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Aboriginal Cultural Heritage Assessment for the Proposed Nepean Pump and Pipeline Development, Penrith Lakes, NSW

August 2006

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Report for
Maunsell Australia Pty Ltd

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- Debbie Bowden, Pamela Tindall and Ken Conway (Maunsell)
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ABBREVIATIONS

AHC	Australian Heritage Council
AHIMS	Aboriginal Heritage Information Management System
ATSIC	Aboriginal and Torres Strait Islander Commission
BP	Before Present
DACHA	Darug Aboriginal Cultural Heritage Assessments
DCAC	Darug Custodian Aboriginal Corporation
DLALC	Deerubbin Local Aboriginal Land Council
DTAC	Darug Tribal Aboriginal Corporation
DEC	Department of Environment and Conservation
DIPNR	Department of Infrastructure, Planning and Natural Resources
DEH	Department of Environment and Heritage
ICOMOS	International Council on Monuments and Sites
LEP	Local Environmental Plan
MGA	Map Grid of Australia – unless otherwise specified all coordinates are in MGA
NPWS	National Parks and Wildlife Service (now part of DEC)
REP	Regional Environmental Plan
RNE	Register of the National Estate

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SUMMARY

Biosis Research Pty Ltd was commissioned by Maunsell Australia Pty Ltd to undertake a cultural and archaeological assessment for a proposed pipeline route (with a number of route options) from Penrith Weir to Penrith Lakes, which will pump water from the Nepean River.

The survey involved the examination of three options for the route of the Nepean Pump and Pipeline, which are 10 metres in width. One of the sections (marked in Figure 3 as Proposed Route 2) traverses an area of quarry where the ground is disturbed and where access is hazardous due to heavy machinery. It was assessed that due to hazards of accessing the quarry on foot and the levels of disturbance in the area, this section would be surveyed from a vehicle moving slowly along proposed route 2.

Representatives of Deerubin Local Aboriginal Land Council, the Darug Tribal Aboriginal Corporation and the Darug Custodian Aboriginal Corporation participated in the fieldwork undertaken on Wednesday 20 July and Thursday 21 July 2005.

No new Aboriginal archaeological sites were located as part of the survey. Representatives of DCAC and DTAC indicated they had no objection to the work proceeding without further assessment. However, the representative of DLALC noted a concern that there was archaeological potential in the riverbank area (at the southern extreme of the route) as far as Peach Tree Creek, and the sloping area of higher ground at Boundary Creek. This can be resolved by a review of the geotechnical testing that will be undertaken for the pipeline works.

The recommendations based on this survey are as follows:

Recommendation 1

- *Results of the Geo-technical work that are to be done within the sloping area of higher ground at Boundary Creek, and the JK Williams land should be reviewed by an archaeologist to determine whether there is any remnant natural soil profile present conducive to containing Aboriginal archaeological relics/artefacts*.

This recommendations and work will result in a short letter report that may recommend, but not be limited to:

- No further archaeological work

or

- Application for a Section 87 permit from DEC to carry out archaeological testing within the proposed pipeline impact-area to determine whether Aboriginal archaeological material may be present within the remnant soil profile.

Archaeological testing, if necessary, should only be undertaken within the actual impact area of the pipeline route. That is, no testing should be undertaken outside of the actual trench for the pipeline route. This would require that the actual route of the pipeline be determined and its path pegged out by a surveyor.

Recommendation 2

- *As the remaining sections of the route are highly disturbed, no further archaeological investigations are required.*

Archaeological reports and the management recommendations contained therein will be independently reviewed by the Cultural Heritage Services Division of the NSW Department of Environment and Conservation (DEC), the relevant Aboriginal community and the NSW Heritage Office.

Although the findings of a consultant's report will be taken into consideration, recommendations in relation to managing heritage place should not be taken to imply automatic approval of those actions by the DEC , the Aboriginal community or the NSW Heritage Office.

1.0 INTRODUCTION

Cultural heritage legislation protecting Aboriginal and non-Aboriginal heritage places applies in New South Wales. These places are an important part of our heritage. They are evidence of 60,000 years of occupation of New South Wales by Aboriginal people, and of the more recent period of settlement by non-Aboriginal people.

Heritage places can provide us with important information about past lifestyles and cultural change. Preserving and enhancing these important and non-renewable resources is encouraged.

It is an offence under sections of legislation to damage or destroy heritage sites without a permit or consent from the appropriate body (see Appendix 3 for a complete discussion of relevant heritage legislation and constraints).

When a project or new development is proposed, it must be established if any cultural heritage places are in the area and how they might be affected by the project. Often it is possible to minimise the impact of development or find an alternative to damaging or destroying a heritage place. Therefore, preliminary research and survey to identify heritage places is a fundamental part of the background study for most developments.

The first stage of a study usually incorporates background research to collect information about the land relevant to the proposed development project (the study area). A second stage often involves a field inspection of this area.

Possibly the most important part of the study involves assessing the cultural heritage significance of heritage places in the study area. Understanding the significance of a heritage place is essential for formulating management recommendations and making decisions.

The subject matter of this report involves the use of a number of technical words and terms with which the reader may be unfamiliar. An extensive glossary has been included at the end of the report and reference to this may be of assistance.

1.1 Project Background

Biosis Research Pty Ltd was commissioned by Maunsell to undertake a cultural and archaeological assessment for a proposed pump and pipeline route from the Nepean River to Penrith Lakes.

The Penrith Lakes project involves the extraction of sand and gravel deposits that lie on the present flood plain of the Nepean River in the vicinity of Cranebrook and Upper Castlereagh, extending north from Penrith to the Castlereagh Neck. The project is bounded in the east by the Cranebrook escarpment and in the west by the Nepean River.

The study area for this element of the Penrith Lakes project is the proposed route, and two options, for the new Nepean pump and pipeline which follows the path of the Nepean River north, then west and northwest (along Castlereagh Road), from just north of the Nepean River Weir.

It will be necessary to clear a 10-metre-wide corridor through the vegetation along the southerly section of the route. At this time, it has not been decided whether the pipe will be laid in an open trench or whether the pipeline route will be bored underground without disturbing the surface. It is likely that the method will involve a combination of both.

1.2 Study Area

The study area, known as Penrith Lakes, comprises a rectangular shaped block that is bounded by residential, rural and industrial development to the east, north and south and dense vegetation adjoining Blue Mountains National Park to the west. The Nepean River also borders Penrith Lakes to the south and the west (Figure 1). The study area lies within the Penrith Local Government Area (LGA) and is managed by the Penrith Lakes Development Corporation (PLDC).

The study area includes the site of a large sand and gravel quarrying operation on the Hawkesbury-Nepean River floodplain. There are a number of artificial lakes and dams within the study area that are the result of rehabilitation of past quarrying activities and are used for recreational activities such as rowing and canoeing.

The proposed route options extend a combined length of approximately 6 kilometres and commence from the northern end of Weir Reserve, running along the northern river bank and into the quarried areas of the Penrith Lakes area to the north of the river (Figure 2).

1.3 Proposed Development Activity

It is proposed to construct a pipeline to pump water from Penrith Weir on the Nepean River into existing quarry pits or dams within the Penrith Lakes Scheme, with the aim of extending existing dams and filling new dams. Three separate pipeline routes have been proposed, Pipeline Routes 1, 2 and 3 (Figure 2). All three routes start at Penrith Weir and end in the southern section of the Penrith Lakes Development Area. Both Pipeline Routes 2 and 3 connect to and continue on from Pipeline Route 1, therefore any impacts associated with Pipeline Route 1 are common to all three routes.

Pipeline Route 1 starts in the south at Penrith Weir and follows the Nepean River, crossing Peach Tree Creek and Boundary Creek, both of which are tributaries of the Nepean River, before heading upslope across a steep weedy bank. The route then crosses a cleared area and follows a vehicle track before turning northwards between two tailings dams and discharging into an artificial dam called Duck Pond. In the vicinity of the Nepean River, three route options (A, B and C) within Pipeline Route 1 have been proposed.

Pipeline Route 2 continues on from Pipeline Route 1 before it heads north, continuing the pipeline in a westerly direction. This route heads through the quarry, generally staying as close as possible to the existing quarry roads, and discharges into a previously extracted area.

Pipeline Route 3 continues from where Pipeline Route 1 intersects with Castlereagh Road and heads in a westerly direction along Castlereagh Road and then north along existing quarry roads to the west of the rowing and warm up lakes, generally staying as close as possible to existing quarry roads, before discharging into an existing dam.

1.4 Aims

The main aims for this project are to:

- review previous archaeological and cultural heritage reports undertaken within the Penrith Lakes study area;
- outline previously recorded and potential archaeological sites within the study area;
- undertake a field survey of the proposed routes to identify any cultural heritage places and archaeological sites that may lie along the area or potential route impact;

- undertake consultation with the Deerubbin Local Aboriginal Land Council (DLALC), the Darug Custodian Aboriginal Corporation (DCAC) and the Darug Tribal Aboriginal Corporation (DTAC);

- report on the opportunities and constraints that any development of the pipeline may have on the any known/potential sites in the vicinity of the study area.

1.5 Consultation with the Aboriginal Community

Letters were faxed to the Deerubin Local Aboriginal Land Council, the Darug Tribal Aboriginal Corporation and the Darug Custodian Aboriginal Corporation, informing them of the proposed development and inviting their participation in the field work.

All groups expressed interest in being consulted on the project, and provided representatives who participated in the fieldwork undertaken on Wednesday 20 July and Thursday 21 July 2005.

Subsequent to preparation of the draft assessment a new Darug group was formed and registered with the DEC. Darug Aboriginal Cultural Heritage Assessments, including former members of the Darug Tribal Aboriginal Corporation, has been accepted as a representative Aboriginal Corporation by DEC and, as such, advice from DEC is that consultation should also be undertaken with all Darug groups with regards to cultural heritage assessments.

The draft report was sent to all involved Aboriginal groups, all of whom have provided comment as included in Appendix 1. All the Aboriginal groups agree and support the findings and recommendations of this report.

2.0 BACKGROUND INFORMATION

2.1 Environmental Background

The environmental background to the study area is provided in order to give a context for the archaeological assessment. The environmental aspects of an area will influence the type of archaeological remains that are likely to be present.

The environmental conditions of the study area may have influenced the land use by people in the past, and conditions will also affect the processes by which sites are preserved. Environmental values of an area can also contribute to the cultural significance and attachments people have to a place.

The following background is a brief summary of information relevant to the current assessment of archaeological values of the study area. The study area lies in Penrith Local Government Area, in the Blue Mountains region of New South Wales.

2.1.1 Geology & Landforms

The distribution of Aboriginal sites across an area is often affected by the geological landscape, as it concerns availability of raw materials. This includes suitable stone for the manufacture of tools, and the presence of sandstone for rock shelters and grinding grooves. Geology and soils will also affect the vegetation of an area, which in turn, would have affected settlement patterns.

The underlying geology of the study area comprises Wianamatta shales of Triassic age. However, extensive Quaternary alluvial deposits cover the entire region, associated with the present and past courses of the Hawkesbury-Nepean River system. Deposits of sand and silt several metres thick cover the series of gravels, and the resulting soil profile is generally poorly developed (Kohen 1995).

Most of the gravel units were deposited 60,000 years ago, but the upper silts and sands west of Cranebrook Creek are no older than 15,000 years. To the east of Cranebrook Creek, the overburden is considered to have been deposited soon after the gravels were laid down, approximately 55,000 years ago (Valerie Smith & Assocs.1996).

These early dates for the gravel deposit make it extremely unlikely that Aboriginal artefacts will be found in situ within the gravels, as the earliest claim for Aboriginal occupation in Australia is a site in Arnhem Land that was first occupied no more than 60,000 years ago (Kohen 1995). The overburden

deposits, however, certainly overlap with the probable period of Aboriginal settlement in the area, so the potential exists for these deposits to contain archaeological evidence.

The survey area commences in the south at the Nepean River Weir, running parallel to the river, north, west and northwest, with the final stretch of pipeline running through an area that has been heavily disturbed by quarrying activities since the early twentieth century. This disturbance will have resulted in a significant loss to any archaeological potential of this section of the survey area.

2.1.2 Flora and Fauna

Vegetation is one of the most important physical factors that influence the location of Aboriginal sites. In the Penrith area, water was relatively plentiful. The availability of plant and faunal resources for food and craft would have influenced Aboriginal movement around this landscape. However, over the nineteenth and twentieth centuries, intensive agricultural development has changed local flora and fauna types dramatically, through land clearance, farming and the draining of swamps. The land has been ploughed, grasses have been introduced and virtually all of the original timber and native vegetation has been cleared. The remaining remnants of native vegetation are mainly restricted to the banks of the Nepean River along the southern and western boundaries of the study area.

River and Riparian Vegetation occurs along proposed Pipeline Route 1, which is common to all pipeline route options, from the Penrith Weir at the southern end, then north across two tributaries (Peach Tree Creek and Boundary Creek) until the proposed path of the pipeline diverts upslope from the side of the river. The riparian vegetation occurring along the river was dominated by Casuarinas and has a weedy understorey (e.g. *Lantana camera*). Shrubby understorey with scattered trees consisting mostly of young eucalyptus trees with an understorey dominated by weedy grasses and shrubs also occurs along parts of Pipeline Route 1. The majority of trees present are young and thin in diameter. A complementary flora and fauna study undertaken by Biosis Research Pty. Ltd. for this project provides greater detail (see Beitzel at al. 2005).

