Wahroonga Adventist School: Aboriginal Cultural Heritage Impact Assessment

Prepared by Australian Museum Business Services
for Stanton Dahl Architects

Final report

February 2013

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1 Introduction

1.1 Preamble

Australian Museum Business Services (AMBS) has been commissioned by Stanton Dahl Architects, on behalf of Seventh Day Adventist Church, Greater Sydney Conference, to prepare an Aboriginal cultural heritage impact assessment for the Wahroonga Adventist School. AMBS prepared the Heritage Impact Assessment for the Wahroonga Estate Redevelopment (AMBS 2009), and this assessment will update and expand existing documentation for the current project, and form part of the Development Application (DA) for submission to the Department of Planning & Infrastructure.

The Director General's Environmental Assessment Requirements (DGRs) issued on 6 September 2012 for the Wahroonga Adventist School Application No. SSD 5535 includes the following:

> *11. Aboriginal Heritage*
> *The EIS shall address Aboriginal Heritage in accordance with the Draft Guidelines for Aboriginal Cultural Heritage Impact Assessment and Community Consultation 2005 and Aboriginal Cultural Heritage Consultation Requirements for Proponents, if relevant.*

This report has been prepared to address the DGRs as appropriate supporting documentation to the current application.

1.2 Study Area & Proposed Development

The study area comprises the Wahroonga Adventist School, Fox Valley Road, Wahroonga. The study area covers approximately 14,000m^2 within the Wahroonga Estate Redevelopment site, of which 6,950m^2 is proposed for playing fields, and the remaining 7,050m^2 for school buildings. A proposed road reserve is also included as part of the study area (Figure 1.1).

1.3 Methodology

This report is broadly consistent with the principles of the Burra Charter (*The Australia ICOMOS charter for the conservation of places of cultural significance*). It has been prepared in accordance with current heritage best practice, the DGRs, and the requirements of the Office of Environment and Heritage, Department of Premier & Cabinet (OEH; formerly the Department of Environment, Climate Change and Water [DECCW] and Heritage Branch, Department of Planning) guidelines as specified in the *Draft Guidelines for Aboriginal Cultural Heritage Impact Assessment and Community Consultation* (DEC 2005).

The key heritage requirements for this project are:

- identification of any Aboriginal heritage sites present within the study area;
- assessment of the Aboriginal heritage values of the study area; and
- provision of recommendations for the management of Aboriginal heritage resources in the study area.

To fulfil the requirements of the project, the following tasks were undertaken:

- consultation with the Metropolitan Local Aboriginal Land Council (MLALC), as per the *Draft Guidelines for Aboriginal Cultural Heritage Impact Assessment and Community Consultation* (DEC 2005);
- search and review of the OEH Aboriginal Heritage Information Management System (AHIMS) database, to determine the location and nature of any Aboriginal heritage sites recorded within, or in the vicinity of, the study area;

- review of relevant previous archaeological reports specific to the area, to determine the extent of past archaeological research in the region;
- review of relevant contextual environmental information and previous land use history;
- preparation of a predictive model for Aboriginal archaeological sites within the local area;
- a site inspection undertaken by an AMBS archaeologist to confirm the results of the background review and the predictive model; and
- preparation of a report describing the results of the background research, the extent and significance of any Aboriginal heritage items recorded in the study area, and management recommendations and mitigation measures for any Aboriginal heritage resources, including constraints and opportunities.

1.3.1 Aboriginal Consultation

The DGRs for this assessment require consultation with the Local Aboriginal Land Council, as per the *Draft Guidelines for Aboriginal Cultural Heritage Impact Assessment and Community Consultation* (DEC 2005). As such, the Metropolitan Local Aboriginal Land Council (MLALC) was notified of the project on 30 November 2012 and asked to identify any Aboriginal cultural heritage significance or sensitivity for the study area (see letter attached in Appendix A). Further, a copy of this draft report was sent to MLALC for review and comment on 10 January 2013. No responses have been received within the feedback period, as at 7 February 2013.

1.4 Authorship

This report has been prepared by AMBS Project Officer Jenna Weston. AMBS Senior Project Manager Jennie Lindbergh reviewed the report for quality and consistency.

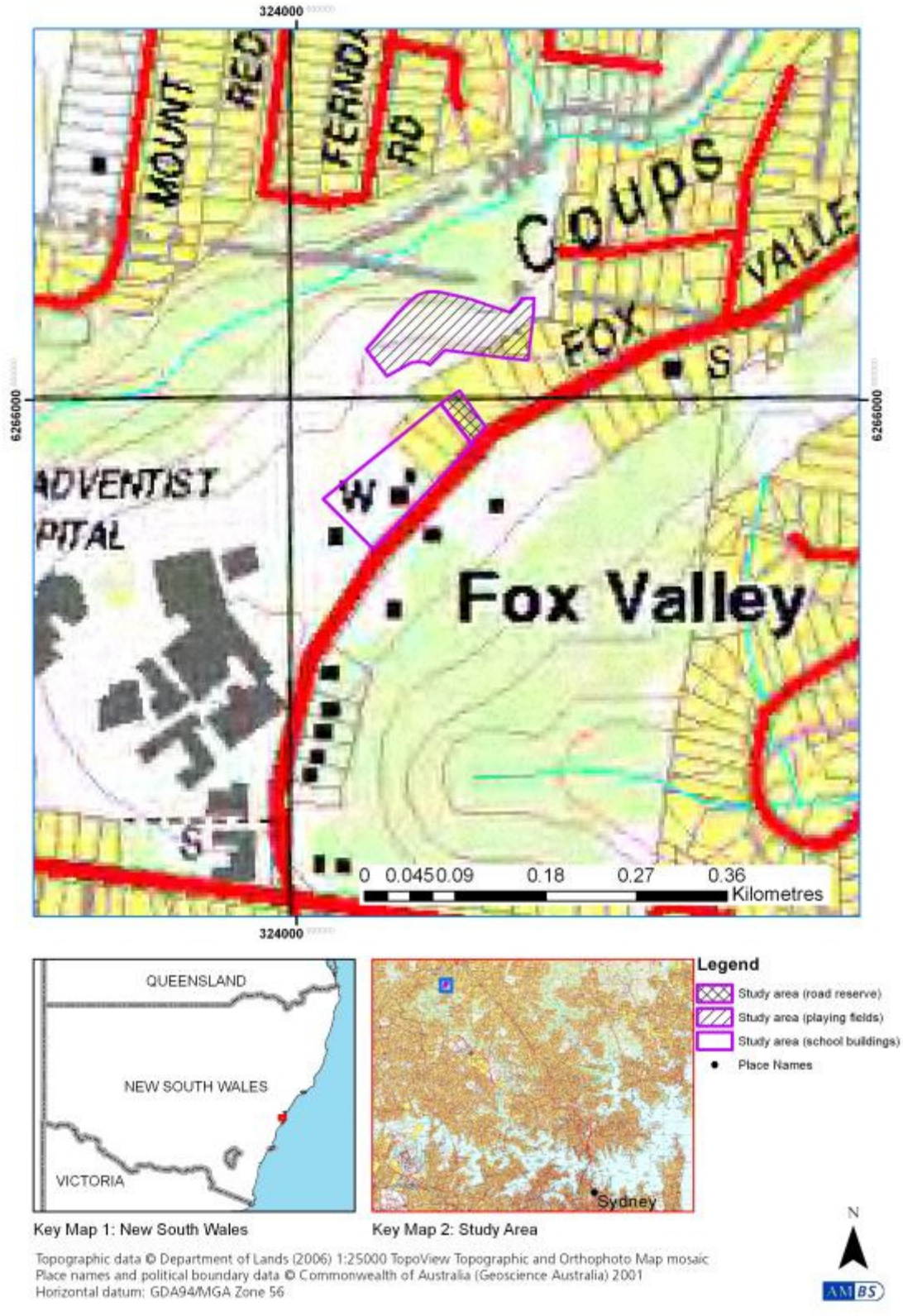

Figure 1.1 Location of the study area.

