a definite apex, base or margins.

Environmental Wounding/Damage Wounding inflicted by environmental factors or modifications to the growing *environment* of a tree, e.g. sun-scald, drought, fire, water logging, wind damage to leaves, branches, bark or roots, phytotoxic damage from chemicals, or air, soil or water pollution.

Fire Wound Wounding caused by fire. Such wounds may cause initial damage or may be secondary from a previous wounding *episode*/s. Some fire damage may be superficial or may destroy a tree in full or part rendering it potentially vulnerable to failure. Note: fire damaged trees can be potentially hazardous and should be assessed carefully.

Hollow A large void initiated by a *wound* forming a *cavity* in the trunk, branches or roots and usually increased over time by *decay* or other contributing factors, e.g. fire, or fauna such as birds or insects e.g. ants or termites. A hollow can be categorized as an *Ascending Hollow* or a *Descending Hollow*.

Horizontal Wound Usually superficial horizontal wounding from insects burrowing between bark layers and revealed by decorticating bark. Often evident on smooth bark Eucalypts.

Impact Wound *Mechanical wound* caused by an impact *episode* e.g. collision by a motor vehicle.
Incision Wound caused by cutting or engraving. See also *Laceration*.

Increment strip A linear, usually narrow, *fluted* section of *adaptive wood,* forming in a place of high *stress* indicating the pattern of *force flow* (Mattheck 2004, p. 140). Evident as lighter coloured bark usually occurring around the edges of a *notch* or *branch stub*, along a *buttress*, or along a *sharp-edged rib*.

Initial Wound Margin The site of initial wounding often evident as a faint line of discoloured bark or bark of a different texture to adjacent undamaged trunk. This may assist in determining the age of a wound.

Insect Wound Wounding to any part of a tree caused by insect activity, e.g. borers and termites.

Laceration Wound caused by tearing. See also *Incision*.

Lightning Strike Wound A wound from a lightning strike. Such a wound may kill a tree outright or cause it to catch fire, or may destroy the tree in full or part, or no injury may be evident and a tree gradually declines through resulting *stress*. Bark may be exploded from the tree by pressure radiating from the core of the lightning path resulting in further compounded damage through water heating and steam explosions in the tissues and the electrical disruption of living cells (Coder 2004, pp. 35-44).

Mechanical Wound Wounding inflicted by abrasion e.g. by motor vehicles, grass mowing equipment, grazing by horses, cows or birds (parrots); impact e.g. by motor vehicle collisions; drilling e.g. with increment cores, resistographs, cable bracing, hanging pots, hammocks etc.; branch tearing e.g. from wind damage, collision from falling branches, vandalism; and root severance e.g. root pruning for excavation for building or utility services or for agricultural cultivation.

Open Wound Wound with poor to non-existent perimeter or *callus wood* or *wound wood* on an older wound without well-defined apex, base or margins and often this will be associated with a recent wounding *episode* or an older episode on a senescent tree or a tree in *poor condition* or of *low vigour*, or where repeated wounding episodes such as inflicted by ongoing borer activity damages and continually alters wound perimeters, or repeated scalping of exposed roots by lawn mowing equipment.

Occlusion Growth processes where *wound wood* develops to enclose the *wound face* by the merging of *wound margins* concealing the *wound* and restoring the growing surface of the structure with each *growth increment* gradually realigning *fibres* in the wood longitudinally along the stem to maximise uniform stress loading. See also *Axiom of Uniform Stress*.

Partial Occlusion *Wound wood* growth that encloses some of the *wound face* by the merging and *grafting* of some sections of the *wound margins*. Usually evident by reduced *wound face* width and indicated where an *apex* or *base* is *acute* with the vertical extent often indicated by the length of an *occlusion seam*.

Partially Bridged Occlusion *Wound wood* partly forming an *occlusion* by joining areas of the *wound margins* across the *wound face* at point/s other than the base or apex and may form an *occlusion seam*.

Pruning Wound A wound created by the act of *pruning*.

Ram's Horning *Wound wood* that becomes curled inward and can wrap around itself as it crosses a void such as a *cavity* and may succumb to cracking with those wounds susceptible to further infestation by *decay* pathogens.

Scar Tree A tree containing a wound of cultural or scientific interest, inflicted initially for a specific purpose, e.g. by indigenous people to extract implements or carved as a marker or with a pattern for ceremonial purposes, or as a marker and *blaze* by a surveyor or explorer, or from an accidental *wound* that has not *occluded*.

Stepped Incision A localised area of deeper wounding often extending to the heartwood, usually proximally within a *blaze*, removing a vertical semi-circular wedge like section from the *wound face* with a horizontal bench like structure formed by deep cuts as its base. Such wound sections usually taper distally and may be cut around the outer edges to assist removal of the semi-circular wedge, and likely undertaken to inhibit regrowth.

Structural Wound Any wound occurring on a tree as a result of a structural failure e.g. branch splitting or *hazard beam*, diminishing its stability in full or part.

Succession Wound Preceding layers of failed wound margin/s forming a step like sequence away from the *wound face*, where present, to the current wound margin/s indicating repeated cycles of formation and failure of *CODIT Wall 4*.

Sun Scald Wounding Wounding usually on the upper side of branches after sudden exposure to sunlight especially in summer e.g. after excessive pruning of the upper crown, or following storm damage stripping foliage or branches e.g. *Ficus spp.*

Survey Marker Wound *See Blaze.*

Tear Out *See Branch Tear Out.*

Tear Out Wound A wound of usually concave shape created by a *branch tear out*.

Wound Damage inflicted upon a tree through injury to its living cells, from biotic or abiotic causes, e.g. where *vascular cambium* has been damaged by branch breakage, impact or insect attack. Some wounds *decay* and cause *structural deterioration* or *defects*. Trees of *normal vigour* are able to resist and contain infection by walling off areas within the wood by *compartmentalization*. See *Compartmentalization Of Decay In Trees (CODIT)*. An *occlusion* may eventually conceal a wound but the enclosed *defect* remains internally and *decay* may continue to develop further weakening the *heartwood* and *sapwood* compromising the tree's *structural integrity*. The cause of a wound may be accidental e.g. *branch tear out* or deliberate e.g. *carved tree*.

Wound Apex The distal end of a wound. The shape may be acute, irregular, jagged, obtuse, rounded, or truncate.

Wound Apex Acute Apex of a wound that is tapering and the *occlusion* interface angle is less than $<90^{o}$.

Wound Apex Irregular The *wound wood* growth at the apex mostly interrupted forming an edge that is not uniform or jagged. Often this may be influenced by a *successional wound* resulting in disproportionate development of *callous wood* and *wound wood*.

Wound Apex Jagged The *wound wood* growth or tissue damaged initially at the apex that is uneven and likely to have been caused by laceration.

Wound Apex Obtuse Apex of a wound that is tapering and the *occlusion* interface angle is greater than $>90^{o}$.

Wound Apex Rounded The *wound wood* growth at the apex that is curved.

Wound Apex Truncate The *wound wood* growth or tissue damaged initially at the apex that is even and likely to have been caused by incision.

Wound Base The proximal end of a wound. The shape may be acute, irregular, jagged, obtuse, rounded, or truncate.

Wound Base Acute Base of wound that is tapering and the *occlusion* interface angle is less than <90°.

Wound Base Irregular The *wound wood* growth at the base mostly interrupted forming an edge that is not uniform or jagged. Often this may be influenced by a *successional wound* resulting in disproportionate development of *callous wood* and *wound wood.*

Wound Base Jagged The *wound wood* growth or tissue damaged initially at the base that is uneven and likely to have been caused by laceration.

Wound Base Obtuse Base of wound that is tapering and the *occlusion* interface angle is greater than >90°.

Wound Base Rounded The *wound wood* growth at the base that is curved.

Wound Base Truncate The *wound wood* growth or tissue damaged initially at the base that is even and likely to have been caused by incision.

Wound Face Surface area of tissue exposed by injury, e.g. bark, sapwood, heartwood.

Wound Face Cracks Horizontal Transverse cracks in a *wound face* indicative of failure from *tension* force (Mattheck & Breloer 1994, p. 183).

Wound Face Cracks Vertical Longitudinal cracks in a *wound face* indicative of failure from *compression* force (Mattheck & Breloer 1994, p. 183).

Wound Face Entire Surface of exposed tissue is uniform without damage extending to a different layer or unaffected by borers or decay, e.g. possibly described as *wound face* entire to dead sapwood.

Wound Face Incomplete Surface of exposed tissue is not uniform with damage extending to different layers or affected by borers or decay, e.g. possibly described as *wound face incomplete* with cavity at apex. See also *Wound face entire*.

Wound Face Exposed Heartwood Wound extending to reveal the *heartwood*, or has deteriorated through *decay* to reveal this layer of wood.

Wound Face Exposed Sapwood Wound extending to reveal the sapwood, or has deteriorated through *decay* to reveal this layer of wood.

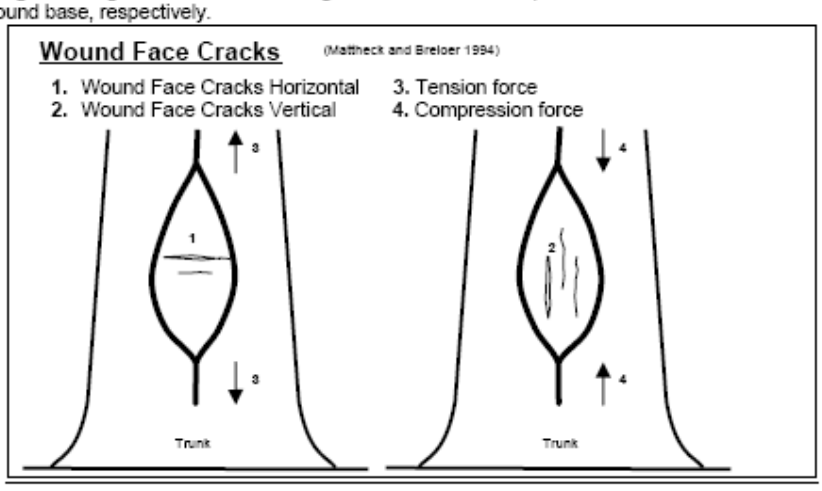
Wound Margin The left and right sides of a *wound* as bound by the alignment of fibres along a stem or root longitudinally, being either the remaining undamaged living cells and new *callus wood* and *wound wood* on older wounds. Here the fibres are usually formed from *meristematic* cells. A wound margin may be circular on a *pruning wound* or form around the perimeter of a *canker*.

Wound Margin Entire The *wound wood* growth in the margin is mostly uninterrupted forming a uniform edge.

Wound Margin Irregular The *wound wood* growth in the margin is mostly interrupted and forms an edge that is not uniform e.g. where repeated wounding *episodes* such as inflicted by ongoing borer activity damages and continually alters the *wound perimeter* with *callus wood* and *wound wood*. See also *Successional Wound*.

Wound Margin Left The left side of a wound margin when the distal and proximal ends of the wound is known, to determine the *wound apex* and *wound base*, respectively.

Wound Margin Right The right side of a wound margin when the distal and proximal end of the wound is known, to determine the *wound apex* and wound base, respectively.



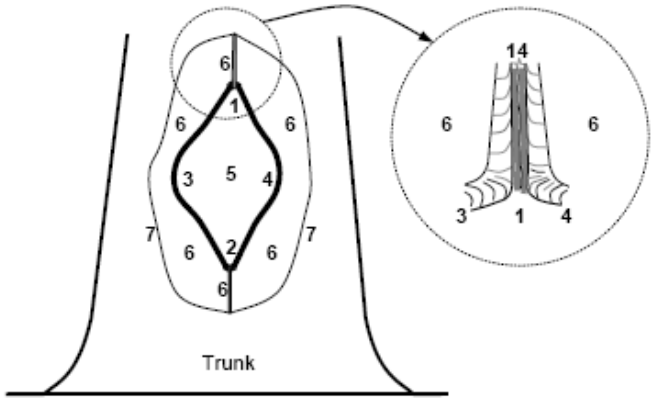
Wound Margin Width Distance from *wound margin* to the site of initial wounding. Where evident the *initial wound margin* may be identified by discoloured bark or bark of a different texture to adjacent undamaged trunk. This may also assist in determining the age of a wound.

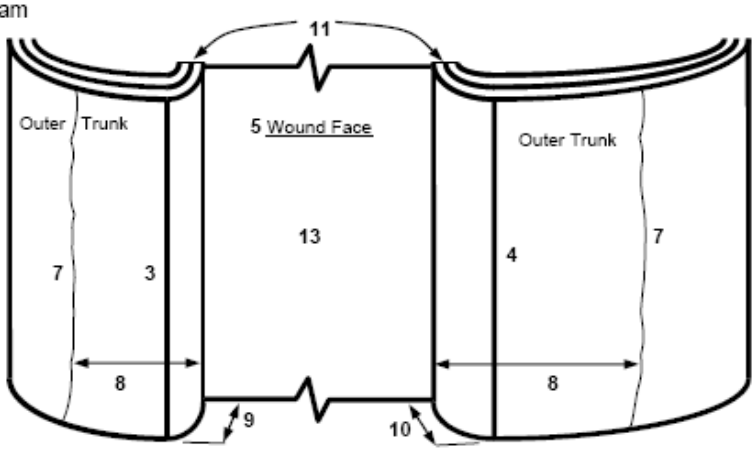
Wound Wood Aged *callus wood* around the margins of a wound that becomes differentiated to form *CODIT Wall 4* producing new lignified wood. This wood may grow to surround a wound and may eventually develop to enclose the wound by *occlusion*.

Wound Diagrams

Wound Parts

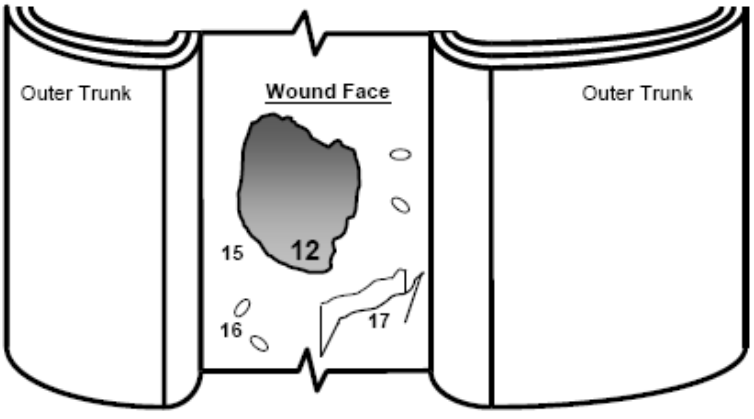
1. Apex
2. Base
3. Wound Margin Left
4. Wound Margin Right
5. Wound Face
6. Partial Occlusion
7. Initial Wound Margin
8. Margin Width
9. Left Margin Depth
10. Right Margin Depth
11. Wound Wood
12. Cavity
13. Wound Face Entire
14. Occlusion Seam





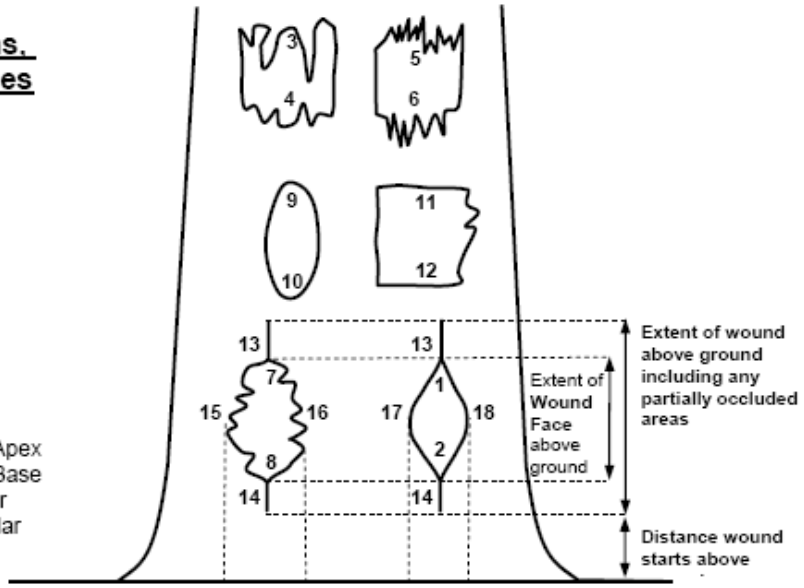
Examples of other Wound Faces

15. Wound face extending from dead sapwood to cavity in heartwood.
16. Oval shaped borer exit holes evident indicative of Longicorn Borer (Family Cerambycidae).
17. Linear laceration as made by an axe.



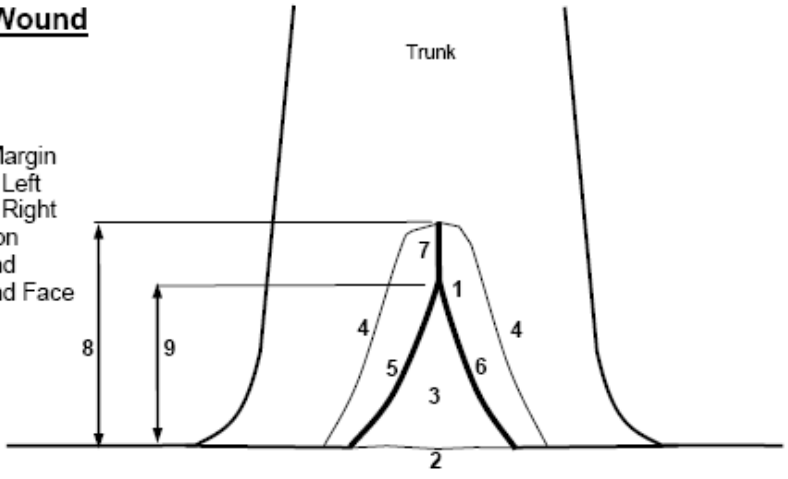
Wounds, Margins, Apexes and Bases

1. Apex Acute
2. Base Acute
3. Apex Irregular
4. Base Irregular
5. Apex Jagged
6. Base Jagged
7. Apex Obtuse
8. Base Obtuse
9. Apex Rounded
10. Base Rounded
11. Apex Truncate
12. Base Truncate
13. Partially Occluded Apex
14. Partially Occluded Base
15. Left Margin Irregular
16. Right Margin Irregular
17. Left Margin Entire
18. Right Margin Entire



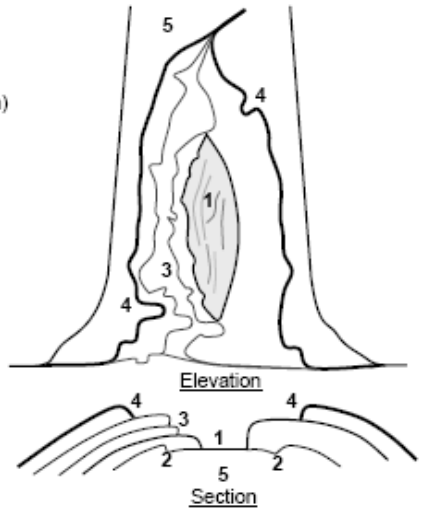
Basal Trunk Wound

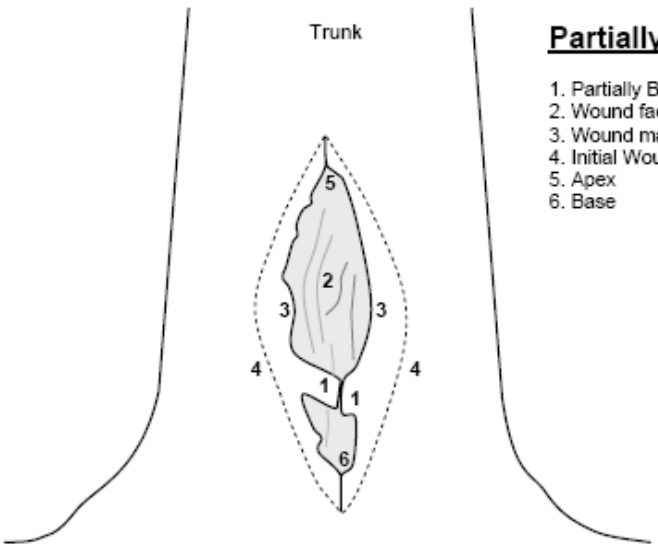
1. Apex
2. Base
3. Wound Face
4. Initial Wound Margin
5. Wound Margin Left
6. Wound Margin Right
7. Partial Occlusion
8. Extent of Wound
9. Extent of Wound Face



Successional Wound

1. Initial wound face
2. Initial wound margins (concealed when viewed in Elevation)
3. Successive wound margins
4. Wound margins (current)
5. Trunk





Partially Bridged Occlusion

1. Partially Bridged Occlusion
2. Wound face
3. Wound margins
4. Initial Wound Margins
5. Apex
6. Base

Condition of Trees

Condition A tree's *crown form* and growth habit, as modified by its *environment* (aspect, suppression by other trees, soils), the *stability* and *viability* of the *root plate*, trunk and structural branches (first (1st) and possibly second (2nd) order branches), including structural defects such as wounds, cavities or hollows, *crooked* trunk or weak trunk/branch junctions and the effects of predation by pests and diseases. These may not be directly connected with *vigour* and it is possible for a tree to be of *normal vigour* but in *poor condition*. Condition can be categorized as *Good Condition*, *Fair Condition*, *Poor Condition* and *Dead*.

Good Condition Tree is of good habit, with *crown form* not severely restricted for space and light, physically free from the adverse effects of *predation* by pests and diseases, obvious instability or structural weaknesses, fungal, bacterial or insect infestation and is expected to continue to live in much the same condition as at the time of inspection provided conditions around it for its basic survival do not alter greatly. This may be independent from, or contributed to by vigour. See also *Condition*, *Fair Condition* and *Poor Condition*.

Fair Condition Tree is of good habit or *misshapen*, a form not severely restricted for space and light, has some physical indication of *decline* due to the early effects of *predation* by pests and diseases, fungal, bacterial, or insect infestation, or has suffered physical injury to itself that may be contributing to instability or structural weaknesses, or is faltering due to the modification of the *environment* essential for its basic survival. Such a tree may recover with remedial works where appropriate, or without intervention may stabilise or improve over time, or in response to the implementation of beneficial changes to its local environment. This may be independent from, or contributed to by vigour. See also *Condition*, *Good Condition* and *Poor Condition*.

Poor Condition Tree is of good habit or *misshapen*, a form that may be severely restricted for space and light, exhibits symptoms of advanced and *irreversible decline* such as fungal, or bacterial infestation, major die-back in the branch and *foliage crown*, *structural deterioration* from insect damage e.g. termite infestation, or storm damage or lightning strike, ring barking from borer activity in the trunk, root damage or instability of the tree, or damage from physical wounding impacts or abrasion, or from altered local environmental conditions and has been unable to adapt to such changes and may decline further to death regardless of remedial works or other modifications to the local *environment* that would normally be sufficient to provide for its basic survival if in *good* to *fair* condition. Deterioration physically, often characterised by a gradual and continuous reduction in vigour but may be independent of a change in vigour, but characterised by a proportionate increase in susceptibility to, and *predation* by pests and diseases against which the tree cannot be sustained. Such conditions may also be evident in trees of advanced senescence due to normal phenological processes, without modifications to the growing environment or physical damage having been inflicted upon the tree. This may be independent from, or contributed to by vigour. See also *Condition*, *Good Condition* and *Fair Condition*.

Dead Tree is no longer capable of performing any of the following processes or is exhibiting any of the following symptoms;
Processes
Photosynthesis via its foliage crown (as indicated by the presence of moist, green or other coloured leaves);
Osmosis (the ability of the root system to take up water);
Turgidity (the ability of the plant to sustain moisture pressure in its cells);
Epicormic shoots or *epicormic strands* in Eucalypts (the production of new shoots as a response to stress, generated from latent or adventitious buds or from a *lignotuber*);
Symptoms
Permanent leaf loss;
Permanent wilting (the loss of turgidity which is marked by desiccation of stems leaves and roots);
Abscission of the *epidermis* (bark desiccates and peels off to the beginning of the sapwood).

Removed No longer present, or tree not able to be located or having been cut down and retained on a site, or having been taken away from a site prior to site inspection.

Periods of Time

Periods of Time The life span of a tree in the urban environment may often be reduced by the influences of encroachment and the dynamics of the environment and can be categorized as *Immediate*, *Short Term*, *Medium Term* and *Long Term*.

Immediate An *episode* or occurrence, likely to happen within a twenty-four (24) hour period, e.g. tree failure or collapse in full or part posing an imminent danger. See also *Short Term*, *Medium Term* and *Long Term*.

Short Term A period of time less than <1 – 15 years. See also *Periods of Time*, *Immediate*, *Medium Term* and *Long Term*.

Medium Term A period of time 15 – 40 years. See also *Periods of Time*, *Immediate*, *Short Term* and *Long Term*.

Long Term A period of time greater than >40 years. See also *Periods of Time*, *Immediate*, *Medium Term* and *Short Term*.

Vigour

Vigour Ability of a tree to sustain its life processes. This is independent of the *condition* of a tree but may impact upon it. Vigour can appear to alter rapidly with change of seasons (seasonality) e.g. *dormant*, deciduous or semi-deciduous trees. Vigour can be categorized as *Normal Vigour, High Vigour*, *Low Vigour* and *Dormant Tree Vigour*.

Normal Vigour Ability of a tree to maintain and sustain its life processes. This may be evident by the *typical* growth of leaves, *crown cover* and *crown density*, branches, roots and trunk and *resistance* to *predation*. This is independent of the *condition* of a tree but may impact upon it, and especially the ability of a tree to sustain itself against predation. See also *Vigour*, *Low Vigour* and *High Vigour*.

High Vigour *Accelerated growth* of a tree due to incidental or deliberate artificial changes to its growing *environment* that are seemingly beneficial, but may result in *premature aging* or failure if the favourable conditions cease, or promote *prolonged senescence* if the favourable conditions remain, e.g. water from a leaking pipe; water and nutrients from a leaking or disrupted sewer pipe; nutrients from animal waste, a tree growing next to a chicken coop, or a stock feed lot, or a regularly used stockyard; a tree subject to a stringent watering and fertilising program; or some trees may achieve an extended lifespan from continuous *pollarding* practices over the life of the tree.

Low Vigour Reduced ability of a tree to sustain its life processes. This may be evident by the *atypical* growth of leaves, reduced *crown cover* and reduced *crown density*, branches, roots and trunk, and a deterioration of their functions with reduced *resistance* to *predation*. This is independent of the *condition* of a tree but may impact upon it, and especially the ability of a tree to sustain itself against predation. See also *Vigour*, *Normal Vigour* and *High Vigour*.

Dormant Tree Vigour Determined by existing turgidity in lowest order branches in the outer extremity of the crown, with good bud set and formation, and where the last *extension growth* is distinct from those most recently preceding it, evident by bud scale scars. Normal vigour during dormancy is achieved when such growth is evident on a majority of branches throughout the crown.

Good Vigour See *Normal Vigour*.

Poor Vigour See *Low Vigour*.

Health A tree's *vigour* as exhibited by *crown density*, *crown cover*, leaf colour, presence of epicormic shoots ability to withstand *predation* by pests and diseases, *resistance* and the degree of *dieback*.

Age of Trees

Age Most trees have a stable biomass for the major proportion of their life. The estimation of the age of a tree is based on the knowledge of the expected lifespan of the taxa in situ divided into three distinct stages of measurable biomass, when the exact age of the tree from its date of cultivation or planting is unknown and can be categorized as *Young*, *Mature* and *Over-mature* (British Standards 1991, p. 13, Harris *et al*, 2004, p. 262).

Young Tree aged less than <20% of life expectancy, *in situ*. See also *Age*, *Mature* and *Over-mature*.

Mature Tree aged 20-80% of life expectancy, *in situ*. See also *Age*, *Young* and *Over-mature*.

Over-mature Tree aged greater than >80% of life expectancy, *in situ,* or *senescent* with or without reduced *vigour*, and declining gradually or rapidly but irreversibly to death. See also *Age*, *Young* and *Mature*.

Premature Aging Apparent hastened aging and deterioration of a tree where it has been subject to conditions or practices adverse to expected normal growth, resulting in a *spiral of decline*. The following are examples of processes that may start such cycles:

- Top lopping of a mature tree
- In a new car park, the excavation of soil severing the roots of a tree close to its trunk and then sealing the soil surface with asphalt or concrete up to the trunk
- Open trenching alongside a street tree severing all roots in the trench, then top lopping it for power line clearance, and then extensive damage to bark by abrasion by trucks and excavation equipment as tree is adjacent to a construction site
- Root damage from *soil compaction* to substantial areas of the root plate.

Prolonged Senescence A phenomenon in an *over-mature* tree or tree with *structural deterioration* in its *condition* and often *vigour* as *abnormal vigour* as a result of modifications to the tree or the growing environment essential for its survival where it is sustained beyond the *typical* extent of its life cycle, or prevented from failing in full or part from *structural deterioration* by a beneficial artificial modification to its growing environment either by deliberate or incidental intervention, e.g. water from a leaking tap, water and nutrients from a leaking sewer pipe creating a *hydroponic* environment, or by physically propping up a tree with *structural deterioration* as with a *veteran tree*, or by it *leaning* or growing against another tree or structure for support.

Axiom of Uniform Stress The principle that a tree is mechanically optimized growing only sufficient wood for support and loading. As a result, no area is under-loaded to breaking point or over-loaded with excess material (Mattheck & Breloer 1994, pp. 12-13).

Visual Tree Assessment (VTA) A visual inspection of a tree from the ground based on the principle that, when a tree exhibits apparently superfluous material in its shape, this represents repair structures to rectify *defects* or to reinforce weak areas in accordance with the *Axiom of Uniform Stress* (Mattheck & Breloer 1994, pp. 12-13, 145). Such assessments should only be undertaken by suitably competent practitioners.

Drop Zone The distance away from a tree that may be physically influenced by a falling branch.

Fall Zone The distance away from a tree that may be physically influenced if it was cut down or subject to *collapse*.

Leaning Trees

Leaning A tree where the *trunk* grows or moves away from upright. A lean may occur anywhere along the *trunk* influenced by a number of contributing factors e.g. genetically predetermined characteristics, competition for space or light, prevailing winds, aspect, slope, or other factors. A *leaning* tree may maintain a *static lean* or display an increasingly *progressive lean* over time and may be hazardous and prone to *failure* and *collapse*. The degrees of leaning can be categorized as *Slightly Leaning*, *Moderately Leaning*, *Severely Leaning* and *Critically Leaning*.

Slightly Leaning A leaning tree where the trunk is growing at an angle within 0^{o}-15^{o} from upright.

Moderately Leaning A leaning tree where the trunk is growing at an angle within 15^{o}-30^{o} from upright.

Severely Leaning A leaning tree where the trunk is growing at an angle within 30^{o}-45^{o} from upright.

Critically Leaning A leaning tree where the trunk is growing at an angle greater than $>45^{o}$ from upright.

Progressively Leaning A tree where the degree of *leaning* appears to be increasing over time.

Static Leaning A leaning tree whose lean appears to have stabilized over time.

Windthrow Tree failure and collapse when a *force* exerted by wind against the *crown* and *trunk* overcomes resistance to that force in the *root plate*, such that the *root plate* is lifted from the soil on one side as the tree tips over.

Symmetry

Symmetry Balance within a *crown,* or *root plate,* above or below the *axis* of the trunk of branch and foliage, and root distribution respectively and can be categorized as *Asymmetrical* and *Symmetrical*.

Asymmetrical Imbalance within a crown, where there is an uneven distribution of branches and the foliage *crown* or *root plate* around the vertical *axis* of the trunk. This may be due to *Crown Form Codominant* or *Crown From Suppressed* as a result of natural restrictions e.g. from buildings, or from competition for space and light with other trees, or from exposure to wind, or artificially caused by pruning for clearance of roads, buildings or power lines. An example of an expression of this may be, crown asymmetrical, bias to west. See also *Symmetrical* and *Symmetry*.

Symmetrical Balance within a crown, where there is an even distribution of branches and the *foliage crown* around the vertical *axis* of the trunk. This usually applies to trees of *Crown Form Dominant* or *Crown Form Forest*. An example of an expression of this may be crown symmetrical. See also *Symmetry* and *Asymmetrical*.

Crown Spread Orientation Direction of the *axis* of *crown spread* which can be categorized as *Orientation Radial* and *Orientation Non-radial*.

Crown Spread Orientation Non-radial Where the crown extent is longer than it is wide, e.g. east/west or E/W. Further examples, north/south or N/S, and may be *Crown Form Codominant*, e.g. **A** or **B**, *Crown Form Intermediate* e.g. **A**, or *Crown Form Suppressed* e.g. **B**, *and* crown symmetry is *symmetrical* e.g. **A**, or *asymmetrical* e.g. **B**.

Crown Spread Orientation Radial Where the *crown spread* is generally an even distance in all directions from the trunk and often where a tree has *Crown Form Dominant* and is *symmetrical*.

Diameter at Breast Height (DBH) Measurement of trunk width calculated at a given distance above ground from the base of the tree often measured at 1.4 m. The trunk of a tree is usually not a circle when viewed in cross section, due to the presence of *reaction wood* or *adaptive wood*, therefore an average diameter is determined with a *diameter tape* or by recording the trunk along its narrowest and widest axes, adding the two dimensions together and dividing them by 2 to record an average and allowing the orientation of the longest axis of the trunk to also be recorded. Where a tree is growing on a lean the distance along the top of the trunk is measured to 1.4m and the diameter then recorded from that point perpendicular to the edge of the trunk. Where a *leaning* trunk is *crooked* a vertical distance of 1.4m is measured from the ground. Where a tree branches from a trunk that is less than 1.4m above ground, the trunk diameter is recorded perpendicular to the length of the *trunk* from the point immediately below the base of the flange of the *branch collar* extending the furthest down the trunk, and the distance of this point above ground recorded as *trunk* length. Where a tree is located on sloping ground the DBH should be measured at half way along the side of the tree to average out the angle of slope. Where a tree is *acaulescent* or *trunkless* branching at or near ground an average diameter is determined by recording the radial extent of the trunk at or near ground and noting where the measurement was recorded e.g. at ground.

Significant Important, weighty or more than ordinary.

Significant Tree A tree considered important, weighty or more than ordinary. Example: due to prominence of location, or *in situ*, or contribution as a component of the overall landscape for *amenity* or aesthetic qualities, or *curtilage* to structures, or importance due to uniqueness of taxa for species, subspecies, variety, *crown form*, or as an historical or cultural planting, or for age, or substantial dimensions, or habit, or as *remnant vegetation*, or habitat potential, or a rare or threatened species, or uncommon in cultivation, or of aboriginal cultural importance, or is a commemorative planting.

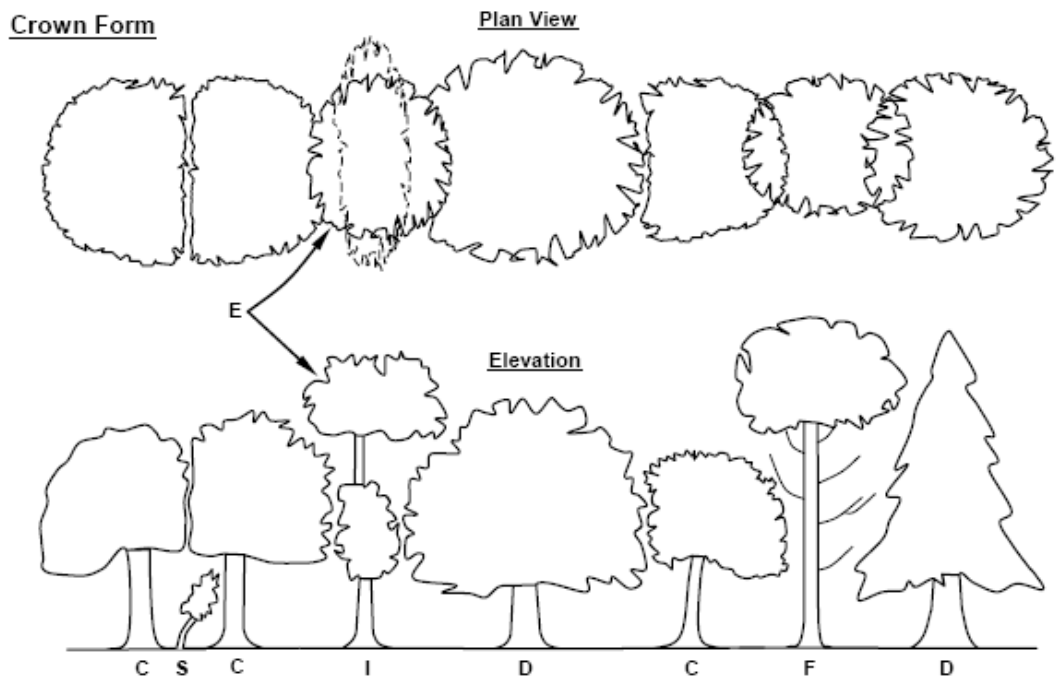
Sustainable Retention Index Value (SRIV) A visual tree assessment method to determine a qualitative and numerical rating for the viability of urban trees for development sites and management purposes, based on general tree and landscape assessment criteria using classes of *age*, *condition* and *vigour*. SRIV is for the professional manager of urban trees to consider the tree *in situ* with an assumed knowledge of the *taxon* and its growing environment. It is based on the physical attributes of the tree and its response to its environment considering its position in a matrix for age class, vigour class, condition class and its sustainable retention with regard to the safety of people or damage to property. This also factors the ability to retain the tree with remedial work or beneficial modifications to its growing environment or removal and replacement. SRIV is supplementary to the decision made by a tree management professional as to whether a tree is retained or removed (IACA - Institute of Australian Consulting Arboriculturists 2005).

