Nepean River Green Bridge at Penrith
Aboriginal Heritage Assessment

Stage 2 PACHCI

Report to RMS
September 2012
Executive Summary

The NSW Roads and Maritime Services (RMS) propose to construct a stand-alone crossing over the Nepean River at Penrith for pedestrians and cyclists. Artefact Heritage has been engaged by RMS to conduct the Aboriginal archaeological survey and assessment for the proposal in accordance with Stage 2 of the RMS Procedure for Aboriginal Cultural Heritage Consultation and Investigation 2010 (PACHCI), as well as the Office of Environment and Heritage (OEH) Code of Practice for Archaeological Investigation of Aboriginal Objects in New South Wales (2010).

The aims of the study were to accurately identify any Aboriginal sites or areas of archaeological potential within the study area. No previously recorded Aboriginal sites were located within the study area, and no Aboriginal sites or areas of archaeological potential were identified during the site survey. The study area was assessed as demonstrating low archaeological potential due the high levels of disturbance from both historical activities and flood events.

This Aboriginal Archaeological Survey Report (ASR) complies with the requirements of Stage 2 of the PACHCI. A copy of this report should be forwarded to the Aboriginal stakeholder group for their comments.

There are no Aboriginal heritage constraints on the proposed development.
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1.0 Introduction and Background

1.1 Description of proposal

The NSW Roads and Maritime Services (RMS) propose to construct a stand-alone crossing over the Nepean River at Penrith for pedestrians and cyclists. The proposal includes the construction of a bridge approximately 250 m in length and five metres wide that will connect Old Ferry Road at Penrith and Punt Road at Emu Plains and provide connections to existing and proposed shared paths. The bridge span will be designed to be flood free in 1:2,000 year flood events. Ancillary construction facilities would include a temporary construction compound, stockpiles and casting yard. The proposed ancillary facilities location is on the west bank of the Nepean River and within River Road Reserve. A study area locality map is shown in Figure 1.

The proposal would be undertaken within the Penrith local government area (LGA).

1.2 Scope of the study

The study would form part of the Review of Environmental Factors (REF) for the Nepean River green bridge project. This archaeological survey report complies with Stage 2 of the RMS PACHCI. If Aboriginal sites or archaeological deposits were to be impacted by the proposal, Stage 3 PACHCI would be initiated by RMS.

The study area is defined as the Old Ferry Road and Punt Road easements, and River Road Reserve (see Figure 1 and Figure 5).
Figure 1. Study area location (background image © Land and Property Information 2012; © SKM Pty Ltd 2012)
1.3 Objectives of the assessment

The objectives of this study are to comply with the RMS PACHCI and the Office of Environment and Heritage (OEH) Code of Practice for Archaeological Investigation of Aboriginal Objects in New South Wales 2010. The main objectives of this study include providing:

- A description of the proposal and the extent of the study area.
- A description of Aboriginal community involvement and Aboriginal consultation.
- Discussion of the environmental context of the study area.
- Discussion of the Aboriginal historical context of the study area.
- A summary of the archaeological context of the study area including a discussion of previous archaeological work in the area.
- Development of an archaeological predictive model.
- Description of Aboriginal sites and PADs located within the study area.
- Development of a significance assessment for these sites and PADs addressing archaeological values.
- Impact assessment for the recorded Aboriginal sites and PADs.
- Recommendations for management and mitigation measures for Aboriginal sites and PADs.

1.4 Development context

The proposed shared bridge over the Nepean River would improve the walking and cycling connection between Penrith and Emu Plains. Currently, Victoria Bridge, with two lanes of traffic and a shared footpath, is the only walking and cycling crossing. An initial proposal to ‘clip on’ a shared path to Victoria Bridge would not be cost effective and would require a lengthy timeframe for construction. RMS has estimated that a stand-alone structure is cheaper and faster to build compared to a clip on structure.

1.5 Investigator and contributions

Josh Symons and Adele Anderson, archaeologists at Artefact Heritage, undertook this study. Josh Symons prepared this report with management input from Dr Sandra Wallace.
1.6 Aboriginal community involvement

Aboriginal consultation has been conducted in accordance with Stage 2 of the RMS PACHCI. A Native Title search was conducted on 15 June 2012 by Artefact, which indicated that there were no Native Title claims granted or registered for consideration within the study area. The study area falls within the boundaries of the Deerubbin Local Aboriginal Land Council (DLALC). A representative of DLALC was contacted by the RMS Aboriginal Cultural Heritage Advisor and invited to participate in the Stage 2 survey. Steve Randall took part in the field survey as representative of DLALC. Comments from DLALC were received and are included as an appendix to this report. DLALC state that they have no objection to the development of the bridge and approaches but that further investigation is warranted at Tench Reserve. At the time of the survey it was proposed that Tench Reserve was used as a compound site for the proposal and it was investigated as such. Tench Reserve was subsequently found to be unsuitable and is no longer considered to be within the study area. A copy of this report will be forwarded to DLALC for their comments.

1.7 Report structure

The study has been divided into the following sections:

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### Section Overview

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2.0 Landscape Context

2.1 Geology and Soils

The underlying geology of the study area consisted of the Cranebrook Formation, an alluvial deposit dating from the late Cainozoic era (see Figure 2). The Cranebrook Formation ranged from 8 m to 14 m in thickness, and generally consisted of basal gravel averaging 7 m in thickness overlain by medium-grained sandy silt and clay (Smith and Clark 1991: 44). The basal gravel comprised of pebbles and cobbles, including quartz, quartzite, chert, porphyry, granite, hornfels, sandstone and silcrete.

It has been suggested that the initial deposition of the Cranebrook formation took place prior to the last glacial period across a braid channel subject to a drainage system with a larger discharge and greater stream power than the present Nepean channel (Nanson et al 1987: 72). Degraded logs in the basal gravel have been radiocarbon dated to between 36,700 (+/- 3,300) BP and 41,700 (+/- 3,000, -2,200) years BP. Two thermoluminescence dates from the basal gravels provided dates of 42,100 (+/- 4,800) and 41,000 (+/- 4,500) years BP (Nanson et al 1987).

Figure 2: Geology (Clark and Jones 1991)
The sandy silt overlying the basal gravels was subject to periodic stripping and reworking in places (Attenbrow 2002: 37). Nanson et al. (1987: 74) present an example to the north of the current study area, where basal dates from one area of overburden ranged between 40,700 and 41,800 BP, whilst a basal date from another area of overburden was 13,700 (+/- 1000) years BP. Other features of the Nepean drainage system included natural levees. Parts of the current study area were located across a natural levee, which was much more pronounced on the eastern side of the Nepean River. The well-defined levee consisted of coarse gravel sloping down to a back plain with Peach Tree Creek at its lowest point.

The soils overlying the study area on both the eastern and western sides of the Nepean River consisted of the Richmond soil landscape, a deep soil comprising poorly structured orange to red clay loams, clays and sands (Bannerman and Hazelton 2011: 88).

Figure 3: Soils (background image © Office of Environment and Heritage 2012)
2.2 Hydrology and Landforms

The hydrology of the study area and its vicinity is dominated by the Nepean River channel, a large watercourse with a water catchment extending as far south as Robertson in the Southern Highlands. The Nepean River is subject to periodic flooding, with the 1:100 year flood level at 26.1 m AHD. The study area ranges between 15 m and 27 m AHD.

The study area was located on both eastern and western banks of the Nepean River channel. The banks were part of a natural levee landform bordering the channel that sloped down away from the River. On the eastern side of the river, the levee sloped eastward to Peach Tree Creek, a low point approximately 240 m south-east of the study area.

2.3 Implications for the study area

The most significant implication of the local geological context for the study area is the possibility of buried archaeological deposit. Although deeper deposits within the Cranebrook Formation have been dated to the Pleistocene period, the very close proximity of the study area to the Nepean River channel suggests that earlier overburden may have been stripped and reworked during powerful flood events.

The other implication of the local geological context is the range of raw materials amongst the gravels of the Cranebrook Formation available for the manufacture of tools. Exposed sections of basal gravels could possibly have included materials widely used across the Cumberland Plain, including silcrete and quartz.
3.0 Aboriginal Historical and Archaeological Context

3.1 Aboriginal material culture

The oldest securely dated site for Aboriginal occupation in the greater Sydney region is 14,700 years before present (yBP), which was recorded in a rock shelter at Shaw’s Creek (Nanson et al 1987). Evidence of Aboriginal occupation has been found dated to 50-60,000 yBP at Lake Mungo in NSW, so it would be likely that Aboriginal people have lived in the Sydney region for even longer than indicated by the oldest recorded dates available at present. The archaeological material record provides evidence of this long occupation, but also provides evidence of a dynamic culture that has changed through time.