2 Environmental Context

An understanding of environmental factors within the local landscape provides a context for past human occupation and history of an area. The analysis of environmental factors contributes to the development of the predictive modelling of archaeological sites, but it is also required to contextualise archaeological material and to interpret patterns of past human behaviour. In particular, the nature of the local landscape including topography, geology, soils, hydrology and vegetation are factors which affect patterns of past human occupation. Current land use practices have the potential to affect the visibility of archaeological material; they may obscure, or expose archaeological sites. In addition, previous disturbances may have also exposed archaeological material, such as excavation for dams or other ground disturbance. It is important that such factors are also considered in making assessments of archaeological resources in an area and understanding the distribution of observed sites.

2.1 Geology, Soils & Topography

The study area is underlain by Triassic Wianamatta Group Shales which comprise the Liverpool Sub-Group of Minchinbury Sandstone and Bringelly and Ashfield Shales (1:250,000 Geological Series Sheet S1 56-5 Sydney). This geological landscape consists of shale with some sandstone beds, and does not generally result in stone outcroppings suitable as surfaces for art (such as engraving and drawing/painting), sharpening stone axes/tools or artefact manufacture, or as shelters for camping. As such, rock engravings/art sites, axe grinding grooves, shelter and quarry sites are highly unlikely to be present in the study area.

The Fox Valley/Wahroonga area is located on the southern edge of the Hornsby Plateau, which is c.200-220 metres in elevation. It has narrow ridges (200-300m) and hillcrests which grade into moderate to steep sideslopes and narrow drainage lines (80-100m elevation). Aboriginal occupation was often focussed on prominent landforms such as ridges, which were favourable locations for camping and travelling, and from which surrounding plant and animal resources could be viewed. However, the main ridgeline in this area is along Fox Valley Road, and as such no evidence of previous Aboriginal occupation is expected to remain. The surrounding slopes are quite steep and therefore unfavourable for camping or extensive travelling, and hence are also considered unlikely to contain evidence of Aboriginal occupation.

The playing fields part of the study area is located on the colluvial Hawkesbury Soil Landscape (Figure 2.1). These soils comprise shallow (>50cm), discontinuous lithosols; siliceous sands associated with rock outcrop; earthy sands, yellow earths and some yellow podzolic soil on the inside of benches and along joints and fractures; localised yellow and red podzolic associated with shale lenses; and siliceous sands and secondary yellow earths along drainage lines. Limitations of the soil include extreme soil erosion and mass movement (rock fall) hazards, steep slopes and rock outcrops. The soil is shallow, stony ad highly permeable, with low soil fertility (Chapman & Murphy 1989:44).

The majority of the educational establishment and proposed road reserve is located on the erosional Glenorie Soil Landscape (Figure 2.1). These soils comprise shallow to moderately deep (<100cm) red podzolic soils on crests; moderately deep (70-150cm) red and brown podzolic soils on upper slopes; deep (>200cm) yellow podzolic soils on lower slopes; and humic gleys, yellow podzolic soils and gleyed podzolic soils along drainage lines. Limitations of the soil include high soil erosion, localised impermeable highly plastic subsoil, and moderate reactivity (Chapman & Murphy 1989:68).

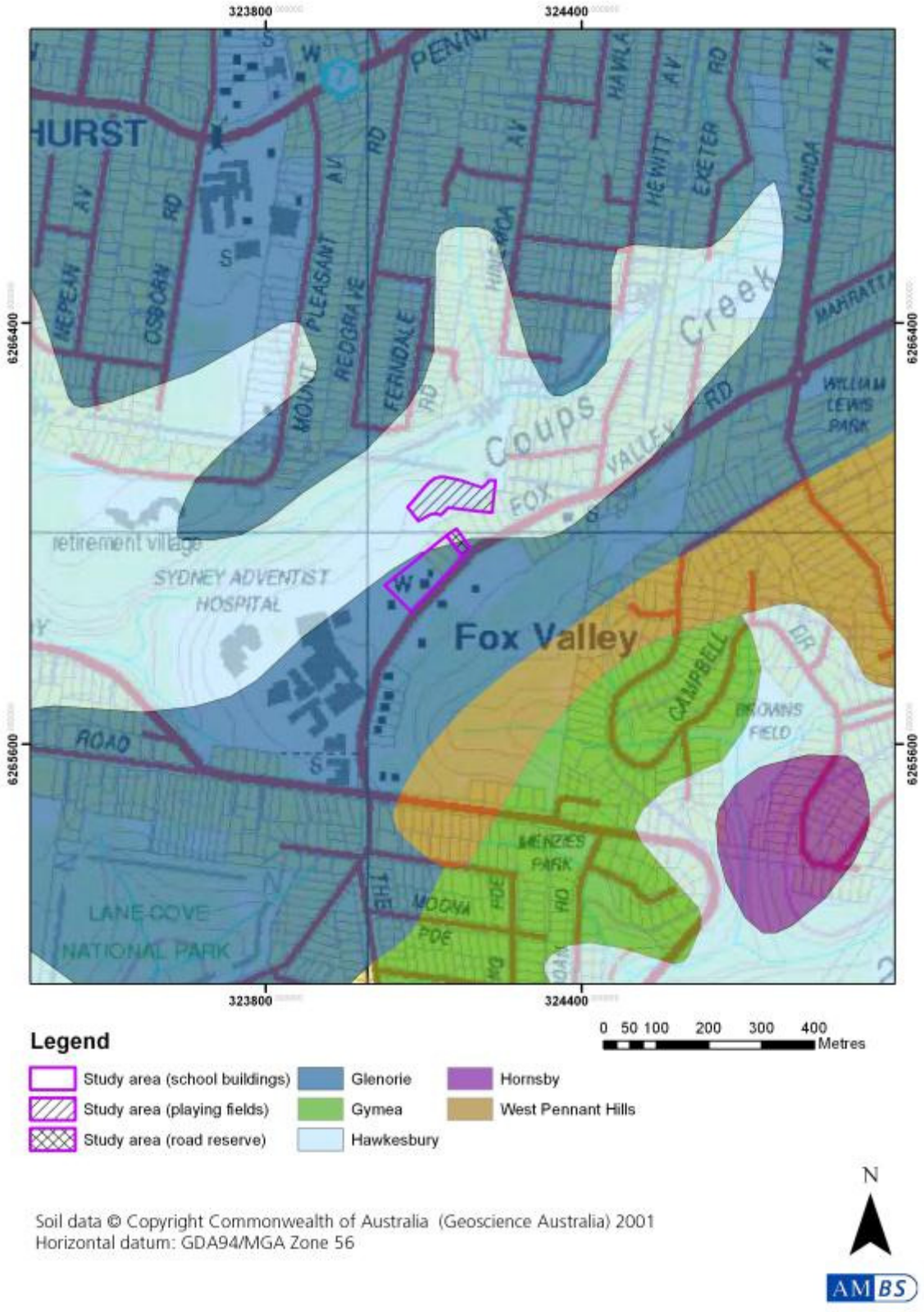

Figure 2.1 Soils within the study area.

2.2 Hydrology and Drainage

Coups Creek, a second-order tributary of the Lane Cove River, is located approximately 40m north west of the study area. Several first- and second-order tributaries and creek are also present in the general vicinity of the study area. The Lane Cover River begins c.1.3km south of the study area,

widening c.6.5km to the south east. In short, the area is well-drained, with ample water to have supported Aboriginal occupation. As such, occupation sites including open stone artefact scatters, and shelters with occupation deposits, may occur within the study area. However, coastal and riverine areas (the Parramatta River located c.10km to the south and the coast c.18km to the east) would have been most frequently occupied for their water and marine food resources.

2.3 Vegetation

The native vegetation of the Wahroonga area would have comprised open forest and open woodland schlerophyll communities, dominated by Sydney blue gum (*Eucalyptus saligna*), blackbutt (*E. pilul*aris), red bloodwood (*E. gummifera*), scribbly gum (*E. haemostoma*), stringybark (*E. oblonga* and *E. capitellata*) and banksia (Benson 1980). The majority of the study area has been cleared for development. Although there are some small sections of urban bushland with mature native vegetation on the edges of the study area, these are unlikely to be remnant trees, and thus it is unlikely that scarred or carved trees would be present.