Form of Trees

Crown Form The shape of the crown of a tree as influenced by the availability or restriction of space and light, or other contributing factors within its growing environment. Crown Form may be determined for tree shape and habit generally as *Dominant*, *Codominant*, *Intermediate*, *Emergent*, *Forest* and *Suppressed*. The habit and shape of a *crown* may also be considered qualitatively and can be categorized as *Good Form* or *Poor Form*. See also *Forest Grown* and *Open Grown*.

Good Form Tree of *typical* crown shape and habit with proportions representative of the taxa considering constraints such as origin e.g. indigenous or exotic, but does not appear to have been adversely influenced in its development by environmental factors in situ such as *soil water* availability, prevailing wind, or cultural practices such as lopping and competition for space and light. See also *Poor Form*.

Poor Form Tree of *atypical* crown shape and habit with proportions not representative of the species considering constraints and appears to have been adversely influenced in its development by environmental factors in situ such as *soil water* availability, prevailing wind, cultural practices such as lopping and competition for space and light; causing it to be *misshapen* or disfigured by disease or vandalism. See also *Good Form*.



(Source: **D**, **C**, **I** and **S**, and Elevation, Matheny and Clark 1998, **E**, **F** and Plan View, IACA 2005)

D. Dominant, **F.** Forest, **C.** Codominant, **E.** Emergent, **I.** Intermediate, **S.** Suppressed

Crown Form Codominant Crowns of trees restricted for space and light on one or more sides and receiving light primarily from above e.g. constrained by another tree/s or a building.

Crown Form Dominant Crowns of trees generally not restricted for space and light receiving light from above and all sides. See also *Crown Form Emergent* and *Open Grown*.

Crown Form Emergent Crowns of trees restricted for space on most sides receiving most light from above until the *upper crown* grows to protrude above the canopy in a stand or forest environment. Such trees may be *crown form dominant* or transitional from *crown form intermediate* to *crown form forest* asserting both *apical dominance* and *axillary dominance* once free of constraints for space and light.

Crown Form Forest Crowns of trees restricted for space and light except from above forming tall trees with narrow spreading crowns with foliage restricted generally to the top of the tree. The trunk is usually erect, straight and continuous, tapering gradually, crown often excurrent, with first order branches becoming structural, supporting the live crown concentrated towards the top of the tree, and below this point other first order branches arising radially with each *inferior* and usually temporary, divergent and ranging from horizontal to ascending, often with internodes exaggerated due to competition for space and light in the *lower crown*.

Crown Form Intermediate Crowns of trees restricted for space on most sides with light primarily from above and on some sides only.

Crown Form Suppressed Crowns of trees generally not restricted for space but restricted for light by being *overtopped* by other trees and occupying an understorey position in the canopy and growing slowly.

Forest Grown A tree with *crown form forest* grown in a group with competition for space and light protected from wind, often resulting in a taller tree with a narrow spreading crown that is concentrated towards the top of the tree (Matheny & Clark 1998, p. 18).

Open Grown A tree with *crown form dominant*, grown singly without competition for space and light, exposed to wind, often resulting in a shorter tree with a broad spreading crown that extends towards the ground (Matheny & Clark 1998, p. 18).

Deadwood

Deadwood Dead branches within a tree's crown and considered quantitatively as separate to *crown cover* and can be categorised as *Small Deadwood* and *Large Deadwood* according to diameter, length and subsequent *risk* potential. The amount of dead branches on a tree can be categorized as *Low Volume Deadwood*, *Medium Volume Deadwood* and *High Volume Deadwood*. See also *Dieback*.

Deadwooding Removing of dead branches by *pruning*. Such pruning may assist in the prevention of the spread of *decay* from *dieback* or for reasons of safety near an identifiable target.

Small Deadwood A dead branch up to 10mm diameter and usually <2 metres long, generally considered of low *risk* potential.

Large Deadwood A dead branch >10mm diameter and usually >2 metres long, generally considered of high *risk* potential.

Low Volume Deadwood Where <5 dead branches occur that may require *removal*.

Medium Volume Deadwood Where 5-10 dead branches occur that may require *removal*.

High Volume Deadwood High Volume Deadwood Where >10 dead branches occur that may require *removal*.

Dieback

Dieback The death of some areas of the *crown*. Symptoms are leaf drop, bare twigs, dead branches and tree death, respectively. This can be caused by root damage, root disease, bacterial or fungal canker, severe bark damage, intensive grazing by insects, *abrupt changes* in growth conditions, drought, water-logging or over-maturity. Dieback often implies reduced *resistance, stress* or *decline* which may be temporary. Dieback can be categorized as *Low Volume Dieback*, *Medium Volume Dieback* and *High Volume Dieback*.

Low Volume Dieback Where <10% of the *crown cover* has died. See also *Dieback*, *High Volume Dieback* and *Medium Volume Dieback*.

Medium Volume Dieback Where 10-50% of the *crown cover* has died.

High Volume Dieback Where >50% of the *crown cover* has died.

Epicormic Shoots

Epicormic Shoots Juvenile shoots produced at branches or trunk from *epicormic strands* in some Eucalypts (Burrows 2002, pp. 111-131) or sprouts produced from dormant or latent buds concealed beneath the bark in some trees. Production can be triggered by fire, pruning, wounding, or root damage but may also be as a result of *stress* or *decline*. Epicormic shoots can be categorized as *Low Volume Epicormic Shoots*, *Medium Volume Epicormic Shoots* and *High Volume Epicormic Shoots*.

Low Volume Epicormic Shoots Where <10% of the *crown cover* is comprised of live *epicormic shoots*.

Medium Volume Epicormic Shoots Where 10-50% of the *crown cover* is comprised of live *epicormic shoots*.

High Volume Epicormic Shoots Where >50% of the *crown cover* is comprised of live *epicormic shoots*.

Epicormic Strands In some taxa of the Myrtaceae family narrow bands of meristematic tissue radiate in stems from pith extending to the outer bark containing bud primordia evident as small prickle or dimple structures up to 10 mm diameter, that after the stimulus of a trauma event such as fire or defoliation develop to form new buds allowing *crown regeneration* (Burrows 2001, Pp. 111-131).

Trunk

Acaulescent A *trunkless* tree or tree growth forming a very short *trunk*. See also *Caulescent*.

Caulescent Tree grows to form a *trunk*. See also *Acaulescent*.

Trunk A single stem extending from the *root crown* to support or elevate the *crown*, terminating where it divides into separate *stems* forming *first order branches*. A trunk may be evident at or near ground or be absent in *acaulescent* trees of *deliquescent* habit, or may be continuous in trees of *excurrent* habit. The trunk of any *caulescent* tree can be divided vertically into three (3) sections and can be categorized as *Lower Trunk*, *Mid Trunk* and *Upper Trunk*. For a *leaning* tree these may be divided evenly into sections of one third along the trunk.

Appendix F - Arborist Notes

From: Jonathan Berry [jberry@pacific.net.au]
Sent: Monday, 1 June 2009 4:24 PM
To: 'Danny'
Cc: 'Lisa Richards'; 'Angela Besant'
Subject: RE: Arboricultural scar tree report for Ashton Coal Operations - Camberwell
NSW

Danny,

Many thanks, excellent advice, greatly appreciated. Sounds like all things being well and as predicted the tree should be fine.

Cheers

Jonathan

-----Original Message-----
From: Danny [mailto:danny@utma.com.au]
Sent: Friday, 29 May 2009 10:08 AM
To: 'Jonathan Berry'
Subject: RE: Arboricultural scar tree report for Ashton Coal Operations - Camberwell NSW

Dear Jonathan,

The average tree will usually survive occasional inundation. The frequency of such events is likely to be the major consideration and the duration till subsidence. It is once a year, once every 10, 50 or 100 year events with the remote but possibility of more frequent events on occasion but rarely. I would be very surprised if it was a major problem but is certainly worth considering. The roots of trees are known to extend for distances of up to and exceeding twice the mature tree height. For this reason it could be expected that there should always be some part of the root plate upslope near the dam's edge that will be inundated for the shortest period allowing the tree to return to aerobic respiration in part of the rootplate after a short period.

If the tree is at the edge of the proposed dam it is very likely that the water will recede from the expected shallow edges first and may not be a significant problem.

However as living things each individual tree is subject to its own response to its growing environment and changes as they occur despite our predictions

and understanding of tree biology.

Hoping this is of assistance.

Danny Draper

Danny Draper
Principal Consultant
(Director)
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-----Original Message-----
From: Jonathan Berry [mailto:jberry@pacific.net.au]
Sent: Friday, 29 May 2009 7:53 AM
To: danny@utma.com.au
Cc: 'Angela Besant'; 'Lisa Richards'
Subject: RE: Arboricultural scar tree report for Ashton Coal Operations - Camberwell NSW

Hi Danny,

I am working on the Ashton South East Open Cut Project and just wanted to follow up on the report you prepared for the scar trees at Camberwell.

The eastern tree, is currently near the edge of a proposed dam, which in times of flood may inundate the base of the tree for short periods (potentially up to 2-3 weeks or so) until high flows recede. Are you able to provide any advice on the tolerance of trees such as this iron bark to withstand this type of inundation, how sensitive are they to hydrological change?

Kind Regards

Jonathan Berry

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Appendix G - Geomorphic Assessment

heh

Huonbrook Environment & Heritage Pty Ltd

ABN 26 062 069 809

ASHTON COAL SE OPEN CUT PROJECT

GEOMORPHIC ASSESSMENT

Dr Philip Hughes

29 October 2009

BACKGROUND

The consultant was commissioned to undertake a geomorphic assessment of areas where it is proposed that salvage archaeological excavation/collection work will be undertaken. In particular the consultant was asked to assess the likelihood that Pleistocene alluvial terraces occur along Glennies Creek in the study area and if so, the likelihood such terraces might contain Pleistocene archaeological sites.

Koettig (1986, 1987)

Archaeological assemblages of claimed Pleistocene age had been recovered by Margrit Koettig (1986, 1987) from colluvial and alluvial terrace deposits along the upper reaches of Glennies Creek (also known as Fal Brook) dating from between about 13,000 and 35,000 years ago. The consultant has visited these sites and is familiar with the reports on them.

It is important to note that they more than 10 km away from the study area in a very different environmental setting in hilly country away from the main Hunter Valley. Where these sites occur, Glennies Creek (Fal Brook) is a well defined permanent river in a well defined valley with well defined gently sloping, well drained banks along it, all of which were in existence during the Pleistocene as well as the Holocene. As such, the banks of this river would have provided a focus for repeated occupation throughout the time Aboriginal people have been in the region, thus enhancing the likelihood that Pleistocene artefacts might be detected. In contrast, in most parts of the Hunter Valley, including the study area, it is difficult to reconstruct Pleistocene landscapes, let alone identify places which might have been foci for Aboriginal occupation during the Pleistocene (for a discussion of this see ERM 2004, Chapter 2, and Dean-Jones and Mitchell 1993).

A summary description and discussion of the two sites with reported Pleistocene assemblages is presented in **Appendix A**.

Mitchell (2002)

Peter Mitchell (2002) undertook a geomorphological assessment in relation to archaeology of the existing Ashton coal project sites immediately west of the present study area. His investigation was intended to further elucidate valley fill stratigraphy along the Hunter River, Bowmans Creek and the western side of Glennies Creek, focussing on the extent of geomorphic features that might contain buried land surfaces of archaeological interest.

His main conclusions were (2002:16-17):

- The geomorphology and valley fill stratigraphy of the lower reaches of Bowmans and Glennies Creeks comprises a maximum of three fluvial terraces each with an insert relationship to one another with the fragments of the highest (3rd) terrace being the only one of possible Pleistocene age and the only one in which any evidence of a buried landsurface has been located.

- All areas of the low floodplains and 1st (flooded by 1:20 year events) and 2nd terraces (flooded by 1:100 year events) have been disturbed extensively by cultivation, erosion and deposition of a blanket of post-European (PE) sediments deposited mainly during the exceptionally large 1955 flood. Visibility of Aboriginal sites in these areas is virtually nil and any sites that exist beneath the PE sediments are likely to be disturbed.

- One of two remnants of the 3rd terrace - that along Bowmans Creek - did not reveal any important stratigraphy that would encourage further excavation.

- The other, Area C on the western side of Glennies Creek a little to the SW of the present study area, contained a dark layer interpreted as the buried A horizon of a palaeosol (fossil soil). This palaeosol contained a single stone artefact. Mitchell suggested that an early Holocene or possibly late Pleistocene age for the buried profile was possible.

Flood levels

The flood levels for this part of Glennies Creek are (to the nearest 0.5 m above seal level (ASL)) as follows:

1. For floods derived from runoff from the Glennies Creek catchment at times when the Hunter River is not in flood:
   1:100 year flood 59.0 m ASL
   1:20 year flood 57.5 m ASL

2. For floods from the Hunter River:
   1:100 year flood 63.0 m ASL
   1:20 year flood 61.5 m ASL

Floodwaters from the Glennies Creek catchment would be relatively fast flowing and would cause scouring of the creek bed, banks and terrace surfaces as well as deposition of alluvium ranging in size from gravel through sand and silt to clay. In

contrast floodwater from the Hunter River would be slow moving, would cause relatively little erosion and would deposit fine textured alluvium (fine sand, silt and clay).

FIELDWORK

Fieldwork was undertaken on 26 October by Philip Hughes, accompanied by the project archaeologists Angela Besant, Chris Carter and Liz Wyatt. The team used an A3 colour photo with contour lines at 1m interval to assist in the identification of terraces.

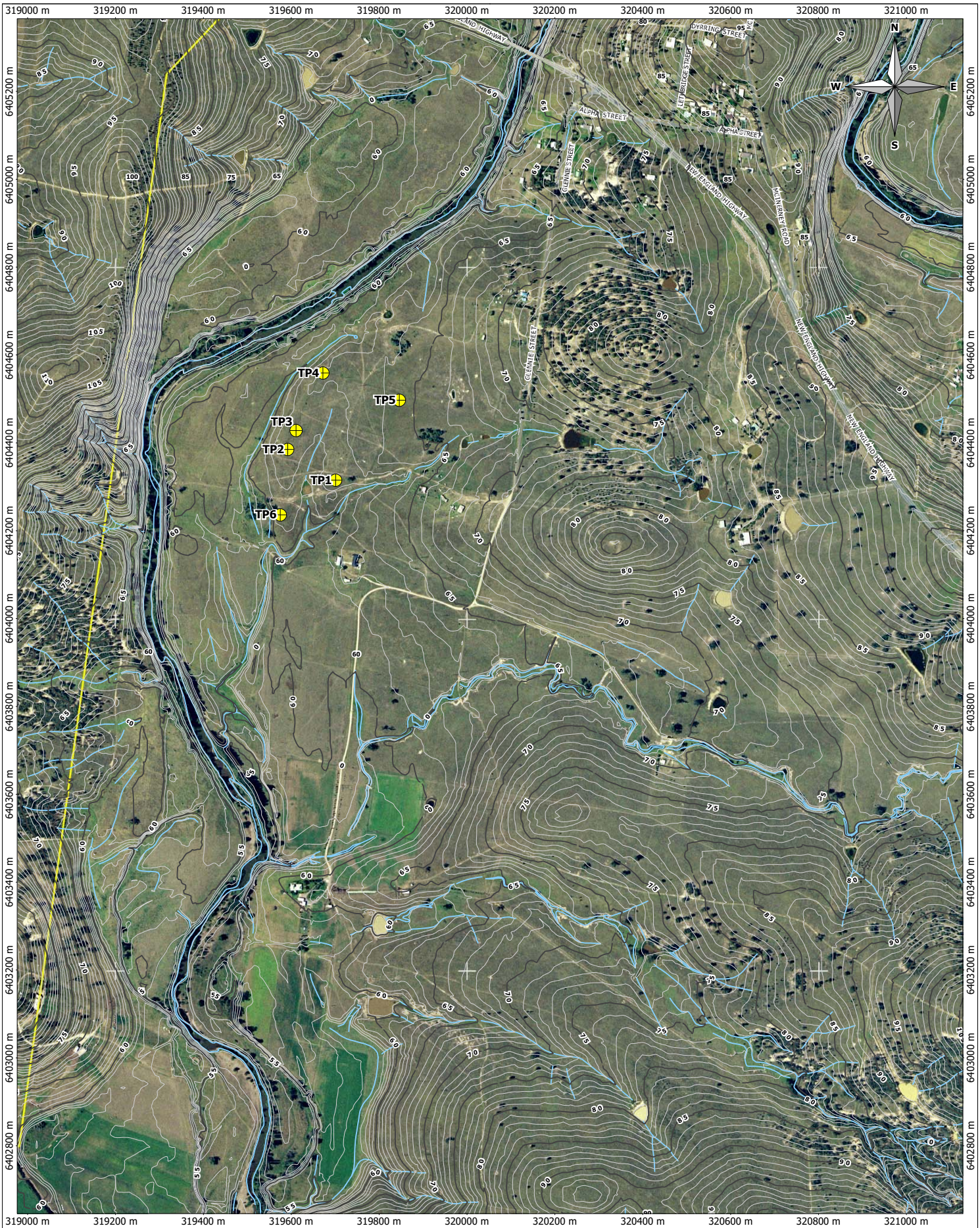
As a first step the team revisited Mitchell's Area A on the west side of the creek. The only exposure of the sediments was along the eroded edge of the terrace facing the creek where beneath a surface layer of sandy sediment homogenous brown sandy clay at least 1m thick occurred.

The terrace surface is 60 m ASL, i.e. within the zone of inundation by 1:100 and 1:20 year floods from the Hunter River (63 m and 61.5 m ASL respectively). It is just below the Glennies Creek 1:100 year flood level (59 m ASL). Given its altitude, is likely that this terrace remnant is Mitchell's 2nd terrace rather than 3rd terrace. PE from the 1955 flood would have been deposited on this terrace and this might account for the surface layer of sandy sediment observed in the eroded section.

The team then walked and drove across the study area on the eastern of the creek identifying the main geomorphic features and selecting locations to dig test pits using a mechanical excavator. Eight test pits were dug at the locations shown on Figure 1. Each pit was about 1 m long, 0.5 m wide and 0.5 m to 1.5 m deep. The stratigraphic sequences revealed in the sections of the test pit are described in **Appendix B**.

The findings of the investigation are summarised in **Table 1**. Two of the test pits (1 and 2) were dug into the footslopes of the low hills to the south. In both of these duplex soil profiles were revealed. Duplex soils occur widely across the hillslopes forming the eastern part of the study and are especially well exposed along the shallow gullies draining these slopes. The nature and archaeological potential of duplex soils is discussed in detail in **Appendix C**. In summary, almost without exception stone artefacts only occur in the upper sandy layer (Unit A) of these duplex soils, which is of Holocene age. Open sites on duplex soils can never be truly stratified in a chronologically useful sense.

Three levels of terrace were identified: High, Middle and Low. These almost certainly correspond to Mitchell's (2002) 1st, 2nd and 3rd levels respectively. Six of the eight test pits (3 to 8) were dug into terrace alluvium.



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Scale: 1:8000 @A3

ASHTON COAL OPERATIONS PTY LIMITED

GEOMORPHOLOGIST
TEST PITS

Tuesday, 27 October 2009 Drawn: JPB

FIGURE 1

Table 1.

Test Pit	Landform	Altitude (m ASL)	Inundated by floods? **				Summary description	Interpretation
			H100	H20	G100	G20		
1	Footslope	64	No	No	No	No	Duplex soil	Artefacts will only occur in upper Unit A which is Holocene in age. Lower weathered clayey sediments (Unit B) likely to be Pleistocene but beyond the time of initial human occupation.
2	Junction between footslope and alluvial plain	62	Yes	No	No	No	Duplex soil with upper Unit A thickened by alluvium	
3	High terrace	63	No	No	No	No	Very thin topsoil with no PE sediment. Underlying sands and clays are relatively homogenous and unweathered. No indications of any palaeosols	Holocene terrace Artefacts will be confined to the thin topsoil No prospect that Pleistocene sites will occur
4	High terrace	62.5	Yes	No	No	No		
5	High terrace	62.5	Yes	No	No	No		
6	High terrace	61	Yes	Yes	No	No		
7	Middle terrace	60.5	Yes	Yes	No	No	600 mm of friable silty fine sand overlying slightly mottled sandy clay	Holocene terrace capped with about 600 mm of recent sediment, probably PE. Artefacts may survive on the pre 1955 flood surface represented by the top of the underlying clay No prospect that Pleistocene sites will occur
8	Low terrace	58.5	Yes	Yes	Yes	No	Unweathered silty sand throughout	Recent terrace probably consisting throughout of PE sediments Unlikely to contain archaeological materials

H100 = 1:100 year flood from Hunter River. H20 = 1:20 year flood from Hunter River
G100 = 1:100 year flood from Glennies Creek G20 = 1:20 year flood from Glennies Creek

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CONCLUSIONS

No landforms which are likely to contain Pleistocene archaeological sites occur in the study area.

The alluvium on which the middle and high terraces in the study area has formed is Holocene in age. There is no evidence that the high terrace contains Pleistocene sediments which might in turn contain Pleistocene sites. No palaeosols were seen in any of the test pits. It is highly unlikely that buried surfaces of Holocene age with artefact assemblages on them occur in the alluvial clays which form this high terrace. Archaeological materials are likely to be confined to the shallow loamy topsoils on this terrace. These materials are unlikely to have been disturbed by floodwaters as most of the surface is above the highest flood levels. They will, however, have been disturbed by repeated cultivation of the topsoil and immediate subsoil.

The middle terrace is capped with recent sandy sediment which is probably post-European in age, as observed by Mitchell (2002) on similar terraces along the Hunter River, Bowmans Creek and the western side of Glennies Creek. Where archaeological materials occur, they are likely to be concentrated on the surface of the Holocene clay core of the terrace beneath the PE sediments. It is likely that such archaeological materials have been disturbed by floodwaters.

The low terrace is of recent age with the upper sandy alluvium, and possibly all of it, being of post-European age. It is very unlikely any archaeological materials occur in these flood-deposited sediments.

On the hillslopes above the alluvial plain duplex soils predominate. Archaeological materials of Holocene age will occur in the upper silty sandy Unit A but not in the underlying weathered clayey Unit B, except for the occasional artefact which has fallen down a desiccation crack, root hole or animal hole.

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APPENDIX A

PLEISTOCENE SITES ALONG GLENNIES CREEK/FAL BROOK

Prepared by Philip Hughes for ERM (2004, Chapter 2)

The work of Koettig (1986, 1987) at two sites along Fal Brook (SGCD 9 and SDCD 16) has shown that despite of the difficulties in identifying potential Pleistocene site locations and in excavating the generally intractable clay deposits the artefacts might occur in, such sites do indeed exist. Excavations at both these sites recovered artefacts from A and B horizons of texture contrast soils (specifically described as solodised solonetz soils).

At SGCD 16, 9 nine artefacts were recovered from the B horizon to a maximum depth of about 600 mm. Koettig (1987:98) admitted that it was not possible to say with certainty that these artefacts were not derived from the overlying A horizon.

At SGCD 43 artefacts were recovered from the B horizon to a maximum depth of 1,400-1,600 mm. Koettig considered that at least nine of these could not conceivably have been derived from the A horizon. These indisputably Pleistocene artefacts were found in three interrelated geomorphic contexts (Koettig 1987:98-99).

- One large core was found in the weathered clayey B horizon of a solodised solonetz soil 920 mm below the surface, possibly associated with an old land surface, itself dated to about 34,500 years BP. The sediments forming this soil were interpreted as colluvium which had accumulated along the base of the footslopes.
- A hearth dated to >20,000 years BP was excavated in what the project geomorphologist, Lisa Worrall, described as a young terrace abutting the colluvial deposits described above. The sediments consisted of relatively homogeneous fine silty sands which became slightly darker and more compact with depth.
- Charcoal in the fill of a gully cut into Unit B was dated to about 13,000 years BP. There were artefacts in the Unit B material above the gully fill and possibly in the fill itself.

There are some unresolved issues about Site SGDC 16. The 20,000 year old terrace sediments in which the hearth was found appear to have undergone very little weathering over this long period. In contrast, the fill of the gully dated to 13,000 years BP is described as B horizon material of the solodised solonetz soil. It is difficult to conceive of how gully deposits of this relatively young age could have been converted to B horizon material in such a short time. Koettig (1987:29) described the B horizon of the solodised solonetz soils as having charcoal variably distributed throughout it, being present as dense layers in some squares and almost totally absent in others. In one square, for example, charcoal chunks up to 20 mm in length were present in the level 1,500-2,000 mm below the surface. Solodised solonetz soils form as a result of intense chemical weathering over long periods of time and it is difficult to conceive of how such large amounts of charcoal (which itself is subject to biochemical decay) could have survived such intense weathering. It is clear from the descriptions in the reports and the section photos that the soils have indeed been subject to intense pedogenesis.

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APPENDIX B

STRATIGRAPHIC OF THE DEPOSITS EXPOSED IN THE TEST PITS

FOOTSLOPES

Two test pits were dug on the footslopes east of the Glennies Creek alluvial terraces. Test Pit 1 was at the northern end at an altitude of about 64 m ASL and Test Pit 2 at the southern end of the study area at the junction between the footslopes and the alluvial plain at an altitude of about 62 m ASL.

Test Pit 1

Depth (mm)	Description
0 - 50	Topsoil. Dark grey loam. Abrupt change to:
50 – 220	Grey blocky, hard, gritty silty fine sand. Abrupt change to:
220 +	Mottled orange brown weathered stony sandy clay
	Base of test pit at 550 mm

Test Pit 2

Depth (mm)	Description
0 - 40	Topsoil. Dark grey loam. Abrupt change to:
40 - 600	Structureless gritty sandy clayey silt to silty clay. Upper 350 mm grey and more sandy. Brownish grey and more clayey at depth. Rock-hard when dry and penetrated by vertical deep desiccation cracks. Backed artefact recovered from one of these cracks. Grades over 50 mm to:
600 +	Reddish brown slightly mottled stony gritty sandy clay
	Base of test pit at 1,000 mm

HIGH TERRACE

Four test pits were dug along the crest of this feature, which is about 61 m to 63 m ASL. From north to south these were Test Pits 3, 4, 5, 6 and 7.

Test Pit 3

Depth (mm)	Description
0 - 100	Topsoil. Dark grey clay loam. Abrupt change to:
100 - 250	Greyish brown heavy sandy clay with blocky structure. Ploughed zone? Grades over a few mm to:
250 - 750	Brown heavy clay. Grades over a few mm to:
750 +	Orange brown sandy clay, grading downwards gradually to silty fine sand.
	Base of test pit at 1,000 mm

Test Pit 4

Depth (mm)	Description
0 - 30	Topsoil. Dark grey clay loam. Abrupt change to:
30 - 250	Greyish brown heavy sandy clay with blocky structure. Ploughed zone? Grades of a few mm to:
250 +	Brown heavy clay
	Base of test pit at 1,000 mm

Test Pit 5

Depth (mm)	Description
0 - 30	Topsoil. Dark grey clay loam. Abrupt change to:
30 - 300	Greyish brown heavy sandy clay with blocky structure. Ploughed zone? Recent shallow pit in NW corner of test pit. Grades of a few mm to:
300 +	Brown heavy clay
	Base of test pit at 1,000 mm

Test Pit 6

Depth (mm)	Description
0 - 100	Topsoil. Grey silty sand. Probably post-European alluvium. Abrupt change to:
100 - 600	Heavy clay. Dark brownish grey, becoming browner with depth. Grades gradually to:
600 – 1,100	Brown gravelly sandy clay. Grades gradually to:
1,100 +	Dark brown sandy clay
	Base of test pit at 1,300 mm

MIDDLE TERRACE

One test pit dug along the crest of this feature, which is about 60 m ASL.

Test Pit 7

Depth (mm)	Description
0 – 600	Grey, homogenous, firm but friable silty fine sand. Grades over a few mm to:
600 +	Slightly mottled sandy clay. Colour grades from greyish brown at the top, through brown to orange brown at the base
	Base of test pit at 1,200 mm

LOW TERRACE

A single test pit was placed on the younger, lower terrace immediately west of the higher terrace with Test Pits 2 to 7. The surface of this terrace was at about 58 m ASL.

Test Pit 8

Depth (mm)	Description
0 - 350	Light brown friable silty sand. The last plough furrows are preserved on the surface of this terrace. Grades over a few mm to:
350 - 700	Firm greyish brown silty sand. Grades over a few mm to:
700 +	Light brown friable silty sand.
	Base of test pit at 1,100 mm.

APPENDIX C

THE ARCHAEOLOGICAL POTENTIAL OF DUPLEX OR TEXTURE CONTRAST SOILS

Duplex/texture contrast soils occur widely across the Hunter Valley, especially the Central Lowlands and Central Goulburn Valley (see for example Hughes 1984). The degree of pedogenesis characteristic of these texture contrast soils (mainly the podsolic and solonetzic soils of van de Graaff 1963) can be equated with the 'high-contrast solum' stage of soil profile development described by Walker and Coventry (1976) for deposits which are Pleistocene in age. It is generally accepted that the alluvial or colluvial parent material for the B horizons of such soils must be at least 20,000 years old and can be very much older than this (see for example Erskine 1991, Dean-Jones and Mitchell 1993).

On texture contrast soils, with few exceptions stone artefacts have only been observed in the A horizon (especially the lower A_2 horizon), and not in the B horizon. Part of the reason for this is that excavations are seldom extended down into the hard B horizon clays. Nevertheless, numerous excavations have been undertaken in these soils which have led to the recovery of many thousands of artefacts from the A horizon. In all but one case, where the excavations have been extended down into the B horizon either no artefacts have been found, or where the occasional artefact was recovered, it could be inferred reasonably that it have been originally derived from the A horizon by, for example, having fallen down a crack in the soil. The exception is the Pleistocene material recovered by Koettig (1986, 1987) from sites with duplex soils along Fal Brook.

Given the uncertainty concerning the pedogenic status of these soils some archaeologists have described them in sedimentological rather than pedological terms. Following the earlier work of Hughes (1981), Stern (1981) and Koettig and Hughes (1985), Hughes has divided the colluvial/alluvial deposits on which these texture contrast soils occur into two units. The Unit A is equivalent to the A soil horizon, and their Unit B equivalent to the B soil horizon. The description of a typical texture contrast or duplex soil is:

Unit A	An upper grey to buff, sandy to silty unit, commonly containing gravel, generally less than 200 mm thick, and with very weakly developed soil profile. This unit tends to be discontinuous, especially on hillslopes, and overlies Unit B, apparently unconformably.
Unit B	A grey, brown to red clay and gravel-rich unit with evidence of deep weathering and with strongly differentiated soil horizons.

Following on from the work of Mitchell and his colleagues on the origin of hillslope duplex soils in the Sydney Basin, Dean-Jones and Mitchell (1993: Section 4.1) consider that in the Hunter region duplex soils are the result of superposition of two unlike materials through the action of contemporary lateral movement of sediments down the slope. Fluvial hillslope processes create the discontinuity present between the A and B horizons which are in effect two distinct strata, which are time transgressive rather than genetic soil horizons.

Their research has demonstrated the importance of rainsplash (raindrop agitated surface flow) as the main sediment transport mechanism operating on slopes. However this alone is not enough to generate a texture contrast and such profiles only develop where slope transport combines with rapid rates of shallow bioturbation (especially by ants, termites and earthworms). Combined, these processes allow the winnowing of the fine fraction of the surface soil, which is then carried downslope as suspended sediment in the rainwash, thus effectively coarsening the A horizon relative to the B horizon (see also Humphreys and Mitchell 1983). These processes commonly lead to the formation of stone layers or lines between the A and B horizons, as stones larger than the diameters of the burrows of the bioturbating organisms 'sink' through the soil with time.

Dean-Jones and Mitchell (1993: Section 4.1.3) concluded that if the genesis model for duplex soils they outlined was accepted, the critical implications for archaeology were:

- Duplex soils (presumably especially the A horizons) do not necessarily indicate great age. 'Mature' texture contrast profiles can develop in a few centuries and they consider (1993: 76) that A horizon materials in duplex soils in the region are probably between 200 and 3,000 years old, rather than 20,000 to 30,000 years old.
- Open sites on duplex soils can never be truly stratified in a chronologically useful sense.
- Stone artefacts will behave in the same way as natural stones on a hillslope and will be subjected to surface dispersion, downslope movement and differential burial or exposure by bioturbation. They may become incorporated into stone lines.
- Intact or relatively undisturbed hearths provide the best prospects for dating open sites in these contexts. All other dates, especially those based on scattered charcoal, are likely to be spurious.

The question arises, 'what archaeological signature may remain in these duplex soils?' Most if not all B horizon (i.e. Unit B) materials in these duplex soils probably have no or negligible archaeological potential, if only because of their inferred ancient age (i.e. mostly pre-dating human occupation of the Hunter Valley). It is likely that from the beginning of occupation of the Hunter region artefacts would have been discarded on to A horizon soils essentially the same as those that occur today. Any stone artefacts of late Pleistocene to early Holocene age which were not completely transported from the slopes would have been left as a lag at or just above the junction between the A and B horizons. These would then have become incorporated in the basal levels of present A horizons, which are probably mid to late Holocene in age.

Dean-Jones and Mitchell (1993) argue that any stone artefacts contained in the evolving A horizons would have been dispersed vertically and laterally. A high degree of lateral dispersal is to be expected on steeper hillslopes, however in the Hunter Valley most sites are on gently inclined footslopes to flat terraces and benches where the lateral movement of artefacts would have been slight. Whatever degree of movement, Pleistocene assemblages are likely to have been affected more severely

than Holocene assemblages by the cumulative effects of rainwash erosion and transport, and of bioturbation.

It follows that unless the A horizons are thick (at least 300 mm) and incorporate *in situ* older, dateable deposits in their basal levels, it will not be possible stratigraphically to distinguish older artefact assemblages from mid to late Holocene assemblages. In thin A horizons it is likely to be difficult to distinguish with certainty using artefact typology any early assemblages which might be present.

Appendix H - Site Cards

N.B
Please note that not all the information (location maps, excerpts of specialist reports ect) submitted with the site cards has not been included in this appendix.

