

GLEDSWOOD PUBLIC SCHOOL, GLEDSWOOD HILLS

ARCHAEOLOGICAL TECHNICAL REPORT

Report to Perumal Pedavoli Architects
on behalf of the Department of Education

Camden LGA

December 2017





EXECUTIVE SUMMARY

Apex Archaeology has been engaged to assist Perumal Pedavoli on behalf of the Department of Education in the archaeological assessment of a proposed public school in Gledswood Hills, NSW.

The proposed development includes the construction of a Public School designed to meet the growth in the South West Sydney area. The new Gledswood Public School will accommodate up to 1000 students on completion. The study area is roughly rectangular in shape and covers an approximate area of 1.4 hectares.

Apex Archaeology was engaged to undertake an archaeological in accordance with the *Code of Practice for Archaeological Investigation of Aboriginal Objects in New South Wales* (DECCW, Sept 2010) to satisfy the Secretary's Environmental Assessment Requirements (SEARs) and to support obtaining an AHIP if necessary. This Archaeological Technical Report (ATR) details the results of the archaeological assessment completed in accordance with the Code of Practice. The AHIP process includes Aboriginal community consultation and the archaeological assessment of the study area. The details of the Aboriginal community consultation are presented in the Aboriginal Cultural Heritage Assessment Report (ACHAR), to which this report is appended. This ATR has also been prepared with reference to the *Guide to investigating, assessing and reporting on Aboriginal cultural heritage in NSW* (OEH, April 2011).

Background research into previous archaeological work within the area was conducted. Additionally, a site inspection was undertaken as part of the assessment. Based on the background research and the results of the site inspection, the site was assessed as having no potential for archaeological deposits to be present. No archaeological material was identified within the study area boundaries, and the area was assessed as being highly disturbed.

Based on the results of the cultural heritage and archaeological assessments, the following recommendations have been made for the project:

RECOMMENDATION 1: NO FURTHER ARCHAEOLOGICAL ASSESSMENT REQUIRED

This report and the accompanying ATR detail the archaeological potential of the site, which has been assessed as nil. No further archaeological assessment is required for the site.

RECOMMENDATION 2: DEVELOPMENT BOUNDARIES

The proposed development works must be contained within the assessed boundaries for this project. If there is any alteration to the boundaries of the proposed development to include areas not assessed as part of this archaeological investigation, further investigation of those areas should be completed to assist in



managing Aboriginal objects and places which may be present in an appropriate manner.

RECOMMENDATION 3: STOP WORK PROVISION

Should unanticipated archaeological material be encountered during site works, all work must cease in the vicinity of the find and an archaeologist contacted to make an assessment of the find and to advise on the course of action to be taken. Further archaeological assessment and Aboriginal community consultation may be required prior to the recommencement of works. Any objects confirmed to be Aboriginal in origin must be reported to the OEH under Division 1, Section 89A of the NPW Act.

In the unlikely event that suspected human remains are identified during construction works, all activity in the vicinity of the find must cease immediately and the find protected from harm or damage. The NSW Police and the Coroner's Office must be notified immediately. If the finds are confirmed to be human and of Aboriginal origin, further assessment by an archaeologist experienced in the assessment of human remains and consultation with both OEH and the RAPs for the project would be required.

This recommendation should be included in any Construction Environmental Management Plan developed for the site.

RECOMMENDATION 4: REPORTING

One digital copy of this report should be forwarded to the Office of Environment and Heritage for inclusion on the Aboriginal Heritage Information Management System (AHIMS).

One copy of this report should be forwarded to each of the registered Aboriginal stakeholders for the project.



Apex Archaeology would like to acknowledge the Aboriginal people who are the traditional custodians of the land in which this project is located. Apex Archaeology would also like to pay respect to Elders both past and present.

DOCUMENT CONTROL

The following register documents the development and issue of the document entitled 'Gledswood Public School: Archaeological Technical Report', prepared by Apex Archaeology in accordance with its quality management system.

Revision	Prepared by	Reviewed by	Comment	Issue Date
1 – Draft	Leigh Bate	Jenni Bate	Initial preparation	3 Nov 2017
2 – Draft	Jenni Bate	Andrew McGrath/ Stephen Earp	Client Review	17 Nov 2017
3 – Draft	Jenni Bate		RAP review	20 Nov 2017
4 – Final	Jenni Bate	Leigh Bate	Report finalisation	21 Dec 2017



GLOSSARY OF TERMS

Aboriginal Object	An object relating to the Aboriginal habitation of NSW (as defined in the NPW Act), which may comprise a deposit, object or material evidence, including Aboriginal human remains.
AHIMS	Aboriginal Heritage Information Management System maintained by OEH, detailing known and registered Aboriginal archaeological sites within NSW
AHIP	Aboriginal Heritage Impact Permit
ASIRF	Aboriginal Site Impact Recording Form
ATR	Archaeological Technical Report
BP	Before Present, defined as before 1 January 1950.
Code of Practice	The DECCW September 2010 <i>Code of Practice for Archaeological Investigation of Aboriginal Objects in New South Wales</i>
Consultation	Aboriginal community consultation in accordance with the DECCW April 2010 <i>Aboriginal cultural heritage consultation requirements for proponents 2010</i> . Consultation is not a required step in a due diligence assessment; however, it is strongly encouraged to consult with the relevant Local Aboriginal Land Council and to determine if there are any Aboriginal owners, registered native title claimants or holders, or any registered Indigenous Land Use Agreements in place for the subject land
DA	Development Application
DECCW	The Department of Environment, Climate Change and Water – now OEH
Disturbed Land	If land has been subject to previous human activity which has changed the land's surface and are clear and observable, then that land is considered to be disturbed
Due Diligence	Taking reasonable and practical steps to determine the potential for an activity to harm Aboriginal objects under the <i>National Parks and Wildlife Act 1974</i> and whether an application for an AHIP is required prior to commencement of any site works, and determining the steps to be taken to avoid harm
Due Diligence Code of Practice	The DECCW Sept 2010 <i>Due Diligence Code of Practice for the Protection of Aboriginal Objects in New South Wales</i>
GIS	Geographical Information Systems
GSV	Ground Surface Visibility
Harm	To destroy, deface or damage an Aboriginal object; to move an object from land on which it is situated, or to cause or permit an object to be harmed
ka	Kiloannus, a unit of time equating to 1,000 years
LALC	Local Aboriginal Land Council
LGM	Last Glacial Maximum
NPW Act	NSW <i>National Parks and Wildlife Act 1974</i>
PAD	Potential Archaeological Deposit
OEH	The Office of Environment and Heritage of the NSW Department of Premier and Cabinet
RAPs	Registered Aboriginal Parties



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1.0 INTRODUCTION

Apex Archaeology has been engaged to assist Perumal Pedavoli on behalf of the Department of Education in the archaeological assessment of a proposed public school in Gledswood Hills, NSW.