Descriptions of the economy of the Aboriginal riverine groups have been provided by early authors: for example, Tench (1793), Collins (1796) and Hunter (1793). Their writings suggest that the principal source of protein was possums, supplemented by fish, waterfowl, lizards, freshwater mussels and quail. In addition, platypus were speared in the lagoons (Kohen 1998). Land mammals such as kangaroos were also important prey species. As well as being important food sources, animal products were also used for tool making and

fashioning myriad utilitarian items. For example, tail sinews are known to have been used as a fastening cord, while 'bone points' which would have functioned as awls or piercers are often an abundant part of the archaeological record.

Plant foods were also important. 'Yams' were dug up along the banks of the river. One true yam (*Dioscores* sp.) is known to occur along the river, but there are also a large number of other plants with edible tubers growing along the alluvial terraces and gullies that are likely to have been exploited (Kohen 1998).

2.2 Aboriginal History

Dates of the earliest occupation of the Australian continent by Aboriginal people are subject to continued revision as more research is undertaken. It is generally accepted that people have inhabited the Australian landmass for at least 60,000 years.

The Aboriginal people who lived in the vicinity of the study area belonged to the Dharug tribe, who occupied the territory from the Hawkesbury River to Appin and from the coast between Botany Bay and Port Jackson to the Lower Blue Mountains (Kohen 1981). There were two major economic divisions within the tribe. The coastal people as far west as Parramatta and Liverpool were dependent on fish and shellfish for their food, while those inland had and economy based on possums, plant foods birds and small game. This economic division was reflected in the language, with two distinct dialects being spoken. The Dharug tribe probably had 500–600 members, divided into smaller bands of 40–50 people. It was to these bands that the European settlers gave the title "tribe". The Penrith area was the home of the Mulgoa "tribe", with the Hawkesbury "tribe" or Boorooberongal to the north and the Cowpastures "tribe" to the south (Kohen 1981).

Bands moved from place to place in line with seasonal changes. In April, there are congregations in the locality of swamps to catch eels: the winter months were characterised by a dispersal of the population into smaller family units. Large gatherings occurred along the river in Summer, when food was more plentiful (Kohen 1998).

The people who lived along the Nepean and Hawkesbury Rivers had one advantage over their coastal relatives – they had access to the stone resources in the gravel beds. Two types of rock were particularly valuable. Chert was ideally suited for making sharp cutting and scraping tools, while the abundant supplies of basalt pebbles provided an unlimited supply of blanks for grinding into hatchet heads. The hatchets (or edge-ground axes) were traded along the New South Wales coast. The inland people also hafted a sharp stone into the end of their

spear throwers to use as a woodworking adze. This stone, according to Kohen (1981), was probably the elouera adze flake, which is commonly found in assemblages in the area.

Archaeological evidence suggests that the Nepean River area has been occupied by Aboriginal people for at least 13,000 years, and possibly twice as long. Mansfield (1822) recorded that at that time Aborigines were still setting fire to the underbrush at Castlereagh. Darwin (1845) noted Aborigines carrying spears and other weapons at Emu Plains in the 1830s (both cited in Kohen 1998).

2.2.1 Previous Archaeological Work

The earliest account of Aboriginal artefacts in the vicinity of the study area is an account by Cox in 1880, who exhibited eight stone axe-heads turned up by a plough at Castlereagh on the Nepean flats. He suggested that they had probably been deposited in the grave of an Aboriginal person on the basis that 30 similar axe heads had been found under the same circumstances on the other side of the river. There were many surface finds of edge-ground axe heads and uniface pebble tools, as well as small Bondi point and geometric microlith-type tools found in the gravel beds between Penrith and Castlereagh and collected by antiquarian collectors in the early part of the twentieth century (Kohen 1981).

In 1948, F. D. McCarthy published the results of an excavation he had undertaken in a rock shelter in Lapstone Creek. This site was in a gully on the western side of the Nepean River. This document reported the first systematic archaeological excavation in New South Wales. He also included a discussion of other sites in the region. He described artefactual areas around the gravel beds at Penrith and Castlereagh as 'surface workshops'. Art sites were restricted to the Hawkesbury sandstone on the western side of the river. They included kangaroo engravings and hand stencils (Kohen 1981).

On the basis of the results of his excavation, McCarthy proposed two distinct phases of Aboriginal occupation: an early phase with a stone toolkit dominated by Bondi points, which he called the Bondian industry, and a more recent assemblage lacking Bondi points but containing large numbers of elouera flakes, edge ground axes and a greater use of quartz. He named the later phase the Eloueran. He dated the earlier phase (separated from the later by a sterile layer of sand in the deposit) to 3650±100 BP. The later phase was not dated, but the tool type is similar to that in use at the time of European settlement (Kohen 1981).

The majority of more recent archaeological assessments relevant to the study area were completed by Jim Kohen, who began investigating the archaeological

potential of the Penrith Lakes region over 20 years ago, on behalf of the Penrith Lakes Development Corporation (PLDC). The following discussion examines and summarises the findings of these 25 studies, and allows the prediction of the type of sites liable to occur within this study area. The boundaries of the various DA areas in relation to the proposed pipeline routes are shown on Figure 3.

The Penrith Lakes Scheme was proposed as a mechanism for the systematic extraction of sand and gravel deposits located in the Penrith–Castlereagh area, and the subsequent rehabilitation of the area with a view to creating a water-based recreational resource in the former quarry areas. One of the environmental requirements of this development was to identify Aboriginal sites and to assess them in terms of local and regional significance.

Kohen has undertaken the archaeological monitoring and assessment of the development works from the inception of the Penrith Lakes Development Corporation. He completed his first assessment of the proposed development region in 1981. In this first survey of an extensive area from the eastern bank of the Nepean River to Wilchard Road, Church Lane and Cranebrook Road, and from Smith Street to Lugard Street and the north bank of the river, he determined that all the areas involved would not have been equally suited for Aboriginal use and habitation and that there were varying degrees of disturbance from the last two centuries. Quarried areas where extensive gravel extraction had taken place were excluded from the survey, as it was highly unlikely that evidence of Aboriginal occupation would remain (Kohen 1981).

Kohen located Aboriginal artefacts at 28 locations in his study area. He defined 24 as sites (more than one artefact within a radius of 50 metres), and 4 as isolated artefacts. Of the 24 sites, he classified 5 as major sites and 19 as minor. Unfortunately, there was no map included in the copy of this report available for inspection through the DEC Aboriginal Heritage Information Management System (AHIMS), so it is impossible to state which of these sites correspond with the sites locations depicted below in Figure 3 of this current report. Of the five ‘major sites’, three of the open camp sites had scatters of over 100 artefacts, one site had a number of scarred trees along with a large collection of stone artefacts, and one site contained several hundred grinding grooves and an edge ground axe. Kohen used these results to define the zones that were more intensively used by Aboriginal people in the area. These were the eastern bank of the Nepean River, the northern high ground around Smith Street, the ridge on the east of Kohen’s study area, and Cranebrook Creek (Kohen 1981).

In 1986 Kohen surveyed the DA2 Development area. He mentioned a further three sites that had been located during a 1984 survey, but this report could not be located. This brings the total of sites in the area to 31. Of these sites, seven

fell within the boundaries of the DA2 development area. These were all small open scatter sites and of no special significance to the local Aboriginal community. Visibility and ground exposure on this survey were very low (with grass between 1– 2 metres high) with the recommendation that the result of this survey could only be used as a guide to the potential sites in areas of significance in DA2. Nonetheless, stone artefacts were identified at five locations along Cranebrook Creek during this survey.

Four of these sites were small open camp scatters, with a selection of small flakes and a number of cores present in each assemblage. The materials used included chert, quartz, silcrete and quartzite. Two of these open scatters were considered to be components of sites located in his 1981 survey. The fifth site was an isolated uniface pebble tool, found near Cranebrook Creek. None of the sites was felt to be of archaeological significance, due to the small size of the scatters and the lack of diagnostic tools within the assemblages found. The recommendations made were for continued archaeological surveying and monitoring in the area during all continuing development.

During the survey of DA3 development area, Kohen identified an extensive low density spread that was found scattered along the banks of Cranebrook Creek: he classified this a single large site. A Consent to Destroy this site was issued by the Director of the National Parks and Wildlife Service. Other small sites and isolated finds have been exposed by quarrying, and noted in subsequent routine inspections. Cranebrook Creek no longer exists, and the low density scatter found around the entire area (particularly the east bank of the creek) has been destroyed, with the artefacts going to the local Land Council (now Deerubbin LALC).

Over the course of the next 12 years and 18 reports, Kohen continued to carry out routine monitoring and inspection of the quarry sites at the Penrith Lakes Development. Since his original survey and recording of 31 sites, many additional artefact scatters were identified, particularly along Cranebrook Creek. The following discussion looks at these reports by year.

July 1991: Artefacts found in undisturbed swampy high ground at the top of Cranebrook Creek after quarrying removed topsoil. Presence of Bondi Points suggests site less than 4000 years old. To comply with the NPWS Act, routine inspections are carried out every 6 months, and by this point (after 7 surveys) there had been no archaeological evidence found in the gravel deposits; consequently Kohen's recommendation was to continue inspecting the gravels routinely every 6 months. Dharug LALC supported this recommendation. Test excavation was recommended at Cranebrook Creek where these artefacts had been found. This part of the site was planned to be mined in 1992.

January 1992: Routine inspection. There was no indigenous involvement as the Dharug representative was away. The Report refers to a two-day subsurface testing of PL/39 (the Cranebrook Creek site mentioned above) having happened the previous October. 170 artefacts were found in six 0.5 m^2 pits.

As with previous inspections, nothing of human manufacture was noted in the gravel deposits. Two small open artefact scatters were noted elsewhere, forming part of the Cranebrook Creek complex (associated with and close to PL39 area). The Cranebrook Creek complex was taken by Kohen to be a mostly continuous stone scatter along the east bank of what was Cranebrook Creek. At this point Kohen suggested that the emergent pattern was that Aboriginal occupation sites in the Penrith Lakes area are concentrated in the upper 2 metres of the overburden.

After 4 years of inspection, Kohen had found no artefacts in situ within the gravels. Two definite artefacts and one possible artefact were found on the quarry floor, and an additional 1022 artefacts had been found on the surface or in the sub-surface deposits within the overburden units of the quarry excavations.

July 1992: stone artefacts were found at seven locations. Of these, three were previously recorded scatters which had recently been quarried. Once again, Kohen's survey results found no evidence of artefacts within the gravels and the lower levels of the overburden. His assessment is that occupation sites are restricted to the upper 2 metres of the overburden, and that the artefacts that have been located are predominantly recent (less than 5000 years old). The recommendations made at the end of this report were that the gravel extraction should continue; but that the routine 6-monthly inspections should no longer be considered necessary and that an annual inspection be conducted instead. These should examine any newly exposed surfaces in the area between the former Cranebrook Creek and the Nepean River – which may well contain additional sites at depth.

July 1993: examination of freshly exposed gravels between Cranebrook Creek and Castlereagh Road. The Daruk LALC was involved in the field survey. Four stone artefacts were found. No artefacts had previously been found at these new site locations. This result demonstrated that isolated finds and small scatters are probably to be found throughout the area, although in low numbers away from the major creeks and the river. The final recommendation was that mining should be allowed to continue, provided the annual inspections also continued.

Feb 1994: DA3 area. No new sites were recorded, but there was very low visibility throughout survey area. Surface collections had been carried out at most of the sites identified in the original 1981 survey, so there would be no physical evidence of those sites remaining. The 'Surface workshop' site

identified by McCarthy in 1948 occurred to the northeast of Cranebrook Creek in the DA3 area. Surface visibility was minimal here and no artefacts were identified there during this study. Four minor sites, which might be impacted during the development, had been identified in the DA3 area during the original 1981 survey, so Consent to Destroy those sites had to be obtained. Although no sites were identified around Cranebrook Creek on this survey, it is one of the four archaeologically sensitive zones, and visibility was very low. Therefore it was recommended that there be monitoring after the surface stripping of the topsoil on both sides of the creek.

July 1994: two isolated finds were discovered in the DA2 area on the eastern side of Castlereagh Road. These were assessed by Kohen to be unimportant, and his recommendations suggested that quarrying continue and annual archaeological inspections also continue.

July 1995: Aboriginal artefacts were found at three locations on this survey of the recently and actively quarried areas in the north western and eastern parts of the DA2 and the southern parts of the DA3 areas. One new exposure of 10 artefacts was identified in the southern part of the DA3 area where surface stripping had recently taken place. Three artefacts had been exposed on the surface of a previously identified and sub-surface tested site and two flakes were found at the foot of an overburden face north of Cranebrook Village. Kohen believed it possible that the new exposure may be part of McCarthy's 'surface workshop' described in 1948. Regardless, he believed subsurface excavation there would only reveal more artefacts at low densities. He recommended that there be monitoring of the surface stripping in the area.