Aboriginal Site Recording Form

AHIMS Registrar
PO Box 1967, Hurstville NSW 2200
ahims@environment.nsw.gov.au

Department of **Environment and Conservation (NSW)**

Office Use Only

Site Number | | | - | | - | | | |

Date received / / Date entered into system / / Date catalogued / /

Entered by (Name)

Information Access

Office Use Only

☐ Gender/male ☐ Gender/female ☐ Location restriction ☐ General restriction ☐ No access

For Further Information Contact:

☐ **Nominated Trustee**

Title	Surname	First Name	Initials
MS	WORTH	SUZIE	

Organisation: WANARUAH LOCAL ABORGINAL LAND COUNCIL

Address: PO BOX 127 MUSWELLBROOK NSW 2333

Phone number: 02 65431288 Fax: 0265425377

☐ Client on system

☐ **Knowledge Holder**

Title	Surname	First Name	Initials

Organisation:

Address:

Phone number: Fax:

Aboriginal Heritage Unit or Cultural Heritage Division Contacts

Geographic Location

Site Name: SA5/9

Easting: 321644 Nothing: 6403645 ☐ AMG ☒ GDA

Mapsheet: CAMBERWELL 9133-III-S

Zone

☐	54	☐ 1.25k topographic map	☒ Non differential GPS
☐	55	☐ 1.25k topographic map	☐ Non differential GPS
☒	56	☒ 1.25k topographic map	☐ Non differential GPS
			☐ Client GIS or CAD system

☐ Client on system

Primary Recorder

Title	Surname	First Name	Initials
MS	BESANT	ANGELA	

Organisation: INSITE HERITAGE PTY LTD

Address: PO BOX 98 WANGI WANGI NSW 2267

Phone number: 02 49755818 Fax: 0249755818

Date recorded: 12/2008

☐ Client on system

☐ CLOSED SITE ☐ OPEN SITE

Site Context

Landform

- ☐ Mountains
- ☐ Plain
- ☒ Rolling hills
- ☐ Steep hills
- ☐ Undulating plain

Landform Unit

- ☐ Beach
- ☐ Coastal rock platform
- ☐ Dune
- ☐ Intertidal flat
- ☐ Lagoon
- ☐ Tidal Creek
- ☐ Tidal Flat
- ☐ Cliff
- ☐ Crest
- ☐ Flat
- ☒ Lower slope
- ☐ Mid slope
- ☐ Upper slope
- ☐ Plain
- ☐ Ridge
- ☐ Tor
- ☐ Valley flat
- ☐ Levy
- ☐ Stream bank
- ☐ Stream channel
- ☐ Swamp
- ☐ Terrace
- ☐ Terrace flat

Slope

☐ degrees

Vegetation

- ☐ Closed forest
- ☐ Grasslands
- ☐ Isolated clump of trees
- ☐ Open forest
- ☐ Open woodland
- ☐ Scrub
- ☐ Woodland
- ☐ Cleared
- ☐ Revegetated
- ☐ N/A

Land use

- ☐ Conservation
- ☐ Established urban
- ☐ Farming-intensive
- ☐ Farming-low intensity
- ☐ Forestry
- ☐ Industrial
- ☐ Mining
- ☐ Pastoral/grazing
- ☐ Recreation
- ☐ Semi-rural
- ☐ Service corridor
- ☐ Transport corridor
- ☐ Urban expansion
- ☐ N/A

Water

Distance to permanent water source: 2km approx metres

Distance to temporary water source: 5m approx metres

Name of nearest permanent water source: Glennies Ck

Name of nearest temporary water: Unamed tributary

Directions for Relocation

Located within Ashton Coal Operations Ltd Camberwell, NSW, County of Durham Parish of Auckland. Site located at the eastern end of west flowing tributary to Glennies Ck approx 250m south of New England Highway in Insite Heritage 2009, Survey Area 5

Current Land Tenure

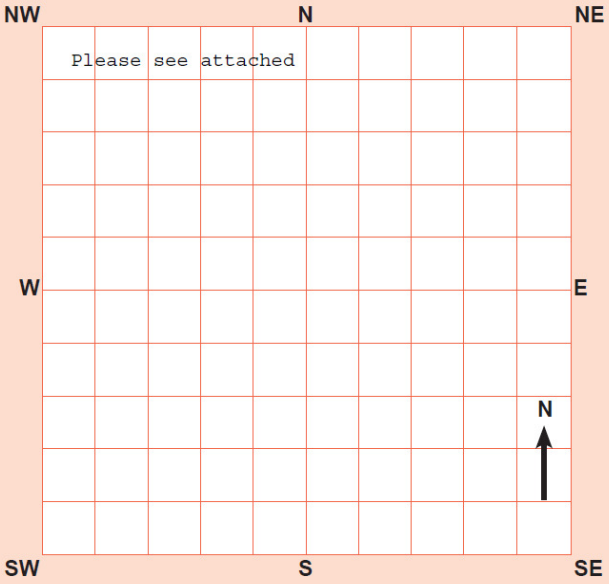
- ☐ Public
- ☐ Private

National Park/other government: ☐

Primary report I.D. ☐ (I.D. Office Use only)

Aboriginal Archaeological Assessment Ashton Coal Operations Ltd Proposed South East Open Cut Project Unpublished Report to Ashton Coal Operations Ltd Insite Heritage 2009

Relocation Map



DEC (NSW) Aboriginal Site Recording Form - Site Information

General Site Information

Closed Site

Shelter/Cave Formation

- [ ] Boulder
- [ ] Wind erosion
- [ ] Water erosion
- [ ] Rock collapse

Condition of Ceiling

- [ ] Boulder
- [ ] Sandstone platform
- [ ] Silica gloss
- [ ] Tessellated
- [ ] Weathered
- [ ] Other platform

Open Site

Rock Surface Condition

- [ ] Boulder
- [ ] Sandstone platform
- [ ] Silica gloss
- [ ] Tessellated
- [ ] Weathered
- [ ] Other platform

Shelter Aspect

- [ ] North
- [ ] North East
- [ ] East
- [ ] South East
- [ ] South
- [ ] South West
- [ ] West
- [ ] North West

Features (including number of features)

[ ]	1. Aboriginal Ceremony & Dreaming	
[ ]	2. Aboriginal Resource & Gathering	
[ ]	3. Art	
[ ]	4. Artefact	
[ ]	5. Burial	
[ ]	6. Ceremonial Ring	
[ ]	7. Conflict	
[ ]	8. Earth Mound	
[ ]	9. Fish Trap	
[ ]	10. Grinding Groove	
[ ]	11. Habitation Structure	
[ ]	12. Hearth	
[ ]	13. Non Human Bone & Organic Material	
[ ]	14. Ochre quarry	
[ ]	15. Potential Archaeological Deposit	
[ ]	16. Stone Quarry	
[ ]	17. Shell	
[ ]	18. Stone Arrangement	
[X]	19. Modified Tree	1
[ ]	20. Water Hole	

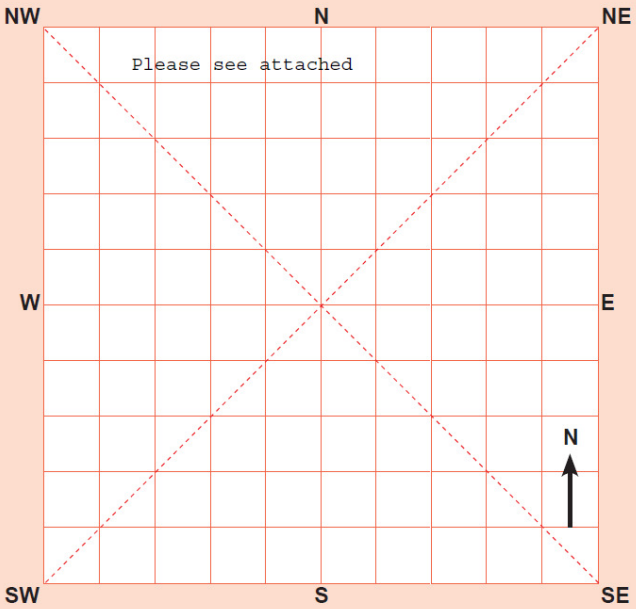
Site Orientation

- [ ] N-S
- [ ] NE-SW
- [ ] E-W
- [ ] SE-NW
- [ ] N/A

Attachments (No.)

- [X] A4 location map
- [ ] B/W photographs
- [ ] Colour photographs
- [ ] Slides
- [ ] Aerial photographs
- [ ] Site plans, drawings
- [X] Recording tables
- [X] Other
- [ ] Feature inserts-No [ ]

Estimated Site Extent and Location of Features



Site Context

Closed Site Dimensions (m)

- [ ] Internal length
- [ ] Internal width
- [ ] Shelter height
- [ ] Shelter floor area

Open Site Dimensions (m)

- [ ] Total length of visible site
- [ ] Average width of visible site
- [ ] Estimated area of visible site
- [ ] Length of assessed site area

Site Interpretation and Community Statement - Aboriginal Community Interpretation and Management Recommendations

Preliminary Site Assessment - Scientific Analysis and Preliminary Management Recommendations

Site comprises of an modified tree. Please see attached for arboricultural report and further details

This section should only be filled in by the Endorsees

Endorsed by: ☐ Knowledge Holder ☐ Nominated Trustee ☐ Native Title Holder ☐ Community Consensus

Title | Surname | First Name | Initials

Organisation

Address

Phone number | Fax

Comments

Site Details: SA5/9

Unit	Site	Landform	Location GPS (UTM, datum WGS84)	Exposure (Approx. m)	Visibility	Description
SA5	**9**	Gully	E 56S 321644 N 6403645	500 x 10	50% SV 80% AV	Scarred tree: Possible. Outside of main study area in area of proposed dam, 3.5m long scar, ironbark, 3m girth, 200mm bark regrowth over scar.

See below excerpt - arboricultural assessment

Aboriginal Site Recording Form

AHIMS Registrar
PO Box 1967, Hurstville NSW 2200
ahims@environment.nsw.gov.au

Department of **Environment and Conservation (NSW)**

Office Use Only

Site Number | | | - | | - | | | |

Date received / / Date entered into system / / Date catalogued / /

Entered by (Name)

Information Access

Office Use Only

☐ Gender/male ☐ Gender/female ☐ Location restriction ☐ General restriction ☐ No access

For Further Information Contact:

☐ **Nominated Trustee**

Title	Surname	First Name	Initials
MS	WORTH	SUZIE	

Organisation: WANARUAH LOCAL ABORGINAL LAND COUNCIL

Address: PO BOX 127 MUSWELLBROOK NSW 2333

Phone number: 02 65431288 Fax: 0265425377

☐ Client on system

☐ **Knowledge Holder**

Title	Surname	First Name	Initials

Organisation:

Address:

Phone number: Fax:

Aboriginal Heritage Unit or Cultural Heritage Division Contacts

Geographic Location

Site Name: SA 8/11

Easting: 320757 Nothing: 6402570 ☐ AMG ☒ GDA

Mapsheet: CAMBERWELL 9133-III-S

☐ Client on system

Zone

☐	54	☐ 1.25k topographic map	☒ Non differential GPS
☐	55	☐ 1.25k topographic map	☐ Non differential GPS
☒	56	☒ 1.25k topographic map	☐ Non differential GPS
			☐ Client GIS or CAD system

Primary Recorder

Title	Surname	First Name	Initials
MS	BESANT	ANGELA	

Organisation: INSITE HERITAGE PTY LTD

Address: PO BOX 98 WANGI WANGI NSW 2267

Phone number: 02 49755818 Fax: 0249755818

Date recorded: 12/2008

☐ Client on system

DEC (NSW) Aboriginal Site Recording Form - Site Information

☐ CLOSED SITE ☐ OPEN SITE

Site Context

Landform

- ☐ Mountains
- ☐ Plain
- ☒ Rolling hills
- ☐ Steep hills
- ☐ Undulating plain

Landform Unit

- ☐ Beach
- ☐ Coastal rock platform
- ☐ Dune
- ☐ Intertidal flat
- ☐ Lagoon
- ☐ Tidal Creek
- ☐ Tidal Flat
- ☐ Cliff
- ☐ Crest
- ☐ Flat
- ☐ Lower slope
- ☐ Mid slope
- ☐ Upper slope
- ☐ Plain
- ☒ Ridge
- ☐ Tor
- ☐ Valley flat
- ☐ Levy
- ☐ Stream bank
- ☐ Stream channel
- ☐ Swamp
- ☐ Terrace
- ☐ Terrace flat

Slope

☐ degrees

Vegetation

- ☐ Closed forest
- ☐ Grasslands
- ☐ Isolated clump of trees
- ☐ Open forest
- ☐ Open woodland
- ☐ Scrub
- ☐ Woodland
- ☐ Cleared
- ☐ Revegetated
- ☐ N/A

Land use

- ☐ Conservation
- ☐ Established urban
- ☐ Farming-intensive
- ☐ Farming-low intensity
- ☐ Forestry
- ☐ Industrial
- ☐ Mining
- ☐ Pastoral/grazing
- ☐ Recreation
- ☐ Semi-rural
- ☐ Service corridor
- ☐ Transport corridor
- ☐ Urban expansion
- ☐ N/A

Water

Distance to permanent water source: 1.2km approx metres

Distance to temporary water source: metres

Name of nearest permanent water source: Glennies Ck

Name of nearest temporary water:

Directions for Relocation

Located within Ashton Coal Operations Ltd Camberwell, NSW, County of Durham Parish of Auckland. Site located at the south eastern end ~~the lease area on top of hillslope~~ to the east of Glennies Creek

Current Land Tenure

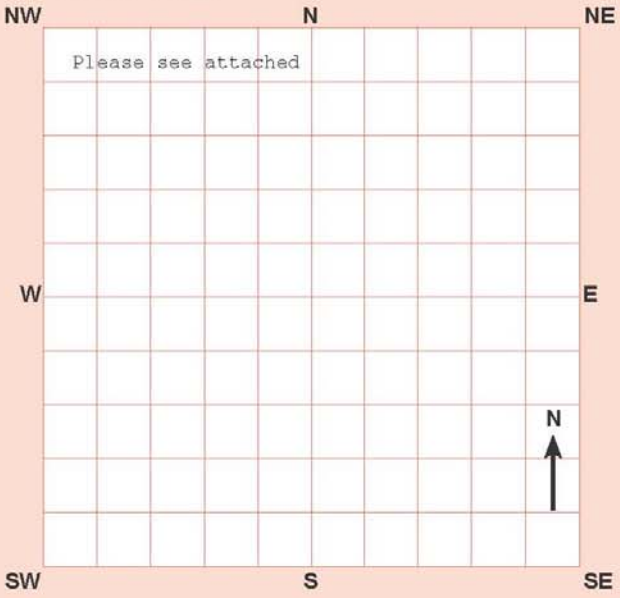
- ☐ Public
- ☐ Private

National Park/other government:

Primary report I.D. ☐ (I.D. Office Use only)

Aboriginal Archaeological Assessment
Ashton Coal Operations Ltd
Proposed South East Open Cut Project
Unpublished Report to Ashton Coal
Operations Ltd
Insite Heritage 2009

Relocation Map



DEC (NSW) Aboriginal Site Recording Form - Site Information

General Site Information

Closed Site

Shelter/Cave Formation

- [ ] Boulder
- [ ] Wind erosion
- [ ] Water erosion
- [ ] Rock collapse

Condition of Ceiling

- [ ] Boulder
- [ ] Sandstone platform
- [ ] Silica gloss
- [ ] Tessellated
- [ ] Weathered
- [ ] Other platform

Open Site

Rock Surface Condition

- [ ] Boulder
- [ ] Sandstone platform
- [ ] Silica gloss
- [ ] Tessellated
- [ ] Weathered
- [ ] Other platform

Shelter Aspect

- [ ] North
- [ ] North East
- [ ] East
- [ ] South East
- [ ] South
- [ ] South West
- [ ] West
- [ ] North West

Features (including number of features)

[ ]	1. Aboriginal Ceremony & Dreaming	[ ]
[ ]	2. Aboriginal Resource & Gathering	[ ]
[ ]	3. Art	[ ]
[X]	4. Artefact	1
[ ]	5. Burial	[ ]
[ ]	6. Ceremonial Ring	[ ]
[ ]	7. Conflict	[ ]
[ ]	8. Earth Mound	[ ]
[ ]	9. Fish Trap	[ ]
[ ]	10. Grinding Groove	[ ]
[ ]	11. Habitation Structure	[ ]
[ ]	12. Hearth	[ ]
[ ]	13. Non Human Bone & Organic Material	[ ]
[ ]	14. Ochre quarry	[ ]
[ ]	15. Potential Archaeological Deposit	[ ]
[ ]	16. Stone Quarry	[ ]
[ ]	17. Shell	[ ]
[ ]	18. Stone Arrangement	[ ]
[ ]	19. Modified Tree	[ ]
[ ]	20. Water Hole	[ ]

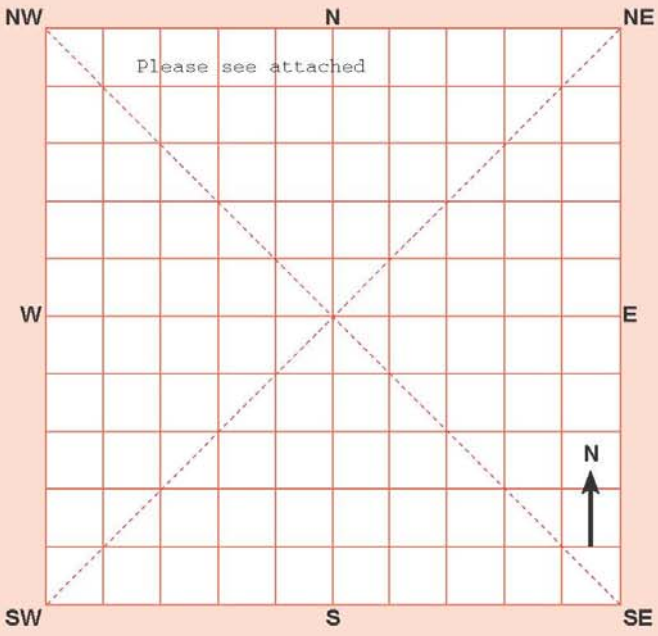
Site Orientation

- [ ] N-S
- [ ] NE-SW
- [ ] E-W
- [ ] SE-NW
- [ ] N/A

Attachments (No.)

- [X] A4 location map
- [ ] B/W photographs
- [ ] Colour photographs
- [ ] Slides
- [ ] Aerial photographs
- [ ] Site plans, drawings
- [X] Recording tables
- [X] Other
- [ ] Feature inserts-No [ ]

Estimated Site Extent and Location of Features



Site Context

Closed Site Dimensions (m)

	Internal length
	Internal width
	Shelter height
	Shelter floor area

Open Site Dimensions (m)

20m	Total length of visible site
10m	Average width of visible site
	Estimated area of visible site
	Length of assessed site area

DEC (NSW) Aboriginal Site Recording Form

Site Interpretation and Community Statement - Aboriginal Community Interpretation and Management Recommendations

Preliminary Site Assessment - Scientific Analysis and Preliminary Management Recommendations

Site comprises of an isolated mudstone artefact. Please see attached for site details tables and site location map

This section should only be filled in by the Endorsees

Endorsed by: ☐ Knowledge Holder ☐ Nominated Trustee ☐ Native Title Holder ☐ Community Consensus

Title | Surname | First Name | Initials

Organisation

Address

Phone number | Fax

Comments

Site Details: SA8/11

Unit	Site	Landform	Location GPS (UTM, datum WGS84)	Exposure (Approx. m)	Visibility	Description
SA8	11	Slope	E 56S 320757 N 6402570	20 x 10	15% SV 15% AV	Isolated find: Limited exposure along track near southern boundary of study area. Artefact: 1 silcrete

Artefact Details: SA8/11

Unit	Site	No	Material	Colour	Class	Sub	L	W	T	Comments
SA8	11	1	Silcrete	Red	Flake		55	35	5	

Aboriginal Site Recording Form

AHIMS Registrar
PO Box 1967, Hurstville NSW 2200
ahims@environment.nsw.gov.au

Department of **Environment and Conservation (NSW)**

Office Use Only

Site Number | | | - | | | - | | | | |

Date received / / Date entered into system / / Date catalogued / /

Entered by (Name)

Information Access

Office Use Only

☐ Gender/male ☐ Gender/female ☐ Location restriction ☐ General restriction ☐ No access

For Further Information Contact:

☐ **Nominated Trustee**

Title	Surname	First Name	Initials
MS	WORTH	SUZIE	

Organisation: WANARUAH LOCAL ABORGINAL LAND COUNCIL

Address: PO BOX 127 MUSWELLBROOK NSW 2333

Phone number: 02 65431288 Fax: 0265425377

☐ Client on system

☐ **Knowledge Holder**

Title	Surname	First Name	Initials

Organisation

Address

Phone number Fax

Aboriginal Heritage Unit or Cultural Heritage Division Contacts

Geographic Location

Site Name: SA10/1 & SA10/2

Easting: 320732 Nothing: 6404660 ☐ AMG ☒ GDA

Mapsheet: CAMBERWELL 9133-III-S

Zone		1.25k topographic map	
☐	54	☐	1.25k topographic map
☐	55	☐	1.25k topographic map
☒	56	☒	1.25k topographic map

☒ Non differential GPS
☐ Non differential GPS
☐ Non differential GPS
☐ Client GIS or CAD system

☐ Client on system

Primary Recorder

Title	Surname	First Name	Initials
MS	BESANT	ANGELA	

Organisation: INSITE HERITAGE PTY LTD

Address: PO BOX 98 WANGI WANGI NSW 2267

Phone number: 02 49755818 Fax: 0249755818

Date recorded: 12/2008

☐ Client on system

DEC (NSW) Aboriginal Site Recording Form - Site Information

☐ CLOSED SITE ☐ OPEN SITE

Site Context

Landform

- ☐ Mountains
- ☐ Plain
- ☒ Rolling hills
- ☐ Steep hills
- ☐ Undulating plain

Landform Unit

- ☐ Beach
- ☐ Coastal rock platform
- ☐ Dune
- ☐ Intertidal flat
- ☐ Lagoon
- ☐ Tidal Creek
- ☐ Tidal Flat
- ☐ Cliff
- ☐ Crest
- ☐ Flat
- ☐ Lower slope
- ☐ Mid slope
- ☐ Upper slope
- ☐ Plain
- ☒ Ridge
- ☐ Tor
- ☐ Valley flat
- ☐ Levy
- ☐ Stream bank
- ☐ Stream channel
- ☐ Swamp
- ☐ Terrace
- ☐ Terrace flat

Slope

☐ degrees

Vegetation

- ☐ Closed forest
- ☐ Grasslands
- ☐ Isolated clump of trees
- ☐ Open forest
- ☐ Open woodland
- ☐ Scrub
- ☐ Woodland
- ☐ Cleared
- ☐ Revegetated
- ☐ N/A

Land use

- ☐ Conservation
- ☐ Established urban
- ☐ Farming-intensive
- ☐ Farming-low intensity
- ☐ Forestry
- ☐ Industrial
- ☐ Mining
- ☐ Pastoral/grazing
- ☐ Recreation
- ☐ Semi-rural
- ☐ Service corridor
- ☐ Transport corridor
- ☐ Urban expansion
- ☐ N/A

Water

Distance to permanent water source: 1200m approx metres

Distance to temporary water source: metres

Name of nearest permanent water source: Glennies Ck

Name of nearest temporary water:

Directions for Relocation

Located within Ashton Coal Operations Ltd Camberwell, NSW, County of Durham Parish of Auckland. Site located on the ridge adjacent to the Camberwell Common and immediately south of the New England Highway. SA10/2 located 500m SE of SA10/1

Current Land Tenure

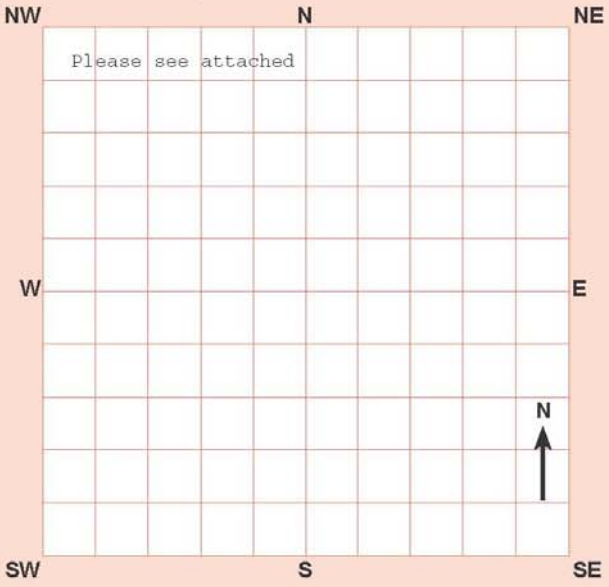
- ☐ Public
- ☐ Private

National Park/other government:

Primary report I.D. (I.D. Office Use only)

Aboriginal Archaeological Assessment
Ashton Coal Operations Ltd
Proposed South East Open Cut Project
Unpublished Report to Ashton Coal
Operations Ltd
Insite Heritage 2009

Relocation Map



DEC (NSW) Aboriginal Site Recording Form - Site Information

General Site Information

Closed Site

Shelter/Cave Formation

- [ ] Boulder
- [ ] Wind erosion
- [ ] Water erosion
- [ ] Rock collapse

Condition of Ceiling

- [ ] Boulder
- [ ] Sandstone platform
- [ ] Silica gloss
- [ ] Tessellated
- [ ] Weathered
- [ ] Other platform

Open Site

Rock Surface Condition

- [ ] Boulder
- [ ] Sandstone platform
- [ ] Silica gloss
- [ ] Tessellated
- [ ] Weathered
- [ ] Other platform

Shelter Aspect

- [ ] North
- [ ] North East
- [ ] East
- [ ] South East
- [ ] South
- [ ] South West
- [ ] West
- [ ] North West

Features (including number of features)

- [ ] 1. Aboriginal Ceremony & Dreaming
- [ ] 2. Aboriginal Resource & Gathering
- [ ] 3. Art
- [X] 4. Artefact
- [ ] 5. Burial
- [ ] 6. Ceremonial Ring
- [ ] 7. Conflict
- [ ] 8. Earth Mound
- [ ] 9. Fish Trap
- [ ] 10. Grinding Groove
- [ ] 11. Habitation Structure
- [ ] 12. Hearth
- [ ] 13. Non Human Bone & Organic Material
- [ ] 14. Ochre quarry
- [ ] 15. Potential Archaeological Deposit
- [ ] 16. Stone Quarry
- [ ] 17. Shell
- [ ] 18. Stone Arrangement
- [ ] 19. Modified Tree
- [ ] 20. Water Hole

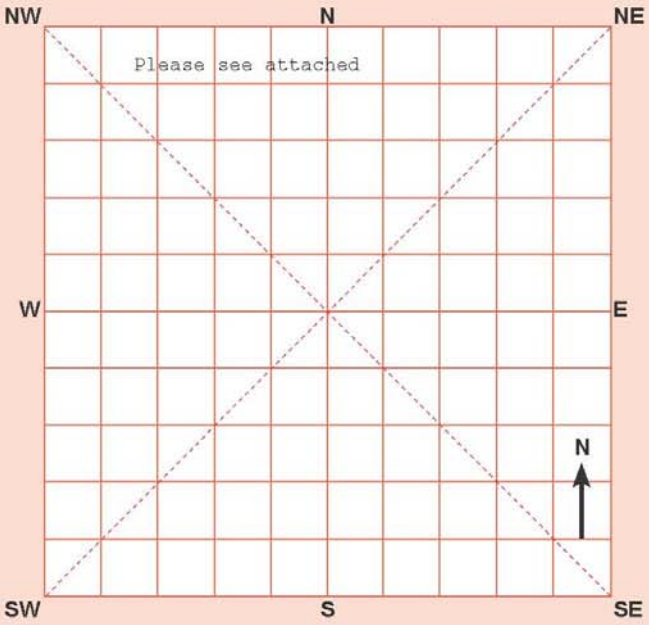
Site Orientation

- [ ] N-S
- [ ] NE-SW
- [ ] E-W
- [ ] SE-NW
- [ ] N/A

Attachments (No.)

- [X] A4 location map
- [ ] B/W photographs
- [ ] Colour photographs
- [ ] Slides
- [ ] Aerial photographs
- [ ] Site plans, drawings
- [X] Recording tables
- [X] Other
- [ ] Feature inserts-No [ ]

Estimated Site Extent and Location of Features



Site Context

Closed Site Dimensions (m)

- [ ] Internal length
- [ ] Internal width
- [ ] Shelter height
- [ ] Shelter floor area

Open Site Dimensions (m) Please see attached

- [ ] Total length of visible site
- [ ] Average width of visible site
- [ ] Estimated area of visible site
- [ ] Length of assessed site area

Site Interpretation and Community Statement - Aboriginal Community Interpretation and Management Recommendations

Please refer to Insite Heritage 2009 report

Preliminary Site Assessment - Scientific Analysis and Preliminary Management Recommendations

Site comprises of 2 loci of artefacts SA10/1 and SA10/2 located on the ridge immediately south of the New England Highway, Camberwell adjacent to the Camberwell Common. Loci located in Survey Area 10 of the study area.

~~SA10/1 - Isolated mudstone artefact. SA10/2 2 x mudstone artefacts.~~

(refer to Insite Heritage 2009 report).

Please see attached for site details tables and location map

Please note GPS coordinates on front page of site card - coordinates for SA10/1

Please refer to attached information for details of SA10/2 and SA10/1

This section should only be filled in by the Endorsees

Endorsed by: ☐ Knowledge Holder ☐ Nominated Trustee ☐ Native Title Holder ☐ Community Consensus

Title	Surname	First Name	Initials

Organisation

Address

Phone number Fax

Comments

Site Details: SA10/1–SA10/2

Unit	Site	Landform	Location GPS (UTM, datum WGS84)	Exposure (Approx. m)	Visibility	Description
SA10	**1**	Ridge crest	E 56S 320732 N 6404660	500 x 20	75% SV 25% AV	Isolated find: Exposure caused by ripping for new tree planting along New England Highway. Very low visibility away from ripped area. Artefacts: 1 mudstone
SA10	**2**	Ridge crest	E 56S 320901 N 6404360	500 x 20	75% SV 25% AV	Artefact scatter: Exposure caused by ripping for new tree planting along New England Highway. Very low visibility away from ripped area. Artefacts: 2 mudstone

Artefact Details: SA1, SA10/1–SA10/2

Unit	Site	No	Material	Colour	Class	Sub	L	W	T	Comments
SA10	**1**	1	Mudstone	Yellow	Flake		46	32	12	
SA10	**2**	1	Mudstone	Yellow	Flake		35	39	8	
SA10	**2**	2	Mudstone	Red	Flake		35	30	7	10% tabular cortex, longitudinal dorsal ridge

Aboriginal Site Recording Form

AHIMS Registrar
PO Box 1967, Hurstville NSW 2200
ahims@environment.nsw.gov.au

Department of **Environment and Conservation (NSW)**

Office Use Only

Site Number | | | - | | - | | | |

Date received / / Date entered into system / / Date catalogued / /

Entered by (Name)

Information Access

Office Use Only

☐ Gender/male ☐ Gender/female ☐ Location restriction ☐ General restriction ☐ No access

For Further Information Contact:

☐ **Nominated Trustee**

Title	Surname	First Name	Initials
MS	WORTH	SUZIE	

Organisation: WANARUAH LOCAL ABORGINAL LAND COUNCIL

Address: PO BOX 127 MUSWELLBROOK NSW 2333

Phone number: 02 65431288 Fax: 0265425377

☐ Client on system

☐ **Knowledge Holder**

Title	Surname	First Name	Initials

Organisation:

Address:

Phone number: Fax:

Aboriginal Heritage Unit or Cultural Heritage Division Contacts

Geographic Location

Site Name: SA13/3

Easting: 319338 Nothing: 6405385 ☐ AMG ☒ GDA

Mapsheet: CAMBERWELL 9133-III-S

Zone			
☐	54	☐ 1.25k topographic map	☒ Non differential GPS
☐	55	☐ 1.25k topographic map	☐ Non differential GPS
☒	56	☒ 1.25k topographic map	☐ Non differential GPS
			☐ Client GIS or CAD system

☐ Client on system

Primary Recorder

Title	Surname	First Name	Initials
MS	BESANT	ANGELA	

Organisation: INSITE HERITAGE PTY LTD

Address: PO BOX 98 WANGI WANGI NSW 2267

Phone number: 02 49755818 Fax: 0249755818

Date recorded: 12/2008

☐ Client on system

DEC (NSW) Aboriginal Site Recording Form - Site Information

☐ CLOSED SITE ☐ OPEN SITE

Site Context

Landform

- ☐ Mountains
- ☐ Plain
- ☐ Rolling hills
- ☐ Steep hills
- ☒ Undulating plain

Landform Unit

- ☐ Beach
- ☐ Coastal rock platform
- ☐ Dune
- ☐ Intertidal flat
- ☐ Lagoon
- ☐ Tidal Creek
- ☐ Tidal Flat
- ☐ Cliff
- ☐ Crest
- ☐ Flat
- ☒ Lower slope
- ☐ Mid slope
- ☐ Upper slope
- ☐ Plain
- ☐ Ridge
- ☐ Tor
- ☐ Valley flat
- ☐ Levy
- ☐ Stream bank
- ☐ Stream channel
- ☐ Swamp
- ☐ Terrace
- ☐ Terrace flat

Slope

☐ degrees

Vegetation

- ☐ Closed forest
- ☐ Grasslands
- ☐ Isolated clump of trees
- ☐ Open forest
- ☐ Open woodland
- ☐ Scrub
- ☐ Woodland
- ☐ Cleared
- ☐ Revegetated
- ☐ N/A

Land use

- ☐ Conservation
- ☐ Established urban
- ☐ Farming-intensive
- ☐ Farming-low intensity
- ☐ Forestry
- ☐ Industrial
- ☐ Mining
- ☐ Pastoral/grazing
- ☐ Recreation
- ☐ Semi-rural
- ☐ Service corridor
- ☐ Transport corridor
- ☐ Urban expansion
- ☐ N/A

Water

Distance to permanent water source: 600m approx metres

Distance to temporary water source: metres

Name of nearest permanent water source: Glennies Ck

Name of nearest temporary water:

Directions for Relocation

Located within Ashton Coal Operations Ltd
Camberwell, NSW, County of Durham
Parish of Auckland.
Site located on the lower slopes,
on the western side of Glennies Creek
in thick grass cover in a cleared paddock
approx 200m south of New England Highway

Current Land Tenure

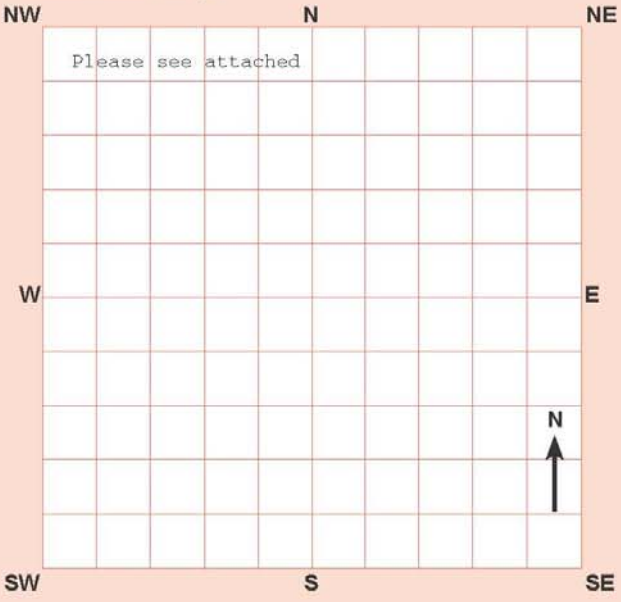
- ☐ Public
- ☐ Private

National Park/other government:

Primary report I.D. (I.D. Office Use only)

Aboriginal Archaeological Assessment
Ashton Coal Operations Ltd
Proposed South East Open Cut Project
Unpublished Report to Ashton Coal
Operations Ltd
Insite Heritage 2009

Relocation Map



DEC (NSW) Aboriginal Site Recording Form - Site Information

General Site Information

Closed Site **Open Site**

Shelter/Cave Formation

- [ ] Boulder
- [ ] Wind erosion
- [ ] Water erosion
- [ ] Rock collapse

Rock Surface Condition

- [ ] Boulder
- [ ] Sandstone platform
- [ ] Silica gloss
- [ ] Tessellated
- [ ] Weathered
- [ ] Other platform

Condition of Ceiling

- [ ] Boulder
- [ ] Sandstone platform
- [ ] Silica gloss
- [ ] Tessellated
- [ ] Weathered
- [ ] Other platform

Shelter Aspect

- [ ] North
- [ ] North East
- [ ] East
- [ ] South East
- [ ] South
- [ ] South West
- [ ] West
- [ ] North West

Features (including number of features)

- [ ] 1. Aboriginal Ceremony & Dreaming
- [ ] 2. Aboriginal Resource & Gathering
- [ ] 3. Art
- [x] 4. Artefact
- [ ] 5. Burial
- [ ] 6. Ceremonial Ring
- [ ] 7. Conflict
- [ ] 8. Earth Mound
- [ ] 9. Fish Trap
- [ ] 10. Grinding Groove
- [ ] 11. Habitation Structure
- [ ] 12. Hearth
- [ ] 13. Non Human Bone & Organic Material
- [ ] 14. Ochre quarry
- [ ] 15. Potential Archaeological Deposit
- [ ] 16. Stone Quarry
- [ ] 17. Shell
- [ ] 18. Stone Arrangement
- [ ] 19. Modified Tree
- [ ] 20. Water Hole

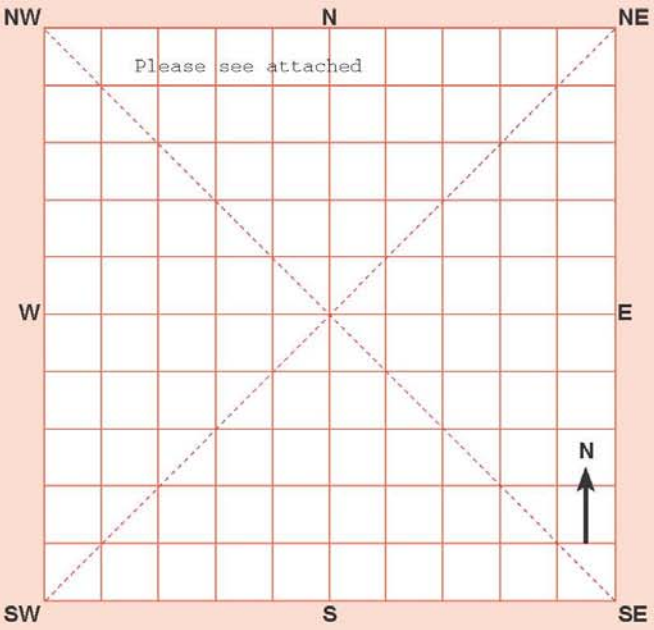
Site Orientation

- [ ] N-S
- [ ] NE-SW
- [ ] E-W
- [ ] SE-NW
- [ ] N/A

Attachments (No.)