The existing archaeological record is limited to certain materials and objects that were able to withstand degradation and decay. As a result the most common type of Aboriginal objects remaining in the archaeological record are stone artefacts. Archaeological analyses of these artefacts in their contexts have provided the basis for the interpretation of change in material culture over time. Technologies used for making tools changed, along with preference of raw material. Different types of tools appeared at certain times, for example ground stone hatchets are first observed in the archaeological record around 4,000 yBP in the Sydney region (Attenbrow 2010:102). It is argued that these changes in material culture were an indication of changes in social organisation and behaviour.

The Eastern Regional Sequence was first developed by McCarthy in 1948 to explain the typological differences he was seeing in stone tool technology in different stratigraphic levels during excavations such as Lapstone Creek near the foot of the Blue Mountains (McCarthy 1948). The sequence had three phases that corresponded to different technologies and tool types (the Capertian, Bondaian and Eloueran). The categories have been refined through the interpretation of further excavation data and radiocarbon dates (Hiscock & Attenbrow 2005, JMcD CHM 2005). It is now thought that prior to 8,500 yBP tool technology remained fairly static with a preference for silicified tuff, quartz and some unheated silcrete. Bipolar flaking was rare with unifacial flaking predominant. No backed artefacts have been found of this antiquity. After 8,500 yBP silcrete was more dominant as a raw material, and bifacial flaking became the most common technique for tool manufacture. From about 4,000 yBP to 1,000 yBP backed artefacts appear more frequently. Tool manufacture techniques become more complex and bipolar flaking increases (JMcD CHM 2006). It has been argued that from 1,400 to 1,000 years before
contact there is evidence of a decline in tool manufacture. This reduction may be the result of decreased tool making, an increase in the use of organic materials, changes in the way tools were made, or changes in what types of tools were preferred (Attenbrow 2010:102). The reduction in evidence coincides with the reduction in frequency of backed blades as a percentage of the assemblage.

After European colonisation Aboriginal people of the Cumberland Plain often continued to manufacture tools, sometimes with new materials such as bottle glass or ceramics. There are a number of sites in Western Sydney where flaked glass has been recorded, for example at Prospect (Ngara Consulting 2003) and Oran Park (JMcD CHM 2007).

3.2 Aboriginal histories of the locality

Prior to the appropriation of their land by Europeans, Aboriginal people lived in small family or clan groups that were associated with particular territories or places. It seems that territorial boundaries were fairly fluid, although details are not known. The language group spoken on the Cumberland Plain is known as Darug (Dharruk – alternative spelling). This term was used for the first time in 1900 (Matthews & Everitt) as before the late 1800s language groups or dialects were not discussed in the literature (Attenbrow 2010:31). The Darug language group is thought to have extended from Appin in the south to the Hawkesbury River, west of the Georges River, Parramatta, the Lane Cove River and to Berowra Creek (Attenbrow 2010:34). This area was home to a number of different clan groups throughout the Cumberland Plain. It is thought that the Aboriginal people living in the Penrith area in the early 19th century belonged to the Darug language group (Kohen 1986: 3).

British colonisation had a profound and devastating effect on the Aboriginal population of the Sydney region, including Darug speakers. In the early days of the colony Aboriginal people were disenfranchised from their land as the British claimed areas for settlement and agriculture. The colonists, often at the expense of the local Aboriginal groups, also claimed resources such as grasses, timber, fishing grounds and water sources. Overall the devastation of the Aboriginal culture did not come about through war with the British, but instead through disease and forced removal from traditional lands. It is thought that during the 1789 smallpox epidemic, over half of the Aboriginal people of the Sydney region died. The disease spread west to the Darug of the Cumberland Plain and north to the Hawkesbury. It may have in fact spread much further afield, over the Blue Mountains (Butlin 1983). This loss of life meant that some of the Aboriginal groups
who lived away from the coastal settlement of Sydney may have disappeared entirely before Europeans could observe them, or record their clan names (Karskens 2010:452).

The British initially thought that Aboriginal people did not live inland, but were confined to the coast taking advantage of the abundant marine resources available. The first major expeditions into the interior did not witness any Aboriginal people, but evidence of their existence was noted. In 1789 Captain Watkin Tench led an expedition to the Nepean River. He noted that:

‘Traces of the natives appeared at every step, sometimes in their hunting huts which consist of nothing more than a large piece of bark bent in the middle and opened at both ends, exactly resembling two cards set up to form an acute angle; sometimes in marks on trees which they had climbed; or in squirrel-traps….We also met with two old damaged canoes hauled up on the beach ‘(Tench 1789).

It wasn’t until rural settlement began in the western Cumberland Plain, around 1791 that the colonists and Aboriginal people came face to face. Relations quickly disintegrated, and tensions over land and resources spilled over. Governor King sanctioned the shooting of Aboriginal people in a General Order made in 1801 (Kohen 1986:24). Intermittent killings on both sides continued for over 15 years, including the Appin massacre and attacks at South Creek in 1816 (Karskens 2010: 225, Kohen 1986:23).

Into the nineteen and twentieth centuries descendants of Darug language speakers continued to live in Western Sydney along with Aboriginal people from other areas of NSW, and in the present-day, the study area falls within the area of the DLALC.

3.3 AHIMS

An extensive search of the Aboriginal Heritage Information System (AHIMS) database was undertaken on the 12 June 2012 for sites registered within the following coordinates:

GDA 1994 MGA 56 282000E – 287000E  
6260000N – 6265500N

Buffer 50 m

Number of sites 27

AHIMS Search ID72301

The distribution of recorded sites within the AHIMS search area is shown in Figure 4.
Figure 4: AHIMS register search results (search # 72301), (background image © SKM Pty Ltd 2012)

Removed for public version
The location of Aboriginal sites is considered culturally sensitive information. It is advised that this information, including the AHIMS data appearing on the heritage maps for the proposal be removed from this report if it is to enter the public domain.

Table 1: Frequency of site types from AHIMS data.

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<th>Site Type</th>
<th>Frequency</th>
<th>Percentage</th>
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<tbody>
<tr>
<td>AFT (artefact)</td>
<td>25</td>
<td>92</td>
</tr>
<tr>
<td>PAD (potential archaeological deposit)</td>
<td>1</td>
<td>4</td>
</tr>
<tr>
<td>ART (Pigment or Engraved)</td>
<td>1</td>
<td>4</td>
</tr>
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Artefact sites were clearly the most frequent Aboriginal site type recorded in the vicinity of the study area, with one PAD (45-5-3904) identified approximately one kilometre west of the study area, and one art site (45-5-0340) recorded 650 m to the south-west.

The art site (45-5-0340) consisted of two sandstone slabs with an engraving of a man on one and a fish on the other. The two sandstone slabs were removed from the path of a new road alignment in Brookvale, northern Sydney, and currently reside in the lawn of the Penrith Regional Gallery.

No sites registered on the AHIMS database were located within the study area.

3.4 Previous archaeological investigations

The geological deposits in the vicinity of the Nepean and Hawkesbury Rivers contain the oldest dated archaeological deposits in the Sydney area. The oldest secured dates for Aboriginal occupation of the Sydney area are from open site PT12 and rock shelter site KII – both bordering the Nepean / Hawkesbury Rivers. Site PT12 was a deep archaeological deposit located in a Pleistocene sand deposit (Williams et al 2012) overlooking the Hawkesbury River at 24 m AHD.

The Hawkesbury River bank at Pitt Town was located approximately 160 m north of PT12 and at 10 m AHD.

The rock shelter site KII at Shaws Creek was located on the western side of the Nepean River and approximately 11 km north of the current study area (Nanson et al 1987). The shelter was located approximately 700 m upstream from the junction of Shaws Creek and the Nepean River. The shelter would have been inundated during flood events, but due to the arrangement of the surrounding sandstone landforms, would have been protected from high power water flows and
instead would have been inundated by flood backwater. During those high water events fine silt / clay would have been deposited in the shelter (Nanson et al 1987: 76).