2.4 Land Use and Disturbance

The study area and its surrounds have been used for various purposes, including health, aged care, education and religion, in addition to the construction of roads, a temporary hardstand car parking lot, and other associated infrastructure. In addition, recent activities on site associated with the redevelopment have also had an impact. As such, there has been a history of European use and disturbance to the original ground surface, which will have impacted upon the integrity of any Aboriginal sites that were present in the study area.

3 Archaeological Context

This chapter describes the nature of the known Aboriginal archaeology of the study area, based upon a review of relevant archaeological reports and publications, and a search and review of previously recorded sites in the OEH AHIMS. This review and discussion allows for the development of a predictive model for potential Aboriginal sites within the study area, and establishes context for a comparative significance assessment. Summary descriptions of site types are provided in Table 3.1.

Table 3.1 Summary descriptions of Aboriginal site types referred to in this report.

Site Type	Details
Open camp sites/ stone artefact scatters/ isolated finds	Open camp sites represent past Aboriginal subsistence and stone knapping activities, and include archaeological remains such as stone artefacts and hearths. This site type usually appears as surface scatters of stone artefacts in areas where vegetation is limited and ground surface visibility increases. Such scatters of artefacts are also often exposed by erosion, agricultural events such as ploughing, and the creation of informal, unsealed vehicle access tracks and walking paths. These types of sites are often located on dry, relatively flat land along or adjacent to rivers and creeks. Camp sites containing surface or subsurface deposit from repeated or continued occupation are more likely to occur on elevated ground near the most permanent, reliable water sources. Flat, open areas associated with creeks and their resource-rich surrounds would have offered ideal camping areas to the Aboriginal inhabitants of the local area. Isolated finds may represent a single item discard event, or be the result of limited stone knapping activity. The presence of such isolated artefacts may indicate the presence of a more extensive, in situ buried archaeological deposit, or a larger deposit obscured by low ground visibility. Isolated artefacts are likely to be located on landforms associated with past Aboriginal activities, such as ridgelines that would have provided ease of movement through the area, and level areas with access to water, particularly creeks and rivers.
Middens	Shell middens result from Aboriginal exploitation and consumption of shellfish, in marine, estuarine or freshwater contexts. Middens may also include faunal remains such as fish or mammal bone, stone artefacts, hearths, charcoal and occasionally, burials. They are usually located on elevated dry ground close to the aquatic environment from which the shellfish has been exploited and where fresh water resources are available. Deeper, more compacted, midden sites are often found in areas containing the greatest diversity of resources, such as river estuaries and coastal lagoons.
Scarred trees	Tree bark was utilised by Aboriginal people for various purposes, including the construction of shelters (huts), canoes, paddles, shields, baskets and bowls, fishing lines, cloaks, torches and bedding, as well as being beaten into fibre for string bags or ornaments. The removal of bark exposes the heart wood of the tree, resulting in a scar. Over time the outer bark of the tree grows across the scar (overgrowth), producing a bulging protrusion around the edges of the scar. Trees may also have been scarred in order to gain access to food resources (e.g. cutting toe-holds so as to climb the tree and catch possums or birds), or to mark locations such as tribal territories. The locations of scarred trees often reflect historical clearance of vegetation rather than the actual pattern of scarred trees. Unless the tree is over 150 years old, scarring is not likely to be of Aboriginal cultural origin; therefore, these sites most often occur in areas with mature, remnant native vegetation.
Axe grinding grooves	Grinding grooves are the physical evidence of tool making or food processing activities undertaken by Aboriginal people. The manual rubbing of stones against each other creates grooves in the rock, which are usually found on flat areas of soft rock such as sandstone, in areas of creek beds and other water sources. They are often associated with rock pools in creek beds and on platforms to enable the wet-grinding technique.
Quarries	Aboriginal quarry sites are sources of raw materials, primarily for the manufacture of stone tools, but also for ochre procurement. They are only found where raw materials (stone or ochre) occur within the landscape, and where these have been exploited in the past. Such sites are often associated with stone artefact scatters and stone knapping areas. Loose or surface exposures of stone or cobbles may be coarsely flaked for removal of portable cores. Raw materials can be sourced to these sites and provide evidence for Aboriginal movement and/or exchange.
Rock engravings	Rock engravings are a type of Aboriginal art, and are often located on high vantage points along ridge lines at the headwaters of creeks, but can be located on any suitable fine grained stone surface.

Shelter sites with art (engraving, painting or drawing) or occupation deposit	These are art or occupation sites located in areas where suitable rock outcrops and surfaces occur, where weathering has resulted in suitable overhangs or recesses in boulder outcrops or cliff-lines.
Bora/ceremonial	Aboriginal ceremonial sites are locations that have spiritual or ceremonial values to Aboriginal people. Aboriginal ceremonial sites may comprise natural landforms and, in some cases, will also have archaeological material. Bora grounds are a ceremonial site type, usually consisting of a cleared area around one or more raised earth circles, and often comprised two circles of different sizes, connected by a pathway, and accompanied by ground drawings or mouldings of people, animals or deities, and geometrically carved designs on the surrounding trees. Unfortunately, the raised earth features are easily destroyed by agricultural and pastoral activities, vegetation growth and exposure to weather.
Stone arrangements	Stone arrangements usually consist of geometric arrangements of portable stone on prominent rock outcrops, such as vantage points along escarpments where other key landmarks are visible. Some stone arrangements also include circles and pathways. They are thought to be ceremonial in nature, and may have also sometimes been used for corroborees (dances), fights or judicial meetings. Stone arrangements are often isolated from known camp site areas.
Natural mythological (ritual) sites	These types of sites are usually identified by the local Aboriginal community as locations of cultural significance, and they may not necessarily contain material evidence of Aboriginal associations with the place.
Carved trees	Carved trees generally marked areas for ceremonial purposes, or the locations of graves.
Burial sites	Aboriginal burial of the dead often took place relatively close to camp site locations. This is due to the fact that most people tended to die in or close to camp (unless killed in warfare or hunting accidents), and it is difficult to move a body long distances. Soft, sandy soils on, or close to, rivers and creeks allowed for easier movement of earth for burial; and burials may also occur within rockshelters or middens. Aboriginal burial sites may be marked by stone cairns, carved trees or a natural landmark. Burial sites may also be identified through historic records, or oral histories.
Contact/ historical sites	These types of sites are most likely to occur in locations of Aboriginal and settler interaction, such as on the edge of pastoral properties or towns. Artefacts located at such sites may involve the use of introduced materials such as glass or ceramics by Aboriginal people, or be sites of Aboriginal occupation in the historical period.

3.1 Regional Archaeological Context

At the time of European settlement, the Aboriginal people of the Sydney region lived in local clans. Groups local to the study area are likely to have belonged to the Darug (Dharug) language groups (Attenbrow 2010:23,32).

Aboriginal occupation of the Sydney region is likely to have spanned at least 20,000 years, although dates of more than 40,000 years have been claimed for artefacts found in gravels of the Cranebrook Terrace on the Nepean River (Nanson et al. 1987; Stockton 1993; Stockton & Holland 1974). Late Pleistocene occupation sites have been identified on the fringes of the Sydney basin and from rock shelter sites in adjoining areas. Dates obtained from these sites were 14,700 years Before Present (BP) at Shaws Creek in the Blue Mountain foothills (Kohen et al. 1984), c.11,000 BP at Loggers Shelter in Mangrove Creek (Attenbrow 1981, 2004), and c.20,000 BP at Burrill Lake on the South Coast (Lampert 1971). The majority of sites in the Sydney region, however, date to within the last 3,000 to 5,000 years, with many researchers proposing that occupation intensity increased from this period (Kohen 1986; McDonald 1994; McDonald & Rich 1993). This increase in sites may reflect an intensity of occupation which was influenced by rising sea levels, which stabilised approximately 6,500 years ago. Older occupation sites along the now submerged coastline would have been flooded, with subsequent occupation concentrating on and utilising resources along the current coastlines and in the changing ecological systems of the hinterland (Attenbrow 2010).