- [x] A4 location map
- [ ] B/W photographs
- [ ] Colour photographs
- [ ] Slides
- [ ] Aerial photographs
- [ ] Site plans, drawings
- [x] Recording tables
- [x] Other
- [ ] Feature inserts-No [ ]

Estimated Site Extent and Location of Features



Site Context

Closed Site Dimensions (m)

- [ ] Internal length
- [ ] Internal width
- [ ] Shelter height
- [ ] Shelter floor area

Open Site Dimensions (m) Please see attached

- [ ] Total length of visible site
- [ ] Average width of visible site
- [ ] Estimated area of visible site
- [ ] Length of assessed site area

Site Interpretation and Community Statement - Aboriginal Community Interpretation and Management Recommendations

Please refer to Insite Heritage 2009 report

Preliminary Site Assessment - Scientific Analysis and Preliminary Management Recommendations

Site comprises of 2 loci of artefacts SA10/1 and SA10/2 located on the ridge immediately south of the New England Highway, Camberwell adjacent to the Camberwell Common. Loci located in Survey Area 10 of the study area.

~~SA10/1 - Isolated mudstone artefact. SA10/2 2 x mudstone artefacts.~~

(refer to Insite Heritage 2009 report).

Please see attached for site details tables and location map

Please note GPS coordinates on front page of site card - coordinates for SA10/1

Please refer to attached information for details of SA10/2 and SA10/1

This section should only be filled in by the Endorsees

Endorsed by: ☐ Knowledge Holder ☐ Nominated Trustee ☐ Native Title Holder ☐ Community Consensus

Title	Surname	First Name	Initials

Organisation

Address

Phone number Fax

Comments

Site Details: SA13.3

Unit	Site	Landform	Location GPS (UTM, datum WGS84)	Exposure (Approx. m)	Visibility	Description
SA13	3	Slope	E 56S 319338 N 6405385	2 x 1	50% SV 50% AV	Artefact scatter: Grass cover in cleared paddock. Artefacts: 2 mudstone

Artefact Details: SA13.3

Unit	Site	No	Material	Colour	Class	Sub	L	W	T	Comments
SA13	**3**	2	Mudstone	Yellow	Flake		25	30	12	10% pebble cortex
13	**3**	1	Mudstone	Yellow	Flake	Scraper	80	40	15	steeply retouched, usewear along lateral margin

Aboriginal Site Recording Form

AHIMS Registrar
PO Box 1967, Hurstville NSW 2200
ahims@environment.nsw.gov.au

Department of **Environment and Conservation (NSW)**

Office Use Only

Site Number | | | - | | - | | | |

Date received / / Date entered into system / / Date catalogued / /

Entered by (Name)

Information Access

Office Use Only

☐ Gender/male ☐ Gender/female ☐ Location restriction ☐ General restriction ☐ No access

For Further Information Contact:

☐ **Nominated Trustee**

Title	Surname	First Name	Initials
MS	WORTH	SUZIE	

Organisation: WANARUAH LOCAL ABORGINAL LAND COUNCIL

Address: PO BOX 127 MUSWELLBROOK NSW 2333

Phone number: 02 65431288 Fax: 0265425377

☐ Client on system

☐ **Knowledge Holder**

Title	Surname	First Name	Initials

Organisation

Address

Phone number Fax

Aboriginal Heritage Unit or Cultural Heritage Division Contacts

Geographic Location

Site Name: SA1/1-SA1/7, SA2/1-SA2/6, SA3/1

Easting: 320356 Nothing: 6404731 ☐ AMG ☒ GDA

Mapsheet: CAMBERWELL 9133-III-S

Zone

☐ 54	☐ 1.25k topographic map	☒ Non differential GPS	
☐ 55	☐ 1.25k topographic map	☐ Non differential GPS	
☒ 56	☒ 1.25k topographic map	☐ Non differential GPS	
		☐ Client GIS or CAD system	

☐ Client on system

Primary Recorder

Title	Surname	First Name	Initials
MS	BESANT	ANGELA	

Organisation: INSITE HERITAGE PTY LTD

Address: PO BOX 98 WANGI WANGI NSW 2267

Phone number: 02 49755818 Fax: 0249755818

Date recorded: 12/2008

☐ Client on system

☐ CLOSED SITE ☐ OPEN SITE

Site Context

Landform

- ☐ Mountains
- ☐ Plain
- ☒ Rolling hills
- ☐ Steep hills
- ☐ Undulating plain

Landform Unit

- ☐ Beach
- ☐ Coastal rock platform
- ☐ Dune
- ☐ Intertidal flat
- ☐ Lagoon
- ☐ Tidal Creek
- ☐ Tidal Flat
- ☐ Cliff
- ☒ Crest
- ☐ Flat
- ☐ Lower slope
- ☐ Mid slope
- ☒ Upper slope
- ☐ Plain
- ☐ Ridge
- ☐ Tor
- ☐ Valley flat
- ☐ Levy
- ☐ Stream bank
- ☐ Stream channel
- ☐ Swamp
- ☐ Terrace
- ☐ Terrace flat

Slope

☐ degrees

Vegetation

- ☐ Closed forest
- ☐ Grasslands
- ☐ Isolated clump of trees
- ☐ Open forest
- ☐ Open woodland
- ☐ Scrub
- ☐ Woodland
- ☐ Cleared
- ☐ Revegetated
- ☐ N/A

Land use

- ☐ Conservation
- ☐ Established urban
- ☐ Farming-intensive
- ☐ Farming-low intensity
- ☐ Forestry
- ☐ Industrial
- ☐ Mining
- ☐ Pastoral/grazing
- ☐ Recreation
- ☐ Semi-rural
- ☐ Service corridor
- ☐ Transport corridor
- ☐ Urban expansion
- ☐ N/A

Water

Distance to permanent water source: 250 - 500mapprox metres

Distance to temporary water source: metres

Name of nearest permanent water source: Glennies Ck

Name of nearest temporary water:

Directions for Relocation

Located within Ashton Coal Operations Ltd Camberwell, NSW, County of Durham Parish of Auckland. Sites located to the east of Glennies Ck on the slopes and crest of spur around village of Camberwell and the Camberwell Common south of the New England Highway

Current Land Tenure

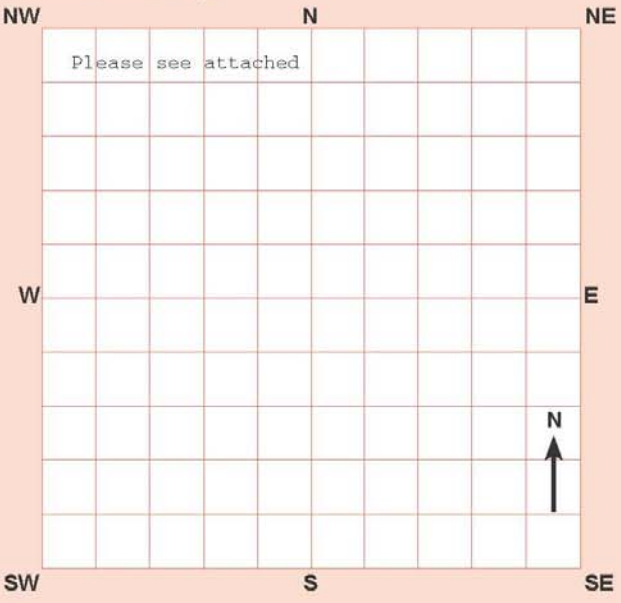
- ☐ Public
- ☐ Private

National Park/other government:

Primary report I.D. ☐ (I.D. Office Use only)

Aboriginal Archaeological Assessment Ashton Coal Operations Ltd Proposed South East Open Cut Project Unpublished Report to Ashton Coal Operations Ltd Insite Heritage 2009

Relocation Map



DEC (NSW) Aboriginal Site Recording Form - Site Information

General Site Information

Closed Site

Shelter/Cave Formation

- [ ] Boulder
- [ ] Wind erosion
- [ ] Water erosion
- [ ] Rock collapse

Condition of Ceiling

- [ ] Boulder
- [ ] Sandstone platform
- [ ] Silica gloss
- [ ] Tessellated
- [ ] Weathered
- [ ] Other platform

Open Site

Rock Surface Condition

- [ ] Boulder
- [ ] Sandstone platform
- [ ] Silica gloss
- [ ] Tessellated
- [ ] Weathered
- [ ] Other platform

Shelter Aspect

- [ ] North
- [ ] North East
- [ ] East
- [ ] South East
- [ ] South
- [ ] South West
- [ ] West
- [ ] North West

Features (including number of features)

- [ ] 1. Aboriginal Ceremony & Dreaming
- [ ] 2. Aboriginal Resource & Gathering
- [ ] 3. Art
- [x] 4. Artefact
- [ ] 5. Burial
- [ ] 6. Ceremonial Ring
- [ ] 7. Conflict
- [ ] 8. Earth Mound
- [ ] 9. Fish Trap
- [ ] 10. Grinding Groove
- [ ] 11. Habitation Structure
- [ ] 12. Hearth
- [ ] 13. Non Human Bone & Organic Material
- [ ] 14. Ochre quarry
- [ ] 15. Potential Archaeological Deposit
- [ ] 16. Stone Quarry
- [ ] 17. Shell
- [ ] 18. Stone Arrangement
- [ ] 19. Modified Tree
- [ ] 20. Water Hole

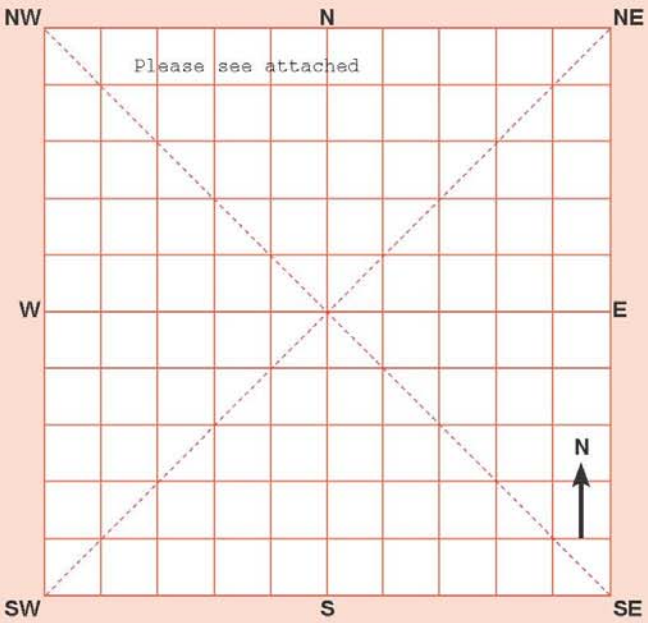
Site Orientation

- [ ] N-S
- [ ] NE-SW
- [ ] E-W
- [ ] SE-NW
- [ ] N/A

Attachments (No.)

- [x] A4 location map
- [ ] B/W photographs
- [ ] Colour photographs
- [ ] Slides
- [ ] Aerial photographs
- [ ] Site plans, drawings
- [x] Recording tables
- [x] Other
- [ ] Feature inserts-No [ ]

Estimated Site Extent and Location of Features



Site Context

Closed Site Dimensions (m)

- [ ] Internal length
- [ ] Internal width
- [ ] Shelter height
- [ ] Shelter floor area

Open Site Dimensions (m) Please see attached

- [ ] Total length of visible site
- [ ] Average width of visible site
- [ ] Estimated area of visible site
- [ ] Length of assessed site area

Site Interpretation and Community Statement - Aboriginal Community Interpretation and Management Recommendations

Preliminary Site Assessment - Scientific Analysis and Preliminary Management Recommendations

Site comprises of 13 separate Loci of artefacts: SA1/1-SA1/7, SA2/1-SA2/6, SA3/1.

Please see attached for site details tables and location map

Please note GPS reading for site taken from Loci SA2/3. Please refer to attached tables for GPS locations all loci.

This section should only be filled in by the Endorsees

Endorsed by: ☐ Knowledge Holder ☐ Nominated Trustee ☐ Native Title Holder ☐ Community Consensus

Title	Surname	First Name	Initials

Organisation

Address

Phone number Fax

Comments

Site Details: SA1/1-SA1/7, SA2/1–SA2/6, SA3/1

Unit	Site	Landform	Location GPS (UTM, datum WGS84)	Exposure (Approx. m)	Visibility	Description
SA1	**4**	Slope	E 56S 320332 N 6405026	30 x 10	50% SV 50% AV	Artefact scatter: Limited exposures under trees in grassed paddocks. Gravel background. Artefacts: 2 silcrete, 1 mudstone
SA1	**5**	Slope	E 56S 320274 N 6405002	6 x 2.5	75% SV 50% AV	Artefact scatter: Limited exposure along fence line in grassed paddock. Artefacts: 2 mudstone.
SA1	**2**	Slope	E 56S 320108 N 6404820	10 x 6	75% SV 75% AV	Artefact scatter: Exposure of gravels near house paddock. Limited visibility away from exposure due to light grass cover. Artefacts: 2 mudstone.
SA1	**7**	Slope	E 56S 320282 N 6404811	5 x 4	80% SV 50% AV	Artefact scatter: Exposure in ant's nest in open woodland. Artefacts: 2 mudstone
SA2	**4**	Spur crest	E 56S 320247 N 6404747	30 x 15	90% SV 75% AV	Artefact scatter: Exposure on hill top. Exposed area on hill side under open eucalypt and casuarina woodland (replanted). Visibility restricted away from exposure. Artefacts: 4 mudstone, 2 silcrete
SA1	**1**	Slope	E 56S 320107 N 6404679	60 X 5	100% SV 50% AV	Artefact scatter: Large exposure formed by driveway approaching house from Glennies Road. B horizon exposed by sheet erosion. Ironstone gravel background. Artefacts: 5 silcrete, 2 mudstone.
SA2	**5**	Spur crest	E 56S 320183 N 6404590	2 x 2	75% SV 50% AV	Artefact scatter: Small exposure on hill slope. Exposed area on hill side under open eucalypt and casuarina woodland (replanted). Artefacts: 1 mudstone, 1 volcanic.
SA2	**6**	Spur crest	E 56S 320314 N 6404462	20 x 10	75% SV 75% AV	Artefact scatter: One of a number of exposures on gentle hill slope below crest, under open eucalypt woodland (replanted). Thin layer, light sandy soils with clay B horizon exposed in part due to sheet erosion. High potential for sub-surface deposit. Artefacts: 26 mudstone, 3 silcrete. Concentration and number of small (<10mm) flakes suggest this may have been a knapping floor.
SA3	**1**	Gully	E 56S320261 N 6404429	40 x 10	75% SV 75% AV	Artefact scatter: Exposure alongside small dam in gully, possible sub-surface deposits. Artefacts: 2 mudstone
SA2	**1**	Spur crest	E 56S 320399 N 6404694	20 diam.	50% SV 90% AV	Artefact scatter: Exposed area on hill side under open eucalypt and casuarina woodland (replanted). Visibility limited by leaf litter and light grass cover. B horizon exposed by sheet erosion. Artefacts: 1 silcrete. 1 mudstone
SA1	**6**	Slope	E 56S 320376 N 6404768	20 x 15	80% SV 60% AV	Artefact scatter: Exposure with background gravels. Artefacts: 2 mudstone
SA2	**2**	Spur crest	E 56S 320353 N 6404710	50 x 3	75% SV 50% AV	Isolated find: Exposure along track running across hill side. Exposed area on hill side under open eucalypt and casuarina woodland (replanted). Artefacts: 1 mudstone

Unit	Site	Landform	Location GPS (UTM, datum WGS84)	Exposure (Approx. m)	Visibility	Description
SA2	**3**	Spur crest	E 56S 320356 N6404731	5 0 x 50	50% SV 75% AV	Artefact scatter: Exposure on hill top. Visibility limited by leaf litter, gravels and light grass cover. Exposed area on hill side under open eucalypt and casuarina woodland (replanted). Numerous artefacts across site but numbers decrease on slopes. B horizon exposed in part due to sheet erosion. 80m above ephemeral creek line. High potential for sub-surface material. Artefacts: 11 mudstone, 8 silcrete (10 x 10 area recorded in detail) 91 mudstone, 47 silcrete, 1 quartz (count only outside of sample area)

Artefact Details: SA1/1-SA1/7, SA2/1–SA2/6, SA3/1

Unit	Site	No	Material	Colour	Class	Sub	L	W	T	Comments
SA1	**4**	1	Silcrete	Pink	Flake		11	14	2	
SA1	**4**	2	Silcrete		Flake		30	65	15	
SA1	**4**	3	Mudstone		Core		35	65	35	
SA1	**5**	1	Mudstone		Flake		35	40	4	
SA1	**5**	2	Mudstone		Flake		25	20	4	
SA1	**2**	1	Mudstone	Red	Flake		42	25	7	5% tabular cortex
SA1	**2**	2	Mudstone	Yellow	Flake		17	12	4	
SA1	**7**	1	Mudstone		Flake		30	25	10	
SA1	**7**	2	Mudstone		Flake		35	25	8	
SA1	**1**	1	Mudstone	Yellow	Flake		16	11	3	
SA1	**1**	2	Silcrete	Grey	Core		72	45	34	40% pebble cortex, 3 negative scars, 2 platforms
SA1	**1**	3	Silcrete	Pink	Core		40	27	20	6 negative scars, 3 platforms
SA1	**1**	4	Silcrete	Pink	Flake		31	17	10	
SA1	**1**	5	Silcrete	Pink	Flake		16	14	4	
SA1	**1**	6	Silcrete	Red	Angular fragment		42	18	17	
SA1	**1**	7	Mudstone	Yellow	Flake		35	37	13	5% tabular cortex
SA2	**4**	1	Mudstone	Yellow	Core		75	35	22	
SA2	**4**	2	Silcrete	Grey	Flake		30	18	15	4 negative scars, 3 platforms
SA2	**4**	3	Silcrete	Grey	Flake	Backed	22	9	7	
SA2	**4**	4	Mudstone	Grey	Flake	Portion	17	9	2	
SA2	**4**	5	Mudstone	Pink	Flake	Portion	12	9	5	Mid
SA2	**4**	6	Mudstone	Pink	Flake	Portion	10	6	2	Lateral
SA2	**5**	1	Mudstone	Red	Angular fragment		19	15	12	Distal
SA2	**5**	2	Volcanic	Grey	Flake		55	35	13	
SA2	**6**	1	Mudstone	Yellow	Flake	Portion	9	5	2	40% pebble cortex, edge damage
SA2	**6**	2	Mudstone	Yellow	Flake	Portion	8	4	1	Distal
SA2	**6**	3	Mudstone	Yellow	Flake	Portion	18	7	3	Distal
SA2	**6**	4	Mudstone	Yellow	Angular fragment		9	6	4	Lateral
SA2	**6**	5	Mudstone	Yellow	Flake		26	18	8	
SA2	**6**	6	Silcrete	Pink	Flake	Portion	12	7	3	
SA2	**6**	7	Mudstone	Yellow	Flake		16	9	3	Lateral
SA2	**6**	8	Silcrete	Pink	Core		28	18	12	
SA2	**6**	9	Silcrete	Pink	Angular fragment		32	19	15	4 negative scars, 2 platforms

Unit	Site	No	Material	Colour	Class	Sub	L	W	T	Comments
SA2	**6**	10	Mudstone	Pink	Flake		38	25	15	
SA2	**6**	11	Mudstone	Pink	Flake		21	9	4	
SA2	**6**	12	Mudstone	Yellow	Flake		18	13	4	
SA2	**6**	13	Mudstone	Pink	Flake	Portion	32	20	8	
SA2	**6**	14	Mudstone	Yellow	Flake		16	9	4	Lateral
SA2	**6**	15	Mudstone	Yellow	Flake	Portion	18	14	4	
SA2	**6**	16	Mudstone	Yellow	Flake	Portion	12	9	3	Distal
SA2	**6**	17	Mudstone	Yellow	Flake		15	20	3	Lateral
SA2	**6**	18	Mudstone	Yellow	Flake		22	14	3	
SA2	**6**	19	Mudstone	Grey	Flake		24	18	6	
SA2	**6**	20	Mudstone	Yellow	Flake		21	15	6	
SA2	**6**	21	Mudstone	Pink	Flake		22	15	5	
SA2	**6**	22	Mudstone	Yellow	Flake		18	10	6	
SA2	**6**	23	Mudstone	Yellow	Flake		14	9	2	
SA2	**6**	24	Mudstone	Yellow	Flake		9	6	2	
SA2	**6**	25	Mudstone	Pink	Flake	Portion	12	7	4	
SA2	**6**	26	Mudstone	Pink	Core		32	20	14	
SA2	**6**	27	Mudstone	Pink	Flake		9	5	4	4 negative scars, 2 platforms
SA2	**6**	28	Mudstone	Yellow	Angular fragment		19	15	12	
SA2	**6**	29	Mudstone	Pink	Flake		6	5	2	
SA3	**1**	1	Mudstone	Yellow	Core		65	42	25	
SA3	**1**	2	Mudstone	Red	Flake		35	24	8	25% pebble cortex, 4 negative scars, 2 platforms
SA2	**1**	1	Silcrete	Pink	Angular fragment		38	22	18	
SA2	**1**	2	Mudstone	Red	Flake	Portion	35	22	8	
SA1	**6**	1	Mudstone		Flake		30	30	10	
SA1	**6**	2	Mudstone		Flake		30	25	8	
SA2	**2**	1	Mudstone	Grey	Flake	Portion	20	18	4	Distal, 50% pebble cortex, 2 tranverse dorsal scars
SA2	**3**	1	Silcrete	Red	Angular fragment		28	22	14	
SA2	**3**	2	Silcrete	Red	Flake		30	39	7	
SA2	**3**	3	Silcrete	Red	Flake		30	25	9	
SA2	**3**	4	Silcrete	Red	Flake	Portion	17	12	4	
SA2	**3**	5	Silcrete	Red	Flake	Portion	20	12	4	Mid
SA2	**3**	6	Mudstone	Red	Flake		21	18	9	Proximal
SA2	**3**	7	Silcrete	Red	Core		28	21	18	2 longitudinal dorsal scars
SA2	**3**	8	Mudstone	Yellow	Angular fragment		45	21	17	3 blade scars, 2 platforms

Unit	Site	No	Material	Colour	Class	Sub	L	W	T	Comments
SA2	**3**	9	Mudstone	Cream	Flake		17	9	6	10% tabular cortex
SA2	**3**	10	Mudstone	Grey	Angular fragment		28	17	12	
SA2	**3**	11	Mudstone	Red	Flake	Portion	17	12	6	
SA2	**3**	12	Mudstone	Red	Flake	Utilised	15	10	4	Mid
SA2	**3**	13	Mudstone	Red	Core		62	35	22	Use-wear/edge damage along distal margin
SA2	**3**	14	Mudstone	Red	Flake		55	25	8	60% pebble cortex, 5 negative scars, 2 platforms
SA2	**3**	15	Mudstone	Pink	Angular fragment		28	18	15	
SA2	**3**	16	Silcrete	Red	Flake		16	15	3	
SA2	**3**	17	Mudstone	Yellow	Flake		45	50	16	
SA2	**3**	18	Silcrete	Red	Flake		35	25	9	
SA2	**3**	19	Mudstone	Red	Flake		28	18	7	

AHIMS Aboriginal Heritage Information Management System

This information is not guaranteed to be free from errors or omissions. DEC and its employees disclaim liability for any act done or omission made on the information and consequences of such acts or omissions.

Aboriginal Site Recording Form

AHIMS Registrar
PO Box 1967, Hurstville NSW 2200
ahims@environment.nsw.gov.au

Department of **Environment and Conservation (NSW)**

Office Use Only

Site Number | | | - | | | - | | | |

Date received / / Date entered into system / / Date catalogued / /

Entered by (Name)

Information Access

Office Use Only

☐ Gender/male ☐ Gender/female ☐ Location restriction ☐ General restriction ☐ No access

For Further Information Contact:

☐ **Nominated Trustee**

Title	Surname	First Name	Initials
MS	WORTH	SUZIE	

Organisation: WANARUAH LOCAL ABORGINAL LAND COUNCIL

Address: PO BOX 127 MUSWELLBROOK NSW 2333

Phone number: 02 65431288 Fax: 0265425377

Client on system ☐

☐ **Knowledge Holder**

Title	Surname	First Name	Initials

Organisation

Address

Phone number Fax

Aboriginal Heritage Unit or Cultural Heritage Division Contacts

Geographic Location

Site Name: SA4/1, SA4/6 - SA4/11

Easting: 320345 Nothing: 6404168 ☐ AMG ☒ GDA

Mapsheet: CAMBERWELL 9133-III-S

Client on system ☐

Zone

☐ 54	☐ 1.25k topographic map	☒ Non differential GPS	
☐ 55	☐ 1.25k topographic map	☐ Non differential GPS	
☒ 56	☒ 1.25k topographic map	☐ Non differential GPS	
		☐ Client GIS or CAD system	

Primary Recorder

Title	Surname	First Name	Initials
MS	BESANT	ANGELA	

Organisation: INSITE HERITAGE PTY LTD

Address: PO BOX 98 WANGI WANGI NSW 2267

Phone number: 02 49755818 Fax: 0249755818

Date recorded: 12/2008

Client on system ☐

DEC (NSW) Aboriginal Site Recording Form - Site Information

☐ CLOSED SITE ☐ OPEN SITE

Site Context

Landform

- ☐ Mountains
- ☐ Plain
- ☒ Rolling hills
- ☐ Steep hills
- ☐ Undulating plain

Landform Unit

- ☐ Beach
- ☐ Coastal rock platform
- ☐ Dune
- ☐ Intertidal flat
- ☐ Lagoon
- ☐ Tidal Creek
- ☐ Tidal Flat
- ☐ Cliff
- ☒ Crest
- ☐ Flat
- ☐ Lower slope
- ☐ Mid slope
- ☒ Upper slope
- ☐ Plain
- ☐ Ridge
- ☐ Tor
- ☐ Valley flat
- ☐ Levy
- ☐ Stream bank
- ☐ Stream channel
- ☐ Swamp
- ☐ Terrace
- ☐ Terrace flat

Slope

☐ degrees

Vegetation

- ☐ Closed forest
- ☐ Grasslands
- ☐ Isolated clump of trees
- ☐ Open forest
- ☐ Open woodland
- ☐ Scrub
- ☐ Woodland
- ☐ Cleared
- ☐ Revegetated
- ☐ N/A

Land use

- ☐ Conservation
- ☐ Established urban
- ☐ Farming-intensive
- ☐ Farming-low intensity
- ☐ Forestry
- ☐ Industrial
- ☐ Mining
- ☐ Pastoral/grazing
- ☐ Recreation
- ☐ Semi-rural
- ☐ Service corridor
- ☐ Transport corridor
- ☐ Urban expansion
- ☐ N/A

Water

Distance to permanent water source: 500mapprox metres

Distance to temporary water source: metres

Name of nearest permanent water source: Glennies Ck

Name of nearest temporary water:

Directions for Relocation

Located within Ashton Coal Operations Ltd Camberwell, NSW, County of Durham Parish of Auckland.

Sites located to the east of Glennies Ck on the crest of spur to the south of the Camberwell Common and the New England Highway

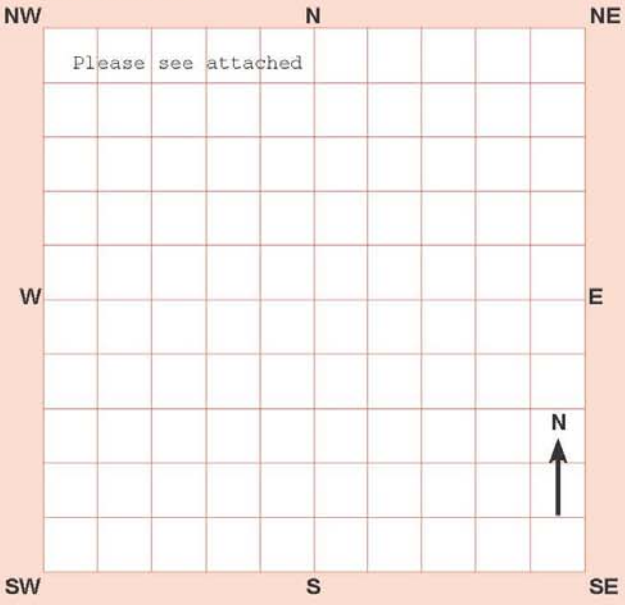
Current Land Tenure

- ☐ Public — National Park/other government
- ☐ Private

Primary report I.D. ☐ (I.D. Office Use only)

Aboriginal Archaeological Assessment
Ashton Coal Operations Ltd
Proposed South East Open Cut Project
Unpublished Report to Ashton Coal
Operations Ltd
Insite Heritage 2009

Relocation Map



DEC (NSW) Aboriginal Site Recording Form - Site Information

General Site Information

Closed Site

Shelter/Cave Formation

- [ ] Boulder
- [ ] Wind erosion
- [ ] Water erosion
- [ ] Rock collapse

Condition of Ceiling

- [ ] Boulder
- [ ] Sandstone platform
- [ ] Silica gloss
- [ ] Tessellated
- [ ] Weathered
- [ ] Other platform

Open Site

Rock Surface Condition

- [ ] Boulder
- [ ] Sandstone platform
- [ ] Silica gloss
- [ ] Tessellated
- [ ] Weathered
- [ ] Other platform

Shelter Aspect

- [ ] North
- [ ] North East
- [ ] East
- [ ] South East
- [ ] South
- [ ] South West
- [ ] West
- [ ] North West

Features (including number of features)

- [ ] 1. Aboriginal Ceremony & Dreaming
- [ ] 2. Aboriginal Resource & Gathering
- [ ] 3. Art
- [x] 4. Artefact
- [ ] 5. Burial
- [ ] 6. Ceremonial Ring
- [ ] 7. Conflict
- [ ] 8. Earth Mound
- [ ] 9. Fish Trap
- [ ] 10. Grinding Groove
- [ ] 11. Habitation Structure
- [ ] 12. Hearth
- [ ] 13. Non Human Bone & Organic Material
- [ ] 14. Ochre quarry
- [ ] 15. Potential Archaeological Deposit
- [ ] 16. Stone Quarry
- [ ] 17. Shell
- [ ] 18. Stone Arrangement
- [ ] 19. Modified Tree
- [ ] 20. Water Hole

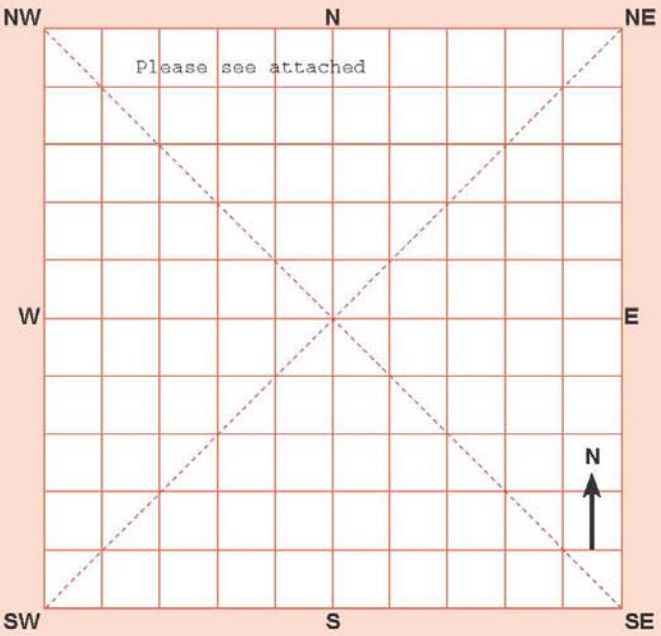
Site Orientation

- [ ] N-S
- [ ] NE-SW
- [ ] E-W
- [ ] SE-NW
- [ ] N/A

Attachments (No.)

- [x] A4 location map
- [ ] B/W photographs
- [ ] Colour photographs
- [ ] Slides
- [ ] Aerial photographs
- [ ] Site plans, drawings
- [x] Recording tables
- [x] Other
- [ ] Feature inserts-No [ ]

Estimated Site Extent and Location of Features



Site Context

Closed Site Dimensions (m)

- [ ] Internal length
- [ ] Internal width
- [ ] Shelter height
- [ ] Shelter floor area

Open Site Dimensions (m) Please see attached

- [ ] Total length of visible site
- [ ] Average width of visible site
- [ ] Estimated area of visible site
- [ ] Length of assessed site area

Site Interpretation and Community Statement - Aboriginal Community Interpretation and Management Recommendations

Preliminary Site Assessment - Scientific Analysis and Preliminary Management Recommendations

Site comprises of 7 separate Loci of artefacts: SA4/1,SA4/6 - SA4/11 located on crest of spur, and upper to mid slopes of spur to the east of Glennies Ck and to the south of Camberwell Common.

Please see attached for site details tables and location map

Please note GPS reading on front of site card is the GPS reading for loci SA4/10. Please refer to attached tables for GPS locations all loci.