The proposed development includes the construction of a Public School designed to meet the growth in the South West Sydney area. The new Gledswood Public School will accommodate up to 1000 students on completion. The study area is roughly rectangular in shape and covers an approximate area of 1.4 hectares.

In order to assess the Aboriginal archaeological values of the study area, Apex Archaeology was engaged to undertake an archaeological assessment in accordance with the *Code of Practice for Archaeological Investigation of Aboriginal Objects in New South Wales* (DECCW, Sept 2010) and the *Aboriginal cultural heritage consultation requirements for proponents 2010* (DECCW, April 2010). This Aboriginal Cultural Heritage Assessment Report (ACHAR) has been produced in accordance with the Consultation Guidelines.

The archaeological investigation was also completed with reference to the OEH guidelines *Guide to Investigating, Assessing and Reporting on Aboriginal Cultural Heritage in NSW* (OEH, April 2011). This Archaeological Technical Report (ATR) is attached as an appendix to the ACHAR.

1.1 PURPOSE OF THE ARCHAEOLOGICAL INVESTIGATION

The archaeological investigation was undertaken to build on previous archaeological assessment within the study area, and to meet the requirements of the Secretary's Environmental Assessment Requirements (SEARs) for the project, which required archaeological assessment of the site.

The SEARs for the current project state:

Address Aboriginal Cultural Heritage in accordance with the Guide to investigating, assessing and reporting on Aboriginal Cultural Heritage in NSW (DECCW, 2011) and Aboriginal cultural heritage consultation requirements for proponents 2010 (DECCW).

In order to meet the requirements of the SEARs, full consultation with the Aboriginal community in accordance with the Consultation Guidelines was initiated, along with the assessment of the archaeological potential of the site in accordance with the Code of Practice.

The site has been subject to previous assessment, and included within a previous Aboriginal Heritage Impact Permit (AHIP), which expired on 30 October 2017. This AHIP covered the Turner Road North Precinct within the South West Growth Centre land release area, which included the current study area.



The archaeological assessment was prepared to determine the nature and extent of Aboriginal heritage sites within the study area, through an assessment of the number, type, condition and archaeological potential of any Aboriginal archaeological sites located within the study area. In addition, the relationship between any sites within the study area and the wider landscape was considered. This was necessary to assist in making an assessment of the significance of the archaeological values of the study area and to determine if and how the proposed project would impact on the identified Aboriginal archaeological significance of the study area.

The assessment also aimed to assist in developing strategies to minimise the impact of the proposed development on the Aboriginal archaeological significance of the study area and to provide recommendations to assist in implementing any proposed mitigation measures.

1.2 PROJECT PROPONENT

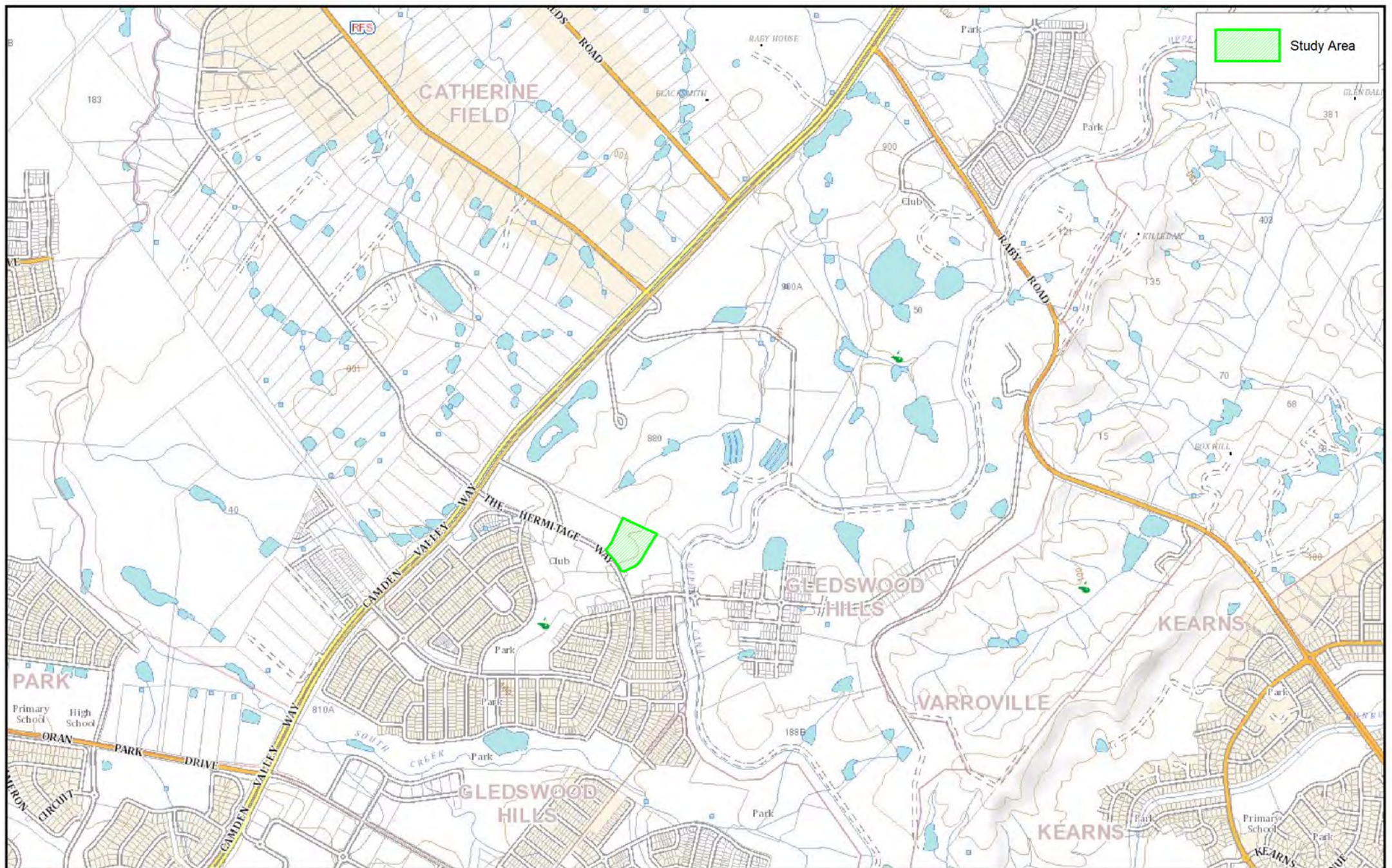
The proponent for the project is Perumal Pedavoli on behalf of the Department of Education, who have engaged Apex Archaeology to undertake Aboriginal archaeological investigations within the study area.