3.2 Local Archaeological Context

3.2.1 Site Types

A search of the AHIMS database was undertaken on 19 November 2012 (AHIMS ID 85576), and 101 registered Aboriginal sites are identified within approximately 5km of the study area. The search results are presented in Figure 3.1 and summarised in Table 3.2.

Table 3.2 Summary of Aboriginal sites previously recorded near the study area (data obtained from AHIMS search [ID: 85576] on 19/11/12).

Site types	Count	Percentage
Rock engraving	29	33.5%
Shelter with art	21	22%
Shelter with deposit	18	17%
Axe grinding groove	15	14%
Shelter with art & deposit	6	5.5%
Isolated find	4	2%
Axe grinding groove, rock engraving	3	3%
Open camp site	1	1%
Scarred tree	1	1%
Shelter with PAD	1	1%
Axe grinding groove, water hole/well	1	1%
Not an Aboriginal site	1	1%
Total	**101**	**100%**

No Aboriginal sites are registered within the study area. The closest site to the study area is shelter with deposit approximately 400m south west of the study area (AHIMS Site #45-6-2040). The most common sites previously recorded in the local area are rock engravings, shelters with art, shelters with archaeological deposit, and axe grinding grooves. These sites are associated with the formation of the Hawkesbury Sandstone in this area, as it outcrops in platforms and shelters which were used by Aboriginal people for these purposes. Apart from engravings, shelter sites and axe grinding grooves, there are a small number of stone artefacts located in the open, and one scarred tree within 5km of the study area.

3.2.2 Previous Archaeological Investigations

There have been several archaeological investigations in the general vicinity of the study area. The majority of these studies are summarised in Appendix B, while the investigations that are most relevant to the study area are outlined in the following paragraphs. Archaeological assessments within c.3-4km of the study area have tended to find little or no evidence of Aboriginal occupation (AMBS 1995; Appleton 2001a; Brayshaw 1999; Brayshaw & Associates 1984; Clegg & Crew 1997; Corkill 1996; Cosmos Archaeology 2004; Haglund 1985, 1997; Jackson 2011; Mills 1999; Navin Officer 2005; RTA 1995; Smith 1987a; Tacon 1995). However, this is likely to be a reflection of the early urban development of the inland area of North Sydney (including Wahroonga) which would have precluded the preservation of sites and the necessity for archaeological assessment, rather than an indication of less intense Aboriginal occupation of the area. Further, within the Hornsby Shire it has been found that many sites have been destroyed by previous development (with the current study area identified as developed), that sites within reserves can be subjected to severe impact (for example the destruction of art by graffiti), and that sites within areas of residential development are likely to have been heavily impacted (Koettig 1996:58).

In addition, excavations within 5-6km of the study area, particularly in the Pennant Hills/Cherrybrook area, have revealed substantial Aboriginal occupation deposits, specifically within rockshelters. Stone artefacts tend to be manufactured predominantly of quartz and silcrete, with a much lesser use of materials like mudstone, chert, quartzite and fine-grained siliceous stone. Evidence

of use of the bipolar stone knapping technique is most commonly found in addition to microlithic/Bondaian technology (Greer 1985; Haglund 1995; McDonald 1985a; McDonald & Brayshaw 1984; NPWS 1990).

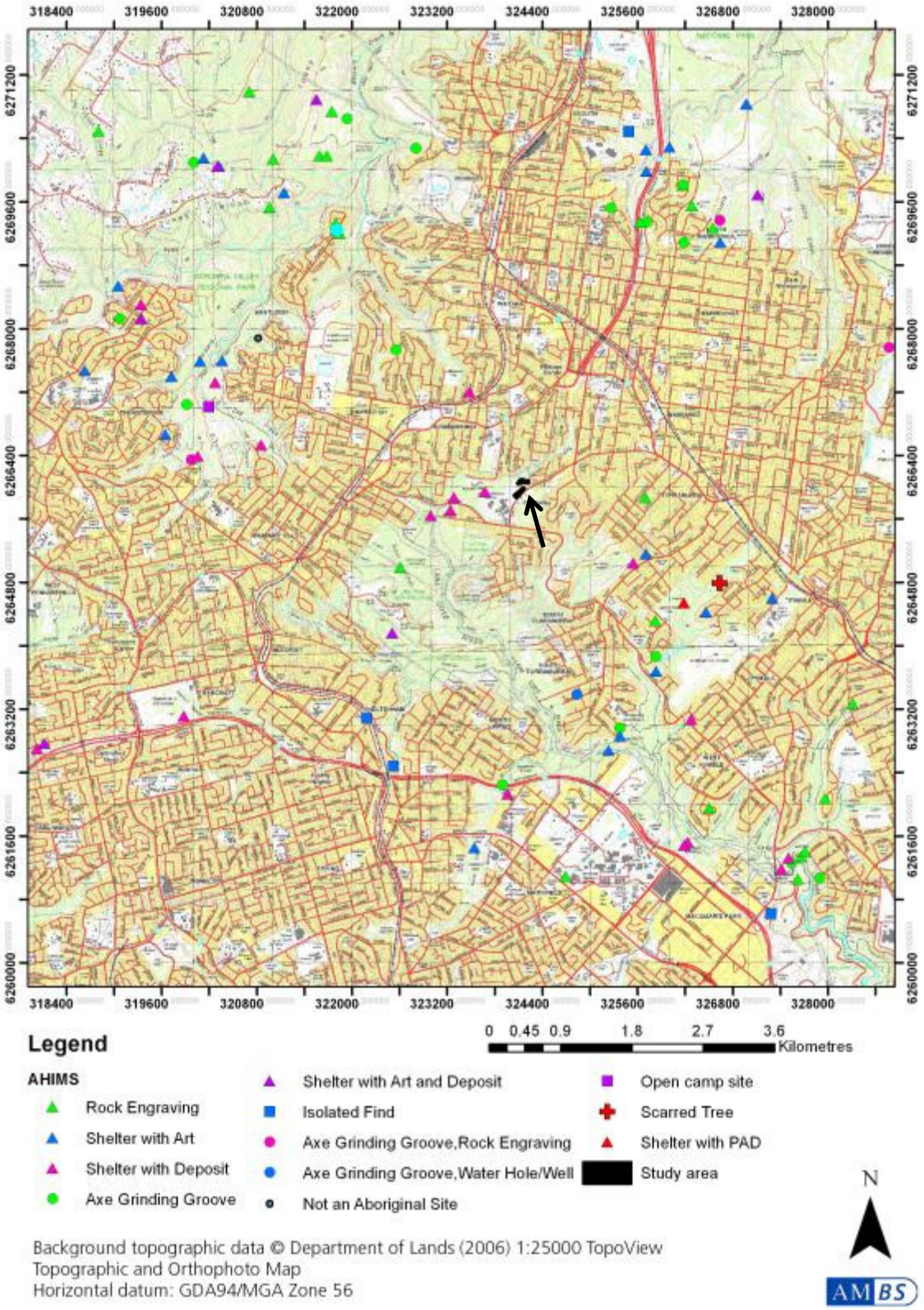

Figure 3.1 AHIMS sites in the vicinity of the study area (study area arrowed; data obtained from AHIMS search [ID: 85576] on 19/11/12).

In 1989-90, Attenbrow undertook Stage 1 of the Port Jackson Archaeological Project, which involved documentary research on previous archaeological work done in the catchment, detailed recording of registered sites and some field survey of areas where no sites had been registered. Stage 2 involved further research of regional issues through excavation of certain sites. During Stage 1 of this project, Attenbrow recorded the four sites which are registered in closest proximity to the study area (four shelters with deposit c.400m-1.1km south west of the study area; Figure 3.1). Overall, Attenbrow classified six sites as having excellent research potential, 48 as having good potential, and 151 as having poor to nil potential. Each of the four sites closest to the study area was considered to have poor to nil potential for further research or excavation.