This section should only be filled in by the Endorsees

Endorsed by: ☐ Knowledge Holder ☐ Nominated Trustee ☐ Native Title Holder ☐ Community Consensus

Title | Surname | First Name | Initials

Organisation

Address

Phone number | Fax

Comments

Site Details: SA4/1,SA4/6 – SA4/11

Unit	Site	Landform	Location GPS (UTM, datum WGS84)	Exposure (Approx. m)	Visibility	Description
SA4	**1**	Slope	E 56S 320400 N 6404265	5 x 5	75% SV 75% AV	Isolated find: Limited exposure on slope under scattered eucalypt woodland (replanted). Heavy grass cover away from exposure. Artefacts: 1 mudstone
SA4	**6**	Slope	E 56S 320233 N 6404069	6 x 2	75% SV 50% AV	Artefact scatter: Mid slope in grassed paddock with heavy stock treadage Artefacts: 1 mudstone, 1 silcrete
SA4	**7**	Slope	E 56S 320192 N 6404207	5 x 5	50% SV 50% AV	Isolated find: Mid slope in grassed paddock, sheet erosion Artefacts: 1 mudstone
SA4	**8**	Slope	E 56S 320227 N 6404253	15 x 3	80% SV 60% AV	Artefact scatter: Mid slope adjacent to exposure along fence line. Artefacts: 2 mudstone
SA4	**9**	Slope	E 56S 320330 N 6404205	2 x 2	80% SV 60% AV	Artefact scatter: Mid slope in grassed paddock, sheet erosion Artefacts: 2 silcrete, 1 mudstone
SA4	**10**	Slope	E 56S 320345 N 6404168	15 x 5	50% SV 50% AV	Artefact scatter: Upper slope in grassed paddock, sheet erosion Moderate potential for sub-surface deposit. Artefacts: 6 mudstone, 2 FGS, 1 silcrete, 1 chert
SA4	**11**	Slope	E 56S 320380 N 6404244	50 x 20	60% SV 80% AV	Artefact scatter: Upper slope in grassed paddock with scatter of casuarinas. Moderate potential for sub-surface deposit. Artefacts: 9 silcrete, 2 mudstone

Artefact Details: SA4/1,SA4/6 – SA4/11

Unit	Site	No	Material	Colour	Class	Sub	L	W	T	Comments
SA4	**1**	1	Mudstone	Orange	Flake		44	28	17	
SA4	**6**	1	Mudstone		Core		35	25	15	
SA4	**6**	2	Silcrete		Flake	Portion	35	2	15	
SA4	**7**	1	Mudstone		Flake		30	25	4	
SA4	**8**	1	Mudstone		Flake	Portion	35	16	4	
SA4	**8**	2	Mudstone		Flake	Portion	32	16	9	
SA4	**9**	1	Mudstone		Core		35	18	4	
SA4	**9**	2	Silcrete		Flake		25	15	2	
SA4	**9**	3	Silcrete	Yellow	Flake		30	29	9	
SA4	**10**	1	FGS	Yellow	Flake	Portion	40	20	15	
SA4	**10**	2	Mudstone	Red	Flake		25	20	5	
SA4	**10**	3	Silcrete	Pink	Flake		35	15	2	
SA4	**10**	4	FGS		Flake	Portion	20	10	2	
SA4	**10**	5	Mudstone		Flake	Portion	30	25	4	
SA4	**10**	6	Mudstone		Flake		32	25	4	
SA4	**10**	7	Mudstone		Flake		11	10	1	
SA4	**10**	8	Chert		Flake		11	10	1	
SA4	**10**	9	Mudstone	Cream	Flake		15	15	2	
SA4	**10**	10	Mudstone	Yellow	Flake	Portion	10	11	2	
SA4	**11**	1	Silcrete	Pink	Core		30	24	15	
SA4	**11**	2	Silcrete	Cream	Core		30	30	15	
SA4	**11**	3	Silcrete	grey	Core		30	20	20	
SA4	**11**	4	Silcrete		Flake	Portion	20	15	3	
SA4	**11**	5	Silcrete		Flake		15	8	2	
SA4	**11**	6	Mudstone	Yellow	Flake		40	30	1	
SA4	**11**	7	Mudstone	Yellow	Flake		38	41	15	
SA4	**11**	8	Silcrete	Grey	Core		30	26	21	40% cortex
SA4	**11**	9	Silcrete		Flake	Portion	15	15	3	
SA4	**11**	10	Silcrete		Flake	Portion	20	15	2	
SA4	**11**	11	Silcrete		Flake	Portion	10	20	3	

Aboriginal Site Recording Form

AHIMS Registrar
PO Box 1967, Hurstville NSW 2200
ahims@environment.nsw.gov.au

Department of **Environment and Conservation (NSW)**

Office Use Only

Site Number | | | - | | | - | | | |

Date received / / Date entered into system / / Date catalogued / /

Entered by (Name)

Information Access

Office Use Only

☐ Gender/male ☐ Gender/female ☐ Location restriction ☐ General restriction ☐ No access

For Further Information Contact:

☐ **Nominated Trustee**

Title	Surname	First Name	Initials
MS	WORTH	SUZIE	

Organisation: WANARUAH LOCAL ABORGINAL LAND COUNCIL

Address: PO BOX 127 MUSWELLBROOK NSW 2333

Phone number: 02 65431288 Fax: 0265425377

☐ Client on system

☐ **Knowledge Holder**

Title	Surname	First Name	Initials

Organisation:

Address:

Phone number: Fax:

Aboriginal Heritage Unit or Cultural Heritage Division Contacts

Geographic Location

Site Name: SA4/3-SA4/5, SA5/1-SA5/8, SA5/10-SA5/11, SA6/1-SA6/4

Easting: 321027 Nothing: 6403665 ☐ AMG ☒ GDA

Mapsheet: CAMBERWELL 9133-III-S

Zone

☐	54	☐ 1.25k topographic map	☒ Non differential GPS
☐	55	☐ 1.25k topographic map	☐ Non differential GPS
☒	56	☒ 1.25k topographic map	☐ Non differential GPS
			☐ Client GIS or CAD system

☐ Client on system

Primary Recorder

Title	Surname	First Name	Initials
MS	BESANT	ANGELA	

Organisation: INSITE HERITAGE PTY LTD

Address: PO BOX 98 WANGI WANGI NSW 2267

Phone number: 02 49755818 Fax: 0249755818

Date recorded: 12/2008

☐ Client on system

DEC (NSW) Aboriginal Site Recording Form - Site Information

☐ CLOSED SITE ☐ OPEN SITE

Site Context

Landform

- ☐ Mountains
- ☐ Plain
- ☐ Rolling hills
- ☐ Steep hills
- ☒ Undulating plain

Landform Unit

- ☐ Beach
- ☐ Coastal rock platform
- ☐ Dune
- ☐ Intertidal flat
- ☐ Lagoon
- ☐ Tidal Creek
- ☐ Tidal Flat
- ☐ Cliff
- ☐ Crest
- ☐ Flat
- ☐ Lower slope
- ☐ Mid slope
- ☐ Upper slope
- ☐ Plain
- ☐ Ridge
- ☐ Tor
- ☐ Valley flat
- ☐ Levy
- ☒ Stream bank
- ☐ Stream channel
- ☐ Swamp
- ☐ Terrace
- ☐ Terrace flat

Slope

☐ degrees

Vegetation

- ☐ Closed forest
- ☐ Grasslands
- ☐ Isolated clump of trees
- ☐ Open forest
- ☐ Open woodland
- ☐ Scrub
- ☐ Woodland
- ☐ Cleared
- ☐ Revegetated
- ☐ N/A

Land use

- ☐ Conservation
- ☐ Established urban
- ☐ Farming-intensive
- ☐ Farming-low intensity
- ☐ Forestry
- ☐ Industrial
- ☐ Mining
- ☐ Pastoral/grazing
- ☐ Recreation
- ☐ Semi-rural
- ☐ Service corridor
- ☐ Transport corridor
- ☐ Urban expansion
- ☐ N/A

Water

Distance to permanent water source: 250m-2kmapprox metres

Distance to temporary water source: 0m metres

Name of nearest permanent water source: Glennies Ck

Name of nearest temporary water: Unnamed

Directions for Relocation

Located within Ashton Coal Operations Ltd Camberwell, NSW, County of Durham Parish of Auckland. Site located along an unnamed tributary which runs west into Glennies Creek

Current Land Tenure

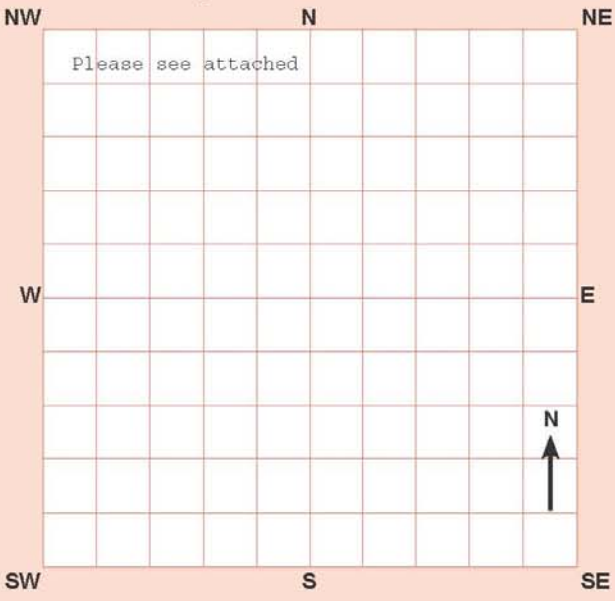
- ☐ Public
- ☐ Private

National Park/other government: ☐

Primary report I.D. ☐ (I.D. Office Use only)

Aboriginal Archaeological Assessment
Ashton Coal Operations Ltd
Proposed South East Open Cut Project
Unpublished Report to Ashton Coal
Operations Ltd
Insite Heritage 2009

Relocation Map



DEC (NSW) Aboriginal Site Recording Form - Site Information

General Site Information

Closed Site

Shelter/Cave Formation

- [ ] Boulder
- [ ] Wind erosion
- [ ] Water erosion
- [ ] Rock collapse

Condition of Ceiling

- [ ] Boulder
- [ ] Sandstone platform
- [ ] Silica gloss
- [ ] Tessellated
- [ ] Weathered
- [ ] Other platform

Open Site

Rock Surface Condition

- [ ] Boulder
- [ ] Sandstone platform
- [ ] Silica gloss
- [ ] Tessellated
- [ ] Weathered
- [ ] Other platform

Shelter Aspect

- [ ] North
- [ ] North East
- [ ] East
- [ ] South East
- [ ] South
- [ ] South West
- [ ] West
- [ ] North West

Features (including number of features)

- [ ] 1. Aboriginal Ceremony & Dreaming
- [ ] 2. Aboriginal Resource & Gathering
- [ ] 3. Art
- [x] 4. Artefact
- [ ] 5. Burial
- [ ] 6. Ceremonial Ring
- [ ] 7. Conflict
- [ ] 8. Earth Mound
- [ ] 9. Fish Trap
- [ ] 10. Grinding Groove
- [ ] 11. Habitation Structure
- [ ] 12. Hearth
- [ ] 13. Non Human Bone & Organic Material
- [ ] 14. Ochre quarry
- [x] 15. Potential Archaeological Deposit
- [ ] 16. Stone Quarry
- [ ] 17. Shell
- [ ] 18. Stone Arrangement
- [ ] 19. Modified Tree
- [ ] 20. Water Hole

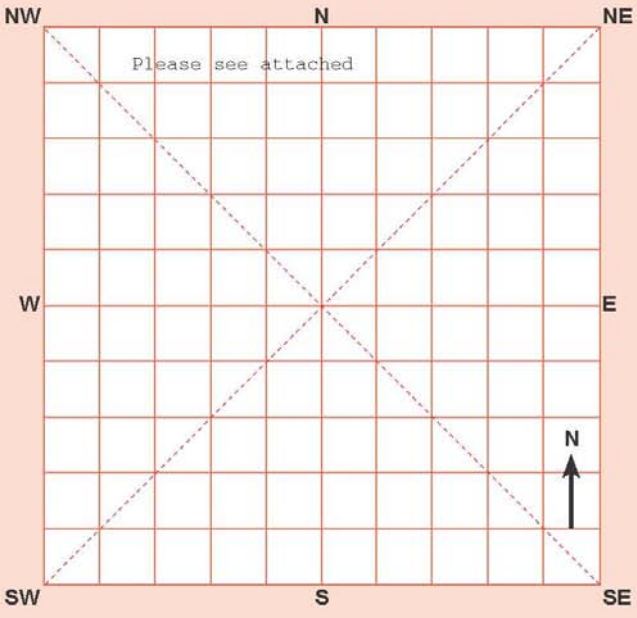
Site Orientation

- [ ] N-S
- [ ] NE-SW
- [ ] E-W
- [ ] SE-NW
- [ ] N/A

Attachments (No.)

- [x] A4 location map
- [ ] B/W photographs
- [ ] Colour photographs
- [ ] Slides
- [ ] Aerial photographs
- [ ] Site plans, drawings
- [x] Recording tables
- [x] Other
- [ ] Feature inserts-No

Estimated Site Extent and Location of Features



Site Context

Closed Site Dimensions (m)

- Internal length
- Internal width
- Shelter height
- Shelter floor area

Open Site Dimensions (m) Please see attached

- Total length of visible site
- Average width of visible site
- Estimated area of visible site
- Length of assessed site area

Site Interpretation and Community Statement - Aboriginal Community Interpretation and Management Recommendations

Please refer to Insite Heritage 2009 report

Preliminary Site Assessment - Scientific Analysis and Preliminary Management Recommendations

Site comprises of 17 separate Loci of artefacts:
SA4/3-SA4/5, SA5/1-SA5/8, SA5/10-SA5/11, SA6/1-SA6/4
located adjacent to east west flowing tributary of Glennies Creek.
These loci located in Survey Area 5 & Survey Area 4 of study area
(refer to Insite Heritage 2009 report).
Survey Area 5 - Also identified as and area of moderate significance for potential to contain subsurface artefacts.
Please see attached for site details tables and location map
Please note GPS reading on front of site card are the GPS co-ordinates for loci SA5/10.
Please refer to attached tables for GPS locations all loci.

This section should only be filled in by the Endorsees

Endorsed by: ☐ Knowledge Holder ☐ Nominated Trustee ☐ Native Title Holder ☐ Community Consensus

Title	Surname	First Name	Initials

Organisation

Address

Phone number Fax

Comments

Site Details: SA4/3-SA4/5, SA5/1-SA5/8, SA5/10-SA5/11, SA6/1-SA6/4

Unit	Site	Landform	Location GPS (UTM, datum WGS84)	Exposure (Approx. m)	Visibility	Description
SA4	**3**	Slope	E 56S 321170 N 6403767	7 x 3	50% SV 50% AV	Isolated find: Small exposure in house paddock, heavy grass cover away from exposure. Few sandstone exposures. Artefacts: 1 mudstone
SA4	**4**	Slope	E 56S 321152 N 6403748	30 x 5	80% SV 25% Av	Isolated find: Exposure around small dam. Artefact: 1 volcanic
SA4	**5**	Slope	E56S 320396 N 6403801	1 x1	80% SV 50% AV	Isolated find: Small exposure in ditch adjacent to access road. Low visibility away from track. Artefact: 1 mudstone
SA5	**1**	Gully	E 56S 320095 N 6403881	500 x 10	50% SV 80% AV	Artefact scatter: On creek line, exposures due to erosion along bank, dense grass cover away from creek line. Artefacts: 2 mudstone, 1 silcrete
SA5	**2**	Gully	E 56S 319996 N 6403821	500 x 10	50% SV 80% AV	Artefact scatter: On creek line, exposures due to erosion along bank, dense grass cover away from creek line. High potential for sub-surface deposit. Artefacts: 11 silcrete, 10 mudstone
SA5	**3**	Gully	E 56 S 319955 N 640 3815	500 x 10	50% Sv 80% AV	Isolated find: On creek line, continuous exposures due to erosion along bank, dense grass cover away from creek line. Artefacts: 1 silcrete
SA5	**4**	Gully	E 56S319920 N 6403801	500 x 10	50% SV 80% AV	Artefact scatter: On creek line, continuous exposures due to erosion along bank, dense grass cover away from creek line. Artefacts: 7 mudstone, 1 volcanic
SA5	**5**	Gully	E 56S319900 N 6403780	500 x 10	50% SV 80% AV	Artefact scatter: On creek line, exposures due to erosion along bank, dense grass cover away from creek line. Artefacts: 6 silcrete, 1 mudstone
SA5	**6**	Gully	E 56S 320418 N 6403683	500 x 10	50% SV 80% AV	Artefact scatter: On creek line, exposures due to erosion along bank, dense grass cover away from creek line. Artefacts: 1 silcrete
SA5	**7**	Gully	E 56S320398 N 6403690	500 x 10	50% SV 80% AV	Artefact scatter: On creek line, exposures due to erosion along bank, dense grass cover away from creek line. Artefacts: 2 mudstone, 1 silcrete, 1 quartz
SA5	**8**	Gully	E 56S320139 N 6403864	500 x 10	50% SV 80% AV	Artefact scatter: On creek line, exposures due to erosion along bank, dense grass cover away from creek line. Artefacts: 3 mudstone, 1 silcrete, 1 quartz
SA5	**10**	Gully	E 56S 321027 N 6403665	500 x 10	50% SV 80% AV	Artefact scatters: On creek bank. Exposures caused by erosion along both banks. High potential for sub-surface deposit. Mudstone AF also located further east along bank at 321385 6403640 Artefacts: 21 silcrete, 7 mudstone.
SA5	**11**	Gully	E 56S 320720 N 6403610	100 x 50	75%SV 50% AV	Artefact scatter: Along eroded sections of both sides of creek bank. High potential for sub-surface deposits. Artefacts: 10 mudstone, 1 silcrete
SA6	**1**	Slope	E 56S 321041 N 6403486	20 x 20	20% S V 50% AV	Artefact scatter. Limited exposure over approx . 20m on slope, 100m above creek line. Scattered replanting of eucalypt in the area. Visibility limited by grass and leaf litter. Shallow A1 horizon washed off exposing artefacts, moderate potential for sub-surface material. Artefacts: 5 mudstone, 1 silcrete.

Unit	Site	Landform	Location GPS (UTM, datum WGS84)	Exposure (Approx. m)	Visibility	Description
SA6	**2**	Slope	E 56S 320877 N 6403489	35 x 4	90% SV, 10% AV	Artefact scatter. Exposure along wall of dam 20m south of creek line. Visibility away from dam wall limited by grass and leaf litter. Moderate potential for sub-surface material below dam wall on creek bank. Artefacts: 5 mudstone, 3 silcrete, 1 chert.
SA6	**3**	Slope	E 56S 320836 N 6403496	22 x 3	25%SV 25%AV	Artefact scatter. Limited exposure (stock trail) along fence line. Heavy grass away from exposure. 40m south of creek. Some potential for sub-surface deposit. Artefacts: 3 mudstone, 1 silcrete
SA6	**4**	Slope	E 56S 320855 N 6403502	10 x 6	50% SV 75% AV	Artefact scatter: Exposure in track 20m south of creek line below dam wall. Artefacts: 4 mudstone

Artefact Details: SA4/3-SA4/5, SA5/1-SA5/8, SA5/10-SA5/11, SA6/1-SA6/4

Unit	Site	No	Material	Colour	Class	Sub	L	W	T	Comments
SA5	**1**	1	Mudstone	Cream	Flake		7	5	2	
SA5	**1**	2	Silcrete	Red	Flake		9	6	4	
SA5	**1**	3	Mudstone	Pink	Flake		12	6	3	
SA5	**2**	1	Mudstone	Cream	Flake		52	24	5	
SA5	**2**	2	Silcrete	Cream	Flake		20	10	5	
SA5	**2**	3	Mudstone	Yellow	Flake	Portion	40	20	10	
SA5	**2**	4	Silcrete	Red	Angular fragment		55	45	10	Mid
SA5	**2**	5	Silcrete	Red	Angular fragment		40	30	15	
SA5	**2**	6	Mudstone	Grey	Flake		35	20	8	
SA5	**2**	7	Mudstone	Yellow	Flake	Backed	20	10	4	
SA5	**2**	8	Mudstone	Red	Flake	Portion	21	10	4	
SA5	**2**	9	Mudstone	Grey	Flake		25	40	10	Mid
SA5	**2**	10	Volcanic	Grey	Hammerstone		80	70	60	Banded grey/yellow, redirecting flake
SA5	**2**	11	Mudstone	Yellow	Angular fragment		10	8	3	Pitting to ends
SA5	**2**	12	Mudstone	Yellow	Angular fragment		9	4	2	
SA5	**2**	13	Mudstone	Yellow	Angular fragment		35	20	12	
SA5	**2**	14	Silcrete	Grey	Flake		10	8	3	
SA5	**2**	15	Silcrete	Grey	Flake		9	4	2	
SA5	**2**	16	Silcrete	Grey	Flake		5	8	4	
SA5	**2**	17	Silcrete	Grey	Flake		4	6	2	
SA5	**2**	18	Silcrete	Grey	Flake		8	5	4	
SA5	**2**	19	Silcrete	Grey	Flake		8	4	2	
SA5	**2**	20	Silcrete	Grey	Flake		5	4	3	
SA5	**2**	21	Silcrete	Grey	Flake		11	5	3	
SA5	**3**	1	Silcrete	Yellow	Angular fragment		20	30	6	
SA5	**4**	1	Volcanic	Red	Flake		35	25	10	Coarse grained
SA5	**4**	2	Mudstone	Yellow	Flake		50	60	15	
SA5	**4**	3	Mudstone	Yellow	Flake	Backed	30	19	10	10% pebble cortex
SA5	**4**	4	Mudstone	Yellow	Flake		35	44	7	Scraper
SA5	**4**	5	Mudstone	Purple	Flake	Redirecting	45	25	18	50% pebble cortex
SA5	**4**	6	Mudstone	Red	Flake		25	22	8	
SA5	**4**	7	Mudstone	Red	Flake	Portion	10	14	4	40% pebble cortex
SA5	**4**	8	Mudstone	Grey	Flake		40	27	7	Distal
SA5	**5**	1	Silcrete	Red	Flake		22	20	4	5% pebble cortex
SA5	**5**	2	Silcrete	Red	Flake	Blade	25	4	3	?heat treated

Unit	Site	No	Material	Colour	Class	Sub	L	W	T	Comments
SA5	**5**	3	Silcrete	Red	Flake		30	30	15	
SA5	**5**	4	Silcrete	Red	Flake		28	15	10	
SA5	**5**	5	Silcrete	Red	Flake	Blade	25	7	4	
SA5	**5**	6	Mudstone	Brown	Flake		20	18	7	
SA5	**5**	7	Silcrete	Red	Angular fragment		60	40	30	
SA5	**6**	1	Silcrete	Grey	Flake		25	20	4	
SA5	**7**	1	Mudstone	Yellow	Flake	Portion	34	30	6	
SA5	**7**	2	Quartz	White	Angular fragment		15	12	6	Proximal
SA5	**7**	3	Mudstone	Yellow	Flake		20	10	5	
SA5	**7**	4	Silcrete	Grey	Flake		15	12	7	
SA5	**8**	1	Mudstone	Yellow	Flake		30	20	7	
SA5	**8**	2	Quartz	White	Flake		20	10	3	
SA5	**8**	3	Mudstone	Yellow	Flake		10	7	4	
SA5	**8**	4	Mudstone	Red	Flake		8	5	3	
SA5	**8**	5	Silcrete	Yellow	Flake	Scraper	45	50	20	
SA5	**10**	1	Silcrete	Yellow	Flake		35	33	8	Steep retouch to distal margin
SA5	**10**	2	Silcrete	Red	Angular fragment		39			
SA5	**10**	3	Silcrete	Red	Flake	Portion	40	30	12	
SA5	**10**	4	Silcrete	Red	Flake	Portion	28	11	7	
SA5	**10**	5	Silcrete	Red	Angular fragment		35			
SA5	**10**	6	Silcrete	Red	Angular fragment		26			
SA5	**10**	7	Silcrete	Red	Flake		41	23	6	
SA5	**10**	8	Mudstone	Yellow	Flake	Portion	45	32	11	
SA5	**10**	9	Mudstone	Yellow	Flake		30	36	9	
SA5	**10**	10	Mudstone	Yellow	Flake	Portion	18	14	3	
SA5	**10**	11	Mudstone	Yellow	Flake	Portion	15	8	2	
SA5	**10**	12	Silcrete	Red	Flake		40	35	20	
SA5	**10**	13	Silcrete	Yellow	Flake		38	29	6	
SA5	**10**	14	Mudstone	Brown	Core		30	38	24	
SA5	**10**	15	Silcrete	Red	Flake	Portion	20	10	3	
SA5	**10**	16	Silcrete	Red	Flake		19	13	2	
SA5	**10**	17	Silcrete	Pink	Flake	Portion	12	13	2	
SA5	**10**	18	Silcrete	Pink	Flake	Portion	28	15	6	
SA5	**10**	19	Silcrete	Pink	Core		35			
SA5	**10**	20	Silcrete	Red	Angular fragment		16			
SA5	**10**	21	Silcrete	Yellow	Flake		10	14	7	
SA5	**10**	22	Silcrete	Yellow	Flake	Portion	24	10	3	

Unit	Site	No	Material	Colour	Class	Sub	L	W	T	Comments
SA5	**10**	23	Silcrete	Red	Flake	Portion	23	10	3	
SA5	**10**	24	Silcrete	Brown	Flake	Portion	13	8	2	Proximal
SA5	**10**	25	Mudstone	Brown	Flake	Portion	23	18	7	
SA5	**10**	26	Mudstone		Flake		13	12	11	Proximal
SA5	**10**	27	Silcrete		Flake	Portion	16	9	1	
SA5	**10**	28	Silcrete	Red	Flake		25	2	5	
SA5	**11**	1	Mudstone	Yellow	Flake	Portion	27	35	8	
SA5	**11**	2	Mudstone	Brown	Flake		32	12	10	
SA5	**11**	3	Mudstone	Red	Flake	Portion	26	18	3	
SA5	**11**	4	Mudstone	Red	Flake		26	17	2	
SA5	**11**	5	Mudstone		Flake		11	11	2	
SA5	**11**	6	Mudstone		Flake	Portion	29	27	6	
SA5	**11**	7	Mudstone	White	Angular fragment		30			
SA5	**11**	8	Mudstone	Yellow	Flake		20	18	3	
SA5	**11**	9	Silcrete	Red	Flake		20	25	3	
SA5	**11**	10	Mudstone		Flake	Portion	19	8	5	
SA5	**11**	11	Mudstone	Red	Flake		9	8	1	
SA6	**1**	1	Mudstone	Orange	Flake	Portion	14	12	3	Proximal, 25% tabular cortex
SA6	**1**	2	Mudstone	Yellow	Flake		30	21	9	5% tabular cortex
SA6	**1**	3	Mudstone	Orange	Angular fragment		18	10	8	
SA6	**1**	4	Mudstone	Orange	Flake		30	21	8	5% tabular cortex
SA6	**1**	5	Silcrete	Yellow	Flake		14	7	2	Longitudinal dorsal ridge
SA6	**1**	6	Mudstone	Red	Flake		27	22	6	Longitudinal dorsal scar
SA6	**2**	1	Mudstone	Yellow	Angular fragment		23	15	12	
SA6	**2**	2	Mudstone	Brown	Flake		42	26	8	10% tabular cortex
SA6	**2**	3	Mudstone	Cream	Flake		26	16	4	Longitudinal dorsal ridge
SA6	**2**	4	Silcrete	Grey	Angular fragment		22	11	8	20% weathered cortex
SA6	**2**	5	Silcrete	Red	Flake		40	30	12	25% weathered cortex
SA6	**2**	6	Mudstone	Yellow	Angular fragment		26	16	12	
SA6	**2**	7	Silcrete	Grey	Flake	Portion	15	10	2	Distal
SA6	**2**	8	Mudstone	Yellow	Flake	Portion	15	8	5	Mid
SA6	**2**	9	Chert	Grey	Flake		25	19	9	10% pebble cortex
SA6	**3**	1	Mudstone	Red/orange	Flake		33	27	7	
SA6	**3**	2	Silcrete	Grey	Angular fragment		31	15	11	

Unit	Site	No	Material	Colour	Class	Sub	L	W	T	Comments
SA6	**3**	3	Mudstone	Yellow	Flake	Portion	22	13	7	Distal
SA6	**3**	4	Mudstone	Grey	Flake	Backed	25	11	6	
SA6	**4**	1	Mudstone	Red	Flake		45	30	10	
SA6	**4**	2	Mudstone	Yellow	Flake		17	11	3	
SA6	**4**	3	Mudstone	Yellow	Angular fragment		80			
SA6	**4**	4	Mudstone	Yellow	Flake	Portion	12	8	2	
SA4	**3**	1	Mudstone	Red	Flake	Scraper	35	28	12	
SA4	**4**	1	Volcanic	Grey	Axe	Pre- form	120	90	23	45% pebble cortex
SA4	**5**	1	Mudstone	Red	Flake	Portion	57	35	9	

Aboriginal Site Recording Form

AHIMS Registrar
PO Box 1967, Hurstville NSW 2200
ahims@environment.nsw.gov.au

Department of **Environment and Conservation (NSW)**

Office Use Only

Site Number | | | - | | - | | | |

Date received / / Date entered into system / / Date catalogued / /

Entered by (Name)

Information Access

Office Use Only

☐ Gender/male ☐ Gender/female ☐ Location restriction ☐ General restriction ☐ No access

For Further Information Contact:

☐ **Nominated Trustee**

Title	Surname	First Name	Initials
MS	WORTH	SUZIE	

Organisation: WANARUAH LOCAL ABORGINAL LAND COUNCIL

Address: PO BOX 127 MUSWELLBROOK NSW 2333

Phone number: 02 65431288 Fax: 0265425377

☐ Client on system

☐ **Knowledge Holder**

Title	Surname	First Name	Initials

Organisation:

Address:

Phone number: Fax:

Aboriginal Heritage Unit or Cultural Heritage Division Contacts

Geographic Location

Site Name: SA6/5-SA6/7, SA6/9-SA6/10, SA6/12, SA7/2

Easting: 320493 Nothing: 6403367 ☐ AMG [X] GDA

Mapsheet: CAMBERWELL 9133-III-S

Zone

☐	54	☐ 1.25k topographic map	[X] Non differential GPS
☐	55	☐ 1.25k topographic map	☐ Non differential GPS
[X]	56	[X] 1.25k topographic map	☐ Non differential GPS
			☐ Client GIS or CAD system

☐ Client on system

Primary Recorder

Title	Surname	First Name	Initials
MS	BESANT	ANGELA	

Organisation: INSITE HERITAGE PTY LTD

Address: PO BOX 98 WANGI WANGI NSW 2267

Phone number: 02 49755818 Fax: 0249755818

Date recorded: 12/2008

☐ Client on system

DEC (NSW) Aboriginal Site Recording Form - Site Information

☐ CLOSED SITE ☐ OPEN SITE

Site Context

Landform

- ☐ Mountains
- ☐ Plain
- ☒ Rolling hills
- ☐ Steep hills
- ☐ Undulating plain

Landform Unit

- ☐ Beach
- ☐ Coastal rock platform
- ☐ Dune
- ☐ Intertidal flat
- ☐ Lagoon
- ☐ Tidal Creek
- ☐ Tidal Flat
- ☐ Cliff
- ☐ Crest
- ☐ Flat
- ☒ Lower slope
- ☒ Mid slope
- ☐ Upper slope
- ☐ Plain
- ☐ Ridge
- ☐ Tor
- ☐ Valley flat
- ☐ Levy
- ☐ Stream bank
- ☐ Stream channel
- ☐ Swamp
- ☐ Terrace
- ☐ Terrace flat

Slope

☐ degrees

Vegetation

- ☐ Closed forest
- ☐ Grasslands
- ☐ Isolated clump of trees
- ☐ Open forest
- ☐ Open woodland
- ☐ Scrub
- ☐ Woodland
- ☐ Cleared
- ☐ Revegetated
- ☐ N/A

Land use

- ☐ Conservation
- ☐ Established urban
- ☐ Farming-intensive
- ☐ Farming-low intensity
- ☐ Forestry
- ☐ Industrial
- ☐ Mining
- ☐ Pastoral/grazing
- ☐ Recreation
- ☐ Semi-rural
- ☐ Service corridor
- ☐ Transport corridor
- ☐ Urban expansion
- ☐ N/A

Water

Distance to permanent water source: 400m-1.2km approx metres

Distance to temporary water source: 250m approx metres

Name of nearest permanent water source: Glennies Ck

Name of nearest temporary water: Unnamed

Directions for Relocation

Located within Ashton Coal Operations Ltd
Camberwell, NSW, County of Durham
Parish of Auckland.
Site located on slopes located between
~~two tributaries to the north and south~~
flowing west to Glennies Creek

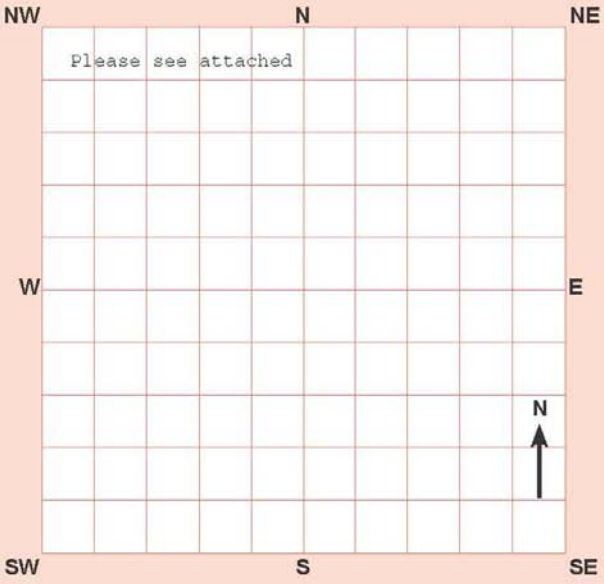
Current Land Tenure

- ☐ Public — National Park/other government
- ☐ Private

Primary report I.D. ☐ (I.D. Office Use only)

Aboriginal Archaeological Assessment
Ashton Coal Operations Ltd
Proposed South East Open Cut Project
Unpublished Report to Ashton Coal
Operations Ltd
Insite Heritage 2009

Relocation Map



DEC (NSW) Aboriginal Site Recording Form - Site Information

General Site Information

Closed Site ☐ **Open Site** ☐

Shelter/Cave Formation

- ☐ Boulder
- ☐ Wind erosion
- ☐ Water erosion
- ☐ Rock collapse

Rock Surface Condition

- ☐ Boulder
- ☐ Sandstone platform
- ☐ Silica gloss
- ☐ Tessellated
- ☐ Weathered
- ☐ Other platform

Condition of Ceiling

- ☐ Boulder
- ☐ Sandstone platform
- ☐ Silica gloss
- ☐ Tessellated
- ☐ Weathered
- ☐ Other platform

Shelter Aspect

- ☐ North
- ☐ North East
- ☐ East
- ☐ South East
- ☐ South
- ☐ South West
- ☐ West
- ☐ North West

Features (including number of features)

☐	1. Aboriginal Ceremony & Dreaming	☐
☐	2. Aboriginal Resource & Gathering	☐
☐	3. Art	☐
X	4. Artefact	☐
☐	5. Burial	☐
☐	6. Ceremonial Ring	☐
☐	7. Conflict	☐
☐	8. Earth Mound	☐
☐	9. Fish Trap	☐
☐	10. Grinding Groove	☐
☐	11. Habitation Structure	☐
☐	12. Hearth	☐
☐	13. Non Human Bone & Organic Material	☐
☐	14. Ochre quarry	☐
☐	15. Potential Archaeological Deposit	☐
☐	16. Stone Quarry	☐
☐	17. Shell	☐
☐	18. Stone Arrangement	☐
☐	19. Modified Tree	☐
☐	20. Water Hole	☐

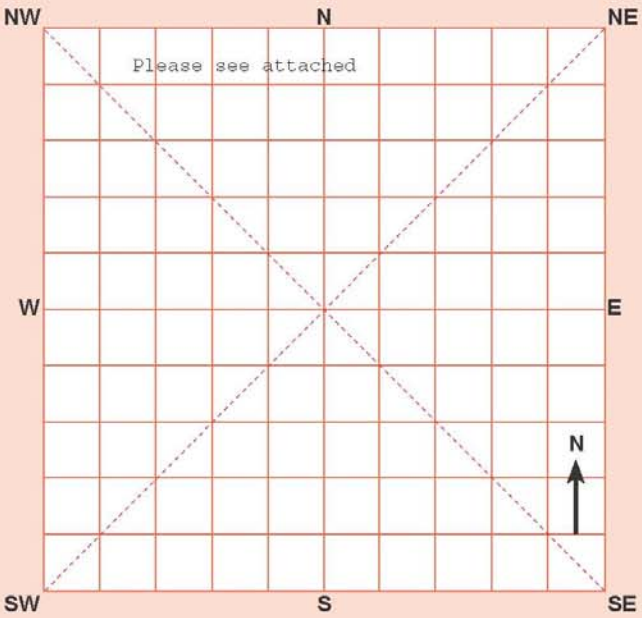
Site Orientation

- ☐ N-S
- ☐ NE-SW
- ☐ E-W
- ☐ SE-NW
- ☐ N/A

Attachments (No.)