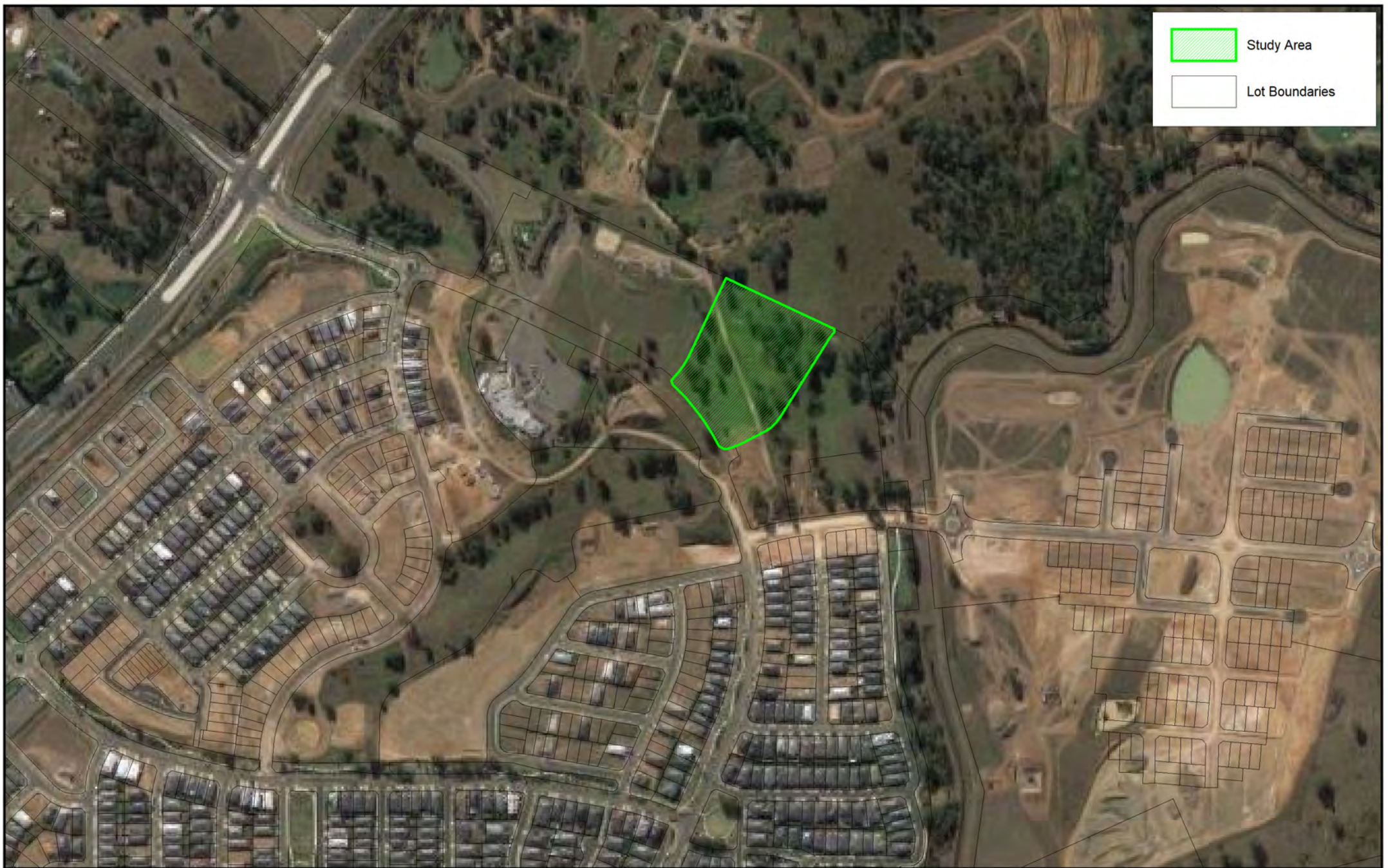
This report was prepared in accordance with the requirements of the OEH 2010 *Code of Practice for Archaeological Investigation of Aboriginal Objects in New South Wales*, and to satisfy the conditions of the SEARs for the project.

1.3 STUDY AREA

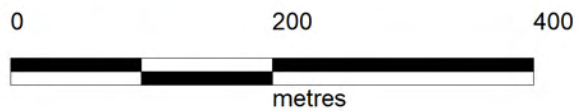
The study area is located 42km south east of Sydney (Figure 1) within the Camden Council Local Government Area (LGA). The study area comprises approximately 2.5ha in total and is located within the suburb of Gledswood, on The Hermitage Way, at Lot 3 DP 1227491 (Figure 2).

The proposed development includes the construction of a Public School designed to meet the growth in the South West Sydney area. The new Gledswood Public School will accommodate up to 1000 students on completion. The study area is roughly rectangular in shape and is shown in Figure 3.