AMBS (2009) surveyed the Sydney Adventist Hospital site proposed for redevelopment, which included the current study area. No new sites were identified, although the location of the previously recorded AHIMS Site #45-6-2040 was confirmed. AMBS concluded that the creekline with areas of sandstone outcrop had Aboriginal heritage sensitivity, but would be preserved because no development was proposed in this area. No sites or areas of archaeological sensitivity were identified within the current study area.

Cosmos Archaeology assessed a section (Precinct 6) of the abandoned B2-B3 Freeway corridor, which was proposed for rezoning from "County Road Reservation", to allow residential development for the Wahroonga Estate in accordance with the May 2004 Master Plan. This area is located c.160m to the south east of the current study area (see Figure 3.2). Cosmos Archaeology's survey area comprised a 5.244ha "strip of uncleared, relatively steep terrain, traversing the middle and lower slopes of a western flowing creek gully" (2004:ii). No sites were identified during the survey, and the area was assessed as having low archaeological sensitivity and potential, given the site patterning of the Ku-ring-gai area and the topography of the study area, which comprised "steep terrain underlain by Wianamatta Shales and 'poor quality' Hawkesbury Sandstone and access only to an ephemeral watercourse" (Cosmos Archaeology 2004:iv).

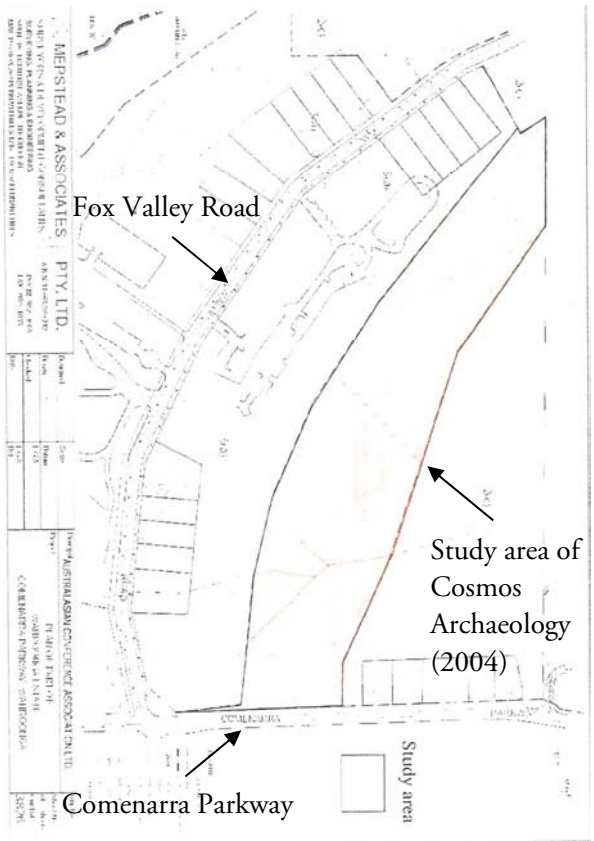

Figure 3.2 Location of Cosmos Archaeology's study area (2004:Figure 1.2).

Apart from the Port Jackson Archaeological Project, several regional studies have been undertaken in the vicinity of the study area (see Koettig 1996; McDonald 1985b, 1987, 1990, 1994; NPWS 1990). Koettig undertook a study of Aboriginal heritage sites in the Hornsby LGA in 1996, McDonald carried out the Sydney Basin Rock Art Project, over several years, for the National Parks & Wildlife Service (NPWS, now OEH) and as part of her doctoral research, and NPWS completed an Aboriginal Sites Planning Study for the Lane Cove River State Recreation Area in 1990.

A study of the Sydney region reveals that Aboriginal sites are distributed across the whole range of physiographic units and environmental zones, although certain types of sites may be more frequently associated with certain parts of the landscape (for example, shelter sites are particularly common in areas of Hawkesbury Sandstone), and different parts of the landscape contain different resources, which may be seasonally available or highly localised (Koettig 1996). Hence, although no middens are registered on the AHIMS within 5km of the current study area, they are common in the Port Jackson region around the shores of bays, rivers, harbours and the coast, in areas where shellfish are available. Accordingly, Attenbrow noted that the Port Jackson archaeological record is different to that of the Cumberland Plain, partly because of the different resources in these areas (1990:30). Attenbrow found, from a review of excavation work in the Port Jackson area, that Aboriginal people were living around the harbour foreshores gathering shellfish at least 4,500 years ago, that the number and species of shellfish represented in middens varied according to distance from the harbour mouth, and that a change from exploitation of predominantly cockle (*Anadara trapezia*) to predominantly oysters *Saccostrea commercialis*) appears to have occurred over time in this region (ibid.). She also found that most middens are located within 10m of the high water level, and that burials were placed in open middens as well as in middens within rockshelters. In the same year, the NPWS (1990) observed that regional excavations of coastal sites with midden layers indicated the exploitation of a variety of sea and land resources.

It should also be recognised that the archaeological evidence within any particular site can vary considerably in quantity and the range of evidence present, and that the number of sites or amount of archaeological evidence found in any specific area varies. Further, the distribution of presently recorded sites in some areas is unlikely to be indicative of the original distribution of Aboriginal sites and therefore may not be a reliable guide to the occupation history of that area (Koettig 1996). Accordingly, without professional archaeological assessment of an area, the sites most likely to have been recorded are those which are most obvious to non-professionals, such as rockshelters and art sites. For example, Table 3.3 shows the distribution of sites that had been recorded in the Hornsby Shire (adjacent to the Ku-ring-gai LGA) in 1996.

Nevertheless, Hawkesbury Sandstone does outcrop in and underlie the local area of Hornsby/Ku-ring-gai (although the small area of the current study area does not have underlying sandstone). Therefore, it may be expected that occupation deposits will most frequently be found in rockshelters, and that art (including engravings) and axe grinding grooves will be present in the general area as it contains the appropriate resources (sandstone). Further, the Sydney Basin Rock Art Project revealed that most shelters with art are located on hilltops (with some found on valley bottoms and ridgetops), approximately a quarter of shelter with art sites are associated with known archaeological deposit, most rock engravings are located on horizontal sandstone exposures on ridgetops or slopes (or occasionally in valleys), and approximately 13% of rock engravings are associated with axe grinding grooves (McDonald 1985b, 1987, 1990, 1994). However, it should be noted that some sites cannot be detected through inspection of the ground surface or rock surfaces alone, and that shelters without visible occupation deposit may be sites (Koettig 1996:57).

It is recognised that, although sites may be found in all topographic units and in all parts of the landscape, the areas with particularly high archaeological sensitivity within this region are the estuarine

foreshore, creeklines with sandstone beds, sandstone platforms/outcrops larger than 5m^2, sandstone cliffline or isolated boulders more than 2m high, and creek flats on sandstone, alluvium or shale (Koettig 1996:57, 75). Despite the high level of disturbance that has occurred generally within the region, and particularly within the majority of the current study area, many sites (or parts of them) are often in relatively good condition, and sites close to (as opposed to within) residential development can survive well (Koettig 1996:58).

Table 3.3 Aboriginal sites recorded in the Hornsby Shire in 1996 (Koettig 1996:Table 6).