- X A4 location map
- ☐ B/W photographs
- ☐ Colour photographs
- ☐ Slides
- ☐ Aerial photographs
- ☐ Site plans, drawings
- X Recording tables
- X Other
- ☐ Feature inserts-No ☐

Estimated Site Extent and Location of Features



Site Context

Closed Site Dimensions (m)

- ☐ Internal length
- ☐ Internal width
- ☐ Shelter height
- ☐ Shelter floor area

Open Site Dimensions (m) Please see attached

- ☐ Total length of visible site
- ☐ Average width of visible site
- ☐ Estimated area of visible site
- ☐ Length of assessed site area

Site Interpretation and Community Statement - Aboriginal Community Interpretation and Management Recommendations

Please refer to Insite Heritage 2009 report

Preliminary Site Assessment - Scientific Analysis and Preliminary Management Recommendations

Site comprises of 7 separate Loci of artefacts:
SA6/5-SA6/7, SA6/9-SA6/10, SA6/12, SA7/2
These loci located in Survey Area 6 of the study area
(refer to Insite Heritage 2009 report).

Please see attached for site details tables and location map

Please note GPS reading on front of site card are the GPS co-ordinates for loci SA6/9.
Please refer to attached tables for GPS locations all loci.

This section should only be filled in by the Endorsees

Endorsed by: ☐ Knowledge Holder ☐ Nominated Trustee ☐ Native Title Holder ☐ Community Consensus

Title | Surname | First Name | Initials

Organisation

Address

Phone number | Fax

Comments

Site Details: SA6/5-SA6/7, SA6/9-SA6/10, SA6/12, SA7/2

Unit	Site	Landform	Location GPS (UTM, datum WGS84)	Exposure (Approx. m)	Visibility	Description
SA6	**5**	Slope	E 56S 320796 N 6403289	50 X 3	75% SV 25% AV	Artefact scatter: Exposure along contour bank in open eucalypt woodland. Ironstone gravel background. Leaf litter and light grass cover off track. Artefacts: 2 mudstone, 1 silcrete
SA6	**6**	Slope	E 56S 321017 N 6402904	20 x 2	75% SV 25% AV	Isolated find: Exposure at base of dam wall. Leaf litter and light grass cover away from exposure. Artefacts: 1 mudstone
SA6	**7**	Slope	E 56S 320969 N 6403043	2 x 2	50% SV 50% AV	Isolated find: Exposure near track. Heavy grass cover away from track. Artefacts: 1 mudstone
SA6	**9**	Slope	E 56S 320493 N 6403367	20 x 4	75% SV 75% AV	Isolated find: Exposure along track through cleared paddock. Heavy grass cover away from track. Artefacts: 1 mudstone
SA6	**10**	Slope	E 56S 320207 N 6403433	20 x 3	75% SV 25% Av	Artefact scatter: Exposure along track at base of slope. Heavy grass cover away from slope. Artefacts: 3 mudstone, 1 silcrete.
SA6	**12**	Slope	E 56S319899 N 6403508	100 x 0.3	75% SV 25% Av	Isolated find: Exposure along narrow stock track. Dense grass cover away from track. In similar locale as previous site – potential for sub-surface material. Artefacts: 1 silcrete
SA7	**2**	Gully	E 56S 320769 N 6403022	10 x 5	80% SV 80% AV	Isolated find : Exposure on creek bank. Dense grass cover away from bank. Artefacts: 1 mudstone

Site Details: SA6/5-SA6/7, SA6/9-SA6/10, SA6/12, SA7/2

Unit	Site	No	Material	Colour	Class	Sub	L	W	T	Comments
SA6	**5**	1	Mudstone	Grey	Flake		14	9	3	5% tabular cortex
SA6	**5**	2	Silcrete	Grey	Core		52	40	27	4 negative scars, 2 platforms
SA6	**5**	3	Mudstone	Yellow	Flake		19	12	4	50% pebble cortex
SA6	**6**	1	Mudstone	Yellow	Core		33	31	19	40% pebble cortex, 4 negative scars, 2 platforms
SA6	**7**	1	Mudstone	Red	Core		38	29	17	30% pebble cortex, 3 negative scars, 2 platforms
SA6	**9**	1	Mudstone	Yellow	Flake		32	28	15	30% pebble cortex
SA6	**10**	1	Silcrete	Pink	Flake		29	14	7	Blade
SA6	**10**	2	Mudstone	Yellow	Flake	Portion	12	11	4	Mid
SA6	**10**	3	Mudstone	Cream	Flake		26	27	8	2 transverse dorsal scars
SA6	**10**	4	Mudstone	Red	Flake		12	4	3	
SA6	**12**	1	Silcrete	Pink	Flake	Portion	22	16	4	
SA7	**2**	1	Mudstone		Flake	Portion	16			

Aboriginal Site Recording Form

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PO Box 1967, Hurstville NSW 2200
ahims@environment.nsw.gov.au

Department of **Environment and Conservation (NSW)**

Office Use Only

Site Number | | | - | | | | | |

Date received / / Date entered into system / / Date catalogued / /

Entered by (Name)

Information Access

Office Use Only

☐ Gender/male ☐ Gender/female ☐ Location restriction ☐ General restriction ☐ No access

For Further Information Contact:

☐ **Nominated Trustee**

Title	Surname	First Name	Initials
MS	WORTH	SUZIE	

Organisation: WANARUAH LOCAL ABORGINAL LAND COUNCIL

Address: PO BOX 127 MUSWELLBROOK NSW 2333

Phone number: 02 65431288 Fax: 0265425377

Client on system ☐

☐ **Knowledge Holder**

Title	Surname	First Name	Initials

Organisation

Address

Phone number Fax

Aboriginal Heritage Unit or Cultural Heritage Division Contacts

Geographic Location

Site Name: SA6/8, SA6/11, SA7/1, SA7/3-SA7/6, SA8/2-SA8/4, SA8/13

Easting: 320215 Nothing: 6403355 ☐ AMG ☒ GDA

Mapsheet: CAMBERWELL 9133-III-S

Client on system ☐

Zone

☐	54	☐ 1.25k topographic map	☒ Non differential GPS
☐	55	☐ 1.25k topographic map	☐ Non differential GPS
☒	56	☒ 1.25k topographic map	☐ Non differential GPS
			☐ Client GIS or CAD system

Primary Recorder

Title	Surname	First Name	Initials
MS	BESANT	ANGELA	

Organisation: INSITE HERITAGE PTY LTD

Address: PO BOX 98 WANGI WANGI NSW 2267

Phone number: 02 49755818 Fax: 0249755818

Date recorded: 12/2008

Client on system ☐

DEC (NSW) Aboriginal Site Recording Form - Site Information

☐ CLOSED SITE ☐ OPEN SITE

Site Context

Landform

- ☐ Mountains
- ☐ Plain
- ☒ Rolling hills
- ☐ Steep hills
- ☐ Undulating plain

Landform Unit

- ☐ Beach
- ☐ Coastal rock platform
- ☐ Dune
- ☐ Intertidal flat
- ☐ Lagoon
- ☐ Tidal Creek
- ☐ Tidal Flat
- ☐ Cliff
- ☐ Crest
- ☐ Flat
- ☒ Lower slope
- ☐ Mid slope
- ☐ Upper slope
- ☐ Plain
- ☐ Ridge
- ☐ Tor
- ☐ Valley flat
- ☐ Levy
- ☒ Stream bank
- ☐ Stream channel
- ☐ Swamp
- ☐ Terrace
- ☐ Terrace flat

Slope

☐ degrees

Vegetation

- ☐ Closed forest
- ☐ Grasslands
- ☐ Isolated clump of trees
- ☐ Open forest
- ☐ Open woodland
- ☐ Scrub
- ☐ Woodland
- ☐ Cleared
- ☐ Revegetated
- ☐ N/A

Land use

- ☐ Conservation
- ☐ Established urban
- ☐ Farming-intensive
- ☐ Farming-low intensity
- ☐ Forestry
- ☐ Industrial
- ☐ Mining
- ☐ Pastoral/grazing
- ☐ Recreation
- ☐ Semi-rural
- ☐ Service corridor
- ☐ Transport corridor
- ☐ Urban expansion
- ☐ N/A

Water

Distance to permanent water source: 300m-1.2km approx metres

Distance to temporary water source: 0m approx metres

Name of nearest permanent water source: Glennies Ck

Name of nearest temporary water: Unnamed

Directions for Relocation

Located within Ashton Coal Operations Ltd Camberwell, NSW, County of Durham Parish of Auckland. Site located on unnamed tributary flowing west into Glennies Creek

Current Land Tenure

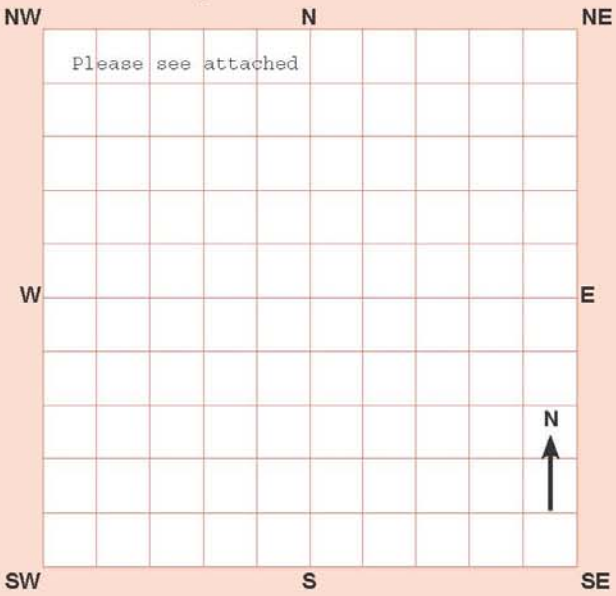
- ☐ Public
- ☐ Private

National Park/other government:

Primary report I.D. ☐ (I.D. Office Use only)

Aboriginal Archaeological Assessment
Ashton Coal Operations Ltd
Proposed South East Open Cut Project
Unpublished Report to Ashton Coal
Operations Ltd
Insite Heritage 2009

Relocation Map



DEC (NSW) Aboriginal Site Recording Form - Site Information

General Site Information

Closed Site **Open Site**

Shelter/Cave Formation

- [ ] Boulder
- [ ] Wind erosion
- [ ] Water erosion
- [ ] Rock collapse

Rock Surface Condition

- [ ] Boulder
- [ ] Sandstone platform
- [ ] Silica gloss
- [ ] Tessellated
- [ ] Weathered
- [ ] Other platform

Condition of Ceiling

- [ ] Boulder
- [ ] Sandstone platform
- [ ] Silica gloss
- [ ] Tessellated
- [ ] Weathered
- [ ] Other platform

Shelter Aspect

- [ ] North
- [ ] North East
- [ ] East
- [ ] South East
- [ ] South
- [ ] South West
- [ ] West
- [ ] North West

Features (including number of features)

- [ ] 1. Aboriginal Ceremony & Dreaming
- [ ] 2. Aboriginal Resource & Gathering
- [ ] 3. Art
- [x] 4. Artefact
- [ ] 5. Burial
- [ ] 6. Ceremonial Ring
- [ ] 7. Conflict
- [ ] 8. Earth Mound
- [ ] 9. Fish Trap
- [ ] 10. Grinding Groove
- [ ] 11. Habitation Structure
- [ ] 12. Hearth
- [ ] 13. Non Human Bone & Organic Material
- [ ] 14. Ochre quarry
- [x] 15. Potential Archaeological Deposit
- [ ] 16. Stone Quarry
- [ ] 17. Shell
- [ ] 18. Stone Arrangement
- [ ] 19. Modified Tree
- [ ] 20. Water Hole

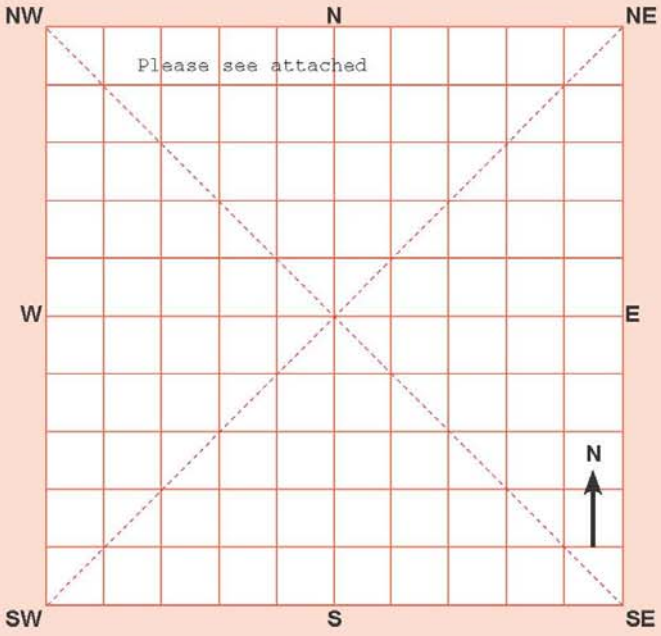
Site Orientation

- [ ] N-S
- [ ] NE-SW
- [ ] E-W
- [ ] SE-NW
- [ ] N/A

Attachments (No.)

- [x] A4 location map
- [ ] B/W photographs
- [ ] Colour photographs
- [ ] Slides
- [ ] Aerial photographs
- [ ] Site plans, drawings
- [x] Recording tables
- [x] Other
- [ ] Feature inserts-No [ ]

Estimated Site Extent and Location of Features



Site Context

Closed Site Dimensions (m)

- [ ] Internal length
- [ ] Internal width
- [ ] Shelter height
- [ ] Shelter floor area

Open Site Dimensions (m) Please see attached

- [ ] Total length of visible site
- [ ] Average width of visible site
- [ ] Estimated area of visible site
- [ ] Length of assessed site area

Site Interpretation and Community Statement - Aboriginal Community Interpretation and Management Recommendations

Please refer to Insite Heritage 2009 report

Preliminary Site Assessment - Scientific Analysis and Preliminary Management Recommendations

Site comprises of 11 separate Loci of artefacts located along the banks of an unnamed tributary: SA6/8, SA6/11, SA7/1, SA7/3-SA7/6, SA8/2-SA8/4, SA8/13

These loci located in Survey Area 7 and 8 of the study area

(refer to Insite Heritage 2009 report).Survey Area 7 has also been identified as an area of moderate significance - potential for subsurface deposits (see attached map)

Please see attached for site details tables and location map

Please note GPS reading on front of site card are the GPS co-ordinates for loci SA7/6.

Please refer to attached tables for GPS locations of all loci within this site.

This section should only be filled in by the Endorsees

Endorsed by: ☐ Knowledge Holder ☐ Nominated Trustee ☐ Native Title Holder ☐ Community Consensus

Title	Surname	First Name	Initials

Organisation

Address

Phone number Fax

Comments

Site Details: SA6/8, SA6/11, SA7/1, SA7/3-SA7/6, SA8/2-SA8/4, SA8/13

Unit	Site	Landform	Location GPS (UTM, datum WGS84)	Exposure (Approx. m)	Visibility	Description
SA6	8	Slope	E 56S 320416 N 6403283	15 x 5	80% SV 25% AV	Artefact scatter: Exposure along contour bank running into dam at base of slope. Open paddock with several mature eucalypts along creek at base of slope. Low integrity of site although potential for sub-surface material above contour bank. Artefacts: 6 silcrete, 2 mudstone
SA6	11	Slope	E 56S 320001 N 6403455	50 X 3	50% SV 50% AV	Artefact scatter: Exposure along track leading to stock yards, dense grass cover away from track. At toe of slope overlooking Glennies Creek floodplain. High potential for sub-surface deposit. Artefacts: 12 mudstone, 6 silcrete.
SA7	1	Gully	E 56S 320529 N 6403169	5 x 3	80% SV 80% AV	Artefact scatter: Exposure on creek bank. Dense grass cover away from bank. Artefacts: 3 silcrete, 1 chert
SA7	3	Gully	E 56S 320893 N 6402775	50 x 20	50% SV 50% AV	Isolated find: Exposure on creek bank under open casuarina woodland. Dense grass cover away from bank. Artefacts: 1 silcrete
SA7	4	Gully	E 56S 320780 N 6402886	5 x 4	50% SV 50% AV	Isolated find: Exposure on creek bank in ant's nest. Dense grass cover away from bank. Artefacts: 1 mudstone
SA7	5	Gully	E 56S 320686 N 6402995	3 x 3	50% SV 50% AV	Isolated find: Small exposure on edge of drainage channel near larger exposure. Artefacts: 1 mudstone
SA7	6	Gully	E 56S 320215 N 6403355	100 x 15	70% SV 60% AV	Artefact scatter: Large exposure (erosion scour) under open eucalypt woodland. B horizon exposed by slope wash. Moderate potential for sub-surface deposit. 6 distinct loci. Artefacts: 12 silcrete, 10 mudstone, 1 volcanic
SA8	2	Slope	E 56S 319837 N 6403270	10 x 5	80%SV 25% AV	Isolated find: Large exposure around dam – disturbed context Artefacts: 1 mudstone
SA8	3	Slope	E 56 S 319780 N 6403333	20 x 4	80% SV 25%AV	Artefact scatter: Exposure along dam overflow channel - disturbed context. Artefacts:2 mudstone, 1 silcrete
SA8	4	Slope	E 56S 319812 N 6403283	10 x 5	80%SV 25%AV	Artefact scatter: Exposure along dam cut - disturbed context. Moderate potential for sub-surface deposit away adjoining disturbed area. Artefacts: 9 mudstone, 2 volcanic
SA8	13	Slope	E 56S 320063 N 6403355	15 x 6	70% SV 80% AV	Artefact scatter: Exposure along track near fence approx 50m from creek line. Moderate potential for sub-surface deposit. Artefacts: 5 silcrete, 4 mudstone, 1 FGS 12 silcrete, 8 mudstone (count only)

Artefact Details: SA6/8, SA6/11, SA7/1, SA7/3-SA7/6, SA8/2-SA8/4, SA8/13

Unit	Site	No	Material	Colour	Class	Sub	L	W	T	Comments
SA6	8	1	Silcrete	Pink	Flake	Portion	36	28	7	Proximal, transverse & longitudinal dorsal scars
SA6	8	2	Silcrete	Pink	Flake	Portion	17	19	6	Proximal, 2 longitudinal dorsal scars
SA6	8	3	Mudstone	Orange	Core		32	27	18	5 negative scars, 3 platforms
SA6	8	4	Silcrete	Yellow	Flake	Portion	25	11	4	Distal, longitudinal dorsal scar
SA6	8	5	Silcrete	Pink	Flake		25	32	9	20% weathered cortex
SA6	8	6	Mudstone	Red	Core		26	17	14	3 negative scars, 2 platforms
SA6	8	7	Silcrete	Pink	Flake	Portion	15	9	7	Mid, Longitudinal dorsal ridge
SA6	8	8	Silcrete	Pink	Flake		32	27	9	25% weathered cortex
SA6	11	1	Mudstone	Red	Flake	Portion	16	14	6	Lateral
SA6	11	2	Mudstone	Pink	Angular fragment		32	18	8	
SA6	11	3	Mudstone	Cream	Flake		31	20	7	5% tabular cortex, longitudinal dorsal scar
SA6	11	4	Mudstone	Red	Flake		12	6	3	Longitudinal dorsal ridge
SA6	11	5	Mudstone	Orange	Flake		8	4	2	
SA6	11	6	Mudstone	Red	Flake	Portion	17	17	9	Distal
SA6	11	7	Mudstone	Orange	Flake		35	26	13	Longitudinal dorsal ridge & scar
SA6	11	8	Silcrete	Red	Flake		28	26	14	Longitudinal dorsal scar
SA6	11	9	Mudstone	Orange	Flake		12	4	2	
SA6	11	10	Silcrete	Red	Flake		14	6	3	
SA6	11	11	Silcrete	Pink	Angular fragment		40	27	18	
SA6	11	12	Mudstone	Yellow	Flake		17	12	4	
SA6	11	13	Silcrete	Pink	Flake		29	17	9	
SA6	11	14	Mudstone	Yellow	Flake		37	39	11	
SA6	11	15	Silcrete	Pink	Flake		28	18	9	
SA6	11	16	Silcrete	Pink	Flake		25	16	7	
SA6	11	17	Mudstone	Yellow	Flake		28	20	14	
SA6	11	18	Mudstone	Orange	Flake		6	4	3	
SA7	1	1	Chert		Flake	Portion	25			
SA7	1	2	Silcrete		Flake	Portion	18			50% cortex

Unit	Site	No	Material	Colour	Class	Sub	L	W	T	Comments
SA7	1	3	Silcrete	Yellow	Flake	Portion	33			
SA7	1	4	Silcrete	Yellow	Flake	Portion	26			
SA7	3	1	Silcrete	Pink	Flake		20	15	3	
SA7	4	1	Mudstone	Red	Flake		50	42	20	
SA7	5	1	Mudstone		Core		70	60	30	
SA7	6	1	Mudstone		Flake	Portion	30	15	3	
SA7	6	2	Mudstone	Yellow	Flake		60	40	25	
SA7	6	3	Silcrete	Red	Flake		40	16	5	
SA7	6	4	Silcrete	Red	Flake	Portion	18			
SA7	6	5	Mudstone	White	Flake	Portion	12			
SA7	6	6	Silcrete		Flake	Portion	19			
SA7	6	7	Mudstone		Flake	Blade	35	12	14	
SA7	6	8	Mudstone		Flake		35	22	4	
SA7	6	9	Mudstone		Flake		35	15	3	
SA7	6	10	Mudstone		Flake		40	50	5	
SA7	6	11	Silcrete	Yellow	Anvil		250	150	45	Shallow hollow scar noted on one face
SA7	6	12	volcanic	Black	Hammerstone		110			
SA7	6	13	Silcrete		Flake		26	28	6	
SA7	6	14	Mudstone	Yellow	Flake		2	12	3	
SA7	6	15	Mudstone		Flake		15	12	3	
SA7	6	16	Silcrete		Flake		37	24	5	
SA7	6	17	Silcrete		Flake	Portion	15	20	3	
SA7	6	18	Silcrete	Pink	Flake	Portion	22			
SA7	6	19	Silcrete	Pink	Flake	Scraper	25	40	5	
SA7	6	20	Silcrete		Flake		34	25	5	
SA7	6	21	Mudstone		Flake		30	20	3	
SA7	6	22	Silcrete		Flake		30	20	3	
SA7	6	23	Silcrete		Flake		30	20	3	
SA8	2	1	Mudstone	Red	Core		54	46	12	90% pebble cortex, 1 negative scar
SA8	3	1	Mudstone	Red	Flake		40	50	5	
SA8	3	2	Silcrete	Red	Flake	Portion	30	20	10	Proximal
SA8	3	3	Mudstone	Orange	Flake		25	12	7	
SA8	4	1	Volcanic	Black	Flake		22	10	4	
SA8	4	2	Volcanic	Red	Manuport		100	90	35	
SA8	4	3	Mudstone	Red	Flake		25	15	5	
SA8	4	4	Mudstone	Red	Flake	Recdirecting	45	32	15	
SA8	4	5	Mudstone	Red	Flake		22	15	3	
SA8	4	6	Mudstone	Yellow	Angular fragment		47	20	10	
SA8	4	7	Mudstone	Yellow	Core		25	24	15	16 negative scars
SA8	4	8	Mudstone	Yellow	Flake	Retouched	25	20	5	
SA8	4	9	Mudstone	Yellow	Angular		24	10	2	

Unit	Site	No	Material	Colour	Class	Sub	L	W	T	Comments
					fragment					
SA8	4	10	Mudstone	Yellow	Flake		24	20	2	
SA8	4	11	Mudstone	Yellow	Angular fragment		20	15	4	
SA8	5	1	Silcrete	Grey	Core		100	50	45	4 negative scars
SA8	13	1	Silcrete		Flake		20	10	2	
SA8	13	2	Mudstone		Flake	Portion	23			
SA8	13	3	FGS		Flake		18	22	3	
SA8	13	4	Mudstone	Red	Flake	Backed blade	18	22	3	
SA8	13	5	Mudstone		Flake		8	5	3	
SA8	13	6	Mudstone		Flake	Backed blade	18			
SA8	13	7	Silcrete	Grey	Flake		35	20	5	
SA8	13	8	Silcrete	Pink	Core		30	35	3	
SA8	13	9	Silcrete	Pink	Core		40	45	20	
SA8	13	10	Silcrete	Grey	Core		26	35	20	

Aboriginal Site Recording Form

AHIMS Registrar
PO Box 1967, Hurstville NSW 2200
ahims@environment.nsw.gov.au

Department of **Environment and Conservation (NSW)**

Office Use Only

Site Number | | | - | | - | | | |

Date received / / Date entered into system / / Date catalogued / /

Entered by (Name)

Information Access

Office Use Only

[ ] Gender/male [ ] Gender/female [ ] Location restriction [ ] General restriction [ ] No access

For Further Information Contact:

[ ] **Nominated Trustee**

Title	Surname	First Name	Initials
MS	WORTH	SUZIE	

Organisation: WANARUAH LOCAL ABORGINAL LAND COUNCIL

Address: PO BOX 127 MUSWELLBROOK NSW 2333

Phone number: 02 65431288 Fax: 0265425377

[ ] Client on system

[ ] **Knowledge Holder**

Title	Surname	First Name	Initials

Organisation:

Address:

Phone number: Fax:

Aboriginal Heritage Unit or Cultural Heritage Division Contacts

Geographic Location

Site Name: SA8/1, SA8/5-SA8/9, SA9/1-SA9/2

Easting: 319795 Nothing: 6403149 [ ] AMG [X] GDA

Mapsheet: CAMBERWELL 9133-III-S

[ ] Client on system

Zone

[ ] 54	[ ] 1.25k topographic map	[X] Non differential GPS
[ ] 55	[ ] 1.25k topographic map	[ ] Non differential GPS
[X] 56	[X] 1.25k topographic map	[ ] Non differential GPS
		[ ] Client GIS or CAD system

Primary Recorder

Title	Surname	First Name	Initials
MS	BESANT	ANGELA	

Organisation: INSITE HERITAGE PTY LTD

Address: PO BOX 98 WANGI WANGI NSW 2267

Phone number: 02 49755818 Fax: 0249755818

Date recorded: 12/2008

[ ] Client on system

DEC (NSW) Aboriginal Site Recording Form - Site Information

☐ CLOSED SITE ☐ OPEN SITE

Site Context

Landform

- ☐ Mountains
- ☐ Plain
- ☐ Rolling hills
- ☐ Steep hills
- ☒ Undulating plain

Landform Unit

- ☐ Beach
- ☐ Coastal rock platform
- ☐ Dune
- ☐ Intertidal flat
- ☐ Lagoon
- ☐ Tidal Creek
- ☐ Tidal Flat
- ☐ Cliff
- ☐ Crest
- ☐ Flat
- ☒ Lower slope
- ☐ Mid slope
- ☐ Upper slope
- ☐ Plain
- ☐ Ridge
- ☐ Tor
- ☐ Valley flat
- ☐ Levy
- ☒ Stream bank
- ☐ Stream channel
- ☐ Swamp
- ☐ Terrace
- ☐ Terrace flat

Slope

☐ degrees

Vegetation

- ☐ Closed forest
- ☐ Grasslands
- ☐ Isolated clump of trees
- ☐ Open forest
- ☐ Open woodland
- ☐ Scrub
- ☐ Woodland
- ☐ Cleared
- ☐ Revegetated
- ☐ N/A

Land use

- ☐ Conservation
- ☐ Established urban
- ☐ Farming-intensive
- ☐ Farming-low intensity
- ☐ Forestry
- ☐ Industrial
- ☐ Mining
- ☐ Pastoral/grazing
- ☐ Recreation
- ☐ Semi-rural
- ☐ Service corridor
- ☐ Transport corridor
- ☐ Urban expansion
- ☐ N/A

Water

Distance to permanent water source: 200m-1km approx metres

Distance to temporary water source: 0m approx metres

Name of nearest permanent water source: Glennies Ck

Name of nearest temporary water: Unnamed

Directions for Relocation

Located within Ashton Coal Operations Ltd Camberwell, NSW, County of Durham Parish of Auckland. Site located on unnamed tributary flowing west into Glennies Creek

Current Land Tenure

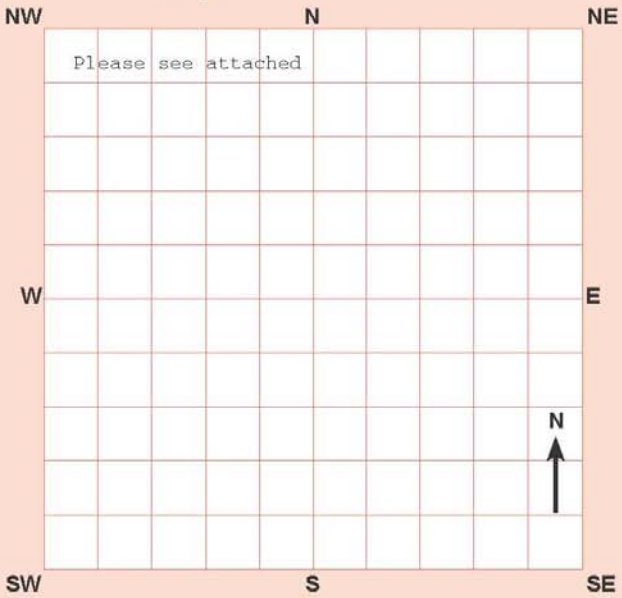
- ☐ Public
- ☐ Private

National Park/other government

Primary report I.D. ☐ (I.D. Office Use only)

Aboriginal Archaeological Assessment
Ashton Coal Operations Ltd
Proposed South East Open Cut Project
Unpublished Report to Ashton Coal
Operations Ltd
Insite Heritage 2009

Relocation Map



DEC (NSW) Aboriginal Site Recording Form - Site Information

General Site Information

Closed Site

Shelter/Cave Formation

- [ ] Boulder
- [ ] Wind erosion
- [ ] Water erosion
- [ ] Rock collapse

Condition of Ceiling

- [ ] Boulder
- [ ] Sandstone platform
- [ ] Silica gloss
- [ ] Tessellated
- [ ] Weathered
- [ ] Other platform

Open Site

Rock Surface Condition

- [ ] Boulder
- [ ] Sandstone platform
- [ ] Silica gloss
- [ ] Tessellated
- [ ] Weathered
- [ ] Other platform

Shelter Aspect

- [ ] North
- [ ] North East
- [ ] East
- [ ] South East
- [ ] South
- [ ] South West
- [ ] West
- [ ] North West

Features (including number of features)

- [ ] 1. Aboriginal Ceremony & Dreaming
- [ ] 2. Aboriginal Resource & Gathering
- [ ] 3. Art
- [X] 4. Artefact
- [ ] 5. Burial
- [ ] 6. Ceremonial Ring
- [ ] 7. Conflict
- [ ] 8. Earth Mound
- [ ] 9. Fish Trap
- [ ] 10. Grinding Groove
- [ ] 11. Habitation Structure
- [ ] 12. Hearth
- [ ] 13. Non Human Bone & Organic Material
- [ ] 14. Ochre quarry
- [X] 15. Potential Archaeological Deposit
- [ ] 16. Stone Quarry
- [ ] 17. Shell
- [ ] 18. Stone Arrangement
- [ ] 19. Modified Tree
- [ ] 20. Water Hole

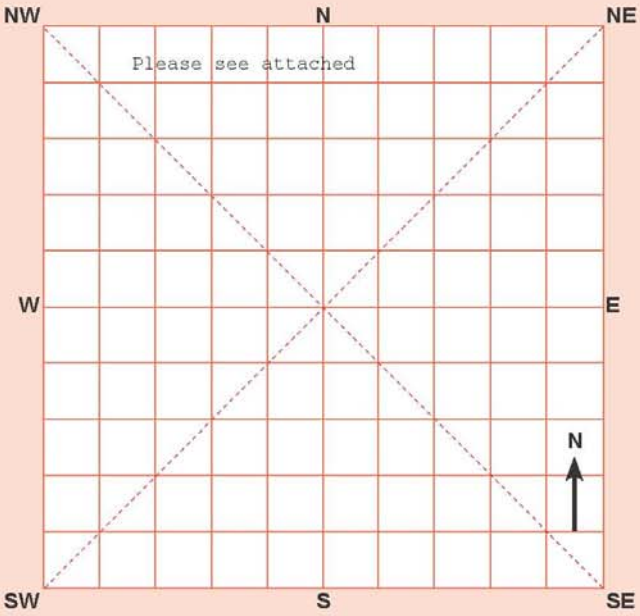
Site Orientation

- [ ] N-S
- [ ] NE-SW
- [ ] E-W
- [ ] SE-NW
- [ ] N/A

Attachments (No.)

- [X] A4 location map
- [ ] B/W photographs
- [ ] Colour photographs
- [ ] Slides
- [ ] Aerial photographs
- [ ] Site plans, drawings
- [X] Recording tables
- [X] Other
- [ ] Feature inserts-No

Estimated Site Extent and Location of Features



Site Context

Closed Site Dimensions (m)

- Internal length
- Internal width
- Shelter height
- Shelter floor area

Open Site Dimensions (m) Please see attached

- Total length of visible site
- Average width of visible site
- Estimated area of visible site
- Length of assessed site area

Site Interpretation and Community Statement - Aboriginal Community Interpretation and Management Recommendations

Please refer to Insite Heritage 2009 report

Preliminary Site Assessment - Scientific Analysis and Preliminary Management Recommendations

Site comprises of 8 separate Loci of artefacts located along the banks of an unnamed tributary: SA8/1, SA8/5-SA8/9, SA9/1-SA9/2

These loci located in Survey Area 8 and 9 of the study area

(refer to Insite Heritage 2009 report).Survey Area 9 has also been identified as an area of moderate significance - potential for subsurface deposits (see attached map)

Please see attached for site details tables and location map

Please note GPS reading on front of site card are the GPS co-ordinates for loci SA9/1.

Please refer to attached tables for GPS locations of all loci within this site.