PO Box 291
Macarthur Square
NEW SOUTH WALES 2560



Projection:
MGA Zone 56 (GDA 94)
Base Map:
Google Earth Pro
FINAL Version 1

Figure 2: Gledswood Public School in its local context



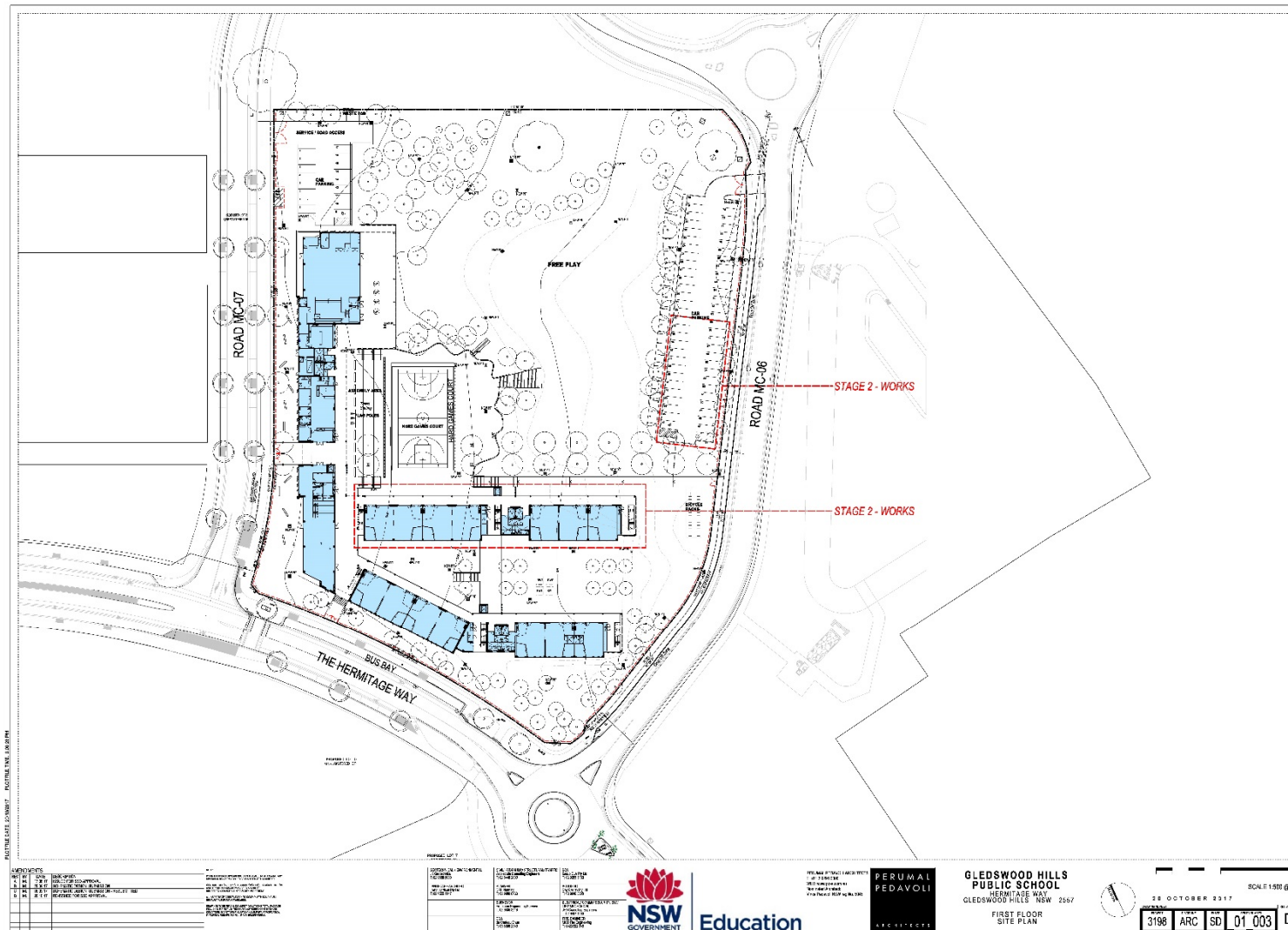


Figure 3: Proposed layout of the Gledswood Public School.



1.4 STATUTORY CONTEXT

1.4.1 NATIONAL PARKS AND WILDLIFE ACT 1974

Protection for Aboriginal heritage in NSW is provided primarily under the *National Parks and Wildlife Act 1974* (NPW Act). Although cultural heritage is protected by other Acts, the NPW Act is the relevant Act for undertaking due diligence assessments. Protection for Aboriginal sites, places and objects is overseen by the Office of Environment and Heritage (OEH), of the Department of Premier and Cabinet. Changes to the NPW Act with the adoption of the *NPW Amendment (Aboriginal Objects and Places) Regulation 2010* in October 2010 led to the introduction of new offences regarding causing harm to Aboriginal objects or declared Aboriginal places. These new offences include destruction, defacement or movement of an Aboriginal object or place. Other changes to the NPW Act include:

- Increased penalties for offences relating to Aboriginal heritage for individuals and companies who do not comply with the legislation;
- Introduction of the strict liability offences, meaning companies or individuals cannot claim ‘no knowledge’ if harm is caused to Aboriginal objects or places; and
- Changes to the permitting process for AHIPs – preliminary archaeological excavations can be undertaken without the need for an AHIP, providing the excavations follow the *Code of Practice for Archaeological Investigation of Aboriginal Objects in New South Wales*.

A strict liability offence was introduced, meaning a person who destroys, defaces or moves an Aboriginal object without an Aboriginal Heritage Impact Permit (AHIP) is guilty of an offence, whether they knew it was an Aboriginal object or not.

1.4.2 ENVIRONMENTAL PLANNING & ASSESSMENT ACT 1979

The project has been declared State Significant Development (SSD) under the *State Environmental Planning policy (State and Regional Development) 2011* (SRD SEPP). Schedule 1 of the SRD SEPP lists educational establishments of any capital investment value as SSD.

SSD applications are determined by the Department of Planning and Environment (DPE). As part of the environmental assessment for SSD, an environmental impact statement (EIS) must be prepared for the project. In order to prepare the EIS, the applicant must request Secretary’s Environmental Assessment Requirements (SEARs) to be issued for the project. The SEARs detail the requirements for all aspects of environmental assessment for the project, including the assessment of cultural heritage within the site.

The SEARs for the current project state:



Address Aboriginal Cultural Heritage in accordance with the Guide to investigating, assessing and reporting on Aboriginal Cultural Heritage in NSW (DECCW, 2011) and Aboriginal cultural heritage consultation requirements for proponents 2010 (DECCW).

In order to meet the requirements of the SEARs, full consultation with the Aboriginal community in accordance with the Consultation Guidelines was initiated, along with the assessment of the archaeological potential of the site in accordance with the Code of Practice.

Although it may not be necessary to apply for an Aboriginal Heritage Impact Permit (AHIP) for SSD projects, it was considered appropriate to follow the above guidelines in the archaeological assessment of the site.

1.5 LIMITATIONS

This report is based on previously recorded archaeological and environmental information for the Gledswood area. This includes information from AHIMS, which is acknowledged to be occasionally inaccurate, due to inaccuracies in recording methods. No independent verification of the results of external reports has been made as part of this report.

Field investigations for this report included survey. The results are considered to be indicative of the nature and extent of Aboriginal archaeological remains within the study area, but it should be noted that further Aboriginal objects and sites which have not been identified as part of this assessment may be present within the study area, although this is considered to be unlikely.

1.6 INVESTIGATORS AND CONTRIBUTORS

This archaeological assessment was commissioned and funded by the NSW Department of Education. Apex Archaeology thanks Andrew McGrath from Perumal Pedavoli Architects, Stephen Earp from DFP Planning, and Raj Sharma from Sekisui House Australia for their assistance with the project. Thanks are also extended to the registered Aboriginal groups for their participation and assistance with the project.

This report has been prepared by Jenni Bate, Director and Archaeologist with Apex Archaeology. The report was reviewed by Leigh Bate, Director and Archaeologist with Apex Archaeology. Both Jenni and Leigh have over nine years of consulting experience within NSW.