Site Type	Number Present	Percentage
Rock engravings	81	34%
Shelters with art	58	25%
Axe grinding grooves	25	11%
Rock engravings associated with axe grinding grooves	13	5%
Shelters with deposit	12	5%
Shelters with midden	10	4%
Shelters with art & midden	7	3%
Open middens	6	2.5%
Shelters with art & rock engravings	5	2%
Rock engravings associated with middens	4	2%
Stone arrangements	2	1%
Open stone artefact scatters	2	1%
Shelters with deposit & axe grinding grooves	2	1%
Shelters with deposit & rock engravings	2	1%
Shelters with midden & axe grinding grooves	1	0.5%
Carved trees	1	0.5%
Rock engravings associated with middens & axe grinding grooves	1	0.5%
Shelters with art & deposit	1	0.5%
Shelters with isolated finds	1	0.5%
Total	**234**	**100%**

3.3 Aboriginal Heritage Site Prediction Modelling

On the basis of the registered archaeological sites in the region and the review of previous archaeological studies, the following conclusions can be drawn regarding the potential presence and location of Aboriginal heritage sites within the landscape of the study area:

- rock engravings/art, shelter sites with art and/or occupation deposit, and axe grinding grooves are the most common site type occurring across the landscape. However, the current study area lacks suitable stone outcrops, and is therefore highly unlikely to contain such sites;
- open stone artefact sites are the most likely site type to occur within the study area, but are likely to represent low density background scatter associated with the nearby creek, rather than extensive or frequent occupation. Further, previous disturbance will have impacted the integrity of any such sites within the study area;
- although there are some small sections of urban bushland with mature native vegetation on the edges of the study area, these are unlikely to be remnant trees, and thus it is unlikely that scarred or carved trees are present;
- stone quarry sites are highly unlikely to be found in the study area because of the lack of suitable stone outcrops;
- midden deposits are highly unlikely to be found within the study area, as the creeklines do not appear to support shellfish; and
- burials and ceremonial sites (including stone arrangements and bora grounds) are highly unlikely to be present in the area given the previous disturbance and the lack of shelter outcrops and middens.

4 Conclusion & Recommendations

There are no registered Aboriginal heritage items within the study area. The original survey for the Wahroonga Estate Development, undertaken on 19 June 2008 by AMBS archaeologists Christopher Langeluddecke and Jenna Weston, accompanied by Aboriginal community representatives (listed in Table 5.1 in the AMBS 2009 report), did not identify any Aboriginal sites or areas of archaeological sensitivity within the current study area. Given the results of this previous survey, the predictive model for the local area, the underlying geology and the level of disturbance resulting from previous surrounding development, it is not considered that there is any archaeological potential for intact or substantial Aboriginal heritage deposits within the study area. Further, no Aboriginal cultural issues or sensitivities were identified for the study area during the previous assessment (AMBS 2009), or during the current round of consultation with MLALC. As such, there are no Aboriginal heritage constraints for the development of the study area.

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Appendix A

Aboriginal consultation letters

AMBS Reference: 1201069

30 November 2012

Australian museum
BUSINESS SERVICES

Paul Morris
Metropolitan Local Aboriginal Land Council
PO Box 1103
Strawberry Hills NSW 2012
Sent by email to metrolalc@metrolalc.org.au

Dear Paul

Wahroonga Adventist School:
Preliminary Aboriginal Heritage Assessment

Australian Museum Business Services has been commissioned by Stanton Dahl Architects, on behalf of Seventh Day Adventist Church, Greater Sydney Conference, to prepare a preliminary Aboriginal heritage assessment for the Wahroonga Adventist School. AMBS prepared the Heritage Impact Assessment for the Wahroonga Estate Redevelopment (AMBS 2008), as supporting documentation to the Part 3A application. The preliminary Aboriginal heritage assessment will update and expand existing documentation for the current project, and form part of the Development Application (DA) for submission to the Department of Planning & Infrastructure under the existing Part 3A approval for the Wahroonga Estate Redevelopment. The study area covers approximately 14,000m^2 within the Wahroonga Estate Redevelopment site, of which 6,900m^2 is proposed for a playing field, and the remaining 7,100m^2 for school buildings. A general map of the study area is attached below.

This area was surveyed by AMBS archaeologists and Aboriginal community representatives (including Darren Duncan from MLALC) as part of the original assessment in 2008, and no sites or areas of Aboriginal heritage sensitivity were identified within the current study area.

Step 1: Preliminary Assessment

The aim of the preliminary assessment is to identify any Aboriginal cultural heritage values that are known or likely to be associated with the study area, and determine if they are likely to be affected by the proposed works. At this time, we are seeking to identify any spiritual, traditional, historical or contemporary associations and attachments which this area has for the present-day Aboriginal community, in accordance with the *Draft Guidelines for Aboriginal Cultural Heritage Impact Assessment and Community Consultation* (Department of Environment and Conservation 2005).

Contact Details

This letter is to inform your organisation of the proposed works, and to invite you to register an interest in being consulted on this project. If you have any cultural concerns or perspectives regarding the proposed works, or if you would like to provide any information about Aboriginal

AMBS
Australian Museum Business Services - 6 College Street, Sydney NSW 2010, Ph (02) 9320 6311, Fax (02) 9320 6428
australianmuseum.net.au/AMBS ambs@austmus.gov.au

cultural heritage values associated with the study area, please contact me within 14 days, by Friday 14 December 2012.

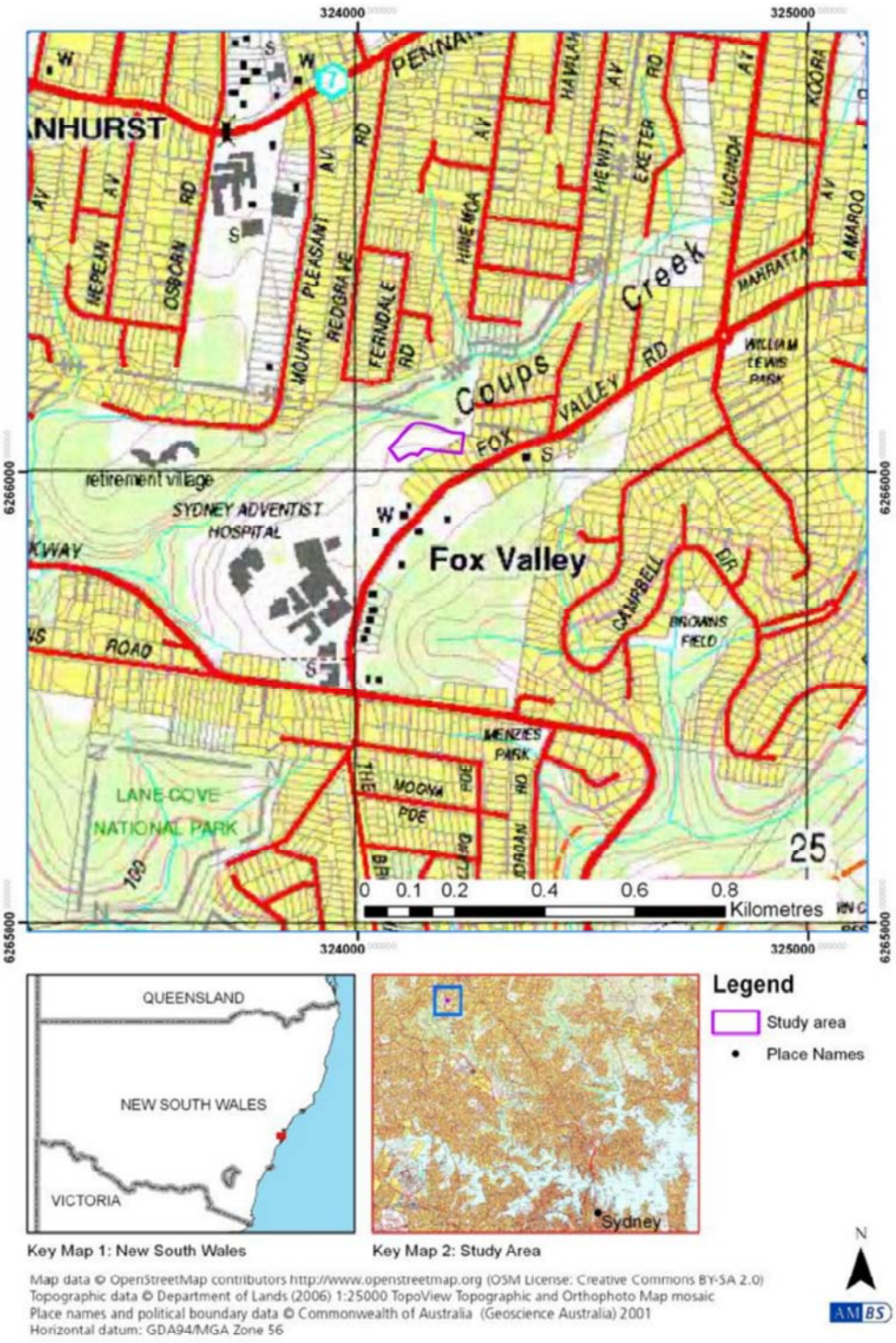
Please find attached a form that you may choose to fill out after having read this letter. This form is intended to make it easier for you to provide feedback and is not obligatory. If you would like to use this form, please fill out the relevant sections, sign it and return the form to AMBS. Alternatively, if you would like to provide feedback concerning the heritage values of the study area in another form, you can respond by email to ngaire.richards@austmus.gov.au, by fax to (02) 9320 6428, or by post to:

Attn: Ngaire Richards
Australian Museum Business Services
6 College Street
Sydney NSW 2010

Should you require any additional information or if I can be of assistance in any way please contact me on (02) 9320 6349 or email ngaire.richards@austmus.gov.au.