Radiocarbon dates from the deepest excavated unit at site KII place the earliest archaeological deposit at 14,700 +/- 250 yBP. No datable charcoal was identified during excavation at site PT12, where thermoluminescence dates demonstrated oldest occupation between 15,000 and 11,000 yBP (Williams et al 2012). With similar dates for earliest evidence of occupation between KII and PT12, Williams et al (2012) note that there was also a strong correlation between the artefact assemblages. The older assemblage from both sites represented a Caperatian assemblage dominated by chert/tuff, with later Holocene assemblages representing a Bondian assemblage with increased silcrete usage and backed artefact production (Williams et al 2012: 94).

The oldest unsecured date of archaeological material in the Sydney area and indeed one of the oldest dates in Australia is from the basal gravel of the Cranebrook Formation (Nanson et al 1987). As discussed in Section 2, both radiocarbon and thermoluminescence techniques were used to date the basal gravel to around 40,000 yBP. The argument put forward by Nason et al (1987) was that artefacts retrieved from the basal gravel would be associated with those dates. However, the unsecured association between the artefacts and the dated material from the basal gravel leaves the later Pleistocene dates from site KII and PT12 as the oldest secured dates in the Sydney area.

Closer to the current study area, Kohen (1984) discussed a complex of sites identified on the margins of Jamisons Creek. The ‘site complex’ was located approximately two kilometres south-west of the current study area. Three artefact scatters were recorded in that area, named JC/1, JC/1E and JC/LT. The site complex was located at Emu Plains and approximately one kilometre upstream from the junction of Jamisons Creek and the Nepean River, where the creek had incised through the underlying Cranebrook Formation forming two distinct terraces.

Site JC/1 was located on the upper terrace. A surface collection of artefacts retrieved around 10,000 artefacts from 775/m² (Kohen 1984: 11). Raw materials included chert, basalt, quartz, quartzite, silcrete and silicified wood, with at least some of the materials suggested by Kohen to have originated from the Nepean River gravels. Site JC/1E was a smaller exposure of artefacts near JC/1 and also located on the upper terrace, whilst site JC/LT was located on the lower terrace. Excavation at JC/1 showed archaeological material throughout the Holocene sand deposit, with the lower indurated Pleistocene sand / clay layer archaeologically sterile (Kohen 1984: 14). A small excavation at JC/LT demonstrated a similar stratigraphic profile to JC/1.
Other archaeological investigations in the vicinity

AHMS (2010) conducted an investigation for proposed stabling yards at Emu Plains, approximately 850 m west of the current study area. The area was located on the Nepean River floodplain, although AHMS identified that one portion of land was on a terrace or levee deposit and was likely to be above a 1:100 year flood event. Field survey identified two isolated finds and one area of PAD in the area of higher elevation. A permit has been issued for archaeological excavation at the PAD, although no report on the results is so far available.

Archaeological test excavations were conducted at locations on the margins of Peach Tree Creek approximately 800 m south-west of the study area on the eastern side of the Nepean River (Silcox 1987). The test excavations were conducted at sites RP3 (45-5-0539) and RP4 (45-5-0540), both identified by Rich (1986) during an archaeological assessment of a proposed transmission line. Test excavation at the two sites was conducted due to potential impact to their location from development of the Penrith Rugby League Club.

Aboriginal artefacts were recovered from excavation at both sites RP3 and RP4, however, the archaeological deposit was identified as heavily disturbed, and with historical material mixed through the deposit to a depth of 25 cm. Silcox (1987: 9) suggested that the high levels of disturbance were likely due to the effects of flood events and farming activities. The excavations were conducted below the 1:100 year flood level.

Impact to archaeology from flood events

One of the key questions regarding any potential archaeological deposit bordering the Nepean River is the impact that powerful events would have had on deposit integrity.

Attenbrow (2002: 37) noted that the upper sandy deposit of the Cranebrook formation would likely be subject to intermittent stripping and replacement. Nanson et al (1987) demonstrated this activity by comparing the basal dates of the sandy deposit, showing that there was an unconformity in the basal age of that deposit likely due to periodic stripping and reworking in some parts of the Cranebrook Formation more than others. This process does not necessarily preclude the existence of intact terminal Pleistocene or Holocene deposits, but does introduce the variable of impact to archaeological deposit from powerful flood events.

As part of the test excavation program at Pitt Town, AHMS (2006) tested the archaeological integrity of the Hawkesbury River bank. Transect PT11 was positioned on the river bank at an
elevation of 10 m. In comparison, site PT12, where securely dated terminal Pleistocene deposit was identified, was located at 24 m AHD and approximately 160 m from the river bank. Excavation at PT11 demonstrated that the soil layers consisted of recent alluvial deposits thought to have been affected by severe flood events over the last 150 years (AHMS 2006: 39).

AHMS (2006: 53) identified an association between artefact density and location relative to the 1:100 year flood level. The 1:100 year flood level at Pitt Town was 17.3 m AHD, with test excavation results demonstrating significantly lower artefact densities below that level (1.4 artefacts per m³), whilst above that level the average density was 29.84 m³. It is clear that the creek bank at Pitt Town (transect PT1) was located significantly lower than the 1:100 year flood level, and the soil layers and artefact density reflected that.

Some key characteristics of the current study area differ from the above example. Firstly, the river bank forms a natural levee, and as such is positioned much higher relative to the 1:100 year flood level than the river bank at Pitt Town. The 1:100 year flood level at Victoria Bridge is 26.1 m AHD, compared with the highest part of the levee within the study area at 27 m.

A further example of archaeological investigations in the vicinity of the 1:100 year flood level is a recent test excavation program at Windsor. The excavations were conducted as part of the Windsor Bridge replacement project, which involved an investigation of both the north and south sides of the Hawkesbury River (KNC 2012). Test excavation was conducted at two identified PADs bordering the river. One PAD had been identified on the northern side of the river (AHIMS # 45-5-3580) across an area that was below the 1:100 year flood level at Windsor – 17.3 m AHD. The second PAD (AHIMS # 45-5-3581) was identified on the southern side of the river within an area that extended both above and below the 1:100 year flood level.

Test excavation on the northern side of the river identified a very disturbed deposit. Disturbance was linked both to historical activities, including vegetation clearance and cultivation, and to flooding events. The location of PAD 45-5-3580 below the 1:100 year flood level meant that archaeological material was displaced amongst deep homogenous soils (KNC 2012: 12).

Test excavation on the southern side of the river identified an area of intact archaeological deposit on the upper slope of the creek bank above the 1:100 year flood level. An artefact bearing sand layer was identified beneath a layer of fill related to historical construction activities. It was suggested that the sand deposit was deposited by aeolian depositional processes from a bordering dune (KNC 2012: 15).
Although there were significant levels of historical disturbance across the test area, it was still clear that the areas beneath the 1:100 year flood level were subject to more frequent flooding which had resulted in a mixed archaeological deposit. There was more likelihood of relatively intact archaeological deposit above the 1:100 year flood level, as demonstrated by the identification of the artefact bearing sand deposit (KNC 2012).

### 3.5 Archaeological implications for the study area

Previous archaeological investigations of the area indicate not only the frequency of artefact sites in the area, but also the possibility of sub-surface archaeological deposits. Sub-surface investigation close to the study area, but below the 1:100 year flood level (Silcox 1987) demonstrated the presence of archaeological material in a highly disturbed context. Investigations at Pitt Town demonstrated a strong correlation between artefact density/deposit intactness and the 1:100 year flood level. Although the crest of the natural levee bordering the Nepean is above the 1:100 year flood level, the levee is bordered directly on either side by lower deposits that would be prone to frequent flooding and stripping. Additionally, the study area has been subject to significant historical disturbance, meaning that the integrity of potential archaeological deposits in the vicinity may have been affected by both flood events and historical activities.
4.0 Predictions

4.1 Aboriginal land use

Assumptions about Aboriginal land use patterns are made on the basis of archaeological information gained from the local area, from observations made by Europeans after settlement of the area, and from information known about available natural resources.

As Aboriginal people were mobile hunter-gatherers, it would be likely that they moved across the landscape between resources. It would also be likely that movement was related to socio/cultural factors such as gatherings and ceremonial obligations. Campsites would have provided temporary residences such as bark structures. It is difficult to ascertain whether a campsite existed at a given location, but correlations between stone artefact density and campsites are often assumed. While it would be likely that knapping would have occurred at a campsite, it would also be likely that knapping would have occurred during movement across the landscape, as tools were prepared or repaired during hunting and gathering activities.