Name	Role	Qualifications
Jenni Bate	Project Manager; Field inspection; Review	B.Archaeology; Grad. Dip. CHM
Leigh Bate	Primary Report Author, Field inspection, GIS	B.Archaeology; Grad. Dip. Arch; Dip. GIS



2.0 ABORIGINAL CONSULTATION

Aboriginal consultation in accordance with the *Aboriginal cultural heritage consultation requirements for proponents 2010* was undertaken by Apex Archaeology for this project. Full details of the consultation are detailed in the Apex Archaeology report *Vermont Estate Central Precinct: Aboriginal Cultural Heritage Assessment Report* and summarised here.

Invitations to register an interest were sent on 8 August 2017, with registrations accepted until 31 October 2016. An advertisement was placed in the *Hawkesbury Courier* on 22 September 2016, inviting registrations of interest from people who may have cultural knowledge of the project area. Registrations were accepted until 31 October 2016, a total of 39 days to register an interest from the date the advertisement was placed.

A total of 18 Aboriginal people and organisations registered an interest in being consulted for the project. The following list comprises the registered Aboriginal parties (RAPs) for the project:

- Biamanga
- Cullendulla
- Corroboree Aboriginal Corporation
- Cubbitch Barta
- Darug Aboriginal Cultural Heritage Assessments
- Darug Custodian Aboriginal Corporation
- Darug Tribal Aboriginal Corporation
- Darug Land Observations
- Didge Ngunawal Clan
- Goobah Developments
- Gulaga
- Kamilaroi-Yankuntjatjara Working Group
- Kawul Cultural Services
- Murramarang
- Muragadi Heritage Indigenous Corporation
- Tharawal LALC
- Tocomwall
- Warragil Cultural Services



Consultation with the RAPs has been conducted in accordance with the Consultation Guidelines. Information about the project, the sampling strategy and the methodology for undertaking the assessment of cultural heritage significance was provided to the RAPs for their review and comment on 30 August 2017, with comments received until 27 September 2017. Comments received on the methodology were all supportive.

The draft report was submitted to the RAPs for their comment and their responses have been included in the final report. All responses were supportive.

A consultation log was maintained during the project and detailed the correspondence and communication between Apex Archaeology and the registered Aboriginal parties (RAPs). The consultation log for this project is attached to the ACHAR in Appendix A.

For full details of the Aboriginal community consultation completed for this project, please refer to Section 2 of the ACHAR for the project.



3.0 LANDSCAPE CONTEXT

An assessment of landscape features is required to assist in determining whether Aboriginal objects are likely to be present within the proposed activity area. Certain landscape features are more likely to have been utilised by Aboriginal people in the past and therefore are more likely to have retained archaeological evidence of this use. Focal areas of activity for Aboriginal people include rock shelters, sand dunes, water courses, waterholes and wetlands, as well as ridge lines for travel routes.

The presence of specific raw materials for artefact manufacture, as well as soil fertility levels to support vegetation resources, are also factors to be considered in the assessment of the environmental context of a study area. Geomorphological factors, such as erosion and accretion of soils, affect the preservation of potential archaeological deposits and therefore need to be considered when making an assessment of the potential for archaeological material to be present within a study area.

3.1 EXISTING ENVIRONMENT

The study area falls within the Sydney Basin, which is roughly bounded by the Great Dividing Range to the west, the coast to the east, Newcastle to the north and Wollongong to the south. It is the geographic extent of the Hawkesbury sandstone (McDonald 2008). The Cumberland Plain is located within the Sydney Basin, and is formed on shale geology with open plain woodlands, and is surrounded by the Hornsby Plateau to the north, the Woronora Plateau to the south, and the Blue Mountains Plateaux to the west (McDonald 2008). The Cumberland Plain is comprised of generally low gradient, rolling topography, located on shale-dominated Triassic formations, including Tertiary and later alluvial based sediments.

The study area is characterised by a heavily disturbed, sparsely vegetated area, with some remnant woodland scattered throughout, and which slopes gently to the south east. The area has been disturbed through grading and other activities within the site.

The area is located on Bringelly Shale bedrock. Stone sources for artefact manufacture include the St Marys Formation, which has been mapped downstream of the study area. However, there are no naturally occurring geological materials present within the current study area suitable for artefact manufacture.

The study area is located approximately 850m north of South Creek, a third order stream according to the Strahler system as used by DPI Water (Figure 4). Watercourse classification ranges from 1st order through to 4th order (and above) with 1st order being the lowest, ie a minor creek or ephemeral watercourse. This creek would likely have been the most reliable water source within the wider area, although the section of the creek comprising the third order section is only short.

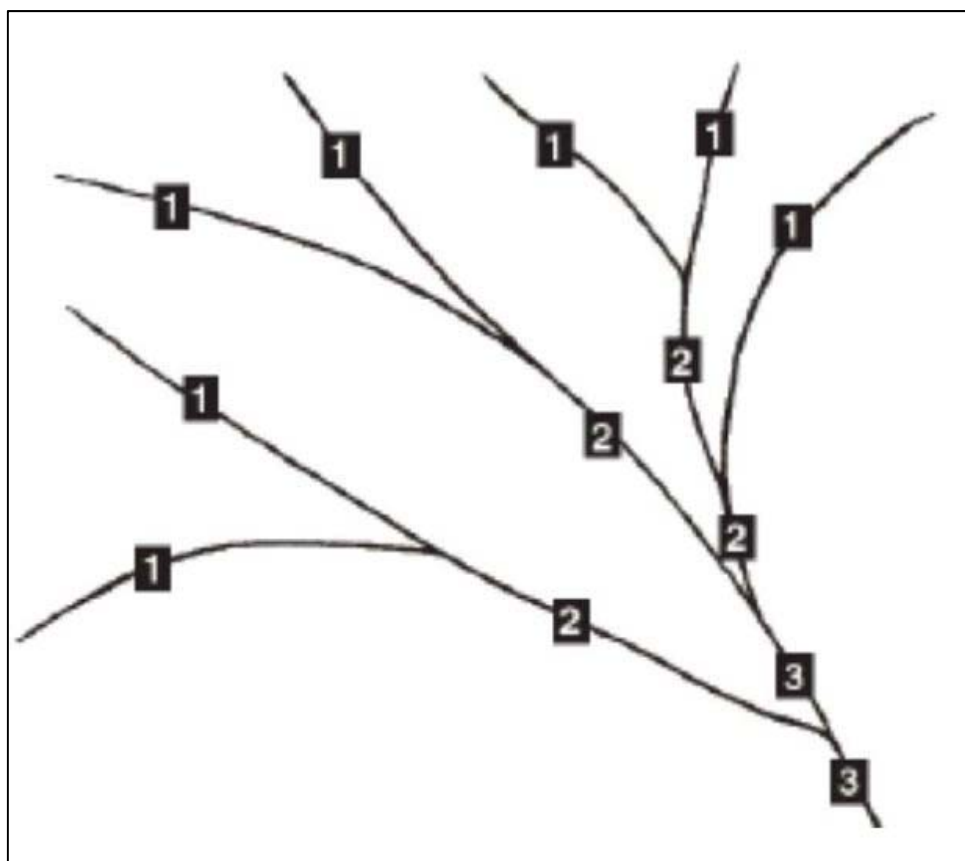


Figure 4: The Strahler system (Source: Department of Planning and Environment 2016).