This section should only be filled in by the Endorsees

Endorsed by: ☐ Knowledge Holder ☐ Nominated Trustee ☐ Native Title Holder ☐ Community Consensus

Title | Surname | First Name | Initials

Organisation

Address

Phone number | Fax

Comments

Site Details: SA8/1, SA8/5-SA8/9, SA9/1-SA9/2

Unit	Site	Landform	Location GPS (UTM, datum WGS84)	Exposure (Approx. m)	Visibility	Description
SA8	1	Slope	E 56S 320415 N 6402884	20 x 3	80% SV 25% Av	Isolated find: Large exposure around dam – disturbed context. Dense grass cover away from exposure. Artefacts: 1 mudstone
SA8	5	Slope	E 56S 319974 N 6403039	30 x 15	40% SV 100%AV	Artefact scatter: Exposure in gravel extraction area. Dense gravel background scatter in otherwise well grassed paddock. Moderate potential for sub-surface deposit. Artefacts: 6 mudstone, 1 silcrete
SA8	6	Slope	E 56S 319983 N 6403057	80 x 25	40% SV 100%AV	Artefact scatter: Exposed gravels above dam. Moderate potential for sub-surface deposit. Artefacts: 11 mudstone, 3 silcrete
SA8	7	Slope	E 56S 320153 N 6402981	2 x 2	75%SV 25%AV	Artefact scatter: Small exposure under solitary tree on slope. Artefacts: 1 volcanic, 1 mudstone
SA8	8	Slope	E 56S 320306 N 6402836	1 x 1	50%SV 25% AV	Isolated find: Small exposure in grassed paddock. Artefacts: 1 mudstone
SA8	9	Slope	E 56S 320095 N 640954	30 x 3	75%SV 25%AV	Artefact scatter: Exposure along section of track through grassy paddock. Artefacts: 6 mudstone
SA9	1	Gully	E56S 319795 N 6403149	1 x 1	50% SV 50% AV	Isolated find: Exposures along creek bank Artefact: 1 mudstone
SA9	2	Gully	E 56S 319825 N 6403135	150 x 20	80% SV 50% AV	Artefact scatter: Disturbed area around dam and adjacent to eroded creek bank. High potential for sub-surface deposit adjacent to disturbed area. Artefacts: 30 mudstone, 13 silcrete, 7 FGS 32 mudstone, 8 silcrete, 3 FGS, 3 chert (count only)

Artefact Details: SA8/1, SA8/5-SA8/9, SA9/1-SA9/2

Unit	Site	No	Material	Colour	Class	Sub	L	W	T	Comments
SA8	1	1	Mudstone	Yellow	Flake		42	45	10	
SA8	5	1	Silcrete	Grey	Core		100	50	45	4 negative scars
SA8	5	2	Mudstone	Yellow	Flake		20	15	9	
SA8	5	3	Mudstone	Red	Flake		40	30	15	
SA8	5	4	Mudstone	Red	Angular fragment		35	25	25	
SA8	5	5	Mudstone	Yellow	Flake		40	18	6	Longitudinal dorsal scar
SA8	5	6	Mudstone	Orange	Flake	Scraper	42	28	11	5% pebble cortex
SA8	5	7	Mudstone	Grey	Core		46	33	28	20% tabular cortex, 4 negative scars, 2 platforms
SA8	6	1	Mudstone	Red	Flake		42	30	15	Longitudinal dorsal scar
SA8	6	2	Mudstone	Yellow	Flake		20	10	5	
SA8	6	3	Mudstone	Yellow	Flake		12	25	5	2 transverse dorsal scars
SA8	6	4	Silcrete	Grey	Flake		30	17	7	
SA8	6	5	Mudstone	Yellow	Flake		36	28	16	Longitudinal dorsal scar
SA8	6	6	Mudstone	Yellow	Flake	Portion	20	35	15	20% pebble cortex, proximal
SA8	6	7	Silcrete	Red	Flake		30	25	15	
SA8	6	8	Silcrete	Grey	Flake		60	35	10	Longitudinal dorsal scar
SA8	6	9	Mudstone	Red	Flake		27	25	5	3 longitudinal dorsal scars
SA8	6	10	Mudstone	Red	Flake	Portion	27	17	10	Proximal, lateral retouch
SA8	6	11	Mudstone	Red	Flake		15	24	8	5% pebble cortex
SA8	6	12	Mudstone	Red	Core		35	40	20	30% pebble cortex, 4 negative scars
SA8	6	13	Mudstone	Red	Core		60	45	25	30% tabular cortex, 7 negative scars
SA8	6	14	Mudstone	Red	Flake	Portion	37	20	21	lateral
SA8	7	1	Volcanic	Grey	Axe		125	75	30	unifacial flaked edge
SA8	7	2	Mudstone	Orange	Flake		35	25	5	15% pebble cortex
SA8	8	1	Mudstone	Yellow	Flake		22	31	5	
SA8	9	1	Mudstone	Red	Core		60	60	34	45% cortex, 12 negative scars, rotated
SA8	9	2	Mudstone	Red	Core		50	20	10	Blade core, 4 negative

Unit	Site	No	Material	Colour	Class	Sub	L	W	T	Comments
										scars
SA8	9	3	Mudstone	Red	Flake	Scraper	25	20	10	
SA8	9	4	Mudstone	Red	Core		45	50	15	45% weathered cortex, 8 negative scars, facetted
SA8	9	5	Mudstone	Yellow	Core		40	34	15	10 negative scars
SA8	9	6	Mudstone	Yellow	Flake		25	25	7	
SA9	1	1	Mudstone	Red/brown	Flake	Portion	11	8	2	Distal
SA9	2	1	Mudstone	Yellow	Flake		45	40	5	
SA9	2	2	Mudstone		Flake	Portion	15	10	2	
SA9	2	3	Mudstone	Yellow	Flake	Portion	14			
SA9	2	4	Mudstone	Yellow	Flake	Portion	24			
SA9	2	5	Mudstone	Yellow	Flake	Portion	16			
SA9	2	6	Mudstone	Yellow	Flake	Portion	27			Proximal
SA9	2	7	Mudstone	Yellow	Flake		20	18	4	
SA9	2	8	Mudstone	Red	Flake	Portion	20			
SA9	2	9	Mudstone	Yellow	Flake	Portion	27			
SA9	2	10	Mudstone	Red	Flake		19	13	3	
SA9	2	11	Mudstone	Yellow	Flake		42	21	3	
SA9	2	12	Mudstone	Yellow	Flake		29	26	2	
SA9	2	13	Mudstone	Red	Flake	Portion	40			
SA9	2	14	Silcrete	Pink	Flake	Portion	18			
SA9	2	15	Mudstone	Yellow	Flake		35			
SA9	2	16	Mudstone		Flake	Portion	22			
SA9	2	17	Silcrete	Grey	Flake	Portion	30			Mid
SA9	2	18	Mudstone		Flake		27	28	3	Usewear on lateral margin
SA9	2	19	Mudstone		Angular fragment		50			50% cortex
SA9	2	20	Mudstone		Flake		64	20	5	
SA9	2	21	Mudstone		Flake		16	27	2	
SA9	2	22	Mudstone	Yellow	Flake		48	35	9	
SA9	2	23	Mudstone	Yellow	Flake		39	25	13	
SA9	2	24	Mudstone	Yellow	Flake	Portion	45	48	15	Proximal
SA9	2	25	Mudstone	Red	Flake	Portion	30			
SA9	2	26	Mudstone	white	Flake	Portion	20			
SA9	2	27	FGS	Grey	Flake		40	25	7	15% cortex
SA9	2	28	FGS		Flake	Portion	39	25	6	Proximal
SA9	2	29	Silcrete		Flake	Scraper	30	30	3	
SA9	2	30	Silcrete		Flake	Portion	25			
SA9	2	31	Silcrete		Flake	Portion	20	20	5	
SA9	2	32	Silcrete		Flake	Portion	27			
SA9	2	33	Silcrete		Flake	Portion	28			
SA9	2	34	Silcrete		Flake	Portion	30			

Unit	Site	No	Material	Colour	Class	Sub	L	W	T	Comments
SA9	2	35	Silcrete		Flake	Portion	21			
SA9	2	36	Silcrete		Flake	Portion	26			
SA9	2	37	Silcrete		Flake	Portion	30			
SA9	2	38	FGS	Grey	Core		56	33	25	
SA9	2	39	Silcrete	Grey	Axe		75	70	15	
SA9	2	40	Silcrete	Pink	Flake	Portion	25			
SA9	2	41	Mudstone		Flake		40	40	13	
SA9	2	42	Mudstone		Flake	Portion	25			Proximal
SA9	2	43	Mudstone	Yellow	Flake	Portion	25			
SA9	2	44	FGS		Flake	Portion	17			
SA9	2	45	Mudstone	Yellow	Flake	Portion	16			
SA9	2	46	FGS	Grey	Flake	Portion	28			
SA9	2	47	FGS	Grey	Flake		31	25	8	
SA9	2	48	FGS	Grey	Flake		20	20	3	
SA9	2	49	Mudstone		Flake	Scraper	50			
SA9	2	50	Mudstone		Flake	Backed blade	25			

Aboriginal Site Recording Form

AHIMS Registrar
PO Box 1967, Hurstville NSW 2200
ahims@environment.nsw.gov.au

Department of **Environment and Conservation (NSW)**

Office Use Only

Site Number | | | - | | - | | | |

Date received / / Date entered into system / / Date catalogued / /

Entered by (Name)

Information Access

Office Use Only

☐ Gender/male ☐ Gender/female ☐ Location restriction ☐ General restriction ☐ No access

For Further Information Contact:

☐ **Nominated Trustee**

Title	Surname	First Name	Initials
MS	WORTH	SUZIE	

Organisation: WANARUAH LOCAL ABORGINAL LAND COUNCIL

Address: PO BOX 127 MUSWELLBROOK NSW 2333

Phone number: 02 65431288 Fax: 0265425377

☐ Client on system

☐ **Knowledge Holder**

Title	Surname	First Name	Initials

Organisation:

Address:

Phone number: Fax:

Aboriginal Heritage Unit or Cultural Heritage Division Contacts

Geographic Location

Site Name: SA8/10, SA8/12, SA8/14

Easting: 319951 Nothing: 6402821 ☐ AMG ☒ GDA

Mapsheet: CAMBERWELL 9133-III-S

Zone

☐	54	☐ 1.25k topographic map	☒ Non differential GPS
☐	55	☐ 1.25k topographic map	☐ Non differential GPS
☒	56	☒ 1.25k topographic map	☐ Non differential GPS
			☐ Client GIS or CAD system

☐ Client on system

Primary Recorder

Title	Surname	First Name	Initials
MS	BESANT	ANGELA	

Organisation: INSITE HERITAGE PTY LTD

Address: PO BOX 98 WANGI WANGI NSW 2267

Phone number: 02 49755818 Fax: 0249755818

Date recorded: 12/2008

☐ Client on system

DEC (NSW) Aboriginal Site Recording Form - Site Information

☐ CLOSED SITE ☐ OPEN SITE

Site Context

Landform

- ☐ Mountains
- ☐ Plain
- ☒ Rolling hills
- ☐ Steep hills
- ☐ Undulating plain

Landform Unit

- ☐ Beach
- ☐ Coastal rock platform
- ☐ Dune
- ☐ Intertidal flat
- ☐ Lagoon
- ☐ Tidal Creek
- ☐ Tidal Flat
- ☐ Cliff
- ☐ Crest
- ☐ Flat
- ☒ Lower slope
- ☒ Mid slope
- ☐ Upper slope
- ☐ Plain
- ☐ Ridge
- ☐ Tor
- ☐ Valley flat
- ☐ Levy
- ☒ Stream bank
- ☐ Stream channel
- ☐ Swamp
- ☐ Terrace
- ☐ Terrace flat

Slope

☐ degrees

Vegetation

- ☐ Closed forest
- ☐ Grasslands
- ☐ Isolated clump of trees
- ☐ Open forest
- ☐ Open woodland
- ☐ Scrub
- ☐ Woodland
- ☐ Cleared
- ☐ Revegetated
- ☐ N/A

Land use

- ☐ Conservation
- ☐ Established urban
- ☐ Farming-intensive
- ☐ Farming-low intensity
- ☐ Forestry
- ☐ Industrial
- ☐ Mining
- ☐ Pastoral/grazing
- ☐ Recreation
- ☐ Semi-rural
- ☐ Service corridor
- ☐ Transport corridor
- ☐ Urban expansion
- ☐ N/A

Water

Distance to permanent water source: 200m-400mapprox metres

Distance to temporary water source: 0m approx metres

Name of nearest permanent water source: Glennies Ck

Name of nearest temporary water: Unnamed

Directions for Relocation

Located within Ashton Coal Operations Ltd Camberwell, NSW, County of Durham Parish of Auckland.
Site located on mid to lower slopes / spur to the east of Glennies Creek adjacent to small southern most unnamed tributary in study area flowing west to Glennies Creek

Current Land Tenure

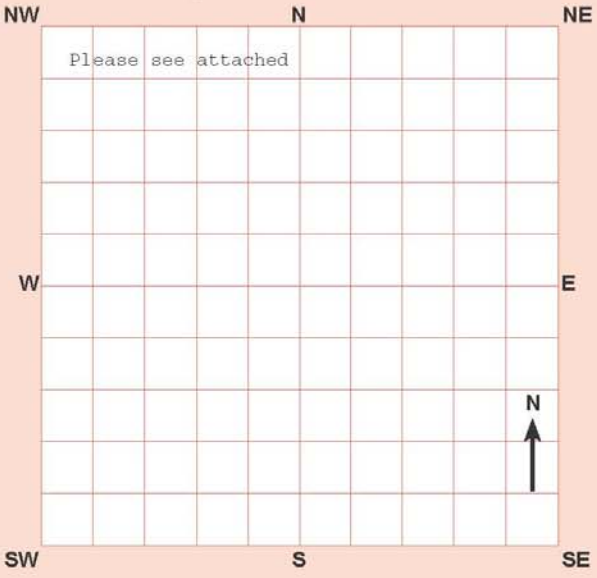
- ☐ Public
- ☐ Private

National Park/other government: ☐

Primary report I.D. ☐ (I.D. Office Use only)

Aboriginal Archaeological Assessment
Ashton Coal Operations Ltd
Proposed South East Open Cut Project
Unpublished Report to Ashton Coal
Operations Ltd
Insite Heritage 2009

Relocation Map



DEC (NSW) Aboriginal Site Recording Form - Site Information

General Site Information

Closed Site | **Open Site**

Shelter/Cave Formation

- [ ] Boulder
- [ ] Wind erosion
- [ ] Water erosion
- [ ] Rock collapse

Rock Surface Condition

- [ ] Boulder
- [ ] Sandstone platform
- [ ] Silica gloss
- [ ] Tessellated
- [ ] Weathered
- [ ] Other platform

Condition of Ceiling

- [ ] Boulder
- [ ] Sandstone platform
- [ ] Silica gloss
- [ ] Tessellated
- [ ] Weathered
- [ ] Other platform

Shelter Aspect

- [ ] North
- [ ] North East
- [ ] East
- [ ] South East
- [ ] South
- [ ] South West
- [ ] West
- [ ] North West

Features (including number of features)

[ ]	1. Aboriginal Ceremony & Dreaming	[ ]
[ ]	2. Aboriginal Resource & Gathering	[ ]
[ ]	3. Art	[ ]
[X]	4. Artefact	[ ]
[ ]	5. Burial	[ ]
[ ]	6. Ceremonial Ring	[ ]
[ ]	7. Conflict	[ ]
[ ]	8. Earth Mound	[ ]
[ ]	9. Fish Trap	[ ]
[X]	10. Grinding Groove	[ ]
[ ]	11. Habitation Structure	[ ]
[ ]	12. Hearth	[ ]
[ ]	13. Non Human Bone & Organic Material	[ ]
[ ]	14. Ochre quarry	[ ]
[ ]	15. Potential Archaeological Deposit	[ ]
[ ]	16. Stone Quarry	[ ]
[ ]	17. Shell	[ ]
[ ]	18. Stone Arrangement	[ ]
[ ]	19. Modified Tree	[ ]
[ ]	20. Water Hole	[ ]

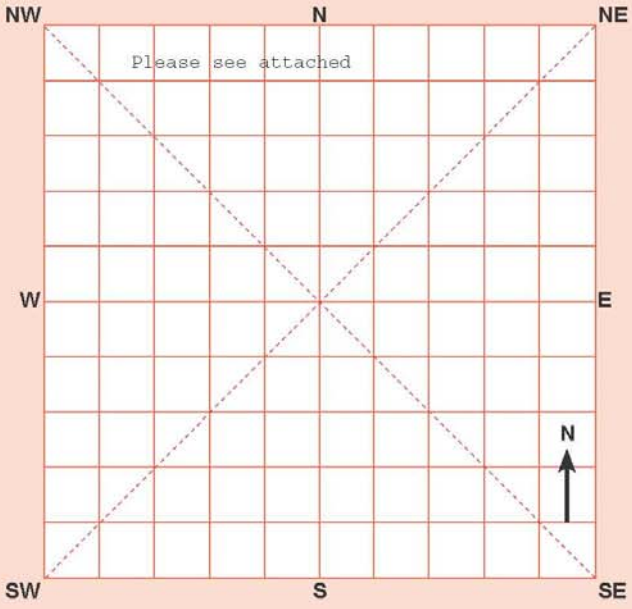
Site Orientation

- [ ] N-S
- [ ] NE-SW
- [ ] E-W
- [ ] SE-NW
- [ ] N/A

Attachments (No.)

- [X] A4 location map
- [ ] B/W photographs
- [ ] Colour photographs
- [ ] Slides
- [ ] Aerial photographs
- [ ] Site plans, drawings
- [X] Recording tables
- [X] Other
- [ ] Feature inserts-No [ ]

Estimated Site Extent and Location of Features



Site Context

Closed Site Dimensions (m)

- [ ] Internal length
- [ ] Internal width
- [ ] Shelter height
- [ ] Shelter floor area

Open Site Dimensions (m) Please see attached

- [ ] Total length of visible site
- [ ] Average width of visible site
- [ ] Estimated area of visible site
- [ ] Length of assessed site area

Site Interpretation and Community Statement - Aboriginal Community Interpretation and Management Recommendations

Please refer to Insite Heritage 2009 report

Preliminary Site Assessment - Scientific Analysis and Preliminary Management Recommendations

Site comprises of 2 separate Loci of artefacts and one pair of grinding grooves
SA8/10(Grinding Grooves), SA8/12, SA8/14
These loci located in Survey Area 8 and 10 of the study area

(refer to Insite Heritage 2009 report).
Please see attached for site details tables and location map

Please note GPS reading on front of site card are the GPS co-ordinates for loci SA8/10.
Please refer to attached tables for GPS locations of all loci within this site.

This section should only be filled in by the Endorsees

Endorsed by: ☐ Knowledge Holder ☐ Nominated Trustee ☐ Native Title Holder ☐ Community Consensus

Title	Surname	First Name	Initials

Organisation

Address

Phone number Fax

Comments

Site Details: SA8/10, SA8/12, SA8/14

Unit	Site	Landform	Location GPS (UTM, datum WGS84)	Exposure (Approx. m)	Visibility	Description
SA8	10	Slope	E 56S 319951 N 6402821	3 x 2	100%Sv 5%AV	Grinding grooves/Isolated find: Two possible grinding grooves in small sandstone exposure. Surrounded by dense grass cover. Artefacts: 1 mudstone
SA8	12	Slope	E 56S 319885 N 6402696	30 x 20	15% SV 15% AV	Artefact scatter: Low visibility due to dense grass cover, limited exposure along fence line. Moderate potential for sub-surface deposit. Artefacts: 8 mudstone, 2 silcrete, 1 quartz
SA8	14	Slope	E 56S 320033 N 6402750	10 x 3	75% SV 80% Av	Artefact scatter: Exposure located mid-slope along track. Artefacts: 1 mudstone, 2 silcrete

Two [potential] grinding grooves were located in a small exposure of sandstone on the slopes above the Glennies Creek terrace (SA8-10). Surface visibility was restricted by a heavy grass cover. The grooves measured 120mm x 15mm which suggests that they were not utilised for grinding the larger axe pre-forms such as those recorded during this survey (SA8-7-1, SA4-4-1). Plate 8 contains a photograph of the exposure and grooves. The sandstone outcrop was a small floater exposed within a cleared pasture area. The exposure is located approx 2 metres from an unformed vehicle track. The grooves are not deep and may result from a single event.

SA8-10 Sandstone exposure with grinding grooves

Artefact Details: SA8/10, SA8/12, SA8/14

Unit	Site	No	Material	Colour	Class	Sub	L	W	T	Comments
SA8	10	1	Mudstone	Yellow	Core		50	40	20	45% cortex, 16 negative scars, ?usewear
SA8	12	1	Mudstone	Red	Flake	Portion	60			
SA8	12	2	Mudstone	Yellow	Flake	Portion	22			
SA8	12	3	Mudstone	Yellow	Flake	Portion	18			
SA8	12	4	Mudstone	Red	Flake	Portion	13			
SA8	12	5	Silcrete	Pink	Flake	Portion	30			
SA8	12	6	Mudstone		Flake		16	5	3	
SA8	12	7	Silcrete		Flake	Portion	15			
SA8	12	8	quartz		Flake	Portion	18			
SA8	12	9	Mudstone	Yellow	Flake	Portion	33			Retouched,
SA8	12	10	Mudstone	Yellow	Flake	Portion	20			Proximal, 10% cortex
SA8	12	11	Mudstone	Red	Flake	Portion	26			
SA8	14	1	Silcrete		Flake	Portion	35			
SA8	14	2	Mudstone		Flake	Portion	25			
SA8	14	3	Silcrete		Flake		15	12	3	

Aboriginal Site Recording Form

AHIMS Registrar
PO Box 1967, Hurstville NSW 2200
ahims@environment.nsw.gov.au

Department of **Environment and Conservation (NSW)**

Office Use Only

Site Number | | | - | | - | | | |

Date received / / Date entered into system / / Date catalogued / /

Entered by (Name)

Information Access

Office Use Only

☐ Gender/male ☐ Gender/female ☐ Location restriction ☐ General restriction ☐ No access

For Further Information Contact:

☐ **Nominated Trustee**

Title	Surname	First Name	Initials
MS	WORTH	SUZIE	

Organisation: WANARUAH LOCAL ABORGINAL LAND COUNCIL

Address: PO BOX 127 MUSWELLBROOK NSW 2333

Phone number: 02 65431288 Fax: 0265425377

☐ Client on system

☐ **Knowledge Holder**

Title	Surname	First Name	Initials

Organisation:

Address:

Phone number: Fax:

Aboriginal Heritage Unit or Cultural Heritage Division Contacts

Geographic Location

Site Name: SA1/8-SA1/11, SA4/2, SA11/1-SA11/5

Easting: 319710 Nothing: 6404240 ☐ AMG ☒ GDA

Mapsheet: CAMBERWELL 9133-III-S

Zone

☐	54	☐ 1.25k topographic map	☒ Non differential GPS
☐	55	☐ 1.25k topographic map	☐ Non differential GPS
☒	56	☒ 1.25k topographic map	☐ Non differential GPS
			☐ Client GIS or CAD system

☐ Client on system

Primary Recorder

Title	Surname	First Name	Initials
MS	BESANT	ANGELA	

Organisation: INSITE HERITAGE PTY LTD

Address: PO BOX 98 WANGI WANGI NSW 2267

Phone number: 02 49755818 Fax: 0249755818

Date recorded: 12/2008

☐ Client on system

DEC (NSW) Aboriginal Site Recording Form - Site Information

☐ CLOSED SITE ☐ OPEN SITE

Site Context

Landform

- ☐ Mountains
- ☐ Plain
- ☐ Rolling hills
- ☐ Steep hills
- ☒ Undulating plain

Landform Unit

- ☐ Beach
- ☐ Coastal rock platform
- ☐ Dune
- ☐ Intertidal flat
- ☐ Lagoon
- ☐ Tidal Creek
- ☐ Tidal Flat
- ☐ Cliff
- ☐ Crest
- ☐ Flat
- ☐ Lower slope
- ☐ Mid slope
- ☐ Upper slope
- ☐ Plain
- ☐ Ridge
- ☐ Tor
- ☐ Valley flat
- ☐ Levy
- ☐ Stream bank
- ☐ Stream channel
- ☐ Swamp
- ☒ Terrace
- ☐ Terrace flat

Slope

☐ degrees

Vegetation

- ☐ Closed forest
- ☐ Grasslands
- ☐ Isolated clump of trees
- ☐ Open forest
- ☐ Open woodland
- ☐ Scrub
- ☐ Woodland
- ☐ Cleared
- ☐ Revegetated
- ☐ N/A

Land use

- ☐ Conservation
- ☐ Established urban
- ☐ Farming-intensive
- ☐ Farming-low intensity
- ☐ Forestry
- ☐ Industrial
- ☐ Mining
- ☐ Pastoral/grazing
- ☐ Recreation
- ☐ Semi-rural
- ☐ Service corridor
- ☐ Transport corridor
- ☐ Urban expansion
- ☐ N/A

Water

Distance to permanent water source: 0-500m approx metres

Distance to temporary water source: metres

Name of nearest permanent water source: Glennies Ck

Name of nearest temporary water:

Directions for Relocation

Located within Ashton Coal Operations Ltd Camberwell, NSW, County of Durham Parish of Auckland. Site located on the eastern, upper terrace of Glennies Creek

Current Land Tenure

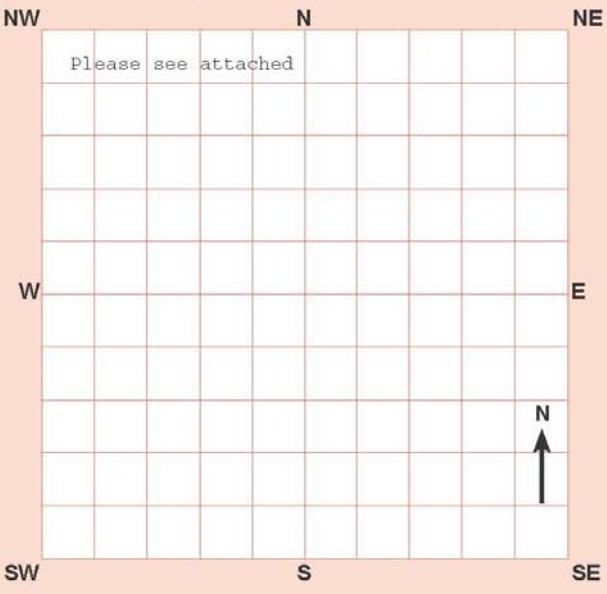
- ☐ Public
- ☐ Private

National Park/other government:

Primary report I.D. (I.D. Office Use only)

Aboriginal Archaeological Assessment
Ashton Coal Operations Ltd
Proposed South East Open Cut Project
Unpublished Report to Ashton Coal
Operations Ltd
Insite Heritage 2009

Relocation Map



DEC (NSW) Aboriginal Site Recording Form - Site Information

General Site Information

Closed Site

Shelter/Cave Formation

- [ ] Boulder
- [ ] Wind erosion
- [ ] Water erosion
- [ ] Rock collapse

Condition of Ceiling

- [ ] Boulder
- [ ] Sandstone platform
- [ ] Silica gloss
- [ ] Tessellated
- [ ] Weathered
- [ ] Other platform

Open Site

Rock Surface Condition

- [ ] Boulder
- [ ] Sandstone platform
- [ ] Silica gloss
- [ ] Tessellated
- [ ] Weathered
- [ ] Other platform

Shelter Aspect

- [ ] North
- [ ] North East
- [ ] East
- [ ] South East
- [ ] South
- [ ] South West
- [ ] West
- [ ] North West

Features (including number of features)

- [ ] 1. Aboriginal Ceremony & Dreaming
- [ ] 2. Aboriginal Resource & Gathering
- [ ] 3. Art
- [x] 4. Artefact
- [ ] 5. Burial
- [ ] 6. Ceremonial Ring
- [ ] 7. Conflict
- [ ] 8. Earth Mound
- [ ] 9. Fish Trap
- [ ] 10. Grinding Groove
- [ ] 11. Habitation Structure
- [ ] 12. Hearth
- [ ] 13. Non Human Bone & Organic Material
- [ ] 14. Ochre quarry
- [x] 15. Potential Archaeological Deposit
- [ ] 16. Stone Quarry
- [ ] 17. Shell
- [ ] 18. Stone Arrangement
- [ ] 19. Modified Tree
- [ ] 20. Water Hole

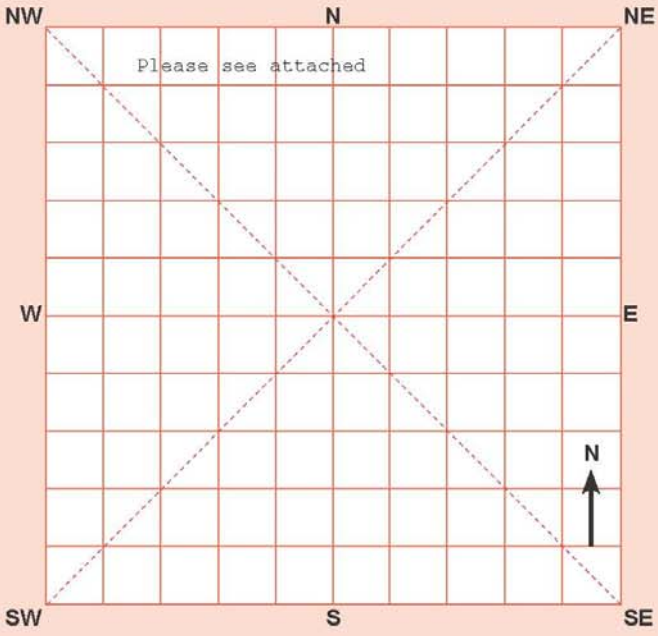
Site Orientation

- [ ] N-S
- [ ] NE-SW
- [ ] E-W
- [ ] SE-NW
- [ ] N/A

Attachments (No.)

- [x] A4 location map
- [ ] B/W photographs
- [ ] Colour photographs
- [ ] Slides
- [ ] Aerial photographs
- [ ] Site plans, drawings
- [x] Recording tables
- [x] Other
- [ ] Feature inserts-No

Estimated Site Extent and Location of Features



Site Context

Closed Site Dimensions (m)

- Internal length
- Internal width
- Shelter height
- Shelter floor area

Open Site Dimensions (m) Please see attached

- Total length of visible site
- Average width of visible site
- Estimated area of visible site
- Length of assessed site area

Site Interpretation and Community Statement - Aboriginal Community Interpretation and Management Recommendations

Please refer to Insite Heritage 2009 report

Preliminary Site Assessment - Scientific Analysis and Preliminary Management Recommendations

Site comprises of 11 separate Loci of artefacts located on the eastern upper terrace of Glennies Creek: SA1/8-SA1/11, SA4/2, SA11/1-SA11/5

These loci located in Survey Area 11, 1 and 4 of the study area . Survey Area 11 has also been identified as an area of high significance - potential for PAD. (refer to Insite Heritage 2009 report).

Please see attached for site details tables and location map

Please note GPS reading on front of site card are the GPS coordinates for loci SA11/6. Please refer to attached tables for GPS locations of all loci within this site.

This section should only be filled in by the Endorsees

Endorsed by: ☐ Knowledge Holder ☐ Nominated Trustee ☐ Native Title Holder ☐ Community Consensus

Title	Surname	First Name	Initials

Organisation

Address

Phone number Fax

Comments

Site Details: SA1/8-SA1/11, SA4/2, SA11/1-SA11/5

Unit	Site	Landform	Location GPS (UTM, datum WGS84)	Exposure (Approx. m)	Visibility	Description
SA1	8	Slope	E 56S 319771 N 6404315	4 x 14	90% SV 70% AV	Artefacts located in trackway. Located NE of SA11.6 Artefact: 1 silcrete, 5 mudstone
SA1	9	Slope	E 56S 319650 N 6404430	45 x 30	<10% SV <10% SV	Artefact scatter: Well grassed paddock with limited exposures. Moderate potential for sub-surface material Artefacts:5 mudstone, 3 silcrete
SA1	10	Slope	E 56S 319558 N 6404380	1 x 1	<10% SV <10% AV	Isolated find: Well grassed paddock with limited exposures. Artefact: 1 FGS
SA1	11	Slope	E 56S 319627 N 6404522	1 x 1	<10% SV <10% AV	Isolated find: Well grassed paddock with limited exposures. Two artefacts located approx. 20m apart. Artefacts: 2 mudstone
SA4	2	Slope	E 56S 319599 N 6404115	2 x 1	75% SV 75% AV	Isolated find: Small exposure amongst dense grass. Artefacts: 1 mudstone
SA11	1	Terrace	E 56S 319660 N 6404750	1 x 1	5% SV 5% AV	Isolated find: In heavy grass cover on river terrace. Low visibility across most of terrace. Artefacts: 1 mudstone
SA11	2	Terrace	E 56S 319740 N 6404659	4 x 3	80% SV 80% AV	Artefact scatter: Limited exposure near track and gate. Dense grass cover away from track. Deep alluvial soils exposed on creek bank, high potential for sub-surface deposit. 40m east of Glennies Creek. Artefacts: 8 mudstone, 3 silcrete, 1 quartz
SA11	3	Terrace	E 56S 319807 N 6404684	20 x 4	50% SV 50% AV	Artefact scatter: Exposure near dam and track. Heavy grass cover elsewhere. Deep alluvial soils exposed on creek bank, high potential for sub-surface deposit. Artefacts: 4 mudstone, 1 silcrete 27 mudstone, 7 silcrete (count only).
SA11	4	Terrace	E 56S 319805 N 6404657	3 x 3	50% SV 75% AV	Artefact scatter: Small exposure with heavy grass cover surrounding. Deep alluvial soils exposed on creek bank, high potential for sub-surface deposit. Artefacts: 8 mudstone, 1 volcanic 10 mudstone, 3 silcrete (count only).
SA11	5	Terrace	E 56S 319505 N 6403889	4 x 1	90% SV 90% AV	Artefact scatter: Limited exposure along stock trail on edge of river terrace. Dense grass cover away from trail. Deep alluvial soils across terrace adjacent to old stream bed approx. 50m east of Glennies Creek. Potential for sub-surface deposit although flooding may have disturbed deposit. Artefacts: 2 mudstone.
SA11	6	Terrace	56S 319710 N 6404240	120 x 5	90% SV 75% AV	Artefact scatter: On terrace approx. 100m east of Glennies Creek. Exposure along track and around dam. Dense grass cover away from exposure. Deep alluvial soils with some gravel patches. Likely knapping floors. Some artefact breakage possibly due to vehicular traffic. Note: this site is almost opposite the ' Glennies Creek Site' (NPWS 37-3-0541) and 'Glennies Bluff Site' (37-3-0540) which are located immediately to the west of Glennies Creek. Very high potential for sub-surface material. Artefacts: 314 mudstone, 75 silcrete, 2 quartz, 1 chert, 1 volcanic

Site Details: SA1/8-SA1/11, SA4/2, SA11/1-SA11/5

Unit	Site	No	Material	Colour	Class	Sub	L	W	T	Comments
SA1	8	1	Silcrete	Yellow	Flake		60	43	10	
SA1	8	2	Mudstone	Red	Core		52	42	25	
SA1	8	3	Mudstone		Flake		30	15	6	
SA1	8	4	Mudstone		Flake	Portion	18	13	3	
SA1	8	5	Mudstone		Flake	Portion	21	15	4	
SA1	8	6	Mudstone		Flake	Portion	49	30	15	
SA1	9	1	Mudstone		Flake	Portion	22	18	5	
SA1	9	2	Silcrete	Red	Flake		40	36	15	
SA1	9	3	Mudstone		Flake	Portion	17	15	1	
SA1	9	4	Mudstone		Flake		60	40	16	
SA1	9	5	Silcrete		Core		108	94	30	
SA1	9	6	Mudstone		Flake	Portion	40	18	5	
SA1	9	7	Mudstone		Flake	Portion	58	40	6	
SA1	9	8	Silcrete	Red	Core		50	54	13	
SA1	10	1	FGS		Flake		35	30	2	
SA1	11	1	Mudstone		Flake		75	62	20	
SA1	11	2	Mudstone		Flake		10	10	5	
SA4	2	1	Mudstone	Brown	Flake		25	15	6	2 transverse dorsal scars
SA11	1	1	Mudstone	Yellow	Flake	Portion	56	34	13	Distal, 40% weathered cortex
SA11	2	1	Silcrete	Black	Flake		23	20	5	
SA11	2	2	Silcrete	Grey	Flake		21	15	3	
SA11	2	3	Mudstone	Pink	Flake		22	22	6	
SA11	2	4	Mudstone	Yellow	Flake		15	8	3	
SA11	2	5	Mudstone	Yellow	Flake		21	14	8	
SA11	2	6	Mudstone	Yellow	Flake		20	16	6	
SA11	2	7	Mudstone	Yellow	Flake		12	12	4	
SA11	2	8	Mudstone	Red	Flake		25	20	6	
SA11	2	9	Silcrete	Grey	Angular fragment		27	24	12	
SA11	2	10	Quartz	White	Flake		28	21	12	
SA11	2	11	Mudstone	Red	Flake		26	28	7	
SA11	2	12	Mudstone	Yellow	Flake		15	12	3	
SA11	3	1	Mudstone	Pink	Flake	Portion	30	28	15	Proximal
SA11	3	2	Mudstone	Yellow	Flake		45	40	10	
SA11	3	3	Silcrete	Yellow	Flake	Portion	75	40	10	Lateral
SA11	3	4	Mudstone	Yellow	Flake		4	3	3	
SA11	3	5	Mudstone	Yellow	Flake	Backed	20	18	5	
SA11	4	1	Mudstone	Yellow	Angular fragment		21	10	7	
SA11	4	2	Mudstone	Yellow	Flake		20	15	12	