Archaeological data gathered in the locality suggests that artefacts would be found across the landscape in high densities. The main limitation to the survivability of archaeological material in the area is impacts of powerful flooding on the soil profile.

4.2 Predictive model

Archaeological data gathered in the locality suggests that the area has been used extensively by Aboriginal people since the Pleistocene. The study area was located in an area with ready access to fresh water and various subsistence resources.

This predictive model comprises a series of statements about the nature and distribution of evidence of Aboriginal land use that is expected in the study area. These statements are based on the information gathered regarding:

- Landscape context and landform units.
- Ethno historical evidence of Aboriginal land use.
- Distribution of natural resources.
- Results of previous archaeological work in the vicinity of the study area.
- Predictive modeling proposed in previous investigations.
Predictive statements are as follows:

Stone artefact scatters in potentially high densities will be the most likely Aboriginal site type. Although archaeological material would normally be visible in surface exposures, the combined variables of powerful flooding events, post-European disturbance and the underlying geomorphology of the area suggest that any potential archaeological material would be located in sub-surface contexts. The extent of sub-surface archaeological deposits would be limited by sediment stripping and re-working during powerful flood events.
5.0 Field Methods

5.1 Site definition

An Aboriginal site is generally defined as an Aboriginal object or place. An Aboriginal object is the material evidence of Aboriginal land use, such as stone tools, scarred trees or rock art. Some sites, or Aboriginal places can also be intangible and although they might not be visible, these places have cultural significance to Aboriginal people.

OEH guidelines state in regard to site definition that one or more of the following criteria must be used when recording material traces of Aboriginal land use:

- The spatial extent of the visible objects, or direct evidence of their location.
- Obvious physical boundaries where present, e.g. mound site and middens (if visibility is good), a ceremonial ground.
- Identification by the Aboriginal community on the basis of cultural information.

For the purposes of this study an Aboriginal site was defined by the recording the spatial extent of visible traces or the direct evidence of their location.

PADs are areas where sub-surface stone artefacts and/or other cultural materials are likely to occur (DECCW 2010:38). These areas may be associated with recorded sites but are often greater in extent taking in areas around the visible artefacts where there is a potential for further buried artefacts to exist. PADs may also be present where no visible artefacts are located. This may be the case when there is no ground surface visibility, but the area is seen to have a high likelihood of containing artefacts.

5.2 Survey methodology

A full coverage survey of the study area was conducted on 12 July 2012. The study area was covered on foot.

The survey was undertaken in accordance with both the OEH Code of Practice (2010) and RMS PACHCI guidelines. A handheld Global Positioning System (GPS) was used to track the path of the surveyors, and to record the co-ordinates of sites, features and location of landform units along the route.
Each of the three separate portions of the study area was designated as a separate survey unit. This included the bridge landing east bank (Survey Unit 1), bridge landing west bank (Survey Unit 2), and ancillary facilities at River Road Reserve (Survey Unit 3) – see Figure 5.

All ground exposures were examined for stone artefacts, shell, or other traces of Aboriginal occupation. Old growth trees were examined for signs of cultural scarring or marking.

A photographic record was kept for all sections of the study area. Photographs were taken to represent the landform unit, vegetation communities, objects of interest and levels of disturbance. Scales were used for photographs where appropriate.
Figure 5. Survey Units (background image and data © Land and Property Information 2012; © SKM Pty Ltd 2012)
6.0 Results

6.1 Effective survey coverage

The survey area covered portions of both the eastern and western banks of the Nepean River. This landform included both the steep bank margins as well as portions of the crest of the river bank. Large portions of the study area had been significantly disturbed by historical modification of the river banks, including road cuttings and stabilisation of steep slopes. Surface visibility was low across most of the study area due to dense grass coverage.

<table>
<thead>
<tr>
<th>Survey Unit</th>
<th>Landform</th>
<th>Survey unit area (m²)</th>
<th>Visibility (%)</th>
<th>Exposure (%)</th>
<th>Effective coverage area (m²)</th>
<th>Effective coverage (%)</th>
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<th>% of landform effectively surveyed</th>
<th>Number of sites</th>
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6.2 Previously recorded Aboriginal sites

No previously recorded Aboriginal sites were located within the study area.

6.3 Newly recorded Aboriginal sites

No Aboriginal sites or areas of archaeological potential were identified within the study area.
Plate 1. View north-east across northern embankment, Old Ferry Road (Survey Unit 1)

Plate 2: View north-east across steep Nepean River bank (Survey Unit 3)
7.0 Archaeological Potential

7.1 Disturbance levels

Overall, high levels of ground disturbance were observed across the study area. All survey units have been significantly affected by historical features, including Old Ferry Road, Punt Road, a car park, and the reinforcement of the steep river banks. Old Ferry Road (Survey Unit 1) and Punt Road (Survey Unit 2) were cut through the river bank, resulting in bordering embankment walls up to five metres high. Additionally, it was apparent during the field survey that fill has been used, predominantly at Old Ferry Road, to both bolster the road and embankment walls. Waste material, including concrete fragments, was observed in the embankment walls.

There was also likely to have been significant disturbance to large portions of the study area from flood activity. Much of the study area consisted of steep river banks that would be susceptible to collapse during large flood events. The modification and reinforcement of the river banks with river gravels, sandstone blocks and concrete slabs, indicates the threat of bank collapse from large flood events.

The eastern half of Survey Unit 3 consisted of the very steep western bank of the Nepean River. The crest of the river bank in the western half of the survey unit appeared to have been significantly modified, with a large bitumenised car park over a leveled portion of the bank landform. The raised car park area was the only portion of Survey Unit 3 above the 1:100 year flood level – the remainder of the area would be heavily impacted during large flood events.

7.2 Archaeological potential

Archaeological potential is closely related to the levels of ground disturbance in the study area. Another factor also taken into account include whether an area is within a sensitive landform unit according to the predictive statements for the area.

All of the study area has been assessed as demonstrating low archaeological potential (see Figure 6), due both to historical disturbance and the likelihood that sub-surface deposits have been significantly affected by large flood events.
Figure 6. Archaeological potential of the study area (background image and data © Land and Property Information 2012; © SKM Pty Ltd 2012)
8.0 Statutory Requirements

This study has been undertaken in the context of several pieces of legislation that relate to Aboriginal heritage and its protection in New South Wales.


The National Parks & Wildlife Act 1974, administered by the OEH provides statutory protection for all Aboriginal ‘objects’ (consisting of any material evidence of the Aboriginal occupation of NSW) under Section 90 of the Act, and for ‘Aboriginal Places’ (areas of cultural significance to the Aboriginal community) under Section 84.

The protection provided to Aboriginal objects applies irrespective of the level of their significance or issues of land tenure. However, areas are only gazetted as Aboriginal Places if the Minister is satisfied that sufficient evidence exists to demonstrate that the location was and/or is, of special significance to Aboriginal culture.

The Act was recently amended (2010) and as a result the legislative structure for seeking permission to impact on heritage items has changed. An s.90 permit is now the only AHIP available and is granted by the OEH. Various factors are considered by OEH in the AHIP application process, such as site significance, Aboriginal consultation requirements, ESD principles, project justification and consideration of alternatives. The penalties and fines for damaging or defacing an Aboriginal object have also increased. As part of the administration of Part 6 of the Act OEH has developed regulatory guidelines on Aboriginal consultation, which are outlined in Aboriginal Cultural Heritage Consultation Requirements for Proponents (2010). Guidelines have also been developed for the processes of due diligence - Due Diligence Code of Practice for the Protection of Aboriginal Objects in NSW (2010), and for investigation of Aboriginal objects - Code of Practice for Archaeological Investigation of Aboriginal Objects in New South Wales (2010) in accordance with the 2010 amendment to the Act.

Aboriginal Land Rights Act (1983)

The Aboriginal Land Rights Act 1983 is administered by the NSW Department of Human Services - Aboriginal Affairs. This Act established Aboriginal Land Councils (at State and Local levels). These bodies have a statutory obligation under the Act to: (a) take action to protect the culture and heritage of Aboriginal persons in the council’s area, subject to any other law, and (b) promote
awareness in the community of the culture and heritage of Aboriginal persons in the council’s area.