The remnant vegetation within the area comprised shale hill woodland, which is dominated by grey box (*Eucalyptus moluccana*), narrow leaved ironbark (*Eucalyptus crebra*) and forest red gum (*Eucalyptus tereticornis*). Regenerated woodland has become more common throughout the area and usually has an understorey of boxthorn (*Themeda australis*). Kangaroo grass and other grasses were present, and patches of shrubs such as blackthorn (*Busaria spinosa*). These species would have supported a range of native fauna, including small mammals such as wallabies and wombats, a variety of bird species and small invertebrates such as snakes and lizards.

3.2 LAND USE HISTORY

The study area falls within an area known as the Cowpastures, after a number of cattle escaped the first European settlers in 1788, and were found in this area in 1795, having increased in number in the intervening years.



The first European exploration parties visited the area in 1795, and when efforts to round up this herd of cattle were unsuccessful, Governor King issued a proclamation in 1803, which forbade anyone from approaching the area without his written permission. The first house was built in the Camden area in 1804, and the Cowpastures Road (now known as the Northern Road) was surveyed in 1805. This allowed land grants to be made in the area, with one of the first major grants made to John Macarthur. This grant was named Camden.

Further grants were made in 1809 following the removal of Governor Bligh, which were then revoked when Governor Macquarie arrived, and later reissued. This confusion was settled in 1811 when Acting Surveyor Meehan undertook a survey of the grants of the area.

The study area itself falls within a grant made in c.1814 to Lieutenant Colonel George James Molle. He served under Macquarie and later received additional grants. The grant was named Molle's Main and comprised 1550 acres. In 1817, Molle was transferred to India along with his regiment, and his estates were transferred to William Macquarie Molle, his oldest son. Molle had been growing wheat and had sheep and cattle as well.

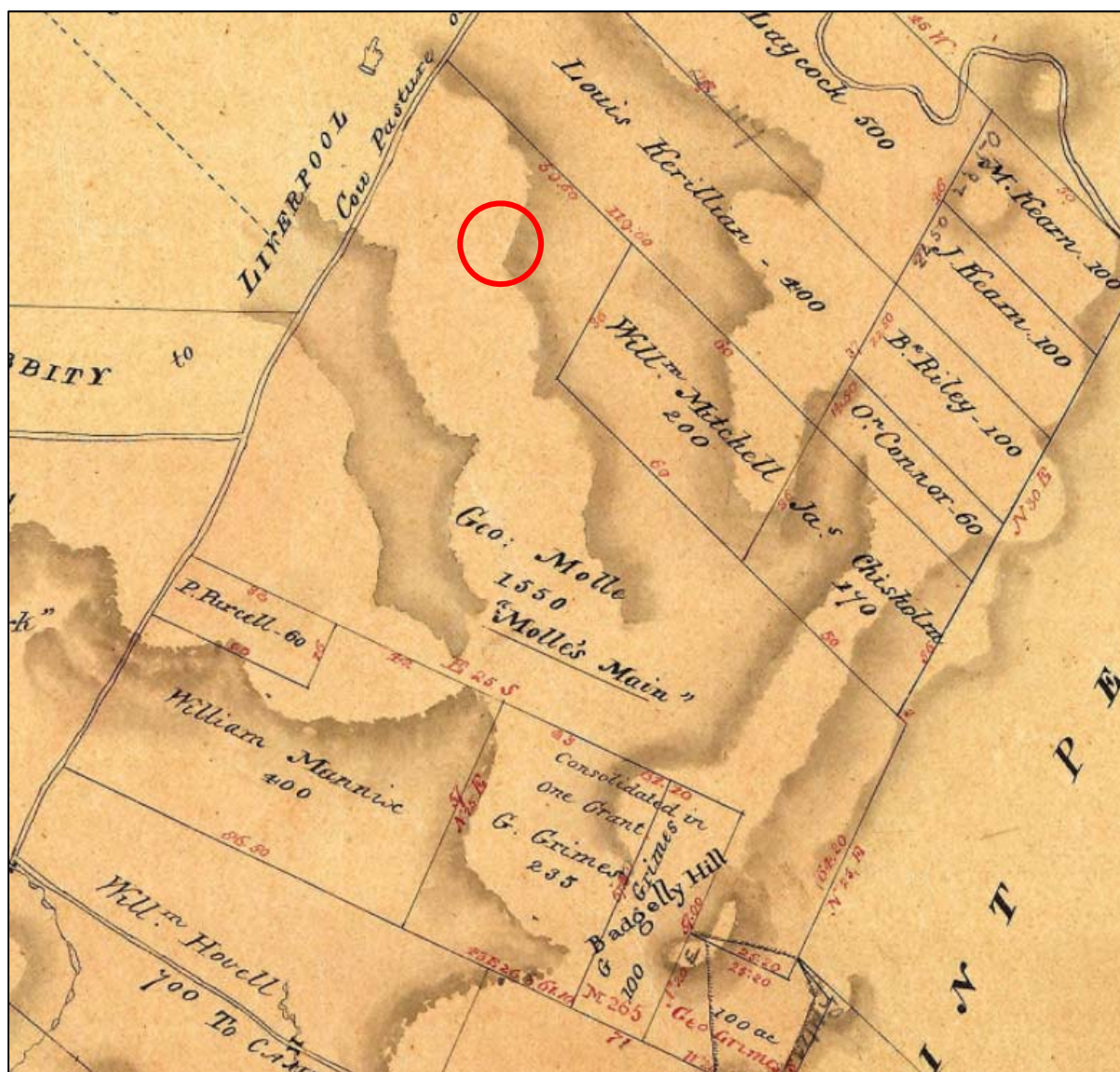


Figure 5; Parish of Narellan, County of Cumberland, parish map, showing the Molle's Main land grant. Approximate study area marked by red circle. (Source: Department of Lands)

Molle's Main was leased to William Howe in 1823, and was then leased again in 1824 with tenant farmers moving in. the property was sold in 1864 and then again in 1866 to Edward Moore, who renamed the estate Badgally. A new house was constructed in 1876 and this house later became the first part of St Gregory's Agricultural College.