Yours sincerely

Ngaire Richards
Project Officer *AMBS Archaeology & Heritage*



Wahroonga Adventist School study area

PURPOSE OF THIS FORM

This form is intended to make it easier for registered Aboriginal parties to comment on the proposed Wahroonga Adventist School development. It is not obligatory to provide feedback in this way, however if you would like to use this form, please fill out, sign and return to AMBS as a scanned document emailed to ngaire.richards@austmus.gov.au, by fax to (02) 9320 6428, or post the original to:

Attn: Ngaire Richards
Australian Museum Business Services
6 College Street, Sydney NSW 2010

ABORIGINAL FEEDBACK

I, _____(your name)

of _____(Aboriginal group name)

would like to make the following comments about the proposed Wahroonga Adventist School development (letter dated November 2012), or provide the following information regarding the cultural heritage values of the study area (cross out if not applicable):

_____

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Signature _____

Date _____

Position within Aboriginal group:

_____

AMBS Reference: 1201069

10 January 2013

Australian museum
BUSINESS SERVICES

Paul Morris
Metropolitan Local Aboriginal Land Council
PO Box 1103
Strawberry Hills NSW 2012
Sent by email to metrolalc@metrolalc.org.au

Dear Paul

Wahroonga Adventist School:
Preliminary Aboriginal Heritage Assessment

Australian Museum Business Services has been commissioned by Stanton Dahl Architects, on behalf of Seventh Day Adventist Church, Greater Sydney Conference, to prepare a preliminary Aboriginal heritage assessment for the Wahroonga Adventist School. AMBS prepared the Heritage Impact Assessment for the Wahroonga Estate Redevelopment (AMBS 2008), as supporting documentation to the Part 3A application. The preliminary Aboriginal heritage assessment updates and expands existing documentation for the current project, and will form part of the Development Application (DA) for submission to the Department of Planning & Infrastructure under the existing Part 3A approval for the Wahroonga Estate Redevelopment. The study area covers approximately 14,000m² within the Wahroonga Estate Redevelopment site, of which 6,950m² is proposed for playing fields, and the remaining 7,050m² for school buildings.

This area was surveyed by AMBS archaeologists and Aboriginal community representatives (including Darren Duncan from MLALC) as part of the original assessment in 2008, and no sites or areas of Aboriginal heritage sensitivity were identified within the current study area.

Preliminary Assessment Draft Report

The aim of the preliminary assessment is to identify any Aboriginal cultural heritage values that are known or likely to be associated with the study area, and determine if they are likely to be affected by the proposed works. A letter sent to your organisation on 30 November 2012 sought to identify any spiritual, traditional, historical or contemporary associations and attachments which this area has for the present-day Aboriginal community, in accordance with the *Draft Guidelines for Aboriginal Cultural Heritage Impact Assessment and Community Consultation* (Department of Environment and Conservation 2005). To date, we have not received any response from your organisation. The draft report has now been prepared, and is attached for your review and comment. It would be greatly appreciated if you could provide us with any written comments that you may have regarding this draft report by **Thursday 7 February 2013**, so that we can finalise the report.

AMBS
Australian Museum Business Services - 6 College Street, Sydney NSW 2010, Ph (02) 9320 6311, Fax (02) 9320 6428
australianmuseum.net.au/AMBS ambs@austmus.gov.au

Please find attached a form that you may choose to fill out after having read the draft report. This form is intended to make it easier for you to provide feedback and is not obligatory. If you would like to use this form, please fill out the relevant sections, sign it and return the form to AMBS. Alternatively, if you would like to provide feedback concerning the heritage values of the study area in another form, you can respond by email to jenna.weston@austmus.gov.au, by fax to (02) 9320 6428, or by post to:

Attn: Jenna Weston
Australian Museum Business Services
6 College Street
Sydney NSW 2010

Should you require any additional information or if I can be of assistance in any way please contact me on (02) 9320 6311 or email jenna.weston@austmus.gov.au.

Yours sincerely

Jenna Weston
Project Officer *AMBS Archaeology & Heritage*

PURPOSE OF THIS FORM

This form is intended to make it easier for registered Aboriginal parties to comment on the draft *Wahroonga Adventist School: Aboriginal Cultural Heritage Impact Assessment* report. It is not obligatory to provide feedback in this way, however if you would like to use this form, please fill out, sign and return to AMBS as a scanned document emailed to jenna.weston@austmus.gov.au, by fax to (02) 9320 6428, or post the original to:

Attn: Jenna Weston
Australian Museum Business Services
6 College Street, Sydney NSW 2010

ABORIGINAL FEEDBACK

I, _____(your name)

of _____(Aboriginal group name)

would like to make the following comments about the draft *Wahroonga Adventist School: Aboriginal Cultural Heritage Impact Assessment* report (dated January 2013), or provide the following information regarding the cultural heritage values of the study area (cross out if not applicable):

_____

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Signature _____

Date _____

Position within Aboriginal group: _____

Appendix B

Summary Table of Previous Local Aboriginal Heritage Investigations

Reference	Location	Type of Investigation	Findings	Distance from Study Area
AMBS (2009)	Sydney Adventist Hospital, Wahroonga	Archaeological survey: Wahroonga Estate Redevelopment	No new sites identified; location of 1 previously recorded shelter with deposit confirmed	Includes current study area
Cosmos Archaeology (2004)	Between Fox Valley Road & Comenarra Parkway	Archaeological survey: proposed residential development	No sites identified. Area assessed as having low archaeological sensitivity and potential, given the steep terrain & 'poor quality' Hawkesbury Sandstone	c.160m south east
Attenbrow (1990)	Port Jackson	Archaeological research, recording, survey & excavation: Port Jackson Archaeological Project	Overall, six sites were classified as having excellent research potential, 48 as having good potential, & 151 as having poor to nil potential.	From c.0.4km south west
Brayshaw & Associates (1984)	Extension of F3 Freeway between Wahroonga and Berowra	Archaeological survey	5 new sites (shelters with deposit, art and/or grinding grooves, & an open camp site/midden), 13 shelters with PAD & 4 isolated finds identified. Test excavation & recording recommended for sites to be impacted	From c.1.5km north west
Brayshaw (1999)	Malton Road, Beecroft	Archaeological survey: proposed urban subdivision	No sites identified	c.3km south west
Navin Officer (2005)	Hornsby Railway Station	Archaeological survey: EIA for proposed platform and stabling project	No sites identified	c.3km north
Mills (1999)	F3 freeway between Wahroonga and Hawkesbury River	Archaeological survey: proposed stabilisation of cutting on F3	No sites identified	From c.3.5km north east
Jackson (2011)	Berowra Valley National Park	Archaeological survey: proposed mountain bike track	1 artefact scatter & 2 shelters with deposit (1 of which was previously recorded) identified. Recommended that track be realigned to avoid these sites	c.3.5km west
Smith (1987a)	Westleigh and Cherrybrook	Archaeological survey: proposed residential subdivisions	1 isolated basalt flaked artefact & 1 previously recorded shelter with art located	c.4km north west
Tacon (1995)	Above Terrys Creek, near intersection of Crimea Rd and Somerset St	Inspection of site reported by Aboriginal person near the proposed M2 development	Shelter with possible footholds & cultural association, & possible scarred trees identified (NB no such sites have been recorded on AHIMS in this area)	c.4km south
RTA (1995)	Terrys Creek bridge, M2	Assessment of proposed design changes to M2 bridge over Terrys Creek	Design change identified as not having further impact than the original design	c.4km south
Haglund (1997)	Near intersection of Crimea Rd and Waterloo Rd	Archaeological survey on land surplus to M2, when possible sites were noticed	Possible grinding grooves found to be modern graffiti. Possible shell midden found to be the remains of a natural shell bed, possibly from fill used in building	c.4km south
Haglund (1985)	Between Brush Farm Park, Eastwood and Epping Road, North Ryde	Archaeological survey: proposed road	No sites identified. Area considered to have been too disturbed to retain intact archaeological deposits	c.4.5km south
AMBS (1995)	Grosvenor Street, Wahroonga	Archaeological survey	No sites located	c.4.5km north east
Clegg & Crew (1997)	Grosvenor Street, Wahroonga	Archaeological re-survey	Confirmed that although no sites were located, the area still had sensitivity to contain rock art, and was significant to MLALC	c.4.5km north east
Corkill (1996)	M2 off-ramp,	Identification of	Chert/mudstone flake found in small	c.4.5km south