Native Title Act (1994)

The Native Title Act 1994 was introduced to work in conjunction with the Commonwealth Native Title Act. Native Title claims, registers and Indigenous Land Use Agreements are administered under the Act.
9.0 Significance Assessment

9.1 Assessment criteria

Archaeological significance refers to the archaeological or scientific importance of a landscape or area. This is characterised by using archaeological criteria such as archaeological research potential, representativeness and rarity of the archaeological resource and potential for educational values. These are outlined below:

- Research potential: does the evidence suggest any potential to contribute to an understanding of the area and/or region and/or state’s natural and cultural history?
- Representativeness: how much variability (outside and/or inside the subject area) exists, what is already conserved, how much connectivity is there?
- Rarity: is the subject area important in demonstrating a distinctive way of life, custom, process, land-use, function or design no longer practised? Is it in danger of being lost or of exceptional interest?
- Education potential: does the subject area contain teaching sites or sites that might have teaching potential?

Cultural values and significance would be discussed by DLALC in their report and during any ongoing Aboriginal consultation for the project.

9.2 Archaeological significance assessment

The archaeological significance of the study area is assessed as being low due to the high levels of disturbance resulting from both historical activities and flood events. No Aboriginal sites have been identified within the study area. No particular areas of cultural significance were noted by DLALC during the site survey.
10.0 Impact Assessment

10.1 Impact assessment

No Aboriginal sites or areas of archaeological potential have been identified within the study area. The study area was assessed as demonstrating low archaeological potential. It is unlikely that the proposal would impact on any intact archaeological sites.
11.0 Recommendations

The following recommendations were based on consideration of:

- Statutory requirements under the *National Parks and Wildlife Act 1974* as amended.
- The results of the background research, site survey and assessment.
- The interests of DLALC.
- The likely impacts of the proposed development.

It was found that:

- No Aboriginal sites or areas of archaeological potential have been identified within the study area.
- The entire study area was assessed as highly disturbed and demonstrating low archaeological significance.

It is therefore recommended that:

- There are no constraints on the proposed development with regard to Aboriginal heritage.
- A copy of this draft report should be forwarded to DLALC for their comments.
- If unexpected Aboriginal sites are located during construction of the Nepean River green bridge the RMS *Unexpected Archaeological Finds Procedure* (2011) would be implemented.
12.0 References


Department of Environment, Climate Change & Water [now OEH] 2010 Code of Practice for Archaeological Investigation of Aboriginal Objects in New South Wales.


Jo McDonald CHM Pty Ltd. 2005. Archaeological salvage excavation of site CG1 (NPWS #45-5-2648), at the corner of Charles and George Streets, Parramatta, NSW. Report for Meriton Apartments Pty Ltd.


Jo McDonald CHM Pty Ltd. 2007. Archaeological investigation of the Oran Park Precinct in the South West Growth Centre, Camden, NSW. Report to APP.


Silcox, R., 1987. Test Excavations at Sites RP3 and RP4 on Peach Tree Creek, Penrith Report to Leffler, Simes, Adameitis Pty Ltd.


Appendix 1

Aboriginal stakeholder report
Roads & Marine Services  
27 Argyle Street  
PARRAMATTA NSW 2150

Our Ref: 2281  
29 August 2012

SUBJECT: PROTECTION OF ABORIGINAL CULTURAL HERITAGE  
Proposed Approaches for Foot/Cycleway Bridge across the Nepean River and  
Site Compound at Tench Reserve  
Penrith

Attention: Barry Gunther,

A representative of the Deerubbin Local Aboriginal Land Council inspected the approaches for the Foot/Cycleway Bridge across the Nepean River and the site compound site in Tench Reserve on Thursday, 12 July 2012. An Aboriginal cultural heritage assessment was undertaken to evaluate the likely impact the proposed development has on the cultural heritage of the land.

Our representative reports that, the approaches to the Nepean River for the Foot/Cycleway Bridge to be disturbed from the previous two bridges, however Tench Reserve has potential to contain subsurface Aboriginal cultural materials (in the form of Stone artefacts, for example).

Deerubbin Local Aboriginal Land Council therefore, has no objection to development of the bridge & approaches. We recommends further investigations be undertaken on Tench Reserve and Nepean River Bank at the location of the site compound.

Yours Faithfully,

(Kevin Cavanagh  
Chief Executive Officer)

C.c. Miranda Morton – Office of Environment & Heritage

C.c. Josh Symon – Artefact Consultants
26 August 2014

Lidiya Hudson
Project Development Manager
Project Development
Infrastructure Development
Level 8, 27 Argyle Street
Parramatta NSW 2150

Dear Lidiya,

Re: Addendum to the PACHCI Stage 2 archaeological survey report for the Nepean River Green Bridge project, Penrith, NSW

Artefact Heritage prepared an archaeological survey report (ASR) in 2012 as part of Stage 2 of the Roads and Maritime Services (Roads and Maritime) Procedure for Aboriginal Cultural Heritage Consultation and Investigation 2011 (PACHCI) for the proposed Nepean River Green Bridge project, Penrith, NSW. Following submission of the initial Artefact Heritage report in 2012, Roads and Maritime has revised its plans and increased the size of the study area, adding proposed locations for potential alternate ancillary facilities to the south if required. Consequently, Artefact Heritage was re-engaged to prepare an addendum report that assesses the full extent of the current study area.

The aim of this investigation is to identify Aboriginal sites or areas of archaeological potential within the current study area. An updated Aboriginal Heritage Information Management System (AHIMS) database search was undertaken to ascertain whether additional Aboriginal heritage sites have been recorded within, or adjacent to, the current study areas since the original investigation. A ground survey was conducted within the additional areas that were not considered during the original investigation.

This addendum report is to be read in conjunction with the original Artefact Heritage ASR (Artefact Heritage 2012). Much of the background information presented in the original report has not been repeated in this addendum.
Figure 1: The study area (background © Google 2014 and © NSW LPI). Note Site 1, 2 and carpark are proposed site compound locations. Site 3 and 4 were potential site compound locations, no longer to be utilised.
1.0 The proposal and study area

The proposal would involve the construction of a stand-alone bridge connecting Memorial Avenue at Penrith, through the Log Cabin property, to Punt Road at Emu Plains. The project will provide a safe crossing for pedestrians and cyclists over the Nepean River and associated connections to existing and future shared use paths. The bridge is expected to be an iconic structure and the heart of the river city regeneration.

The key features of the proposal include:

- Construction of a 288 metre long bridge structure with a main span of 175 metres consisting of a tubular steel triangular Warren truss that is approximately seven metres wide.
- Two-way shared use crossing for pedestrians and cyclists but with a deck space of 4.6 metres wide providing opportunity to linger.
- Connections to existing and future shared paths.
- Scour protection on the eastern and western river banks.
- One bridge pier into the river bed.
- Main bridge span is flood free in 1 in 2000 years events.
- Ancillary construction facilities including temporary construction compound, stockpiles site and casting/fabrication yard.
- Adjustment to public utilities such as electricity, gas and telephone services.

The study area includes the areas of proposed or potential impacts, as shown in Figure 1. This includes the proposed construction footprint for the bridge on the eastern and western banks of the Nepean River, and the proposed site compound locations (Sites 1 and 2) on either side of the river. The study area also includes two possible site compound locations further to the south along the western bank of the river (Sites 3 and 4). An area of hardstanding within the carpark at Regatta Park is an additional potential compound site.

2.0 Objectives of addendum

This addendum report outlines the following information:

- An updated Office of Environment and Heritage (OEH) AHIMS search.
- Identification of any Aboriginal sites or areas of archaeological potential within the study area.
- Development of a significance assessment and impact assessment for any Aboriginal sites or areas of archaeological potential located within the current study area.
- Management and mitigation measures for any Aboriginal sites or areas of archaeological potential located within the current study area.
Further details of the environmental and archaeological context of the local area, Aboriginal histories of the area, and predictive modelling are outlined in the original 2012 ASR (Artefact Heritage 2012) and will not be repeated in this addendum report.

3.0 Aboriginal stakeholder consultation

Aboriginal consultation has been conducted in accordance with Stage 2 of the Roads and Maritime PACHCI. The study area falls within the boundaries of the Deerubbin Local Aboriginal Land Council (DLALC). A representative of DLALC was contacted by the Roads and Maritime Aboriginal Cultural Heritage Advisor and invited to participate in the Stage 2 survey. Steve Randall took part in the field survey undertaken in 2012 as representative of DLALC.