July 1996: Aboriginal artefacts were found at one location during this survey – nine artefacts were found at the northern end of quarry operations, within 3 metres of a fence line. Kohen recommended careful monitoring should occur during the removal of topsoil from the area immediately north of this fence line. This area could also be linked to McCarthy's 'surface workshop'. Survey was restricted to the margins of the quarry, because of safety concerns. Areas likely to be impacted in the following 12 months were also examined. Artefact scatters have been most commonly found on rises between creeks and swamps and this scatter was on a rise between Black Clay swamp in the east and a small tributary of Cranebrook Creek to the west. Kohen's recommendations were exactly as before – quarrying can continue, and monitoring of the topsoil stripping at the newly found site should occur.

Dec 1996: This reported monitoring of a Consent to Destroy site (PL33) located at a disturbed creek line at the foot of Cranebrook escarpment. The developer was digging a drainage ditch through the site. There was considerable European

material present, suggesting the area had been very disturbed in the past. A total of 80 Aboriginal artefacts were found, mostly from within 20 metres of the creek. The assemblage was a mixture of small tool and core tool and scraper tradition industries (suggesting a date more than 4000 years old), and most were of chert.

May 1997: Monitoring and sieving were carried out in an area adjacent to Cranebrook Creek and the Palaeochannel near the foot of Cranebrook Ridge. 700 square metres were analysed in each area. The deposit was removed down to gravels. Based on thermoluminescence dating the Palaeochannel deposit may be more than 50,000 years old. At Cranebrook Creek excavations went down 1.9 metres, at the Palaeochannel excavations terminated at 1.6 metres. Over 99% of the artefacts found came from the top 1.3 metres. There was extensive bioturbation disturbance down to 1–2 metres. The plough zone extended down 20–30 cm. These results suggest that artefacts had been deposited on the surface and had worked their way down through ground movement. The assemblage was of mixed age and tradition. There was European material down to 90 cm on Cranebrook exposure, 60 cm at the Palaeochannel. Based on the results of this study, Kohen believed no further studies are necessary regarding the possibility that stone artefacts occurred in situ at depth within the overburden and/or the gravels. He also recommended that PLDC investigate the possibility of establishing one or more archaeological conservation zones within the DA4 development area. These zones should include the banks of the Nepean River and the major waterways, especially Cranebrook Creek, where the majority of sites are likely to occur. There should be continued involvement of the Aboriginal Community in the selection of the conservation zones. No high density sites were identified. Kohen's theory is that the deposits were laid down by an active river, probably during the Pleistocene. Aboriginal people subsequently camped on the surface. Artefacts that were discarded were incorporated into the sediments and some moved down to a maximum depth of 1.6 metres. The geomorphological and archaeological evidence suggested to him that the recovered artefacts probably span the entire period of occupation of the area by Aboriginal people, which may well exceed 20,000 years. The oldest secure date in the immediate vicinity is from Shaw's Creek rock shelter, where the earliest radiocarbon date is 15,000 BP. The numbers of artefacts recovered here totalled over 2000.

August 1997: Archaeological investigations were undertaken to assist with the Statement of Environmental Effects for the DA4 development area. Kohen listed three areas of major archaeological significance, which all had the potential to contain subsurface evidence for Aboriginal occupation. These were the eastern bank of Nepean, Cranebrook Creek, and the northern extremity of the development in the vicinity of Smith Street.

The Nepean River acted as a focus for Aboriginal economic and social activity in the Penrith Lakes area and it has the potential to contain sites. Given the greater impact of flooding on the margins of the river, it is possible that artefacts may be buried at depth in their primary depositional context, probably the only area in the DA4 where this is likely to occur. Kohen concluded with a discussion of the importance of ongoing Aboriginal involvement in the Penrith Lakes project as it extends into the DA4 area. One recommendation suggested setting aside part of the eastern bank of the Nepean as an archaeological conservation zone.

Nov 1997: This reported monitoring following surface stripping of the PLDC quarry in the DA4 area: the concentration of artefacts recovered was so low that the monitors (DTAC representatives Gordon Morton and Colin Gale) did not feel it was necessary to stop the earth-moving equipment during soil disturbance. A total of 296 artefacts was recovered over 14 days of monitoring. The total area stripped was 130,000 square metres. No data was obtained from these artefacts other than they were of mixed small, core and scraper tool tradition industries, and most of the artefacts were derived from local stone. The main significance was their cultural heritage value for the local Aboriginal community.

Summary

On the basis of the archaeological sites identified since Kohen's original 1981 survey, the majority of sites occur adjacent to waterways and along ridge tops, although small sites do occur on rises near swamps. The Nepean River Terrace is one of the four archaeologically sensitive zones identified by Kohen (Kohen 1994).

All inspections of the Penrith Lakes region suggest that evidence of Aboriginal occupation is largely restricted to the surface and near surface deposits. It is clear that artefact scatters are common on rises between creeks and swamps, but because of the levels of disturbance in the area, most artefacts found can not be assessed to be in situ.

Kohen's overall assessment of his work at Penrith Lakes is that the Nepean River acted as a focus for Aboriginal economic and social activity in the Penrith Lakes area, and although much of it is disturbed by European land-use practices, it all has the potential to contain sites. The evidence from Kohen's DA2 and DA3 studies suggests that low densities of artefacts will be found across the entire area, with greater concentrations likely to occur on high ground and close to waterways. In this regard, the remnants of Cranebrook Creek have some potential for retaining archaeological evidence. For this reason, Kohen suggested that a planned European cultural heritage zone, which already

included part of Cranebrook Creek, be extended to include a larger proportion of the creek banks and adjoining ground. His original conservation zone boundaries are shown on Figure 4.

More recently, a survey was undertaken by Mary Dallas that overlapped with the most southern extent of the proposed pipeline route (Dallas 2004). This appears to have not extended into Kohen's proposed conservation zone. No new sites were recorded as a result of this survey.

A search of the DEC AHIMS register was completed, for a 10 square kilometre area including Penrith Lakes. Within this area there are 82 previously recorded sites (see Figure 5). Looking more closely at the sites surrounding the current study area, within a 4 square kilometre area, the number of relevant sites in the area is reduced to 12 (as two of the sites have been recorded twice). Of these 12, only 3 are in close proximity to the proposed pipeline route (two of those closest to the study area are a double recording for the same site: 45-5-290 and 522), and one of the three has already been destroyed under permit.

DEC ABORIGINAL SITE REGISTER NO.	**Site Name**	**Site Features**	**Site Types**
45-1-0219	Penrith Lakes 39	AFT	Open Camp Site
45-5-0281*	Cranebrook Creek, CC/1	AFT	Contact, Open Camp Site
45-5-0282	Upper Castlereagh	AFT	Open Camp Site
45-5-0290	The Island	AFT	Open Camp Site
45-5-0318	Penrith Lakes 4	AFT	Open Camp Site
45-5-0326*	Penrith Lakes 15	AFT	Open Camp Site
45-5-0328*	Penrith Lakes 17	AFT	Open Camp Site
45-5-0332	Penrith Lakes 21	AFT	Open Camp Site
45-5-0366	Emu Plains 4	AFT	Open Camp Site
45-5-0522	Penrith P/1	AFT	Open Camp Site
45-5-0530	Upper Castlereagh, UC/1	AFT	Open Camp Site
45-5-0589*	Penrith Lakes 29	AFT	Open Camp Site
45-5-0590*	Penrith Lakes 31	AFT	Open Camp Site
45-5-0591*	Penrith Lakes 30	AFT	Open Camp Site

Table 1: Previously recorded Aboriginal archaeological sites within or near the study area.
(Sites marked with * have been destroyed under a Section 90 Consent to Destroy Permit).
(Sites marked in bold are a double entry recording for the same site.)

Site 45-1-219 is an open camp site that consists of 386 stone tools and six glass or ceramic artefacts that were exposed during surface stripping on a ridge top during quarrying works. The site boundaries (ascertained after a course of sub-

surface testing in 1991) measured 120 metres long and 35 metres wide. The tool types found were Bondi points, geometric microliths, eloura adze flakes and scrapers. The sub-surface works consisted of six 50cm x 50cm squares across the area where the surface assemblage was found. Artefacts were found to a depth of 35 cm. The sub-surface assemblage was identical to the surface material. An application for a consent to destroy the site was submitted at the time of recording (February 1992), but according to the AHIMS register, the site is extant, on a ridge overlooking one of the main lakes. As this site is outside the study area for this project, no attempt was made to confirm its existence.

Site 45-5-281 consisted of stone flakes and nineteenth-century glass eroding out of an alluvial terrace on the eastern bank of Cranebrook Creek over an area approximately 20 x 100 metres. The stone flakes were mostly chert, with some silcrete. The site is in close proximity to an old farm, McCartheys Farm, established in 1800. Both the proximity to the farm and the presence of the nineteenth-century glass in association with the stone flakes suggests that this might be a contact site, although none of the glass fragments showed evidence of use. The site and ground around it have been badly disturbed by ploughing and grazing.

Site 45-5-282, about 400 metres north west of the northern limit of the pipeline option for this study, is another open camp site. It shows on the map as being within 200 metres of another recorded open camp, 45-5-530. These two sites are, in fact, the same open camp site. The Upper Castlereagh 1 site consists of a series of stone artefacts exposed in a terrace left by gravel mining operations. Stone flakes and tools were found from the original ground surface level to several metres below. A great deal of material had eroded from the terrace and could be seen at the base near the river. The assemblage consisted of 57 artefacts including four uniface pebble tools, nine cores and eight flakes with evidence of retouch. The material type is not recorded.

Site 45-5-290 was found on the eastern bank of Peach Tree Creek. This site is recorded a second time as 45-5-522, which appear on the map approximately 100 metres apart at the Nepean River Weir (Figure 5). This site is one of the three situated closest to the current study area and consists of thirty-five pieces of stone, including one edge trimmed point, one core scraper and two retouched flakes. The most frequent material used was chert. The creek incised into the Pleistocene and Holocene alluvial deposits of the Nepean River, and the chert flakes were found eroding out of the top 2 metres of this exposed section. No worked stone was visible on the surface, only below ground level in the erosion scold.

Site 45-5-318 is an open camp site, recorded on the AHIMS site card as being 100 metres beyond site 45-5-282. According to the coordinates listed for its position on the site card, it is closer to 700 metres east. Depending on the accuracy of its positional recording, it is approximately 100 metres south west of the proposed pipeline route 3 (closest to the 'warm up lake'). The site card refers to the site being 'on the river bank', so the position shown in Figure 2/3 may not be accurate. Kohen, who recorded the site, suggested that it was an extension of the Upper Castlereagh site (45-5-282). He found one quartz and two chert flakes exposed in a patch of erosion on the terrace where he had previously found the Upper Castlereagh site.

Site 45-5-326 has been destroyed under a Section 90 Consent to Destroy Permit. This site was located on McCarthys Farm, as was site 281 mentioned above. Approximately 12 flakes were exposed during the excavation of the foundations of the historic farmhouse. The site would originally have been adjacent to a swamp.

Site 45-5-332 has also been destroyed under Consent. The site was on a terrace on the eastern bank of Cranebrook Creek. The paddock containing the site was one that the cows are herded prior to milking, so the ground had been badly disturbed. The disturbance had exposed stone artefacts over an area about 100 square metres and included a flaked basalt pebble, a chert core scraper, three chert flakes, a retouched quartzite flake and two quartz bipolar cores.

Site 45-5-366 is on the western side of the Nepean River, and therefore will be unaffected by this development. The site was an exposed gravel bed from which uniface pebble tools and edge ground axes have been collected. The site had been subject to artefact collection in 1948 by F.D McCarthy, during the Lapstone Creek excavations discussed above.

Site 45-5-589 has been destroyed under Consent, and consisted of two chert cores, a quartz core and a quartz waste flake. These artefacts were found on the eastern bank of Cranebrook Creek on a track disturbed by cattle.

Site 45-5-590 has also been destroyed under Consent. This site consisted of a large chert flake and a small quartz core eroding from the terrace east of Cranebrook Creek.

Site 45-5-591 has been destroyed under Consent, and was on the western bank of Cranebrook Creek. It consisted of two small exposures of artefacts, on a track exposed by cattle. One scatter (30 metres from the other) consisted of a quartzite core and five flakes of chert, silcrete and quartz. The second scatter was north of the first and consisted of three small dark-grey and two yellow chert flakes.

2.3 Discussion

Previous work in the region has enabled predictive models to be established, to consider the relative likelihood of sites occurring across the study area. This is based on the authors' observations of the area, the distribution of known sites across the broader region, and previous models of Aboriginal land-use patterns combined with an assessment of the local landform units and their site potential.

There are several factors that are likely to affect where Aboriginal people are likely to have been, where they left evidence of their activities, and how that evidence is visible in the present archaeological record.

Places were visited to obtain natural resources, so therefore areas plentiful in resources were likely to be repeatedly visited. Permanent water, food resources, stone raw materials, shelter and suitable rock art surfaces would all have been important. Frequency of use would also have depended on ease of access to a site.

The general correlation for the existence of sites is that archaeological potential is likely to exist in areas that have been subject to only limited surface disturbance.

The Nepean River and the adjoining flood plain would have acted as a focus for Aboriginal presence and activities (Kohen 1994). A factor making a significant contribution to the identification of archaeological sites in the western Cumberland Plain is that there is a high correlation between the proximity to a permanent water supply and the selection of a camp site (Kohen 1986: 6).