Unit	Site	No	Material	Colour	Class	Sub	L	W	T	Comments
SA11	4	3	Volcanic	Grey	Flake		25	15	11	
SA11	4	4	Mudstone	Yellow	Flake		70	40	30	
SA11	4	5	Mudstone	Orange	Flake		30	22	5	
SA11	4	6	Mudstone	Yellow	Flake		35	25	7	
SA11	4	7	Mudstone	Yellow	Flake		15	10	7	
SA11	4	8	Mudstone	Yellow	Flake	Portion	10	20	4	Mid
SA11	4	9	Mudstone	Yellow	Flake		40	23	5	20% pebble cortex
SA11	5	1	Mudstone	Orange	Flake		80	62	28	30% pebble cortex
SA11	5	2	Mudstone	Orange	Flake		52	37	15	5% pebble cortex
SA11	6	1	Mudstone	Yellow	Core		69	36	26	40% pebble cortex, 2 negative scars, 2 platforms
SA11	6	2	Silcrete	Grey	Flake	Portion	32	30	11	Distal
SA11	6	3	Mudstone	Yellow	Flake	Portion	13	6	2	Mid
SA11	6	4	Mudstone	Yellow	Angular fragment		22	10	7	
SA11	6	5	Mudstone	Red	Flake		22	16	6	10% pebble cortex
SA11	6	6	Silcrete	Yellow	Flake	Portion	10	10	3	Distal
SA11	6	7	Mudstone	Yellow	Flake		9	6	2	
SA11	6	8	Mudstone	Yellow	Flake		12	7	2	
SA11	6	9	Mudstone	Red	Angular fragment		39	25	9	
SA11	6	10	Silcrete	Grey	Flake		21	11	6	
SA11	6	11	Silcrete	Grey	Flake		26	20	7	
SA11	6	12	Mudstone	Grey	Flake	Portion	15	13	6	Distal
SA11	6	13	Mudstone	Yellow	Flake	Portion	31	17	9	3 longitudinal dorsal scars
SA11	6	14	Silcrete	Grey	Core		29	21	16	5 negaitve scars, 3 platforms, rotated
SA11	6	15	Mudstone	Yellow	Flake	Portion	13	6	3	Mid
SA11	6	16	Mudstone	Yellow	Core		36	26	9	5 negative scars, 4 platforms
SA11	6	17	Mudstone	Yellow	Angular fragment		9	7	4	
SA11	6	18	Silcrete	Cream	Flake		37	21	13	
SA11	6	19	Mudstone	Yellow	Flake		11	6	3	
SA11	6	20	Mudstone	Orange	Flake	Portion	16	15	4	Proximal
SA11	6	21	Mudstone	Yellow	Flake		24	19	6	3 longitudinal dorsal scars
SA11	6	22	Mudstone	Yellow	Flake		30	26	13	50% pebble cortex
SA11	6	23	Silcrete	Cream	Flake	Portion	23	21	7	Proximal
SA11	6	24	Mudstone	Orange	Flake	Portion	16	8	3	Lateral
SA11	6	25	Mudstone	Yellow	Angular fragment		24	19	8	50% pebble cortex

Unit	Site	No	Material	Colour	Class	Sub	L	W	T	Comments
SA11	6	26	Mudstone	Yellow	Angular fragment		20	19	9	
SA11	6	27	Silcrete	Cream	Flake	Portion	29	25	9	Distal
SA11	6	28	Silcrete	Pink	Flake	Portion	22	11	3	Lateral
SA11	6	29	Mudstone	Yellow	Flake	Portion	22	14	4	Lateral
SA11	6	30	Silcrete	Pink	Flake	Portion	12	11	3	Mid
SA11	6	31	Silcrete	Pink	Flake	Portion	16	10	2	Lateral
SA11	6	32	Mudstone	Yellow	Angular fragment		12	9	3	
SA11	6	33	Mudstone	Yellow	Angular fragment		22	19	13	
SA11	6	34	Mudstone	Brown	Flake	Portion	17	25	10	Distal, 25% pebble cortex
SA11	6	35	Mudstone	Orange	Flake	Portion	32	20	6	Lateral
SA11	6	36	Mudstone	Yellow	Angular fragment		11	6	5	
SA11	6	37	Silcrete	Yellow	Flake	Portion	15	11	3	Lateral
SA11	6	38	Silcrete	Red	Flake	Portion	19	11	3	Mid, 10% pebble cortex
SA11	6	39	Silcrete	Yellow	Flake		14	12	3	
SA11	6	40	Mudstone	Yellow	Flake	Portion	14	20	7	Mid
SA11	6	41	Silcrete	Orange	Flake	Portion	20	9	7	
SA11	6	42	Mudstone	Yellow	Flake		14	9	3	
SA11	6	43	Mudstone	Yellow	Flake	Portion	11	14	3	Proximal
SA11	6	44	Mudstone	Yellow	Angular fragment		9	8	3	
SA11	6	45	Mudstone	Yellow	Flake		6	5	2	
SA11	6	46	Mudstone	Yellow	Flake	Portion	15	9	3	Mid
SA11	6	47	Mudstone	Yellow	Flake	Portion	8	6	3	Mid
SA11	6	48	Mudstone	Yellow	Core		30	25	15	5 negative scars, 3 platforms
SA11	6	49	Mudstone	Red	Flake		36	30	8	
SA11	6	50	Mudstone	Yellow	Flake		9	6	3	
SA11	6	51	Mudstone	Red	Flake		21	15	7	Longitudinal dorsal scar
SA11	6	52	Mudstone	Red	Flake	Portion	20	12	5	Mid
SA11	6	53	Mudstone	Red	Flake	Portion	15	10	3	Mid
SA11	6	54	Mudstone	Red	Flake		25	15	6	40% pebble cortex
SA11	6	55	Mudstone	Yellow	Flake		21	12	6	
SA11	6	56	Mudstone	Orange	Flake		23	13	4	
SA11	6	57	Mudstone	Yellow	Angular fragment		58	21	15	30% pebble cortex
SA11	6	58	Mudstone	Yellow	Flake	Portion	27	18	10	Mid
SA11	6	59	Mudstone	Yellow	Flake	Portion	9	6	3	Lateral

Unit	Site	No	Material	Colour	Class	Sub	L	W	T	Comments
SA11	6	60	Mudstone	Yellow	Angular fragment		19	13	10	
SA11	6	61	Mudstone	Yellow	Core		22	16	14	7 negative scars, 3 platforms
SA11	6	62	Mudstone	Red	Flake		32	22	8	25% pebble cortex, 2 longitudinal dorsal scars
SA11	6	63	Mudstone	Red	Core		30	20	15	15% pebble cortex, 3 blade scars, 2 platforms
SA11	6	64	Mudstone	Brown	Flake		16	13	4	Longitudinal dorsal scar
SA11	6	65	Mudstone	Orange	Flake		20	12	7	
SA11	6	66	Mudstone	Orange	Angular fragment		16	7	4	
SA11	6	67	Mudstone	Yellow	Angular fragment		34	14	14	
SA11	6	68	Mudstone	Orange	Angular fragment		22	12	4	
SA11	6	69	Mudstone	Brown	Flake	Portion	11	5	3	Mid
SA11	6	70	Mudstone	Red	Flake	Portion	25	22	11	25% Weathered cortex, mid
SA11	6	71	Mudstone	Red	Flake	Portion	18	12	3	Proximal
SA11	6	72	Mudstone	Yellow	Flake		42	20	6	Longitudinal dorsal ridge
SA11	6	73	Mudstone	Yellow	Flake	Portion	39	32	9	Proximal, longitudinal dorsal scar
SA11	6	74	Mudstone	Orange	Flake	Portion	19	13	3	Mid
SA11	6	75	Mudstone	Orange	Flake	Portion	22	15	4	Lateral
SA11	6	76	Mudstone	Orange	Flake	Portion	15	7	2	Lateral
SA11	6	77	Mudstone	Orange	Flake		6	5	2	
SA11	6	78	Mudstone	Orange	Flake	Portion	9	6	5	Lateral
SA11	6	79	Mudstone	Red	Flake	Portion	18	14	4	Lateral
SA11	6	80	Mudstone	Yellow	Flake	Portion	18	22	5	Proximal, 4 longitudinal dorsal scars
SA11	6	81	Mudstone	Yellow	Angular fragment		18	7	7	
SA11	6	82	Mudstone	Orange	Flake	Portion	18	12	5	Mid
SA11	6	83	Mudstone	Yellow	Core		25	22	15	9 negative scars, 4 platforms
SA11	6	84	Mudstone	Yellow	Flake		35	30	7	
SA11	6	85	Mudstone	Orange	Angular fragment		30	16	9	
SA11	6	86	Mudstone	Yellow	Flake	Portion	45	26	9	Distal

Unit	Site	No	Material	Colour	Class	Sub	L	W	T	Comments
SA11	6	87	Mudstone	Cream	Flake		25	40	6	Retroflex hinge termination
SA11	6	88	Mudstone	Red	Flake	Portion	21	12	8	Lateral
SA11	6	89	Mudstone	Yellow	Flake		30	12	6	5% pebble cortex
SA11	6	90	Mudstone	Yellow	Flake	Portion	18	24	6	Proximal
SA11	6	91	Mudstone	Yellow	Angular fragment		17	12	7	
SA11	6	92	Mudstone	Orange	Flake	Portion	11	15	5	Mid, Longitudinal dorsal ridge
SA11	6	93	Mudstone	Orange	Flake		9	6	5	
SA11	6	94	Silcrete	Red	Flake		15	12	3	
SA11	6	95	Mudstone	Yellow	Angular fragment		15	10	6	
SA11	6	96	Mudstone	Yellow	Angular fragment		19	9	8	
SA11	6	97	Mudstone	Yellow	Flake	Portion	16	14	4	Proximal
SA11	6	98	Mudstone	Yellow	Angular fragment		15	7	6	
SA11	6	99	Mudstone	Brown	Flake	Portion	11	9	3	Proximal
SA11	6	100	Mudstone	Orange	Angular fragment		12	9	3	
SA11	6	101	Mudstone	Yellow	Flake		30	25	6	50% pebble cortex
SA11	6	102	Mudstone	Yellow	Flake		24	16	3	Longitudinal dorsal ridge
SA11	6	103	Mudstone	Yellow	Angular fragment		17	13	7	
SA11	6	104	Mudstone	Yellow	Flake	Portion	20	13	5	Lateral
SA11	6	105	Mudstone	Orange	Flake		11	7	2	
SA11	6	106	Mudstone	Orange	Flake		11	8	2	
SA11	6	107	Mudstone	Cream	Flake		11	11	3	
SA11	6	108	Mudstone	Orange	Flake		10	6	2	
SA11	6	109	Mudstone	Brown	Flake	Portion	9	7	3	Mid
SA11	6	110	Mudstone	Brown	Core		19	11	10	4 negative scars, 2 platforms
SA11	6	111	Mudstone	Orange	Flake	Portion	16	10	7	Mid
SA11	6	112	Mudstone	Brown	Flake		12	10	2	
SA11	6	113	Mudstone	Yellow	Flake		5	5	2	
SA11	6	114	Mudstone	Orange	Flake		15	8	2	
SA11	6	115	Mudstone	Yellow	Flake		14	5	3	
SA11	6	116	Mudstone	Orange	Flake		6	5	2	
SA11	6	117	Mudstone	Orange	Flake		6	4	3	
SA11	6	118	Mudstone	Orange	Flake		8	5	2	
SA11	6	119	Mudstone	Brown	Flake	Portion	12	12	4	Proximal, longitudinal dorsal ridge

Unit	Site	No	Material	Colour	Class	Sub	L	W	T	Comments
SA11	6	120	Mudstone	Orange	Core		37	17	15	9 negative scars, 3 platforms, rotated
SA11	6	121	Mudstone	Yellow	Flake	Portion	25	21	8	Proximal
SA11	6	122	Mudstone	Yellow	Core		25	15	9	5 negative scars, 3 platforms, rotated
SA11	6	123	Mudstone	Red	Core		28	22	11	5 negative scars, 3 platforms, rotated
SA11	6	124	Mudstone	Brown	Flake	Portion	13	13	3	Mid
SA11	6	125	Mudstone	Yellow	Flake	Portion	12	11	3	Mid
SA11	6	126	Mudstone	Yellow	Flake	Portion	9	8	3	Mid
SA11	6	127	Mudstone	Yellow	Flake	Portion	8	4	2	Mid
SA11	6	128	Mudstone	Yellow	Core		66	53	29	70% pebble cortex, 6 negative scars, 2 platforms
SA11	6	129	Mudstone	Yellow	Flake	Utilised	50	32	14	40% pebble cortex, usewear on lateral margin
SA11	6	130	Mudstone	Pink	Flake		14	12	3	
SA11	6	131	Mudstone	Orange	Flake		16	12	6	
SA11	6	132	Mudstone	Orange	Flake		19	12	7	
SA11	6	133	Silcrete	Red	Flake		18	9	6	
SA11	6	134	Mudstone	Cream	Flake	Portion	12	18	6	Mid, Longitudinal dorsal ridge
SA11	6	135	Silcrete	Red	Angular fragment		48	33	14	30% weathered cortex
SA11	6	136	Silcrete	Red	Angular fragment		36	30	22	20% weathered cortex
SA11	6	137	Silcrete	Red	Core		58	42	22	4 negative scars, 2 platforms
SA11	6	138	Silcrete	Red	Core		42	38	20	5 negative scars, 2 platforms
SA11	6	139	Mudstone	Yellow	Flake	Portion	14	12	6	Lateral
SA11	6	140	Mudstone	Red	Flake	Portion	28	14	10	Transverse dorsal scar
SA11	6	141	Mudstone	Red	Angular fragment		24	15	10	
SA11	6	142	Silcrete	Red	Flake		17	11	3	
SA11	6	143	Mudstone	Orange	Flake		17	12	4	
SA11	6	144	Mudstone	Yellow	Flake		9	5	3	
SA11	6	145	Mudstone	Red	Core		24	16	11	4 negative scars, 2 platforms
SA11	6	146	Silcrete	Red	Flake	Portion	11	9	6	Mid
SA11	6	147	Mudstone	Red	Flake	Utilised	30	26	6	Longitudinal dorsal ridge, usewear lateral margin

Unit	Site	No	Material	Colour	Class	Sub	L	W	T	Comments
SA11	6	148	Mudstone	Yellow	Flake	Portion	31	25	8	Lateral
SA11	6	149	Mudstone	Yellow	Flake	Portion	10	8	2	Mid
SA11	6	150	Mudstone	Red	Flake	Portion	11	9	6	Distal, longitudinal dorsal ridge
SA11	6	151	Mudstone	Yellow	Flake	Portion	16	16	7	Proximal
SA11	6	152	Mudstone	Yellow	Flake	Portion	18	10	2	Lateral
SA11	6	153	Mudstone	Yellow	Flake		34	15	11	Transverse dorsal scar
SA11	6	154	Silcrete	Red	Flake	Portion	36	23	12	Lateral, longitudinal dorsal scar
SA11	6	155	Silcrete	Red	Flake	Portion	28	18	7	!lateral, conjoin
SA11	6	156	Silcrete	red	Flake	Portion	38	17	11	!lateral, conjoin
SA11	6	157	Mudstone	Orange	Flake		18	11	8	
SA11	6	158	Mudstone	Yellow	Flake	Portion	21	18	7	Proximal
SA11	6	159	Mudstone	Orange	Flake	Portion	19	10	4	Lateral
SA11	6	160	Mudstone	Yellow	Flake	Portion	14	22	8	Proximal
SA11	6	161	Silcrete	Pink	Flake	Portion	20	13	6	Lateral
SA11	6	162	Mudstone	Yellow	Flake	Portion	17	12	9	Mid
SA11	6	163	Mudstone	Yellow	Flake	Portion	11	11	7	Mid, longitudinal dorsal ridge
SA11	6	164	Silcrete	Pink	Flake		12	9	2	
SA11	6	165	Mudstone	Red	Flake	Portion	10	10	3	Proximal
SA11	6	166	Mudstone	Yellow	Flake	Portion	25	16	7	Proximal
SA11	6	167	Mudstone	Orange	Flake		8	4	1	
SA11	6	168	Mudstone	Orange	Flake		11	9	3	
SA11	6	169	Mudstone	Orange	Flake	Portion	18	11	5	Proximal
SA11	6	170	Mudstone	Yellow	Flake	Portion	18	23	9	Lateral
SA11	6	171	Silcrete	Pink	Flake		28	22	6	
SA11	6	172	Mudstone	Orange	Flake		7	6	2	
SA11	6	173	Mudstone	Orange	Flake	Portion	18	12	8	Lateral
SA11	6	174	Mudstone	Cream	Flake		14	11	6	
SA11	6	175	Mudstone	Orange	Angular fragment		17	9	7	
SA11	6	176	Mudstone	Orange	Flake		12	9	4	
SA11	6	177	Mudstone	Yellow	Flake	Portion	15	20	6	Proximal, longitudinal dorsal scar
SA11	6	178	Mudstone	Cream	Flake		28	32	12	40% pebble cortex
SA11	6	179	Mudstone	Yellow	Flake	Portion	14	20	5	Mid, 3 longitudinal dorsal scars
SA11	6	180	Mudstone	Red	Angular fragment		18	12	5	
SA11	6	181	Mudstone	Red	Flake	Portion	15	8	4	
SA11	6	182	Mudstone	Red	Flake	Portion	21	14	6	
SA11	6	183	Mudstone	Yellow	Flake	Portion	9	6	2	Mid

Unit	Site	No	Material	Colour	Class	Sub	L	W	T	Comments
SA11	6	184	Silcrete	Pink	Flake	Portion	20	17	6	Proximal
SA11	6	185	Mudstone	Yellow	Flake		14	11	4	
SA11	6	186	Mudstone	Yellow	Flake	Portion	40	28	14	10% pebble cortex, 2 longitudinal dorsal scars
SA11	6	187	Mudstone	Yellow	Core		50	45	30	20% pebble cortex, 10 negative scars, 3 platforms
SA11	6	188	Mudstone	Red	Flake		20	14	4	
SA11	6	189	Silcrete	Pink	Flake	Portion	24	15	9	Lateral
SA11	6	190	Mudstone	Yellow	Flake	Portion	12	9	4	Proximal
SA11	6	191	Mudstone	Red	Flake	Portion	15	11	6	Distal
SA11	6	192	Mudstone	Red	Core		41	32	15	40% pebble cortex, 4 negative scars,3 platforms
SA11	6	193	Mudstone	Pink	Flake		26	18	8	
SA11	6	194	Mudstone	Pink	Flake		12	7	1	
SA11	6	195	Mudstone	Yellow	Flake	Utilised	50	36	22	Longitudinal dorsal ridge, usewear lateral margin
SA11	6	196	Mudstone	Red	Flake		11	8	3	
SA11	6	197	Mudstone	Orange	Flake	Portion	14	8	3	Distal
SA11	6	198	Mudstone	Cream	Flake	Portion	9	10	3	Distal
SA11	6	199	Mudstone	Yellow	Flake		29	18	6	30% pebble cortex
SA11	6	200	Mudstone	Yellow	Flake		6	5	2	
SA11	6	201	Mudstone	Orange	Flake	Portion	15	11	3	Proximal, 2 longitudinal dorsal scars
SA11	6	202	Mudstone	Yellow	Flake		18	13	9	
SA11	6	203	Mudstone	Yellow	Flake	Portion	18	24	12	Proximal
SA11	6	204	Mudstone	Yellow	Flake		18	14	6	40% pebble cortex
SA11	6	205	Silcrete	Pink	Core		56	32	18	10 negative scars, 3 platforms
SA11	6	206	Silcrete	Pink	Flake	Portion	21	18	10	Proximal
SA11	6	207	Mudstone	Orange	Flake	Portion	5	11	2	Mid
SA11	6	208	Mudstone	Cream	Core		35	30	22	30% pebble cortex, 11 negative scars, 3 platforms
SA11	6	209	Mudstone	Cream	Flake		20	17	10	5% pebble cortex
SA11	6	210	Mudstone	Cream	Flake	Portion	25	20	6	Proximal
SA11	6	211	Silcrete	Pink	Flake	Portion	9	15	3	Proximal
SA11	6	212	Mudstone	Orange	Flake	Portion	7	11	3	Mid
SA11	6	213	Mudstone	Orange	Flake	Portion	14	9	3	Lateral
SA11	6	214	Mudstone	Orange	Core		18	11	10	4 negative scars, 1 platform

Unit	Site	No	Material	Colour	Class	Sub	L	W	T	Comments
SA11	6	215	Silcrete	Red	Flake	Portion	14	13	4	Proximal
SA11	6	216	Mudstone	Grey	Flake	Portion	14	12	4	Lateral
SA11	6	217	Mudstone	Yellow	Angular fragment		48	32	18	25% pebble cortex
SA11	6	218	Mudstone	Red	Flake		25	15	4	20% pebble cortex
SA11	6	219	Volcanic	Grey	Flake		32	42	10	10% pebble cortex
SA11	6	220	Silcrete	Red	Flake	Portion	18	15	5	Proximal, longitudinal dorsal scar
SA11	6	221	Mudstone	Yellow	Flake	Portion	13	19	5	Mid
SA11	6	222	Mudstone	Red	Flake		20	35	9	2 longitudinal dorsal scars
SA11	6	223	Mudstone	Cream	Flake		17	13	5	
SA11	6	224	Mudstone	Orange	Flake		17	13	5	
SA11	6	225	Silcrete	Yellow	Flake	Portion	28	20	8	Lateral
SA11	6	226	Silcrete	Grey	Flake	Portion	12	10	5	Mid
SA11	6	227	Silcrete	Yellow	Flake	Portion	12	20	5	Mid, longitudinal dorsal ridge
SA11	6	228	Mudstone	Red	Flake		44	36	14	
SA11	6	229	Mudstone	Orange	Flake		12	10	4	
SA11	6	230	Silcrete	Pink	Flake		34	18	9	longitudinal dorsal ridge, 2 transverse scars
SA11	6	231	Mudstone	Yellow	Flake		18	12	6	
SA11	6	232	Mudstone	Yellow	Core		48	33	29	40% pebble cortex, 8 negative scars, 3 platforms
SA11	6	233	Silcrete	Pink	Flake		14	12	4	
SA11	6	234	Silcrete	Pink	Flake		18	12	9	
SA11	6	235	Mudstone	Red	Flake	Portion	17	24	5	Mid
SA11	6	236	Silcrete	Yellow	Flake		32	32	9	Transverse dorsal scar
SA11	6	237	Mudstone	Yellow	Flake		14	12	5	
SA11	6	238	Mudstone	Yellow	Flake	Portion	12	9	3	
SA11	6	239	Mudstone	Yellow	Flake	Portion	10	14	4	Mid, transverse dorsal scar
SA11	6	240	Mudstone	Yellow	Core		48	39	38	50% pebble cortex, 5 negative scars, 2 platforms
SA11	6	241	Silcrete	Pink	Flake	Portion	11	11	3	Mid
SA11	6	242	Mudstone	Yellow	Flake		34	22	9	25% weathered cortex
SA11	6	243	Mudstone	Yellow	Flake	Portion	17	10	3	Prooxmal, 3 longitudinal dorsal scars
SA11	6	244	Silcrete	Red	Flake		32	29	9	
SA11	6	245	Silcrete	Red	Flake	Portion	35	25	12	Proximal

Unit	Site	No	Material	Colour	Class	Sub	L	W	T	Comments
SA11	6	246	Silcrete	Yellow	Angular fragment		18	9	7	
SA11	6	247	Mudstone	Red	Angular fragment		12	10	6	
SA11	6	248	Mudstone	Red	Flake	Portion	35	25	11	Lateral
SA11	6	249	Mudstone	Yellow	Flake	Portion	12	20	6	Mid, longitudinal dorsal ridge
SA11	6	250	Mudstone	Orange	Flake	Portion	15	20	9	Mid, longitudinal dorsal ridge
SA11	6	251	Mudstone	Grey	Flake		34	24	11	
SA11	6	252	Mudstone	Grey	Flake		21	11	2	40% pebble cortex
SA11	6	253	Mudstone	Orange	Angular fragment		15	11	9	
SA11	6	254	Silcrete	Red	Flake		50	35	25	2 longitudinal dorsal scars
SA11	6	255	Mudstone	Grey	Flake	Portion	16	18	6	Mid, 3 longitudinal dorsal scars
SA11	6	256	Mudstone	Yellow	Flake		28	21	5	
SA11	6	257	Mudstone	Orange	Flake		23	15	6	
SA11	6	258	Mudstone	Orange	Flake		19	9	3	
SA11	6	259	Mudstone	Yellow	Flake	Portion	20	12	5	Lateral
SA11	6	260	Mudstone	Red	Core		30	23	18	30% pebble cortex, 7 negative scars, 2 platforms
SA11	6	261	Silcrete	Pink	Core		36	26	30	10 negative scars, 4 platforms
SA11	6	262	Silcrete	Red	Flake	Portion	15	18	4	Mid
SA11	6	263	Silcrete	Grey	Core		45	35	26	10 negative scars, 4 platforms
SA11	6	264	Mudstone	Yellow	Angular fragment		24	12	5	30% pebble cortex
SA11	6	265	Mudstone	Red	Flake		20	28	5	
SA11	6	266	Mudstone	Red	Flake	Portion	20	22	9	Proximal, 5% pebble cortex
SA11	6	267	Silcrete	Red	Angular fragment		34	20	17	
SA11	6	268	Mudstone	Red	Flake		50	48	23	25% pebble cortex, 2 longitudinal dorsal scars
SA11	6	269	Mudstone	Orange	Flake		36	30	13	2 longitudinal dorsal scars, 2 transverse scars
SA11	6	270	Silcrete	Grey	Core		20	15	11	3 negative scars, 2 platforms
SA11	6	271	Mudstone	Grey	Flake		11	10	5	

Unit	Site	No	Material	Colour	Class	Sub	L	W	T	Comments
SA11	6	272	Silcrete	Yellow	Flake	Portion	20	15	5	Proximal
SA11	6	273	Silcrete	Yellow	Flake		42	28	12	10% pebble cortex
SA11	6	274	Mudstone	Yellow	Flake		15	5	3	
SA11	6	275	Mudstone	Grey	Flake	Utilised	25	23	7	3 longitudinal dorsal scars,usewear lateral margin
SA11	6	276	Mudstone	Yellow	Flake		22	26	8	3 longitudinal dorsal scars, 2 transverse scars
SA11	6	277	Silcrete	Red	Flake		42	31	9	2 longitudinal dorsal scars
SA11	6	278	Silcrete	Yellow	Flake		18	14	3	longitudinal dorsal scar
SA11	6	279	Mudstone	Red	Flake		26	18	8	2 longitudinal dorsal scars, 2 transverse scars
SA11	6	280	Mudstone	Orange	Flake	Portion	14	11	3	Mid
SA11	6	281	Mudstone	Yellow	Flake	Portion	21	14	7	Distal
SA11	6	282	Mudstone	Red	Flake		12	9	3	
SA11	6	283	Silcrete	Red	Flake	Portion	6	11	3	Mid
SA11	6	284	Mudstone	Red	Flake		9	11	3	Proximal, 3 longitudinal dorsal scars
SA11	6	285	Mudstone	Orange	Angular fragment		12	8	6	
SA11	6	286	Mudstone	Orange	Flake		18	11	3	
SA11	6	287	Mudstone	Red	Flake		12	6	4	
SA11	6	288	Mudstone	Cream	Flake	Portion	15	12	6	Distal
SA11	6	289	Mudstone	Yellow	Core		45	20	14	6 negative scars, 2 platforms
SA11	6	290	Mudstone	Red	Flake		20	15	4	
SA11	6	291	Silcrete	Yellow	Flake	Portion	15	28	4	Proximal
SA11	6	292	Mudstone	Yellow	Flake		16	11	10	
SA11	6	293	Silcrete	Red	Flake	Portion	10	17	3	Proximal, longitudinal dorsal scar
SA11	6	294	Silcrete	Yellow	Flake		34	25	6	2 longitudinal dorsal scars, 2 transverse scars
SA11	6	295	Chert	Grey	Core		36	30	11	banded, 5 negative scars, 3 paltforms
SA11	6	296	Mudstone	Grey	Flake		32	28	13	
SA11	6	297	Mudstone	Grey	Flake	Portion	16	25	6	Distal, retroflex hinge trermination
SA11	6	298	Mudstone	Yellow	Core		28	15	13	5 negative scars, 3 platforms

Unit	Site	No	Material	Colour	Class	Sub	L	W	T	Comments
SA11	6	299	Silcrete	Pink	Angular fragment		18	12	12	
SA11	6	300	Silcrete	Pink	Angular fragment		20	13	7	15% pebble cortex
SA11	6	301	Mudstone	Orange	Flake	Portion	17	16	6	Distal
SA11	6	302	Mudstone	Grey	Flake		22	16	12	
SA11	6	303	Mudstone	Yellow	Flake		11	12	3	
SA11	6	304	Mudstone	Orange	Flake	Portion	7	10	4	Mid
SA11	6	305	Mudstone	Orange	Flake		7	10	3	
SA11	6	306	Silcrete	Red	Flake		12	8	3	
SA11	6	307	Mudstone	Orange	Flake	Portion	9	7	3	Mid
SA11	6	308	Quartz	White	Flake		11	6	2	
SA11	6	309	Quartz	White	Flake		9	5	3	
SA11	6	310	Silcrete	Red	Flake		26	22	4	Longitudinal dorsal scar
SA11	6	311	Mudstone	Red	Flake	Portion	19	10	5	Lateral
SA11	6	312	Mudstone	Yellow	Flake		24	19	9	Longitudinal dorsal ridge
SA11	6	313	Mudstone	Yellow	Flake	Portion	20	19	6	Mid, longitudinal dorsal ridge
SA11	6	314	Mudstone	Yellow	Flake		19	15	3	
SA11	6	315	Mudstone	Yellow	Flake	Portion	12	9	3	Distal
SA11	6	316	Silcrete	Grey	Flake		22	14	7	
SA11	6	317	Silcrete	Grey	Flake		22	13	6	
SA11	6	318	Silcrete	Yellow	Flake		45	29	12	30% pebble cortex, longitudinal dorsal scar
SA11	6	319	Mudstone	Yellow	Flake	Portion	27	18	8	Lateral
SA11	6	320	Mudstone	Yellow	Core		76	70	30	30% pebble cortex, 10 negative scars, 3 platforms
SA11	6	321	Silcrete	Pink	Flake	Portion	22	26	7	Lateral, 2 transverse scars
SA11	6	322	Mudstone	Yellow	Flake		10	8	2	
SA11	6	323	Mudstone	Orange	Flake		9	7	3	
SA11	6	324	Silcrete	Pink	Flake		36	30	13	Longitudinal dorsal ridge
SA11	6	325	Mudstone	Yellow	Flake		9	9	3	
SA11	6	326	Mudstone	Red	Flake		25	20	8	3 longitudinal dorsal scars
SA11	6	327	Mudstone	Cream	Flake	Portion	23	17	4	!lateral, conjoin
SA11	6	328	Mudstone	Cream	Flake	Portion	20	16	4	!lateral, conjoin
SA11	6	329	Mudstone	Cream	Flake		11	14	3	
SA11	6	330	Mudstone	Red	Flake	Portion	14	12	3	Lateral

Unit	Site	No	Material	Colour	Class	Sub	L	W	T	Comments
SA11	6	331	Mudstone	Red	Flake		35	20	11	2 longitudinal dorsal scars
SA11	6	332	Mudstone	Yellow	Flake		18	8	4	
SA11	6	333	Mudstone	Red	Flake		22	15	6	1 longitudinal dorsal scar
SA11	6	334	Mudstone	Red	Flake		16	12	5	
SA11	6	335	Mudstone	Red	Flake		22	11	4	
SA11	6	336	Mudstone	Yellow	Flake		12	9	3	
SA11	6	337	Mudstone	Red	Flake	Portion	12	6	2	Distal
SA11	6	338	Mudstone	Red	Flake	Portion	17	11	6	Proximal
SA11	6	339	Silcrete	Pink	Flake		25	20	5	
SA11	6	340	Mudstone	Brown	Flake		16	14	5	
SA11	6	341	Silcrete	Pink	Flake		10	14	4	Longitudinal dorsal ridge
SA11	6	342	Mudstone	Orange	Flake	Portion	22	20	6	Mid
SA11	6	343	Mudstone	Cream	Flake	Portion	15	19	4	Mid
SA11	6	344	Mudstone	Yellow	Flake		10	7	3	
SA11	6	345	Mudstone	Yellow	Flake		9	10	4	
SA11	6	346	Mudstone	Grey	Flake	Portion	18	4	3	Mid, longitudinal dorsal ridge
SA11	6	347	Mudstone	Yellow	Flake		34	24	12	
SA11	6	348	Mudstone	Red	Flake		37	22	6	
SA11	6	349	Mudstone	Red	Flake		11	10	2	
SA11	6	350	Mudstone	Yellow	Flake		18	18	8	2 transverse scars
SA11	6	351	Mudstone	Yellow	Flake		11	14	3	
SA11	6	352	Mudstone	Orange	Flake	Portion	12	15	3	Mid
SA11	6	353	Mudstone	Yellow	Flake	Portion	10	8	2	Mid
SA11	6	354	Mudstone	Grey	Flake		25	18	10	
SA11	6	355	Mudstone	Yellow	Flake		12	18	6	2 longitudinal dorsal scars
SA11	6	356	Mudstone	Red	Flake		34	32	9	10% pebble cortex
SA11	6	357	Mudstone	Red	Flake		24	16	6	longitudinal dorsal scar
SA11	6	358	Mudstone	Red	Flake		21	18	3	
SA11	6	359	Mudstone	Red	Flake	Portion	18	19	7	Proximal
SA11	6	360	Mudstone	Yellow	Flake		21	15	8	
SA11	6	361	Mudstone	Orange	Flake	Portion	42	27	9	!lateral, conjoin, 40% pebble cortex
SA11	6	362	Mudstone	Orange	Flake	Portion	34	20	11	!lateral, conjoin, 30% pebble cortex
SA11	6	363	Mudstone	Yellow	Flake		12	10	3	
SA11	6	364	Mudstone	Orange	Flake		24	17	8	20% pebble cortex
SA11	6	365	Mudstone	Cream	Flake		28	18	7	
SA11	6	366	Mudstone	Grey	Flake	Portion	10	16	2	Distal

Unit	Site	No	Material	Colour	Class	Sub	L	W	T	Comments
SA11	6	367	Mudstone	Yellow	Flake		20	14	7	
SA11	6	368	Mudstone	Grey	Flake	Portion	20	14	9	Distal
SA11	6	369	Mudstone	Grey	Flake	Portion	15	10	5	Mid
SA11	6	370	Mudstone	Yellow	Flake		12	9	4	
SA11	6	371	Mudstone	Red	Angular fragment		26	19	14	10% pebble cortex
SA11	6	372	Mudstone	Yellow	Flake	Portion	9	15	5	Mid
SA11	6	373	Mudstone	Orange	Flake		9	14	5	
SA11	6	374	Mudstone	Grey	Flake		18	15	6	
SA11	6	375	Mudstone	Orange	Flake	Portion	21	16	9	Lateral
SA11	6	376	Mudstone	Orange	Flake	Portion	15	8	5	Lateral
SA11	6	377	Mudstone	Yellow	Flake		10	14	5	Longitudinal dorsal ridge
SA11	6	378	Silcrete	Yellow	Core		45	33	33	7 negative scars, 2 platforms
SA11	6	379	Silcrete	Yellow	Flake		24	19	9	
SA11	6	380	Mudstone	Red	Flake		32	16	7	3 longitudinal dorsal scars
SA11	6	381	Mudstone	Red	Flake		22	16	6	longitudinal dorsal ridge
SA11	6	382	Mudstone	Red	Flake	Portion	18	24	8	Proximal
SA11	6	383	Mudstone	Red	Flake		26	16	4	
SA11	6	384	Mudstone	Red	Flake		16	13	4	
SA11	6	385	Mudstone	Red	Core		52	42	26	6 negative scars, 3 platforms
SA11	6	386	Mudstone	Red	Flake		45	34	14	2 transverse scars
SA11	6	387	Silcrete	Pink	Flake	Portion	12	13	3	Proximal
SA11	6	388	Mudstone	Orange	Flake		15	12	3	
SA11	6	389	Mudstone	Orange	Flake	Portion	12	14	6	Mid
SA11	6	390	Mudstone	Red	Flake		10	19	6	
SA11	6	391	Mudstone	Yellow	Flake	Portion	13	11	4	Mid
SA11	6	392	Mudstone	Orange	Flake		41	28	14	25% pebble cortex
SA11	6	393	Mudstone	Red	Flake		39	29	12	5% pebble cortex