4.0 Legislative context

This addendum report was prepared in accordance with the following NSW legislation and legislative guidelines:


The National Parks & Wildlife Act 1974 (the NP&W Act) provides statutory protection for all Aboriginal ‘objects’ (consisting of any material evidence of the Aboriginal occupation of NSW) under Section 90 of the Act, and for ‘Aboriginal Places’ (areas of cultural significance to the Aboriginal community) under Section 90. Aboriginal objects are afforded automatic statutory protection in NSW whereby it is an offence to:

’damage, deface or destroy Aboriginal sites without the prior consent of the Director-General of the National Parks and Wildlife Service (now the OEH)’.

The Act defines an Aboriginal ‘object’ as:

‘any deposit, object or material evidence (not being a handicraft for sale) relating to indigenous and non-European habitation of the area that comprises New South Wales, being habitation before or concurrent with the occupation of that area by persons of non-Aboriginal European extraction, and includes Aboriginal remains’.

The Act was recently amended (2010), with the legislative structure for seeking permission to impact on heritage items modified. A s90 permit is now the only Aboriginal Heritage Impact Permit (AHIP) available and may only be granted by OEH if the conditions of the ‘due diligence guidelines’, and/or an ‘archaeological investigation’ have been met. The penalties and fines for damaging or defacing an Aboriginal object have also increased.
The Environmental Planning and Assessment Act 1979

The Environmental Planning and Assessment Act 1979 (the EP&A Act) establishes the framework for cultural heritage values to be formally assessed in the land use planning and development consent process. The EP&A Act requires that environmental impacts are considered prior to land development; this includes impacts on cultural heritage items and places as well as archaeological sites and deposits. The overall study area falls within the boundaries of the Penrith Local Government Area and is covered by the Penrith Local Environmental Plan (LEP) 2010. As the proposal is being undertaken by a state agency (Roads and Maritime), the LEP is overridden by the State Environmental Planning Policy (Infrastructure) (ISEPP) 2007.

5.0 Investigators and contributors

This report was written by Sandra Wallace of Artefact Heritage.

6.0 OEH Aboriginal Heritage Information Management System (AHIMS) search

An updated search of the OEH AHIMS site register was undertaken on 1 May 2014 (Client Service ID 131622).

The following coordinates were used in the updated search: Eastings 282500 - 286700, Northings 6260800 – 6264500 (GDA56) with a buffer of 50 metres applied. The results of the search identified 15 previously recorded Aboriginal sites within the search area (Figure 2). The location of Aboriginal sites is considered culturally sensitive information. It is advised that this information, including the AHIMS data appearing on the heritage map for the proposal, be removed from this report if it is to enter the public domain.

The frequency of recorded site types is summarised in Table 1. Of the 15 previously recorded sites identified in the search area, Artefact sites are the most predominant (n=12). The remaining site types are Potential Archaeological Deposit (PAD) (n=2) and Art (n=1).

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<th>Site Feature</th>
<th>Frequency</th>
<th>Percentage</th>
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</thead>
<tbody>
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<tr>
<td>PAD</td>
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<tr>
<td>Art (Pigment or Engraved)</td>
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</table>
Figure 2: AHIMS results within/near the study area. Background image © NSW LPI.

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Previously recorded Aboriginal sites

Two sites registered on the AHIMS database (# 45-5-0340 and # 45-5-4361) were located in close vicinity to the study area. However, AHIMS site # 45-5-0340 is incorrectly plotted within the Nepean River. The site card describes AHIMS site # 45-5-0340 as located on the lawn of Penrith Regional Art Gallery, approximately 300 metres west of the mapped location provided by AHIMS. Site cards are not available for AHIMS site # 45-5-4361. AHIMS site # 45-5-4361 is located approximately 200 metres northeast of the proposed bridge location and work area and is a PAD recorded in 2014. This PAD is outside the study area and clearly does not extend into Site 1 in which ground surface disturbance is evident.

Silcrete cobble recorded near Punt Road

Details supplied to Roads and Maritime indicate that a fractured silcrete cobble was identified during a separate investigation by Novorail for replacement of power poles near Punt Road in June 2014. The location of the find was described as located on Punt Road (within Site 2), and Novorail supplied Roads and Maritime with a picture of Steve Randall, a representative of the Deerubbin Local Aboriginal Land Council (DLALC), standing at the find’s location.

A Basic Search of the Office of Environment and Heritage (OEH) Aboriginal Heritage Information Management System (AHIMS) was conducted by Artefact Heritage on 12 June 2014. The search area included a buffer of approximately 180 metres (including a 50 metre buffer) around Punt Road. No Aboriginal sites or places have been recorded on the AHIMS site register within that area. This Basic Search indicates that the find has not been recorded as an Aboriginal object on the AHIMS site register. It is understood that Roads and Maritime Services have obtained advice from Novorail confirming that the archaeological consultancy engaged by Novorail will not be seeking to register the cobble as an Aboriginal object.

Josh Symons of Artefact Heritage visited the site visit on 10 June 2014. It was evident during the site visit that the indicated location of the cobble was on the northern margin of Punt Road. That location was characterised by large amounts of introduced gravels and road base, including blue metal gravels and clumps of bitumen. The road itself appears to have been cut into the surrounding natural levee bank landform. Observations of that area indicate that any natural ground surface has been removed. Overall, the area appeared comprehensively disturbed.

The ground surface was investigated to locate the cobble identified during Novorail’s investigation. The only object resembling the description supplied to Roads and Maritime Services by Novorail was a red siliceous shattered cobble fragment. No other material across that area matched the supplied description. The object was 50 millimetres long, and consisted of one cortical surface with negative scarring, and one shattered surface with some distinct negative scarring.
Although there was negative scarring on the object, it was not clear that these were from deliberate flaking activity on the cobble fragment. The nature of the cobble fracturing indicates that these may have instead resulted from natural fracturing as the cobble was rolled in flood waters, or rolled and/or crushed in other gravels introduced across the surface of Punt Road. The find was assessed as not and Aboriginal object by the Artefact Heritage archaeologist. Barry Gunther the Aboriginal Cultural Heritage Advisor from Roads and Maritime agreed with this assessment. This find will not be considered further in this report as it does not require any further assessment or investigation.

7.0 Survey methodology

A full coverage survey of the original study area was conducted on 12 July 2012. The current study area, updated to reflect the new scope of works provided by Roads and Maritime, was partially surveyed by Artefact Heritage (2012) and partially surveyed by the Roads and Maritime Senior Aboriginal Cultural Heritage Advisor (2014). Artefact Heritage surveyed all sections of the current study area that had not been taken into account in the 2012 survey in May 2014.

2012 Survey (Artefact Heritage)

All surveying was undertaken on foot and in accordance with both the OEH Code of Practice (2010) and Roads and Maritime PACHCI guidelines. A handheld Global Positioning System (GPS) was used to track the path of the surveyors, and to record the co-ordinates of sites, features and location of landform units along the route.

All ground exposures were examined for stone artefacts, shell, or other traces of Aboriginal occupation. Old growth trees were examined for signs of cultural scarring or marking.

A photographic record was kept for all sections of the study area. Photographs were taken to represent the landform unit, vegetation communities, objects of interest and levels of disturbance. Scales were used for photographs where appropriate.

During the survey in 2012 an area of PAD was located above the 1:100 year flood level at Watkin Tench Reserve (Figure 3). This PAD was defined as a slightly raised landform unit above the bank sloping down towards the river. It was recommended that no subsurface excavations were undertaken above the 1:100 year flood level in the vicinity of Watkin Tench Reserve.
2014 Survey (Barry Gunther/Sydney ACHA) and Artefact Heritage

The additional survey was conducted on foot by Barry Gunther, Senior Aboriginal Cultural Heritage Advisor. This survey concerned the southernmost sections of the updated study area, Site 3 and Site 4 in Figure 2. These sites were inspected for Aboriginal sites or objects, PADs and the levels of existing disturbance were observed (see Appendix 1 for a report on the site visit).

It was noted that sections of the current study area around the proposed bridge location had not been surveyed by Artefact in 2012 or by Barry Gunther as part of the additional survey. These sections of the current study area were surveyed on 7 May 2014 by Nick Butler and Alyce Howard of Artefact.
Heritage. The remainder of the current study area was also looked at in order to check whether there had been any modifications since the 2012 survey. This survey ensured that this addendum report meets the requirements of Stage 2 PACHCI and the OEH *Code of Practice*.

### 8.0 Survey results

**Effective survey coverage**

The study area was divided into five survey units which correlated with the site areas. Arbitrary survey units were used as the sites areas are relatively small so landform based selection of survey units was not appropriate.