Considerable work has been undertaken in the Cumberland Plain by Jo McDonald. Her conclusions and predictive model relating to the likely nature of sites in the region and how they might vary with landscape features can be summarised as follows (Jo McDonald CHM 2004: 6-7):

- The size of sites (including density and complexity) will vary in line with the permanency of water, landscape unit and the proximity to lithic resources.
- The archaeological evidence for more repeated or permanent occupation, represented by more complex and stratified sites, will be associated with a greater permanency of water flow, e.g. on major creek lines.
- The confluence of creeks at junctions would provide foci for site activity.
- Ridgetop locations between drainage lines are likely to contain only limited archaeological evidence.

- Naturally outcropping silcrete is likely to provide evidence of extraction and exploitation.

Kohen's summary of earlier investigations in the Western Cumberland Plain have also led him to conclude that sites occur throughout the area and are more particularly likely to occur adjacent to rivers and creeks. The distribution of raw materials associated with the manufacture of stone tools suggests that chert and basalt were transported or traded east from the river gravels, and that silcrete was traded or transported west towards the Neapean floodplain from sources in the proximity of South Creek and Eastern Creek (Kohen 1998)

In terms of the immediate study area, the conclusion has been that all artefacts located within the Penrith Lakes Development are considerably less than 40,000 years in age, with the vast majority being less than 4000 years old. Most sites are likely to be associated with the most recent lithic cultural tradition, which is commonly referred to as the Australian Small Tool Tradition, and locally as the 'Bondian Phase'. These industries are characterised by the production of small points and blades, the use of a bipolar reduction technique that results in bipolar cores, and the use of edge-ground hatchet heads. There is strong support for Hiscock's model for primary modification occurring at sites close to the source of the gravels, and subsequent lithic reduction happening at other specialised sites (Kohen 1998).

2.3.1 Study Area Predictions

Artefact Sites

Artefact sites can occur across most landform types although certain landscape features, such as access to water, may be more likely to be the preferred location for larger, potentially more significant sites. Although the current study site is in close proximity to several important water sources, the riverbank areas have been subject to considerable water action and disturbance At the northern end of the survey route the level of past disturbance, resulting mainly from gravel mining, dam construction, road works and other development is such that any other potentially archaeologically sensitive landforms have had that potential dramatically reduced.

Middens

A midden is literally a refuse dump left behind after people have eaten a meal. In a shell midden marine or fresh water shells are the dominant component, and may denote a camp or settlement site. Shell middens can occur around

coastlines, around estuaries along coastal and river floodplains, and around the shores of coastal or inland lakes. There are often stone artefacts and other archaeological material found in association with middens. There is potential for shell middens to occur in the survey area, due to the study area's proximity to the Nepean River and to several well-used creeks, but as the area has been heavily disturbed by sand and gravel mining activities, the likelihood of finding sites is reduced. There are no previously recorded middens in the area.

Scarred Trees

Scarred trees have not been recorded within a 10 square kilometre area of the study area. Portions of the current study site have been extensively disturbed and cleared, however, and do not appear to contain trees mature enough to have been of a suitable size to have been subject to Aboriginal scaring.

Grinding Grooves

Grinding grooves are known to occur in areas of bedrock outcrops where suitably soft bedrock (usually sandstone) is present adjacent to a water source with which the wet grinding of tools such as axe heads can be undertaken. The current study area does contain water sources but the sandstone outcrops likely to have enabled such sites to occur – generally in Hawkesbury sandstone formations, does not. There have been no such sites previously recorded in the vicinity of this survey area.

Ceremonial Sites and Bora Rings

These types of highly significant sites tend to occur on ridge crests and high points away from habitation sites, although this is likely to require further testing when more of such site types are recorded. It is considered unlikely that these site types will occur in the study area.

Post-Contact Sites

These are sites relating to the shared history of Aboriginal and non-Aboriginal people of an area. Many of these sites can hold special significance for Aboriginal people and may include places such as missions, massacre sites, post-contact camp sites and buildings associated with post-contact Aboriginal use. This site type is usually known from historical records or knowledge preserved within the local community. It is considered unlikely that any post-contact sites will be located as part of the current study, although there is one potential contact site mentioned above.

3.0 ABORIGINAL SITES

3.1 Archaeological Survey – Methods

A pedestrian survey of the proposed pipeline routes was undertaken on two days, Wednesday 20 July and Thursday 21 July 2005. The same area was covered on each day to allow for the presence of different team members. The survey team for the first day consisted of Niamh Coulter, archaeologist (Biosis Research), Ken Conway (Maunsell); Pamela Tindall (Maunsell), and Phil Kahn (Deerubin Local Aboriginal Land Council). The team for the second day consisted of Niamh Coulter, Pamela Tindall, Leanne Wright (Darug Custodian Aboriginal Corporation), Gordon Morton (Darug Tribal Aboriginal Corporation), and Ellie Miller (Muru Mittigar).

The aim of the survey was to provide an assessment of the Aboriginal archaeological potential of the proposed routes, as well as provide an opportunity for the representatives of the Aboriginal groups to consider the cultural heritage significance of the area.

The following discussion is a summary of the archaeological survey methods used in the study.

The aim of the foot survey was to achieve 100% survey coverage. Due to the limited width of likely impact from the pipeline (10 metres), this was achieved by walking a single transect with more detailed inspection of the river bank area where access was possible. The aim was to cover the entire ground surface within the non-quarried sections of the route options. Particular attention was paid to areas of surface exposure such as tracks and erosion scolds. Those areas of the route options that extended into heavily quarried areas were covered by vehicle.

The survey commenced at the Nepean River Weir at 10 am. Ken Conway overviewed the plans for the pump and the pipeline, in so far as the plans have been decided. The control room for the pump will be at the northern end of the garden at the Nepean Weir Reserve. The pump will be submerged at the river bank immediately north of the weir, west of the control room. The pipeline then runs north from the pump to Peach Tree Creek and Boundary Creek, both of which it will cross, by a method not yet ascertained. The current proposal is to either dig a trench through the creeks, allowing the pipeline to be laid over them, or else bore through the ground underneath the creeks and have the pipeline travel beneath ground. Either way, these sections of Peach Tree and Boundary Creeks will be disturbed (Plates 1 & 2). This area was surveyed by the field team, and in section (where the profiles are visible through long grass and weeds)

did not appear to have intact soil levels, or visible Aboriginal artefacts. Throughout this first section surveyed, grass and other vegetation hindered visibility, i.e. low exposure did not facilitate the finding of isolated artefacts or any other signs of Aboriginal material.

At Boundary Creek the pipeline route moves away from the low river bank, going upslope through thick vegetation (notably ferns and long grass; Plate 3). Although Phil Khan indicated that it would be important to test the soils here as the ground formation history is not known, Ken Conway advised that there would be full geotechnical surveying of the pipeline route and that this would give an indication of the soil history for that section. Where the ground levels out (land belonging to JK Williams), the pipeline will continue in a north–south alignment, approximately 20–40 metres from the edge of the river. This land has recently been cleared of long grass (though there is still short grass hindering visibility), and has been re-vegetated with young native trees and plants. The soil here appeared to be introduced fill (including plastic and chunks of bitumen visible in eroded patches of grass). Also, there have been flood prevention measures taken in this area of land. There is a channel running through the middle of the re-vegetation area (and throughout Williams' land), acting as a drainage ditch to keep the factories safe from flood (Plate 4). On the basis of the disturbance, it is most likely that this area consists of introduced fill. JK Williams may be able to clarify the history of the land use of this area, and whether intact soil landscapes would be found here or whether it is all introduced soils.

From the newly re-vegetated area, the pipeline will continue along the route of an ungraded vehicle track (Plate 5), which is also disturbed, with bits of plastic and glass visible in the soil. The pipeline route moves off the track north-west into long grass (along the outer edge of PLDC property; Plate 4), until the route turns 90°, heading due north between the eastern and western tailings ponds, along the route of the PLDC ungraded road. The pipeline will then travel west in the left easement of Castlereagh Road, and the remainder of the route is through PLDC property that has all been previously quarried. This section of the route was surveyed by vehicle, as it was too dangerous to travel on foot through the open quarry. Given the considerably disturbed nature of this landscape there is no potential for archaeological material.

On the second day the survey team walked the same route as described above. Gordon Morton was thoroughly familiar with the entire route, and discussed the fact that the river action would have moved any traces of Aboriginal cultural material especially in the vicinity of Peach Tree Creek and Boundary Creek, which are used (or have been used in the past) by local industries for the removal of treated sewage. The ground is clearly disturbed along all of this first section of the pipeline route, and is unlikely to contain cultural material due to the

vigorous movement of the river, as well as continuous flooding action on this section of river. Gordon Morton and Leanne Wright agreed that the only cultural material likely to occur throughout any of this pipeline route are isolated finds totally out of context, which will not add any new information to the cultural record. The area of pipeline route to the south (by the weir and as far as Boundary Creek) would often have been submerged, as the river changed height and flow at this point many times.

The area above Boundary Creek where the pipeline moves away from the river bank would also have been occasionally submerged, and is therefore not likely to provide any cultural material in context. The flat ground above it is industrial land which shows signs of disturbance too.

3.2 Archaeological Survey – Results

No new Aboriginal archaeological sites were located as part of the survey.

3.3 Aboriginal Archaeological Sites – Assessment of Significance

An assessment of archaeological site significance involves a range of heritage criteria and values. The heritage values of a site or place are broadly defined as the 'aesthetic, historic, scientific or social values for past, present or future generations' (Marquis-Kyle & Walker 1992). This means a place can have different levels of heritage value and significance to different groups of people.

3.3.1 Scientific Significance Assessment

Archaeological sites can tell us about past lifestyles and people. They are most commonly assessed in terms of historical and scientific values. There is an accepted procedure for determining the level of significance of an archaeological site. Please see Appendix 2 for a comprehensive discussion of the significance assessment procedures.

As no archaeological sites were discovered, an assessment of significance is not necessary. These details are included for information only.

Each site is given a score (or rating) on the basis of these criteria — the overall scientific significance is determined by the cumulative score.

3.3.2 Aboriginal Cultural Significance

Aboriginal sites and areas of land under the custodianship of a local Aboriginal community usually have a special significance for Aboriginal people.

All pre-contact (pre-European settlement) sites in the study area are considered to have cultural significance to the Dharug people. The sites are evidence of past Aboriginal occupation and use of the area, and are a main source of information about the Aboriginal past. The consultants cannot comment directly on such cultural significance – comment can only be made by the Aboriginal community.

Recorded (and unrecorded) pre-contact sites also have cultural significance because they are rare or, at least, uncommon site-types. In particular, many sites in the greater Sydney area have been destroyed by land clearance and land-use practices in the historic period.

Specific details about cultural significance should be dealt on a case-by-case basis with the Aboriginal community.

No particular sites or places of cultural significance were identified by the representatives of DLALC, DTAC or DCAC during the survey; however, Phil Khan (DLALC) reiterated his preference that the riverbank area (at the southern extreme of the route) as far as Peach Tree Creek, and the sloping area of higher ground at Boundary Creek, be archaeologically tested. He also expressed his concern that if the land on the JK Williams property is the original land surface it should also be tested. This may not be necessary, and will be clarified by the results of the pending geotechnical testing.

Comments received from the Aboriginal groups agree with the identification of much of the study area as being highly disturbed with little or no potential for archaeological material (letters dated: DTAC 24/7/06; DCAC 25/7/06; DLALC 28/7/06 and DACHA 5/8/06). DLALC re-iterates that the assessment of archaeological potential of the sloping area of higher ground at Boundary Creek and the JK Williams land should be refined through inspection of the geo-technical information by an archaeologist, with additional recommendations to follow. DCAC have recommended that a representative of DCAC monitor earthworks in this area. Monitoring should not occur until the geo-technical results have been assessed. All Aboriginal groups associated with the project are supportive of the recommendations contained within this report.

3.4 Statutory Regulations

The following discussion summarises legislation that applies to Aboriginal sites. The statutory regulations that affect the heritage places in NSW are detailed in Appendix 3.

3.4.1 New South Wales Aboriginal Cultural Heritage Legislation

Aboriginal heritage management in NSW is provided for under two pieces of legislation: the *National Parks and Wildlife Act* 1974 and the *Environmental Planning and Assessment Act* 1979. These acts provide protection for all material relating to the past Aboriginal occupation of Australia. This includes individual artefacts, scatters of stone artefacts, rock art sites, ancient camp sites, human burials, scarred trees, ruins and archaeological deposits associated with Aboriginal missions or reserves. The *National Parks and Wildlife Act* also establishes administrative procedures for archaeological investigations and the mandatory reporting of the discovery of Aboriginal sites. The NSW Department of Environment and Conservation administers the *National Parks and Wildlife Act*. The *Environmental Planning and Assessment Act* is administered by The Department of Infrastructure, Planning and Natural Resources (formerly Planning NSW).

The NSW Department of Environment and Conservation also provides guidelines for archaeological survey and reporting (NSW NPWS 1997) and more recent draft guidelines for Aboriginal Heritage Impact Assessment (NSW NPWS 2003) which this assessment follows.