The property was first subdivided in 1907, when a water canal was constructed by the Metropolitan Water Sewerage and Drainage board to supply water to Campbelltown, Minto and Camden (Figure 6). This water canal is still present to the east of the study area.



Figure 6: 1907 Map of Parish of Narellan, showing Mollé's Main and the water canal. Approximate study area marked by red circle. (Source: Mitchell Library)

Further subdivisions were made between 1915 and 1918 and by 1918 the estate was reduced to 911 acres. The area appears in 1947 as cleared land with a few trees or shrubs present, but does not appear to have had any further development occur within the area (Figure 7).



Figure 7: 1947 aerial photograph of the approximate study area, shown marked in red (Source: Dept of Lands)



Figure 8: 1970 aerial photograph of the approximate study area, shown marked in red (Source: Dept of Lands)

By 1970, additional vegetation was present within the area, but no construction was visible within the area, although disturbance within the wider area was visible on the aerial photography (Figure 8).

The site has been graded and cleared, with open exposures currently present. Silt fences have been erected across the site and it has been fenced. Introduced fill has been placed within the eastern portion of the site, creating a hardstand area. Soil from the site to the west has also been pushed onto the site.



4.0 ARCHAEOLOGICAL CONTEXT

An analysis of previous archaeological work within the study area assists in the preparation of predictive models for the area, through understanding what has been found previously. By compiling, analysing and synthesising the previous archaeological work, an indication of the nature and range of the material traces of Aboriginal land use is developed. An understanding of the context in which the archaeological assessment is vital, as development does not occur within a vacuum, but within a wider cultural landscape, and this must be considered during any archaeological assessment in order to develop appropriate mitigation and management recommendations.

4.1 REGIONAL CONTEXT

The study area is located within the Cumberland Plain. Many archaeological assessments have been completed across the Plain, including a range of academic assessments, resource management studies and development impact assessments. All of these help to inform the archaeological assessment of sites within the region.

Generally, the arrival of humans within Australia is considered to have occurred around 43-45 ka (O'Connell & Allen 2004; McDonald 2008). However, recent work at the Madjedbebe site in Arnhem Land in the Northern Territory revealed archaeological evidence confidently dated to the period before 45-46 ka and possibly up to 50-55 ka (Clarkson et al 2015). In NSW, there is strong evidence available to support Aboriginal occupation of the Cumberland Plain region in the Pleistocene period (approximately 10 ka) and possibly earlier. Work in Cranebrook Terrace was dated to 41,700 years BCE by Stockton and Holland (1974), and a site in Parramatta within deep sandy deposits was dated to 25-30 ka (JMcDCHM 2005). Kohen's 1984 assessment of Shaws Creek in the Blue Mountain foothills yielded ages of 13 ka, while Loggers Shelter at Mangrove Creek was dated to 11 ka by Attenbrow 1987. These ages are obtained from both radiocarbon and optically stimulated luminescence (OSL) dating.

Some experts have cast doubt onto the assessment of the items from Cranebrook Terrace as artefactual (Mulvaney & Kamminga 1999; McDonald 2008), although they do not doubt the results of the radiocarbon dates – it is the association of the artefacts with the dated deposits is problematic, and Mulvaney and Kamminga (1999) consider that there are better examples of sites with more robust identification of age available. There has certainly been a great deal of research undertaken within the Sydney region in the intervening years.

Several of the oldest dated sites in the Sydney region have been located within rockshelter deposits or deep alluvial deposits such as those located on the banks of large rivers including the Parramatta River and the Hawkesbury-Nepean. Archaeological work within the Parramatta sand sheet, which is considered to be a Pleistocene sand body (McDonald 2008) revealed the oldest secure date for the Cumberland Plain, dating to approximately 30.7 ka. McDonald considers that initial



occupation of the sand body occurred during the Late Pleistocene, and artefact assemblages of the time comprised mostly silicified tuff artefacts, with the upper limits of this assemblage considered to be 6-8 ka. Overlying these assemblages were heat treated silcrete artefacts, and backed artefacts which were dated to before 2-3 ka. The work completed within the Parramatta sands demonstrated a “distinct and clear change in the archaeological record through time”, based on a typological analysis of the assemblages (McDonald 2008).

Additionally, McDonald argues that the early occupation of the Sydney region was focussed on these large river systems and the resources they supply, with ‘high residential mobility’ resulting in considerable distances being travelled between base camps (McDonald 2008). Camps were made near to resource zones, and the population moved on as resource availability altered over time, due to the change of seasons. Due to the large distances travelled, large cores of silicified tuff from the Nepean River gravels were carried and flaked sparingly with minimal discard occurring (McDonald 2008), with large flakes produced. Backed or retouched artefacts were considered rare.

During the Holocene period around 6.5ka, sea levels increased and stabilised, which led to those groups on the coastal fringes turning inland (McDonald 2008). Around 5 ka a change in archaeological assemblages can be seen, with an emphasis on the use of locally available stone for artefact production. Around 4,000 years ago people began to decrease their residential mobility and inhabit certain biogeographic zone on a permanent basis, with some movement between the Cumberland Plain and the surrounding sandstone country (McDonald 2008).

Most sites dated using radiocarbon or OSL methods within the Sydney region have dated to within the last 10,000 years (Attenbrow 2010). This may support evidence of population growth over time, and an intensification of cultural activity within the Cumberland Plain. Attenbrow’s 2006 work at the Upper Mangrove Creek catchment north of Sydney identified changes in site patterning occurring during the Holocene period. She argued that the use of sites changed, whilst population levels remained relatively stable, in contrast to others who have interpreted this as evidence of increasing population rather than increasing site use and archaeological evidence thereof (Attenbrow 2006).

In contrast, Williams et al (2014) and Smith et al (2008) argued that the population density was far greater in the last 2,000 years than they had been previously, with their justification being that the use of sites across all locations increased at the same time, which suggested increased population using the landscape more intensively rather than increased movement of people across the landscape. No definitive answer has been found to date, but it can be seen that late Holocene sites dominate the archaeological record of the Cumberland Plain and wider Sydney Basin.



4.1.1 REGIONAL SITE PATTERNING

In general, the dominant site types identified within the Sydney region include rock shelters with archaeological deposit (including middens), rock shelters with art, pictographs (rock engravings), artefact concentrations in open contexts, grinding grooves and open middens (Attenbrow 2010). The nature and extent of individual sites is closely related to the environmental context in which they are found – for example, rockshelters are found within sandstone escarpments, while middens are generally located close to water bodies including marine, estuarine and freshwater contexts, and grinding grooves are found on flat sandstone platforms in close proximity to water sources.