Survey coverage was very low to zero across the study area. This was due to dense grass, vegetation along the river, or areas of hardstand or development.

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<th>Survey Unit</th>
<th>Landform</th>
<th>Survey unit area (m²)</th>
<th>Visibility (%)</th>
<th>Exposure (%)</th>
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</table>
Figure 4: Overview of survey units (background © Google 2014 and © NSW LPI).

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Survey observations

Survey Unit 1

Survey Unit 1 comprises of Site 2 and is located along the western bank of the river from Punt Road to the southern approach of the current road bridge (Figure 5).

The survey unit is grassed with banking and ground surface modifications along the perimeter of Emu Hall and along Punt Road (Figure 6).

The section of Survey Unit 1 along Punt Road has been cut down to create the road down to the former ferry crossing. As a result any original topsoil which may have contained Aboriginal archaeological deposits has been removed.

Figure 5: Survey Unit 1
Figure 6: Northern Extent of Survey Unit 1 facing west looking up towards Emu Hall.

Figure 7: Facing south towards the raised area on which the former police station is located.

The original extent of the 2012 survey unit was below the 1:100 year flood level and was noted to have been subject to erosion and re-deposition as a result of powerful flood events with low archaeological potential. In June 2014 the study area was extended to include and area to the west up to the intersection with the Great Western Highway and including section of the Emu Hall and former Police Station properties adjacent to Punt Road. As a result the section of Survey Unit 1 above the 1:100 year flood line within the Emu Hall property and the former Police Station was assessed to have the potential to contain buried archaeological deposits (Figure 8). The area of PAD is located on a slightly raised terrace above the flood line and has had minimal disturbance at depth where the buried deposits are likely to be located. Punt Road and associated areas of disturbance have been excluded from the PAD.
Survey Unit 2

Survey Unit 2 comprises Site 1 which includes the site of the former Log Cabin Inn, Memorial Park and the former pumping station (Figure 9). The survey unit has been heavily modified with development dating back to 1827 when the Pineapple Inn was built where the Log Cabin Inn was to be later constructed. The pumping station was constructed in the early 1900s. The survey unit is heavily disturbed with zero ground surface visibility. At the time of the 2014 survey the site of the former inn was cordoned off and inaccessible due to asbestos removal as indicated by a sign on the fence (Figures 10 and 11).
Figure 9: Survey Unit 2

![Survey Unit 2 Diagram](image)

Legend:
- 1:100 Year Flood Level
- Proposed Construction

Survey Unit & Area
- SITE 2. 2.14 Ha
- TEMPORARY PIER: 0.03 Ha
- WATER ACTIVITIES N. 1.77 Ha
- WATER ACTIVITIES S. 1.46 Ha

Site 1

Figure 10: Site of the former Log Cabin Inn

![Site of the former Log Cabin Inn](image)
Survey Unit 3

Survey Unit 3 comprises of an existing car park at the top of the river bank at Regatta Park (Figure 12). There was no ground surface visibility across the survey unit. It is assumed that there was some ground levelling during car park construction.
Survey Unit 4

Survey Unit 4 consists of Site 4 and is within Watkin Tench Reserve (Figure 13). The survey unit is almost entirely within the 1:100 year flood level and is located on a gentle slope which extends to the steeper vegetated river bank (Figure 14). A small section of the survey unit extends up to the existing road across a slightly elevated landform unit which has been identified as an area of PAD (PSP PAD01) (Figure 15). A small section of the survey unit also extends down to the river through thick vegetation. There was no ground surface visibility within this survey unit.

Figure 13: Survey Unit 4
Figure 14: Up the gentle slope across Survey Unit 5, facing east.

Figure 15: Location of PSP PAD01 in relation to the study area
Survey Unit 5

Survey Unit 5 compromises of Site 3 which is located within Watkin Tench Reserve (Figure 16). The survey unit is located almost entirely within the 1:100 year flood level and is likely to have been affected by erosion and deposition resulting from powerful flood events. A small section of the survey unit extends down the river bank though a steep slope covered in thick vegetation (Figure 17). The survey unit has zero ground surface visibility due to grass and vegetation cover and leaf mulch obscuring tracks and pathways.

Figure 16: Survey Unit 5
Summary of results

The visibility across the study area was very poor with thick ground cover across most areas, apart from those sections of the study area such as Survey Unit 2 and 3 (Site 1 and car park) which have been disturbed by construction or laying of hardstand. The vast majority of the study area is within the 1:100 year flood level and is likely to have been impacted by powerful flood events. There are high levels of historical ground disturbance within Survey Units 1, 2 and 3.

No Aboriginal sites were identified during the site survey. One previously recorded area of PAD is located partially within Survey Unit 4 (Site 4). The PAD is limited to the elevated landform unit above the 1:100 year flood level. One newly recorded area of PAD is located partially within Survey Unit 1 (Site 2). The PAD is limited to the elevated landform unit above the 1:100 year flood level.

9.0 Analysis and discussion

Archaeological potential

Archaeological potential is closely related to the levels of ground disturbance in the area. Other factors are also taken into account when assessing archaeological potential, such as whether artefacts were located on the surface, and whether the area is within a sensitive landform unit according to the predictive statements for the area.

One of the key questions regarding archaeological potential bordering the Nepean River is the impact that powerful events would have had on deposit integrity.

Attenbrow (2002: 37) noted that the upper sandy deposit of the Cranebrook formation would likely be subject to intermittent stripping and replacement. Nanson et al (1987) demonstrated this activity by comparing the basal dates of the sandy deposit, showing that there was an unconformity in the basal age of that deposit likely due to periodic stripping and reworking in some parts of the Cranebrook Formation more than others. This process does not necessarily preclude the existence of intact
terminal Pleistocene or Holocene deposits, but does introduce the variable of impact to archaeological deposit from powerful flood events.

As part of the test excavation program at Pitt Town, AHMS (2006) tested the archaeological integrity of the Hawkesbury River bank. Transect PT11 was positioned on the river bank at an elevation of 10 metres. In comparison, site PT12, where securely dated terminal Pleistocene deposit was identified, was located at 24 metres AHD and approximately 160 metres from the river bank. Excavation at PT11 demonstrated that the soil layers consisted of recent alluvial deposits thought to have been affected by severe flood events over the last 150 years (AHMS 2006: 39).

AHMS (2006: 53) identified an association between artefact density and location relative to the 1:100 year flood level. The 1:100 year flood level at Pitt Town was 17.3 metres AHD, with test excavation results demonstrating significantly lower artefact densities below that level (1.4 artefacts per metre cubed), whilst above that level the average density was 29.84 per metre cubed. It is clear that the creek bank at Pitt Town (transect PT1) was located significantly lower than the 1:100 year flood level, and the soil layers and artefact density reflected that.

Some key characteristics of the current study area differ from the above example. Firstly, the river bank forms a natural levee, and as such is positioned much higher relative to the 1:100 year flood level than the river bank at Pitt Town. The 1:100 year flood level at Victoria Bridge is 26.1 metres AHD, compared with the highest part of the levee within the study area at 27 m.

A further example of archaeological investigations in the vicinity of the 1:100 year flood level is a recent test excavation program at Windsor. The excavations were conducted as part of the Windsor Bridge replacement project, which involved an investigation of both the north and south sides of the Hawkesbury River (Kelleher Nightingale Consulting [KNC] 2012). Test excavation was conducted at two identified PADs bordering the river. One PAD had been identified on the northern side of the river (AHIMS # 45-5-3580) across an area that was below the 1:100 year flood level at Windsor – 17.3 metres AHD. The second PAD (AHIMS # 45-5-3581) was identified on the southern side of the river within an area that extended both above and below the 1:100 year flood level.

Test excavation on the northern side of the river identified a very disturbed deposit. Disturbance was linked both to historical activities, including vegetation clearance and cultivation, and to flooding events. The location of PAD 45-5-3580 below the 1:100 year flood level meant that archaeological material was displaced amongst deep homogenous soils (KNC 2012: 12).

Test excavation on the southern side of the river identified an area of intact archaeological deposit on the upper slope of the creek bank above the 1:100 year flood level. An artefact bearing sand layer was identified beneath a layer of fill related to historical construction activities. It was suggested that the sand deposit was deposited by Aeolian depositional processes from a bordering dune (KNC 2012: 15).
Although there were significant levels of historical disturbance across the test area, it was still clear that the areas beneath the 1:100 year flood level were subject to more frequent flooding which had resulted in a mixed archaeological deposit. There was more likelihood of relatively intact archaeological deposit above the 1:100 year flood level, as demonstrated by the identification of the artefact bearing sand deposit (KNC 2012).