Any queries or applications to excavate or disturb an Aboriginal archaeological site for purposes of archaeological fieldwork should be made in writing to the Cultural Heritage Unit Manager at the relevant DEC Aboriginal Heritage Division regional office. The contact details for the regional office responsible for the area covered by this survey are:

Central Cultural Heritage Unit
Aboriginal Heritage Division
NSW Department of Environment and Conservation
Level 6 / 43 Bridge St
HURSTVILLE NSW 2220

Ph: (02) 9585 6690
Fax: (02) 9585 6325

3.4.2 Commonwealth Aboriginal Cultural Heritage Legislation

The Commonwealth *Aboriginal and Torres Strait Islander Heritage Protection Act* 1984 provides protection for Aboriginal cultural property.

Whereas the State Act provides legal protection for all the physical evidence of past Aboriginal occupation, the Commonwealth Act deals with Aboriginal cultural property in a broader sense. This cultural property includes any places, objects and folklore that 'are of particular significance to Aboriginals in accordance with Aboriginal tradition'. There is no cut-off date and the Act may apply to contemporary Aboriginal cultural property as well as older sites.

4.0 MANAGEMENT ISSUES AND RECOMMENDATIONS

4.1 Introduction

Cultural heritage places provide us with evidence of past human activity. Heritage places may be confined to a small area, or represented by a complex of features, including a cultural landscape. Places of human activity in the past are affected by the actions of the present, particularly urban expansion and agricultural processes. This means cultural heritage places are a diminishing resource.

Cultural heritage places are valuable, not only for the scientific records of the past they provide, but also for their social significance. Many Aboriginal places have a special significance to Aboriginal communities as places where traditional life has continued and places that may have sacred or symbolic significance.

Many heritage places may also be outstanding examples of artistic and creative achievement. Heritage places are valuable to Australians — and the rest of the world — as they not only provide a link with a culturally rich past, but they can contribute to recreational and community life.

Heritage places may also have economic potential (Pearson & Sullivan 1995: 15). These values should, where possible, be protected and handed on to future generations. We all have some degree of social, spiritual, ethical — and legal — obligation to see that this happens.

4.2 Aboriginal Sites

4.2.1 Potential Impacts & Areas of Potential Archaeological Sensitivity

The potential impact of the proposed works on the study alignment includes the control room for the pump at the northern end of the garden at the Nepean Weir Reserve. The pump will be submerged at the river bank immediately north of the weir, west of the control room. The pipeline will run north from the pump to Peach Tree Creek and Boundary Creek, both of which it will cross, either via a dug trench through the creeks, allowing the pipeline to be laid over them, or else by boring through the ground underneath the creeks. Either way, these sections of Peach Tree and Boundary Creeks will be disturbed. However, given the disturbed nature of this area there is little to no archaeological potential, with it being highly unlikely that new sites would be discovered or damaged.

Phil Kahn (DLALC) has indicated his concerns about confirming the nature of the soil history in the riverbank area (at the southern extreme of the route) as far as Peach Tree Creek, and the sloping area of higher ground at Boundary Creek. It should be noted that this section was also recently surveyed by Mary Dallas (1994) and that her assessment of the riverbank to Peach Tree Creek section concurs with one of disturbed/filled ground with no archaeological potential. However, Dallas has also recommended that there should be archaeological monitoring in the heavily vegetated area immediately north of the Boundary Creek / Peach Tree Creek junction.

Phil Khan additionally expressed his concern that if the JK Williams land is the original land surface it should also be tested. This may not be necessary pending the results of geotechnical testing, however this matter is to be discussed with the DLALC committee.

The remainder of the route will be disturbed by the pipeline instalment. However, the route lying between this section and the quarried areas appears to have been either previously disturbed or is characterised by introduced fill. The most northerly sections of the route run through highly disturbed quarried areas. Hence the remainder of the route is considered to have no archaeological potential.

Over the whole pipeline route there were no sections that either Gordon Morton (DTAC) nor Leanne Wright (DCAC) had any concerns in relation to proposed impact and development.

4.3 Management Recommendations

The recommendations based on this survey are as follows:

Recommendation 1

- *Results of the Geo-technical work that are to be done within the sloping area of higher ground at Boundary Creek, and the JK Williams land should be reviewed by an archaeologist to determine whether there is any remnant natural soil profile present conducive to containing Aboriginal archaeological relics/artefacts*.

This recommendations and work will result in a short letter report that may recommend, but not be limited to:

- No further archaeological work

or

- Application for a Section 87 permit from DEC to carry out archaeological testing within the proposed pipeline impact-area to determine whether Aboriginal archaeological material may be present within the remnant soil profile.

Archaeological testing, if necessary, should only be undertaken within the actual impact area of the pipeline route. That is, no testing should be undertaken outside of the actual trench for the pipeline route. This would require that the actual route of the pipeline be determined and its path pegged out by a surveyor.

Recommendation 2

- *As the remaining sections of the route are highly disturbed, no further archaeological investigations are required.*

4.4 Report Lodgement

This Final report has been distributed to:

Pamela Tindall
Maunsell Australia Pty Ltd
PO Box Q410
QVB Post Office
SYDNEY NSW 1230

Mr Kevin Cavanagh
Executive Officer
Deerubbin LALC
PO Box 3184
MT DRUITT VILLAGE NSW 2770

Mrs Leanne Wright
Chairperson
Darug Custodian Aboriginal Corporation
PO Box 36
KELLYVILLE NSW 2155

The Chairperson
Darug Tribal Aboriginal Corporation
PO Box 441
BLACKTOWN NSW 2148

Mr Gordon Morton
Darug Aboriginal Cultural Heritage Assessments
28 Calala St
MT DRUITT NSW 2770

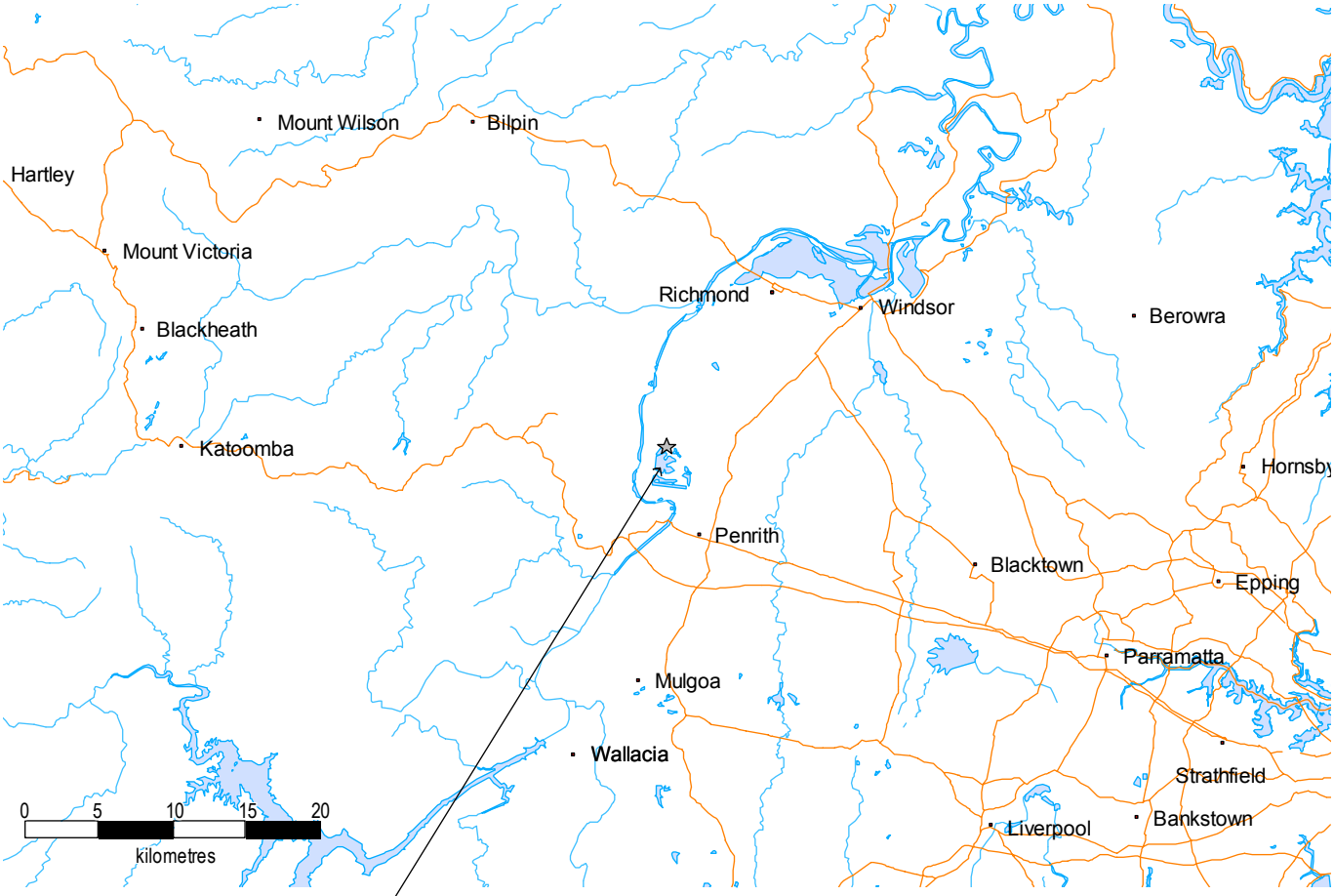
Archaeologist
Central Cultural Heritage Unit
Aboriginal Heritage Division
NSW Department of Environment and Conservation
Level 6 / 43 Bridge St
HURSTVILLE NSW 2220

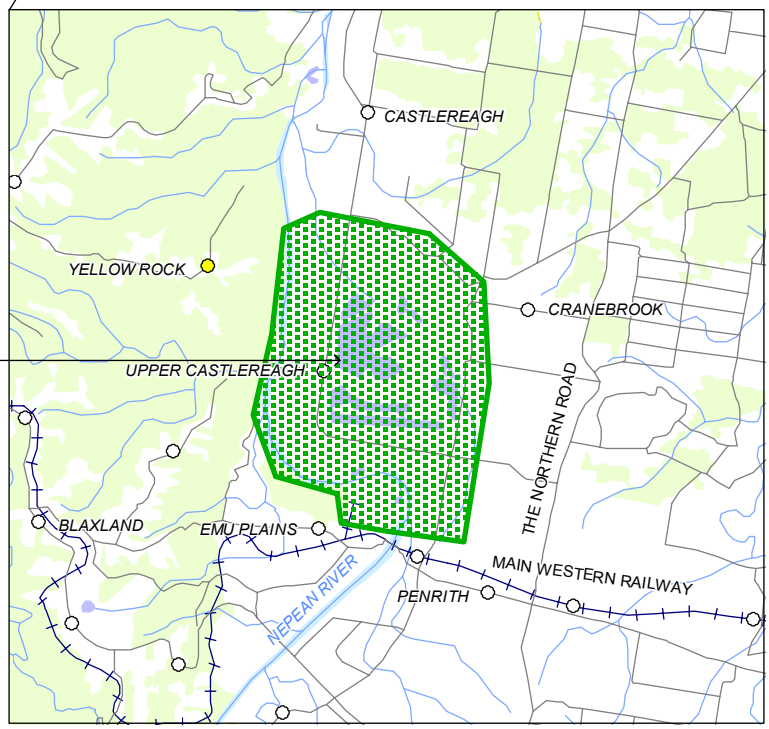
4.5 Independent Review of Reports

Archaeological reports and the management recommendations contained therein will be independently reviewed by the Cultural Heritage Services Division of the NSW Department of Environment and Conservation, the relevant Aboriginal community and the NSW Heritage Office.

Although the findings of a consultant's report will be taken into consideration, recommendations in relation to managing a heritage place should not be taken to imply automatic approval of those actions by the Department of Environment and Conservation, the Aboriginal community or the Heritage Office.

FIGURES





Study area

Acknowledgement: Geoscience Australia (1:250000 - SI/56-8).

BIOSIS RESEARCH Pty Ltd

15 - 17 Henrietta Street
Chippendale
NEW SOUTH WALES 2008

Figure 1: Location of the study area in a regional context.