	near Beecroft Road, Cheltenham	artefact located during historical excavations in construction zone	alluvial deposit beneath sandstone. Assessed as unlikely to contain further Aboriginal artefacts, given considerable disturbance of surrounding area. Artefact left in place and avoided by construction	west
Appleton (2001a)	Arrionga Place, Hornsby	Archaeological survey: proposed subdivision	1 set of axe grinding grooves (4 grooves in a tributary creekline) identified	c.4.5km north
Haglund (1995)	M2 Motorway, Pennant Hills-Beecroft	Archaeological test excavation: shelter with PAD on Devlins Creek	2 0.5mx0.5m pits dug, recovering 602 flaked artefacts of mainly quartz & silcrete, with some chert, mudstone & quartzite. Site thought to have been used for stone knapping. Recommended to be protect during construction	c.5km south west
Rich (1986)	Proposed Cherrybrook Estate, near Dural	Archaeological survey: proposed residential subdivision	No sites located	c.5km north west
Dallas (1996)	Pennant Hills Golf Course, Pennant Hills	Archaeological survey: Devlins Creek within the Golf Course area	1 shelter with deposit located, comprising 7 flaked silcrete artefacts	c.5km south west
Smith & Rich (1985)	St Johns Avenue, Gordon	Archaeological survey: proposed residential development	4 shelters with PAD identified	c.5.5km south east
NPWS (1990)	Lane Cove River State Recreation Area	Archaeological survey: proposed landfill site	5 rock engravings (including 3 previously registered), 2 shelters with midden (comprising oyster, whelk, cockle & unidentified gastropod), 3 shelters with deposit (there were a total of 10 artefacts, comprising flaked mudstone quartzite & silcrete, & a quartz bipolar flake), & 5 shelters with PAD identified	c.5.5km south east
Corkill (1990)	M2 Freeway, Old Windsor Road-Pennant Hills Road	Archaeological survey	4 new shelters with art/deposit, 10 potential shelter sites, 2 PADs and 1 previously recorded site located. Test excavation & recording recommended for sites to be impacted	From c.5.5km south west
McDonald (1984)	Proposed Cherrybrook Estate, near Dural	Archaeological survey: proposed residential subdivision	1 shelter with art, 1 shelter with deposit (a dense concentration of flaked silcrete & quartz artefacts), 1 set of axe grinding grooves (6 grooves around a deep rock pool) & 6 shelters with PAD identified. Recommended that shelter with deposit be salvaged & 3 of the 6 shelters with PAD be excavated	c.6km north west
McDonald & Brayshaw (1984)	Proposed Cherrybrook Estate, near Dural	Archaeological test excavation: site CB1 (shelter with deposit, site 45-6-1649) & PAD3 (shelter with PAD)	PAD found to be archaeologically sterile. 327 flaked stone artefacts (including 49 bipolar flaked artefacts & 1 Bondi point) were recovered from site CB3, manufactured predominantly on quartz & silcrete, in addition to some mudstone & other raw materials	c.6km north west
McDonald (1985a)	Proposed Cherrybrook Estate, near Dural	Archaeological test excavation: site CB1 (shelter with deposit, site 45-6-1649) & PAD3 (shelter with PAD)	8238 stone artefacts (including 20 backed artefacts) made predominantly of quartz & silcrete (some mudstone, fine-grained siliceous [FGS], quartzite, petrified wood & fine grained basic stone), 3 bone fragments & 1 plant fragment recovered from 4.5m^2 of excavation. Bipolar knapping predominant. Site thought to date to mid-Bondaian (2500-3000 years ago), and used for artefact manufacture	c.6km north west
Greer (1985)	Extension of F3 Freeway between Wahroonga and Berowra	Archaeological test excavation: 1 shelter site and 2 shelters with PAD; salvage excavation of 2 shelters with deposit (WB1 and WB4)	Shelter site had 71 flaked artefacts of quartz, silcrete, quartzite, mudstone, chert & FGS, including some bipolar flakes & cores. No artefacts located in the 2 shelters with PAD. 296 flaked artefacts at WB1 made of quartz, mudstone, silcrete, quartzite, FGS, chert & other, including some bipolar flakes & cores. Assemblage identified as	c.6km north west

			Bondaian. 504 flaked artefacts at WB4 made predominantly of quartz, as well as silcrete, mudstone, quartzite, FGS, chert & other, including some bipolar flakes & cores. Assemblage identified as Late Bondaian. Low density of artefacts throughout these sites indicates cont-inuous but infrequent use of the sites	
Richardson (2003)	Eden Gardens, Macquarie Park	Archaeological test excavation across 2 areas of potential archaeological sensitivity and a sandstone outcrop	12 1mx1m test pits dug; 1 quartz flaked artefact recovered; no rock art found	c.6km south east
Rich (1985)	Timbarra Road, St Ives Chase	Archaeological survey: proposed residential development	No sites identified within study area; shelter with PAD immediately adjacent to study area	c.6.5km north east
Rich (1986a)	Ryan Avenue, Hornsby Heights	Archaeological survey: proposed residential subdivision	Shelter with PAD identified; test excavation recommended	c.6.5km north
Rich (1986b)	Ryan Avenue, Hornsby Heights	Archaeological test excavation of shelter with PAD	Shelter deposit found to be sterile	c.6.5km north
Rich (1988)	Cherrybrook	Archaeological survey: proposed sewer	No sites identified; however, potential for axe grinding grooves was identified. Recommended draining rock pool to check stone surfaces	c.6.5km north west
Appleton (2001b)	440 Bobbin Head Road, North Turramurra	Archaeological survey: proposed retirement village	No sites identified	c.6.5km north east
Smith (1987b)	Hornsby Heights and Mount Colah	Archaeological survey: 7 proposed residential subdivision sites	One shelter with PAD identified adjacent to 1 of the areas	c.6.5-9.5km north
Kohen (1989)	Galston Road and Somerville Road, Hornsby Heights	Archaeological survey: 2 proposed development sites	No sites identified in either study area. Shelter with PAD located east of the Somerville Road area	c.6.5-9.5km north
Corkill (1991)	M2 near North Rocks	Archaeological survey: proposed deviation to original M2 design	Confirmation of location of previously recorded shelter with deposit & art (CF1), shelter with deposit (CF5) & shelter with PAD (PAD2). Test excavations & full recording of the sites recommended.	c.7km south west
Byrne (1993)	Mountview Parade, Hornsby Heights	Archaeological survey: proposed residential development	No sites identified	c.8km north
Benton (1999)	Hornsby Heights	Archaeological survey: proposed borehole locations	No sites identified; however, assessed as having potential for sites in undisturbed areas	c.8.5km north