Previous archaeological investigations of the area indicate not only the frequency of artefact sites in the area, but also the possibility of sub-surface archaeological deposits. Sub-surface investigation close to the study area, but below the 1:100 year flood level (Silcox 1987) demonstrated the presence of archaeological material in a highly disturbed context. Investigations at Pitt Town demonstrated a strong correlation between artefact density/deposit intactness and the 1:100 year flood level. Although the crest of the natural levee bordering the Nepean is above the 1:100 year flood level, the levee is bordered directly on either side by lower deposits that would be prone to frequent flooding and stripping. Additionally, the study area has been subject to significant historical disturbance, meaning that the integrity of any remnant areas of potential in the vicinity may have been affected by both flood events and historical activities.

Overall, high levels of ground disturbance were observed across the current study area. The study area has been significantly affected by historical features, including Old Ferry Road, Punt Road, a car park, and the reinforcement of the steep river banks. Old Ferry Road and Punt Road were cut through the river bank, resulting in bordering embankment walls up to five metres high. Additionally, it was apparent during the field survey that fill has been used, predominantly at Old Ferry Road, to both bolster the road and embankment walls. Waste material, including concrete fragments, was observed in the embankment walls.

There was also the likelihood to have been significant disturbance to large portions of the study area from flood activity. Much of the study area consisted of steep river banks that would be susceptible to collapse during large flood events. The modification and reinforcement of the river banks with river gravels, sandstone blocks and concrete slabs, indicates the threat of bank collapse from large flood events.

The exception is the elevated landform along a section of Watkin Tench Reserve and at the western extent of Punt Road and surrounds, which is above the 1:100 year flood level and shows low levels of disturbance. These areas have been designated PADs and therefore have a high potential to contain Aboriginal objects.

10.0 Significance Assessment

Archaeological significance refers to the archaeological or scientific importance of a landscape, site or area. This is characterised using archaeological criteria such as archaeological research potential, representativeness and rarity of the archaeological resource and potential for educational values. These are outlined below:
• Research potential: does the evidence suggest any potential to contribute to an understanding of the area and/or region and/or state’s natural and cultural history?

• Representativeness: how much variability (outside and/or inside the subject area) exists, what is already conserved, how much connectivity is there?

• Rarity: is the subject area important in demonstrating a distinctive way of life, custom, process, land-use, function or design no longer practised? Is it in danger of being lost or of exceptional interest?

• Education potential: does the subject area contain teaching sites or sites that might have teaching potential?

The archaeological significance of the study area is assessed as being generally low due to the high levels of disturbance resulting from both historical activities and flood events. No Aboriginal sites have been identified within the study area. No particular areas of cultural significance were noted by DLALC during the site survey. The significance of the area of PAD (PSP PAD01 and PSP PAD02) are unknown. Sub-surface archaeological testing would be required to ascertain the nature of the archaeological deposit (if it is intact) and level of archaeological significance it has.

11.0 Impact assessment

No Aboriginal sites have been identified within the study area. Two areas of PAD (PSP PAD01 and PSP PAD02) were identified partially within Site 4, one of the proposed compound site locations and partially within Site 2 near Punt Road.

Site 1 and the Regatta Park car park were assessed as demonstrating low archaeological potential. The majority of Site 4 (within the 1:100 year flood level) was assessed as having a low archaeological potential. The majority of Site 2 along Punt Road and the river bank was assessed as having a low archaeological potential.

PSP PAD01 was assessed as having a high archaeological potential. The proposed access track into the compound site at Site 4 may impact on a section of the PAD. It is therefore recommended that Site 4 is avoided and not used as a compound site or as any type of ancillary facility. If Site 4 were to be utilised, subsurface impacts within the PAD area should be avoided.

PSP PAD02 was assessed as having a high archaeological potential. There are some minor works that may potentially impact the PAD including access road upgrades into the former Police Station and Emu Hall. If practicable all subsurface impacts within the PAD should be avoided.
12.0 Mitigation Measures

It is recommended that Site 4 is not utilised as the location of a compound site, or any ancillary facility. If subsurface impacts were proposed within PSP PAD01 at Site 4, further archaeological investigation in the form of test excavations would be required under Stage 3 PACHCI.

It is recommended that all subsurface impacts are avoided within PSP PAD02 within Site 2. If subsurface impacts cannot be avoided further archaeological investigation in the form of test excavations would be required under Stage 3 PACHCI.

As there are no other areas of archaeological potential, or any known Aboriginal sites within the study area there are no further mitigation measures required.

13.0 Recommendations

The following recommendations were based on consideration of:

- Statutory requirements under the National Parks and Wildlife Act 1974 as amended.
- The results of the background research, site survey and assessment.
- The interests of DLALC.
- The likely impacts of the proposal.

It was found that:

- No Aboriginal sites have been identified within the study area.
- One PAD (PSP PAD01) is located partially within the study area at Site 4.
- One PAD (PSP PAD02) is located partially within the study area at Site 2.
- Apart from the designated PADs, the rest of the study area was assessed as disturbed and demonstrating low archaeological potential and low archaeological significance.

It is therefore recommended that:

- There are no constraints on the proposal with regard to Aboriginal heritage at sites 1, 3, or the Regatta Park car park.
- It is recommended that Site 4 is avoided. If Site 4 were to be utilised, subsurface impacts within the PAD area should be avoided. If subsurface impacts were likely further archaeological investigation would be required in the form of archaeological test excavations under Stage 3 PACHCI.
• It is recommended that all subsurface impacts are avoided within PSPO PAD02. If subsurface impacts cannot be avoided further archaeological investigation in the form of test excavations would be required under Stage 3 PACHCI.

• If unexpected Aboriginal sites are located during construction the RMS Unexpected Archaeological Finds Procedure (2012) would be implemented.

If you have any queries regarding this assessment and recommendations, please do not hesitate to contact me.

Yours sincerely,

[Signature]

Dr Sandra Wallace

Director
Artefact Heritage

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14.0 References


Department of Environment, Climate Change & Water [now OEH] 2010 Code of Practice for Archaeological Investigation of Aboriginal Objects in New South Wales.


Jo McDonald CHM Pty Ltd. 2005. Archaeological salvage excavation of site CG1 (NPWS #45-5-2648), at the corner of Charles and George Streets, Parramatta, NSW. Report for Meriton Apartments Pty Ltd.


Jo McDonald CHM Pty Ltd. 2007. Archaeological investigation of the Oran Park Precinct in the South West Growth Centre, Camden, NSW. Report to APP.


24/7/2014

Lydia Hudson
Project Development Manager
27-31 Argyle St
Paramatta NSW 2150

Dear Lydia

Re: Preliminary assessment results for the Nepean River Green Bridge proposal based on Stage 1 of the Procedure for Aboriginal cultural heritage consultation and investigation (the procedure).

The project, as described in the Stage 1 assessment checklist, was assessed as being unlikely to have an impact on Aboriginal cultural heritage. The assessment is based on the following due diligence considerations:

- The project is unlikely to harm known Aboriginal objects or places.
- The AHIMS search did not indicate any known Aboriginal objects or places in the immediate study area.
- The study area does not contain landscape features that indicate the presence of Aboriginal objects, based on the Office of Environment and Heritage’s Due diligence Code of Practice for the Protection of Aboriginal objects in NSW and the Roads and Maritime Services’ procedure.
- The compound site will be in an existing site in a previously disturbed area.
- Note: In regards to the silcrete cobble that was identified during a separate investigation by Novarail, near Punt Road in June 2014. The find was assessed as “not an Aboriginal object” by the archaeologist consultant, Artefact. Therefore this find does not require any further investigation.

Your project may proceed in accordance with the environmental impact assessment process, as relevant, and all other relevant approvals.

If the scope of your project changes, you must contact me and your regional environmental staff to reassess any potential impacts on Aboriginal cultural heritage.

If any potential Aboriginal objects (including skeletal remains) are discovered during the course of the project, all works in the vicinity of the find must cease. Follow the steps outlined in the Roads and Maritime Services’ Unexpected Archaeological Finds Procedure.

For further assistance in this matter and do not hesitate to contact me.

Yours sincerely

[Signature]

Mark Lester
Aboriginal Cultural Heritage Officer – Sydney Region