DATE: 24 June 2005

Checked by: SEW | File number: S4173

Location:... \projects\4000\4100s\4173\Mapping\S4173 Fig 1.wor

Scale: 0 1.5 3.0 4.5 6.0 kilometres

N W E S

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15 - 17 Henrietta Street
Chippendale
NEW SOUTH WALES 2008

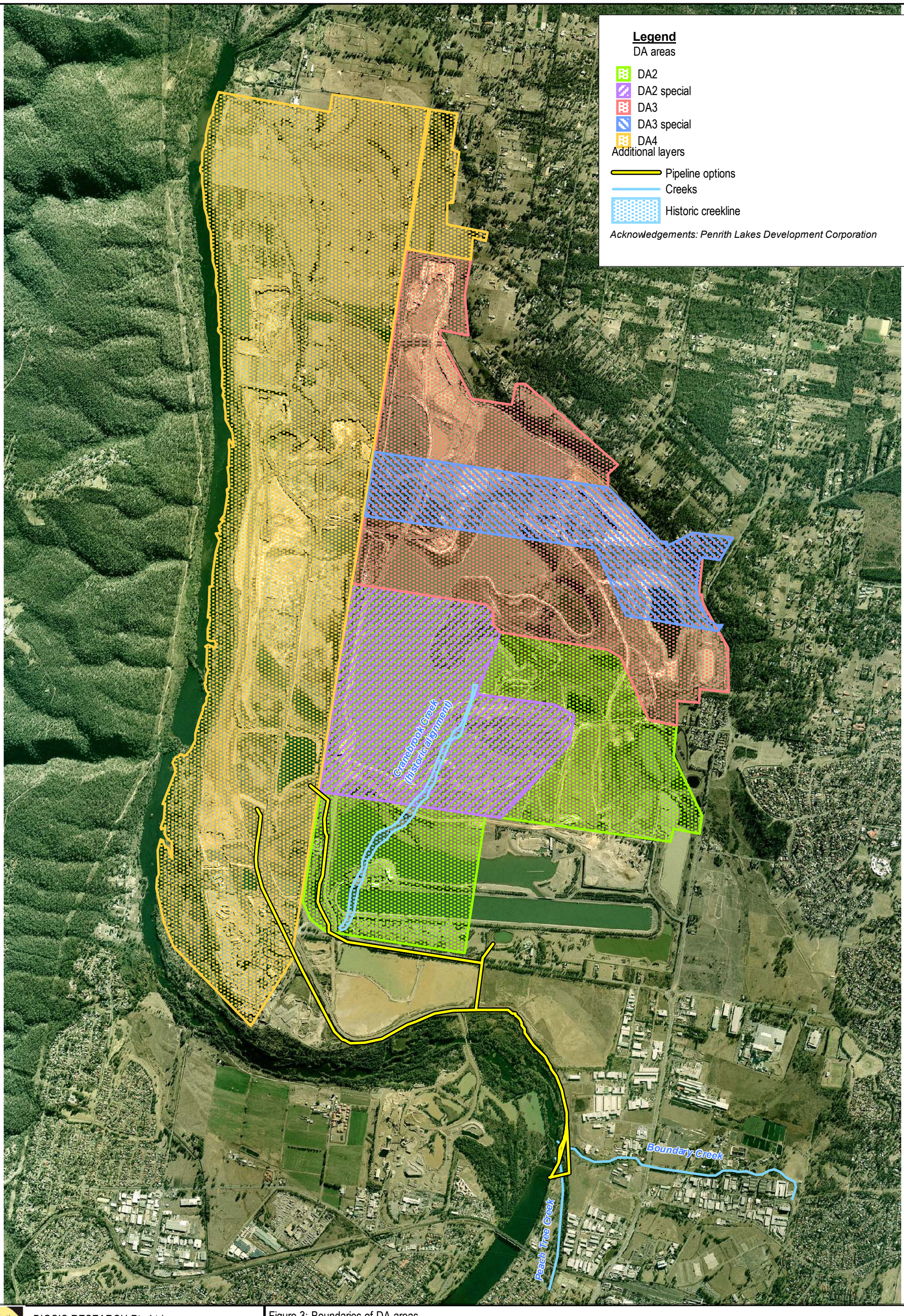
Figure 2: Proposed pipeline route options

DATE: 4 August 2005
Checked by: SEW
File number: S4173
Location:\project\4000\4100s\4173\Mapping\S4173 Fig 2 cults.WOR

Scale: 0 150 300 450 600 750 metres

N W E S

Figure 2: Proposed pipeline route options



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15 - 17 Henrietta Street
Chippendale
NEW SOUTH WALES 2008

Figure 3: Boundaries of DA areas

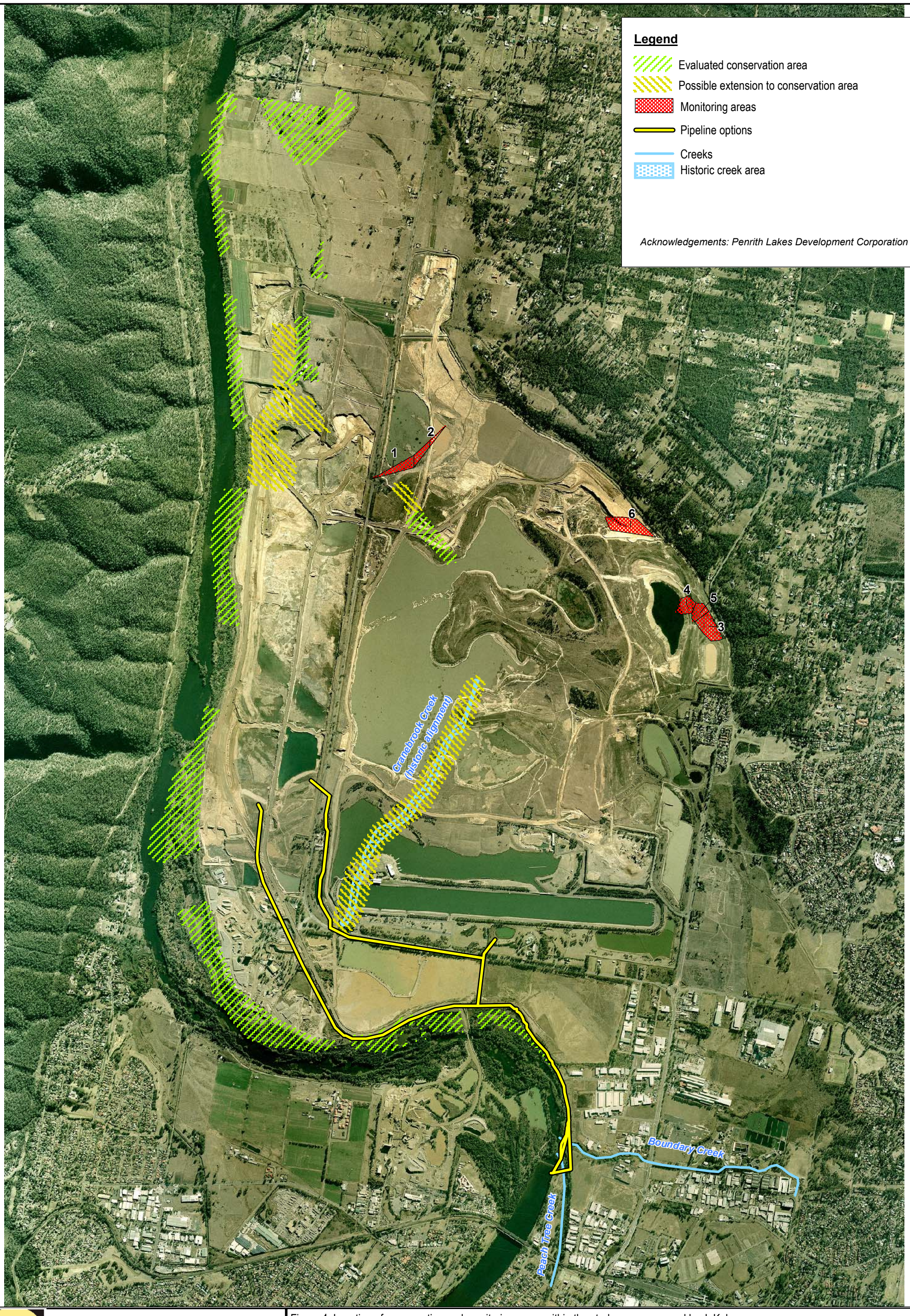
DATE: 4 August 2005

Checked by: NC | File number: S4173

Location:\projects\4000\4100s\4173\Mapping\cults\S4173 Fig 3 cults.WOR

Scale: 0 0.25 0.5 0.75 1.0 1.25 kilometres

N W E S



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15 - 17 Henrietta Street
Chippendale
NEW SOUTH WALES 2008

Figure 4: Location of conservation and monitoring areas within the study area, proposed by J. Kohen

DATE: 2 February 2006

Checked by: NC | File number: S4173

Location:..\4000\4100s\4173\Mapping\cults\S4173 Fig 4 cults.WOR

Scale: 0 0.25 0.5 0.75 1.0 1.25 kilometres

N W E S

BIOSIS RESEARCH Pty Ltd
15 - 17 Henrietta Street
Chippendale
NEW SOUTH WALES 2008

Figure 5: Location of archaeological artefacts within the vicinity of the study area

DATE: 4 August 2005
Checked by: NC
File number: S4173
Location:\project\4000\4100s\4173\Mapping\cults\S4173 Fig 5 cults.WOR

Scale: 0 175 350 525 700 875 metres

N W E S

Figure 5: Location of archaeological artefacts within the vicinity of the study area

PLATES

Plate 1: Peach Tree Creek.

Plate 2: Boundary Creek, looking east.

Plate 3: Sloping ground north of Boundary Creek where pipeline moves onto higher ground

Plate 4: Revegetated section of Williams' land, showing drainage channel.

Plate 5: Ungraded track beyond Williams' land (pipeline will follow line of track)

APPENDICES

APPENDIX 1

A1. Indigenous community comment

5/271 Beames Avenue
PO Box 3184
Mt Druitt Village
NSW 2770 Australia

Ph: (02) 9832 2457
Fax: (02) 9832 2496
Email: Staff@Deerubbin.org.au
Web: http://www.deerubbin.org.au

Pamela Tindall
Environmental Planner
Maunsell Australia Pty Ltd
P.O. Box Q410, QVB Post Office
SYDNEY. NSW. 1230

Our Ref: 1437

28 July 2006

SUBJECT: ABORIGINAL CULTURAL HERITAGE ASSESSMENT
Proposed Nepean Pump and Pipeline Development,
Penrith Lakes. NSW.

Dear Ms Tindall,

I refer to a draft report by Niamh Coulter & Jane Harrington of Biosis Research dated August 2005, but received at Deerubbin Local Aboriginal Land Council office on the 12 July 2006.

As you are aware a representative of the Deerubbin Local Aboriginal Land Council (Phil Khan) inspected the Proposed Nepean Pump and Pipeline Development, Penrith Lakes, NSW on 20 July 2005. Mr Khan undertook an Aboriginal cultural heritage assessment to evaluate the likely impact of the proposed development on the cultural heritage of the land. Consulting archaeologists from Biosis Research carried out a scientific survey at the same time.

Although our representative's findings were, that, no Aboriginal cultural material had been located during his walkover of the study area, nevertheless, it has been the policy of the Deerubbin Local Aboriginal Land Council for several years that, where, there is a proposed development that will affect land within 50 metres of a creek, river or other waterways and where, it is not possible to exclude such land from development, subsurface investigations shall take place prior any development occurring.

Deerubbin LALC supports recommendation 1 on page 1 of the summary by Biosis Research in their draft report entitled "Aboriginal cultural heritage assessment for the proposed Nepean pump and pipeline development, Penrith Lakes, NSW".

Should you require any further clarification, please do not hesitate to contact the writer on 98322457

COPY

Yours Faithfully

Kevin Cavanagh
(Executive Officer)

c.c. Gavin Martin – Department of Environment & Conservation

c.c. Jane Harrington – Biosis Research

c.c. General Manager – Penrith City Council

DARUG CUSTODIAN ABORIGINAL
CORPORATION
PO BOX 81 WINDSOR 2756
PH: 45775181 FAX: 45775098 MOB: 0415770163
ABN: 81935722930
mulgokiwi@agl.com

26 JUL 2006

25th July 2006.

Attention: Jane Harrington.

SUBJECT: Draft Aboriginal Cultural Heritage Assessment for the proposed Nepean Pump and Pipeline development, Penrith Lakes, NSW.

Dear Jane,

The Darug Custodian Aboriginal Corporation received and read the draft report prepared by Biosis Research for the proposed Nepean Pump and pipeline development, Penrith Lakes NSW.
We support the findings and recommendations in the draft report we would like to have a representative on site for the initial earthworks for the pipeline in the area that has not already been disturbed by mining activities.

Leanne Watson
LWatson
Chairperson

Darug Tribal Aboriginal Corporation
(Incorporating Darug Link Associating Inc.)

P.O.Box 441 Blacktown 2148
ABN-GST No. 77184151969

July 24, 2006

Jane Harrington
10 Bartley Street
Chippendale
NSW 2004

Re: Penrith Lakes Proposed Nepean Pump and Pipeline.

The Darug Tribal Aboriginal Corporation has read your report; we support and agree with the recommendations in the report.

We do ask if any top soil is removed outside of the area that we are notified so we can monitor any work carried out.

Respectfully yours,

D. Dy

Des Dyer
Secretary

Darug Aboriginal Cultural Heritage Assessments

28 Calala Street, Mt Druitt 2770
ABN 51734106483

Gordon Morton
Ph: 9625 0005
Fax: 45 677421

Celestine Everingham
Ph/Fax: 4567 7421
Mob: 0432 528 896

5.8.06.

Attention

Sam Woodhe

re Proposed Nepean Pump and Pipeline Development, Penrith Lakes, N.S.W.

Gordon Morton was part of a team to survey the above area. This area is well known to him and he does not have any concerns in relation to the proposed impact and development in the area. Gordon recommends that no further archaeological work or investigations are required by DIPCHR.

Yours Sincerely,
C. Everingham

APPENDIX 2

A2. Assessment of heritage significance

A2.1 Introduction

Assessing the significance of a cultural heritage place is undertaken to make decisions about the best way to protect and manage that particular heritage place. The category and significance of a heritage place will also determine if it is to be given statutory protection.

Places that are assessed as having National heritage significance can be added to the Commonwealth Register of the National Estate, those of State significance to the NSW State Heritage Register. The NSW Department of Environment and Conservation maintains a register of known Aboriginal sites. A heritage place can also be protected under a planning scheme administered by local government. The National Trust maintains a list of significant heritage places, and local historical societies and Aboriginal communities will often have substantial knowledge about local heritage places.

Assessment of the significance of a heritage place can be complex and include a range of heritage values. The cultural heritage values of a site or place are broadly defined in the Burra Charter – the set of guidelines on cultural heritage management and practice prepared by Australia ICOMOS (International Council on Monuments and Sites) – as the "aesthetic, historic, scientific, social or spiritual value for past, present or future generations" (Australia ICOMOS 1999). Various government agencies, including the Australian Heritage Commission and the NSW Heritage Office, have developed formal criteria for assessing heritage significance. These have been included at the end of this appendix and used in this report as applicable. Many Aboriginal sites also have significance to a specific Aboriginal community – this is discussed in a separate section below.

The primary criterion used to assess archaeological sites is ***scientific*** significance. This is based on the capacity of archaeological relics and sites to provide us with historical, cultural or social information. The following evaluation will assess the scientific significance of the archaeological sites recorded during this project. The **scientific significance assessment** methodology outlined below is based on scores for research potential (divided into site contents and site condition) and for representativeness. This system is refined and derived from Bowdler (1981) and Sullivan and Bowdler (1984).

A2.2 Criteria for significance assessment – archaeological sites

i) Scientific significance assessment: historical archaeological sites and Aboriginal artefact scatters and isolated artefacts

Scientific significance is assessed by examining the *research potential* and *representativeness* of archaeological sites.

Research potential is assessed by examining *site contents* and *site condition*. Site contents refers to all cultural materials and organic remains associated with human activity at a site. Site contents also refers to the site structure – the size of the site, the patterning of cultural materials within the site, the presence of any stratified deposits and the rarity of particular artefact types. As the site contents criterion is not applicable to scarred trees, the assessment of scarred trees is outlined separately below. Site condition refers to the degree of disturbance to the contents of a site at the time it was recorded.

The *site contents* ratings used for archaeological sites are:

0 No cultural material remaining.

1 Site contains a small number (e.g. 0–10 artefacts) or limited range of cultural materials with no evident stratification.

2 Site contains:
(a) a larger number, but limited range of cultural materials; and/or
(b) some intact stratified deposit remains; and/or
(c) rare or unusual example(s) of a particular artefact type.

3 Site contains:
(a) a large number and diverse range of cultural materials; and/or
(b) largely intact stratified deposit; and/or
(c) surface spatial patterning of cultural materials that still reflect the way in which the cultural materials were deposited.

The *site condition* ratings used for archaeological sites are:

0 Site destroyed.

1 Site in a deteriorated condition with a high degree of disturbance; some cultural materials remaining.

2 Site in a fair to good condition, but with some disturbance.

3 Site in an excellent condition with little or no disturbance. For surface artefact scatters this may mean that the spatial patterning of cultural materials still reflects the way in which the cultural materials were laid down.

Representativeness refers to the regional distribution of a particular site type. Representativeness is assessed by whether the site is *common*, *occasional*, or *rare* in a given region. Assessments of representativeness are subjectively biased by current knowledge of the distribution and number of archaeological sites in a region. This varies from place to place depending on the extent of archaeological research. Consequently, a site that is assigned low significance values for contents and condition, but a high significance value for representativeness, can only be regarded as significant in terms of knowledge of the regional archaeology. Any such site should be subject to re-assessment as more archaeological research is undertaken.

Assessment of representativeness also takes into account the contents and condition of a site. For example, in any region there may only be a limited number of sites of any type that have suffered minimal disturbance. Such sites would therefore be given a high significance rating for representativeness, although they may occur commonly within the region.

The *representativeness* ratings used for archaeological sites are:

1 common occurrence
2 occasional occurrence
3 rare occurrence

Overall scientific significance ratings for sites, based on a cumulative score for site contents, site integrity and representativeness are given as follows:

1-3 low scientific significance
4-6 moderate scientific significance
7-9 high scientific significance

ii) Scientific significance assessment: scarred trees

The scientific significance assessment for scarred trees varies from the significance assessment outlined above because a scarred tree has no site contents rating (a tree either is, or is not, a scarred tree). Although scarred trees are a site type usually associated with traditional Aboriginal cultural activity, there are examples of scarred trees associated with non-Aboriginal activity (survey blazes for example).

The *site condition* ratings used for scarred trees are:

1 poorly preserved tree scar
2 partly preserved tree scar
3 well preserved example of a scarred tree

Representativeness refers to the regional distribution of scarred trees. Representativeness is assessed on whether the site is common, occasional or rare in a given region. Representativeness should take into account the type and condition of the scar(s)/tree (the tree will be in: good health, poor health, dying, dead-standing, dead-on ground or destroyed) and the tree species involved.

The *representativeness* ratings used for scarred trees are:

1 common occurrence
2 occasional occurrence
3 rare occurrence

Overall scientific significance ratings for scarred tree sites based on a cumulative score for site condition and representativeness are:

1-2 low scientific significance
3-4 moderate scientific significance
4-6 high scientific significance

A2.3 Scientific significance assessment of sites recorded during survey

i) Aboriginal sites

The above criteria and scores are applied to the Aboriginal Archaeological sites recorded during survey. No such sites were recorded during this project.

A2.4 Aboriginal Cultural Significance

Aboriginal sites and areas of land for which a local Aboriginal community has custodianship usually have a special significance for Australian Aboriginal people.

> Australian Aborigines have a very ancient and distinct traditional culture, which is very much alive. At the same time, in Australian society today they constitute a visibly oppressed and disadvantaged minority. These two elements give their heritage and history a special significance, … Aboriginal places may be important to Aboriginal people in a number of ways.
>
> In southern Australia the vast majority of sites are prehistoric {rather than 'sacred' or historic}. They relate to evidence of Aboriginal occupation of the continent over 60,000 years, but they have no specific traditional significance to any particular group. They are usually as unknown to Aborigines as to others until located and identified by archaeological survey of other research.
>
> (Pearson & Sullivan 1995: 159, 162)

All pre-contact (pre-European settlement) sites that are located in the study area are considered to be of cultural significance to the Darkinjung. The sites are evidence of past Aboriginal occupation and use of the area, and are the main source of information about the Aboriginal past. The consultants cannot comment directly on such cultural significance – comment can only be made by the Aboriginal community. In addition, any recorded (and unrecorded) pre-contact sites are of cultural significance because they are rare or, at least, uncommon site-types. In particular, many sites in the greater Sydney region have been destroyed as a result of land clearance and land-use practices in the historic period.

APPENDIX 3

A3. Statutory regulations

A3.1 Aboriginal Sites

i) NSW Aboriginal cultural heritage legislation

National Parks and Wildlife Act 1974

The State *National Parks and Wildlife Act* 1974 provides protection for material and places relating to the past Aboriginal occupation of Australia, both before and after European occupation. This includes individual artefacts, scatters of stone artefacts, rock art sites, ancient camp sites, human burials, scarred trees, and ruins and archaeological deposits associated with Aboriginal missions or reserves. Aboriginal relics (any material evidence of the indigenous occupation of NSW) are protected under Sections 86, 87 and 90 of the Act. Aboriginal places (areas of cultural significance to the Aboriginal Community declared by the Minister) are protected under Section 84 of the Act. Section 91 of the Act requires the mandatory reporting of the discovery of Aboriginal relics, and establishes a mechanism for interim protection orders that may be used to protect relics. The NSW Department of Environment and Conservation administers *the National Parks and Wildlife Act.*

The NSW Department of Environment and Conservation also provides guidelines for standard archaeological reporting and assessment (NSW NPWS 1997). These guidelines are currently being updated and are in draft form (NSW NPWS n.d.)

The *National Parks and Wildlife Act* requires that a permit from the Director General be obtained before archaeological fieldwork involving disturbance to an Aboriginal site is carried out. Queries and applications to excavate or disturb an Aboriginal archaeological site for purposes of archaeological fieldwork, should directed to Cultural Heritage Unit Manager at the relevant DEC Aboriginal Heritage Division regional Office.

ii) Commonwealth Aboriginal cultural heritage legislation

Aboriginal and Torres Strait Islander Heritage Protection Act 1984

The Commonwealth *Aboriginal and Torres Strait Islander Heritage Protection Act* 1984 provides protection for Aboriginal cultural property. Whereas the State Act provides legal protection for all the physical evidence of past Aboriginal occupation, the Commonwealth Act deals with Aboriginal cultural property in a wider sense. Such cultural property includes any places, objects and folklore that 'are of particular significance to Aboriginals in accordance with Aboriginal tradition'. There is no cut-off date and the Act may apply to contemporary Aboriginal cultural property as well as ancient sites.

A3.2 Non-Aboriginal Sites

i) NSW cultural heritage legislation

Heritage Act 1977

The *Heritage Act* 1977 details statutory responsibilities for historic buildings and gardens, historic places and objects, historical archaeological sites, and historic shipwrecks. The Act is administered by the Heritage Council of New South Wales, through the NSW Heritage Office.

The *Heritage Act* protects all historical archaeological sites, places and relics in NSW older than 50 years, regardless of their level of cultural heritage significance.

An excavation permit is required for any works, excavations or activities, associated

with an archaeological site. Excavation permits are issued by the Heritage Council of New South Wales in accordance with sections 60 or 140 of the *Heritage Act*. It is an offence to disturb or excavate land to discover, expose or move a relic without obtaining a permit from the NSW Heritage Council. Excavation permits are usually issued subject to a range of conditions that will relate to matters such as reporting requirements and artefact cataloguing, storage and curation.

The State Heritage Register is a list of places and items with State heritage significance endorsed by the Heritage Council and the Minister that came into effect on 2 April 1999. The register was established under the *Heritage Amendment Act* 1998. It replaces the earlier system of Permanent Conservation Orders as a means for protecting items with State significance. The processes of listing and monitoring the conservation and protection of items are essentially the same.

Items are added to the register by the Minister on the recommendation of the Heritage Council, following an assessment of their significance and consultation with owners and the broader community. The Heritage Council has established the State Heritage Register Committee to recommend items to the Minister for inclusion in the register.

A permit may be required from the Heritage Council of NSW for works or activities associated with a registered place or object.

General queries about site issues and permit applications can be made to the archaeological officers at the Heritage Office. The contact details are:

NSW Heritage Office
3 Marist Place
PARRAMATTA NSW 2150
Ph: (02) 9873 8500
Fax: (03) 9873 8599

Consultation and discussion with the NSW Heritage Office should begin well before lodging an application for a permit to disturb or destroy a historical archaeological site.

A3.3 Additional Legislation

Commonwealth Heritage Legislation

Environment Protection and Biodiversity Conservation Act 1999

In January 2004 three new pieces of Commonwealth Heritage Legislation were enacted. The three new Acts are the:

1. Environment and Heritage Legislation Amendment Act (No. 1) 2003 which:

(a) amends the Environment Protection and Biodiversity Conservation Act 1999 to include 'national heritage' as a new matter of National Environmental Significance and protects listed places to the fullest extent under the Constitution

(b) establishes the National Heritage List

(c) establishes the Commonwealth Heritage List

2. Australian Heritage Council Act 2003 which establishes a new heritage advisory body to the Minister for the Environment and Heritage, the Australian Heritage Council, and retains the Register of the National Estate.

3. Australian Heritage Council (Consequential and Transitional Provisions) Act 2003 which repeals the Australian Heritage Commission Act, amends various Acts as a consequence of this repeal and allows for the transition to the new heritage system.

Any place that has been nominated and assessed as having cultural heritage significance at a national level can be added to the National Heritage List.

Under the *Environment Protection and Biodiversity Conservation Act* 1999 (EPBC Act) an action requires approval from the Federal Environment Minister if the action will, or is likely to, have a significant impact on a matter of national environmental significance. Matters of national environmental significance are:

- World Heritage properties,

- National Heritage Places,
- Ramsar wetlands,
- nationally listed threatened species and communities,
- migratory species listed under international agreements,
- nuclear actions, and
- the Commonwealth marine environment.

The listing and further information about the EPBC Act can be found at the Department of Environment and Heritage website: www.ea.gov.au/epbc. Actions that are likely to have a significant impact on the environment of Commonwealth land (even if taken outside Commonwealth land), and actions taken by the Commonwealth that are likely to have a significant impact on the environment anywhere in the world, may also require approval under the EPBC Act.

Environmental Planning and Assessment Act 1979

The *NSW Environmental Planning and Assessment Act* will have relevance for all development projects because it requires that environmental impacts are considered in land-use planning and decision making. The definition of 'environment impacts' includes impacts on the cultural heritage of the project area. The Act has three relevant parts: Part III, which governs the preparation of planning instruments; Part IV, which relates to development where consent is required under an environmental planning instrument (EPI); and Part V, which relates to activity where development consent is not required but some other government approval assessments are needed.

Under the Act, local government authorities and The Department of Infrastructure, Planning and Natural Resources (formerly Planning NSW) prepare local and regional environmental planning instruments (LEPs and REPs) to give statutory force to planning controls. These may incorporate specific provisions for conserving and managing archaeological sites.

Integrated Development Assessment (IDA) was introduced under the *Environmental Planning and Assessment Act* so that all matters affecting a development application would be considered by the consent authority in an integrated way.

Integrated Development is one which requires development consent as well as one or more approvals from different government agencies. Such agencies may include NSW DEC or the NSW Heritage Council. If a development is likely to impact a heritage item, the consent authority must refer it, to NSW DEC (for Indigenous objects) or the NSW Heritage Council (for sites listed on the State Heritage Register) prior to approval determination.

The Local Government Act 1993

Under the State Local Government Act, councils can prepare local approvals policies that set out specific matters for consideration in relation to applications to demolish, build or undertake works. Archaeological sites could be considerations under such policies

GLOSSARY & REFERENCES

GLOSSARY

Introduction & terminology

The following list provides definitions of various terms used in this report. Many of the terms have been referenced and the sources included in the reference list at the end of this report.

There is often a degree of confusion about the use of terms such as *heritage place*, *historical site*, *archaeological site* and so on. The definitions of these terms, as used in this report, have been included in the glossary and their relationship outlined in **Figure 1** below. The term used most consistently is *heritage place* and this is defined as follows:

Heritage place: A place that has aesthetic, historic, scientific or social values for past, present or future generations – ' ... this definition encompasses all cultural places with any *potential* present or future value as defined above' (Pearson & Sullivan 1995: 7).

For the purpose of discussion in this document 'heritage place' can be sub-divided into **Aboriginal place** and **historic place** (i.e. a historic place refers more particularly to non-Aboriginal sites).

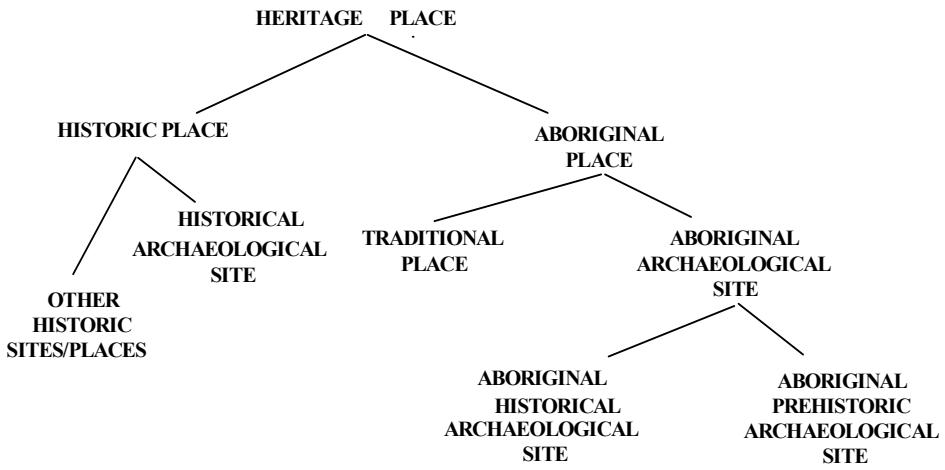

Figure G1: Terminology used for categories of heritage places.

Archaeological site types

The archaeological site types encountered in Australia can be divided into three main groups:

Historical archaeological site: an archaeological site formed since non-Aboriginal settlement that contains physical evidence of past human activity (for example a structure, landscape or artefact scatter).

Aboriginal historical archaeological site (or contact site): a site with a historical context such as an Aboriginal mission station or provisioning point; or a site that shows evidence of Aboriginal use of non-Aboriginal materials and ideas (for example: artefact scatter sites that have artefacts made from glass, metal or ceramics).

Aboriginal prehistoric archaeological site: a site that contains physical evidence of past Aboriginal activity, formed or used by Aboriginal people either before, or not long after, European settlement. These sites are commonly grouped as follows (further definition of each is contained in the glossary list):

- artefact scatter
- burial
- hearth
- isolated artefact
- mound
- quarry
- scarred tree
- shell midden
- structures
- rock art
- rock shelter
- rock well

One of the most common artefact types that provides evidence of Aboriginal people are those made from stone. Types and categories are outlined below in **Figure 2**, with further definition of each in the glossary list.

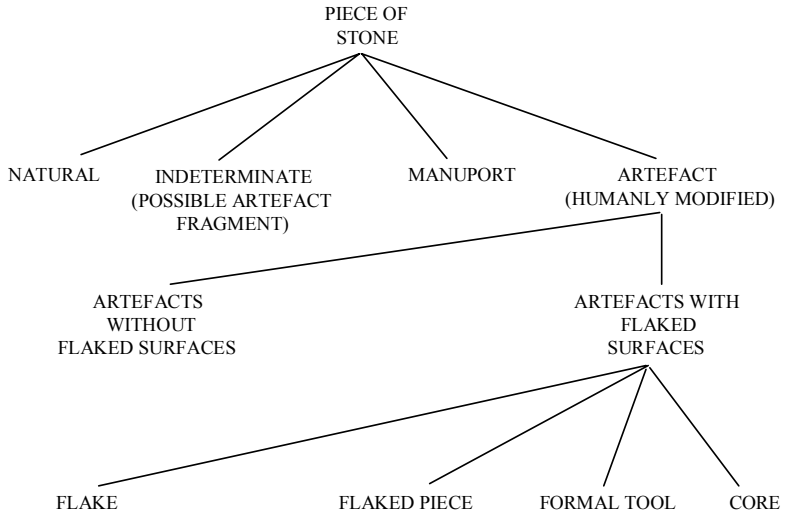

Figure G2: Stone artefact types/categories.

List of definitions

Aboriginal historical archaeological site (or contact site): either a site with an historic context such as an Aboriginal mission station or provisioning point; or a site that shows evidence of Aboriginal use of European/non-Aboriginal materials and ideas (e.g. artefact scatter sites that contain artefacts made from glass, metal or ceramics).

Aboriginal prehistoric archaeological site: a site that contains physical evidence of past Aboriginal use, formed or used by Aboriginal people either before, or not long after, European settlement.

Alluvial terrace: a platform created from deposits of alluvial material along river banks.

Anvil: a portable flat stone, usually a river pebble, used as a base for working stone. Anvils used frequently have a small circular depression in the centre where cores were held while being struck. An anvil is often a multi-functional tool also used as a grindstone and hammerstone.

Archaeology: the study of the remains of past human activity.

Artefact scatter: a surface scatter of cultural material. Artefact scatters are often the only physical remains of places where people have lived camped, prepared and eaten meals and worked.

Backed piece: a flake or blade that has been abruptly retouched along one or more margins opposite an acute (sharp) edge. Backed pieces include backed blades and geometric microliths. They are thought to have been hafted onto wooden handles to produce composite cutting tools. Backed

pieces are a feature of the 'Australian small tool tradition', dating from between 5000 and 1000 years ago in southern Australia (Mulvaney 1975).

Bipolar working: technique used for the reduction of stone, in particular quartz, by placing a core on an anvil and 'smashing' with a hammerstone.

Blade: a flake at least twice as long as it is wide.

Burial site: usually a sub-surface pit containing human remains and sometimes associated artefacts.

Burin: a stone implement roughly rectangular-shaped with a corner flaked to act as point for piercing holes in animal skins. The distinguishing feature is a narrow spall, usually struck from the distal end down the lateral margin of a blade, but sometimes across the end of a flake (McCarthy 1976: 38).

Contact site: see 'Aboriginal historical archaeological site'.

Core: an artefact from which flakes have been detached using a hammerstone. Core types include single platform, multi-platform and bipolar forms.

Cortex: original or natural (unflaked) surface of a stone.

Edge-ground implement: a tool, such as an axe or adze, which has usually been flaked to a rough shape and then ground against another stone to produce a sharp edge.

Edge modification: irregular small flake scaring along one or more margins of a flake, flaked piece or core, which is the result of utilisation/retouch or natural edge damage.

Flake: a stone piece removed from a core by percussion (striking it) or pressure. It is identified by the presence of a striking platform and bulb of percussion, not usually found on a naturally shattered stone.

Flaked piece: a piece of stone with definite flake surfaces, which cannot be classified as a flake or core.

Formal tool: an artefact that has been shaped by flaking, including retouch, or grinding to a predetermined form for use as a tool. Formal tools include scrapers, backed pieces and axes.

Gilgai soils: soils with an undulating surface, presenting as a pattern of mounds and depressions. A possible cause is the alternation of swelling and cracking of clay during periods of wet and dry conditions.

Grindstones: upper (handstone) and lower (basal) stones used to grind plants for food and medicine and/or ochre for painting. A handstone sometimes doubles as a hammerstone and/or anvil.

Hammerstone: a piece of stone, often a creek/river pebble/cobble, which has been used to detach flakes from a core by percussion. During flaking, the edges of the hammerstone become 'bruised' or crushed by impact with the core.

Hearth: usually a sub-surface feature found eroding from a river or creek bank or a sand dune - it indicates a place where Aboriginal people cooked food. The remains of a hearth are usually identifiable by the presence of charcoal and sometimes clay balls (like brick fragments) and hearth stones. Remains of burnt bone or shell are sometimes preserved within a hearth.

Heat treatment: the thermal alteration of stone (including silcrete) by stone workers to improve its flaking qualities (see Flenniken & White 1983).

Heritage Place: A place with aesthetic, historic, scientific or social values for past, present or future generations – '... this definition encompasses all cultural places with any *potential* present or future value as defined above' (Pearson & Sullivan 1995).

Historic place: a place that has some significance or noted association in history.

Historical archaeological site: an archaeological site formed since non-Aboriginal settlement that contains physical evidence of past human activity

(for example a structure, landscape or artefact scatter).

Isolated artefact: the occurrence of one (or a small number as defined by the survey methodology) of artefacts within a given area. It/they can be evidence of a short-lived (or one-off) activity location, the result of an artefact being lost or discarded during travel, or evidence of an artefact scatter that is otherwise obscured by poor ground visibility.

Manuport: foreign fragment**,** chunk or lump of stone that shows no clear signs of flaking but is out of geological context and must have been transported to the site by people.

Mound: these sites, often appearing as raised areas of darker soil, are found most commonly in volcanic plains or on higher ground near bodies of water. The majority were probably formed by a slow build-up of debris resulting from earth-oven cooking; although some may have been formed by the collapse of sod or turf structures. It has also been suggested some were deliberately constructed as hut foundations (Bird & Frankel 1991: 7-8).

Obtrusiveness: how visible a site is within a particular landscape. Some site types are more conspicuous than others. A surface stone artefact scatter is generally not obtrusive, but a scarred tree will be (Bird 1992).

Pebble/cobble: natural stone fragments of any shape. Pebbles are 2–60 mm in size and cobbles are 60–200 mm in size (McDonald et al. 1984: 78).

Percussion: the act of hitting a core with a hammerstone to strike off flakes.

Platform preparation: removal of small flake scars on the dorsal edge of a flake, opposite the bulb of percussion. These overhang removal scars are produced to prevent a platform from shattering (Hiscock 1986: 49).

Pre-contact: before contact with non-Aboriginal people.

Post-contact: after contact with non-Aboriginal people.

Quarry (stone/ochre source): a place where stone or ochre is exposed and has been extracted by Aboriginal people. The rock types most commonly quarried for artefact manufacture include silcrete, quartz, quartzite, chert and fine-grained volcanics such as greenstone.

Retouch: a flake, flaked piece or core with intentional secondary flaking along one or more edges.

Rock art: 'paintings, engravings and shallow relief work on natural rock surfaces' (Rosenfeld 1988: 1). Paintings were often produced by mineral pigments, such as ochre, combined with clay and usually mixed with water to form a paste or liquid that was applied to an unprepared rock surface. Rock engravings were made by incising, pounding, pecking or chiselling a design into a rock surface. Rare examples of carved trees occasionally survive.

Rock shelter: may contain the physical remains of camping places where people prepared meals, flaked stone, etc. They are often classed as a different type of site due to their fixed boundaries and greater likelihood of containing sub-surface deposits. Rockshelters may also contain rock art.

Rock-well: a natural or modified depression within a stone outcrop, which collects water. The most identifiable of these sites have been modified by Aboriginal people, either by deepening or enlarging.

Scarred tree: scars on trees may be the result of removal of strips of bark by Aboriginal People e.g. for the manufacture of utensils, canoes or for shelter; or resulting from small notches chopped into the bark to provide hand and toe holds for hunting possums and koalas. Some scars may be the result of non-Aboriginal activity, such as surveyors marks.

Scraper: a flake, flaked piece or core with systematic retouch on one or more margins. Scraper types follow Jones (1971).

Shell midden: a surface scatter and/or deposit comprised mainly of shell,

sometimes containing stone artefacts, charcoal, bone and manuports. These site types are normally found in association with coastlines, rivers, creeks and swamps – wherever coastal, riverine or estuarine shellfish resources were accessed and exploited.

Significance: the importance of a heritage place or site for aesthetic, historic, scientific or social values for past, present or future generations.

Striking platform: the surface of a core, which is struck by a hammerstone to remove flakes.

Structures (Aboriginal): can refer to a number of different site types, grouped here only because of their relative rarity and their status as built structures. Most structures tend to be made of locally available rock, such as rock arrangements (ceremonial and domestic), fishtraps, dams and cairns, or of earth, such as mounds or some fishtraps.

Stratified deposit: material that has been laid down, over time, in distinguishable layers.

Utilised artefact: a flake, flaked piece or core that has irregular small flake scarring along one or more margins that does not represent platform preparation.

Visibility: the degree to which the surface of the ground can be seen. This may be influenced by natural processes such as wind erosion or the character of the native vegetation, and by land-use practices, such as ploughing or grading. Visibility is generally expressed in terms of the percentage of the ground surface visible for an observer on foot (Bird 1992).

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