In 1986, Kohen developed site location patterning predictions based on a study of archaeological investigations undertaken to date on the Cumberland Plain. Proximity to water was an important consideration in site patterning, with 65% of open artefact scatters located within 100m of permanent fresh water sources (Kohen 1986), and only 8% of sites located more than 500m from a permanent water source. He argued that sites increased in size, in complexity and in density with increasing proximity to water, especially permanent waterways such as creeks and rivers.

Further investigations within the Cumberland Plain have identified that Kohen's work was limited by his reliance on available surface evidence. McDonald (1997) undertook further investigations within the Cumberland Plain and identified that 28% of sites excavated had no surface expressions of artefacts prior to their excavation, with the ratio of surface to excavated artefacts being 1:25, and the nature and extent of the excavated sites could not be determined on the basis of surface expressions of artefacts alone. In summary, she found that a lack of surface evidence does not constitute a reliable estimate for subsurface archaeological potential (McDonald 1997).

These results demonstrate how test excavations can assist in the identification of the nature and extent of subsurface archaeological deposits within the Cumberland Plain.

4.2 LOCAL CONTEXT

The study area falls within the Turner Road Land Release Precinct of the South West Growth Centre. The area has been subject to high level assessment on several occasions.

JMCDCHM 2007

The initial investigations for the Turner Road Precinct were conducted by Jo McDonald CHM in 2007. The project was essentially an opportunities and constraints task, designed to summarise the existing information regarding the area, identify knowledge gaps and provide information regarding future work required.

Previous land use impacts were mapped, which identified a significant level of prior disturbance across the precinct. As a result, land used primarily for agricultural purposes was considered to have the highest potential for archaeological sites to be present. Archaeological sensitivity mapping was completed for the entire precinct (Figure 9), with the recommendation that these sensitive areas should be ground truthed through pedestrian survey.

The current study area falls within the area designated as disturbed/low potential.

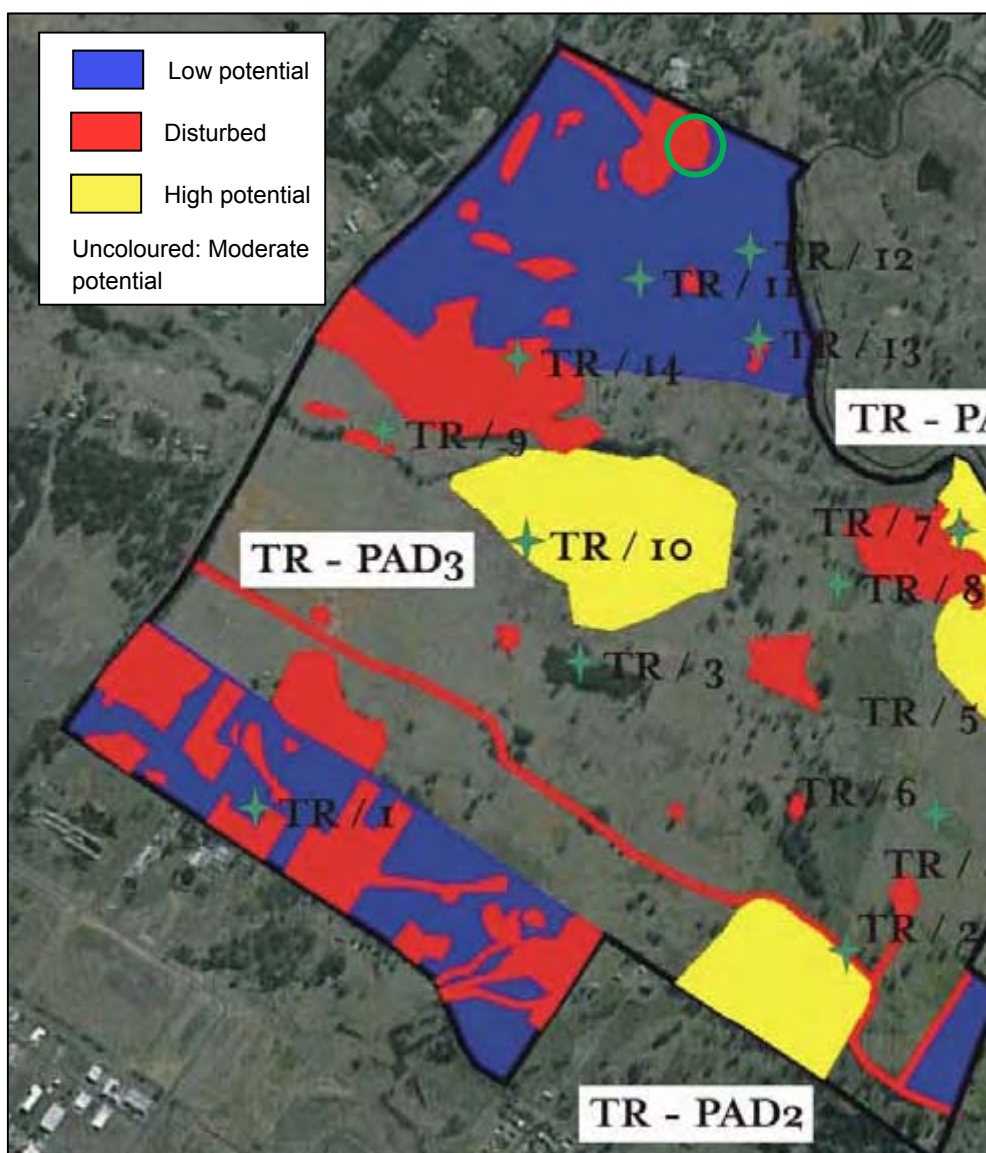


Figure 9: Archaeological sensitivity mapping for Turner Road Precinct. Approximate study area marked by green circle (Source: JMcDCHM 2007 with Apex Archaeology additions)

ENSR-AECOM 2009

Additionally, an intensive archaeological test excavation program by ENSR-AECOM took place within certain areas of the Turner Road Precinct in 2008. An area along South Creek, located to the south of the current study area, was subject to test excavation, with 30 test pits excavated over an area of 120m at this location. The

results from the test excavations at this site showed that relatively low numbers of artefacts were present within this area, and that artefacts were more likely to be identified in the test pits >50m from the creek channel. Additionally, archaeological testing from within the wider Turner Road Precinct, as well as at the associated Oran Park Precinct, identified that the standard prediction of increasing artefact concentrations being associated with higher order water courses was not demonstrated in the results and instead a more uniform spread of artefact deposits was present across much of the land within the precincts, comprising a low-density distribution of artefacts.

This archaeological assessment supported an AHIP for the Turner Road Precinct, which included the current study area. This AHIP (#1106218) expired on 30 October 2016. The current site has been impacted to some degree since this AHIP was issued.

4.3 AHIMS RESULTS

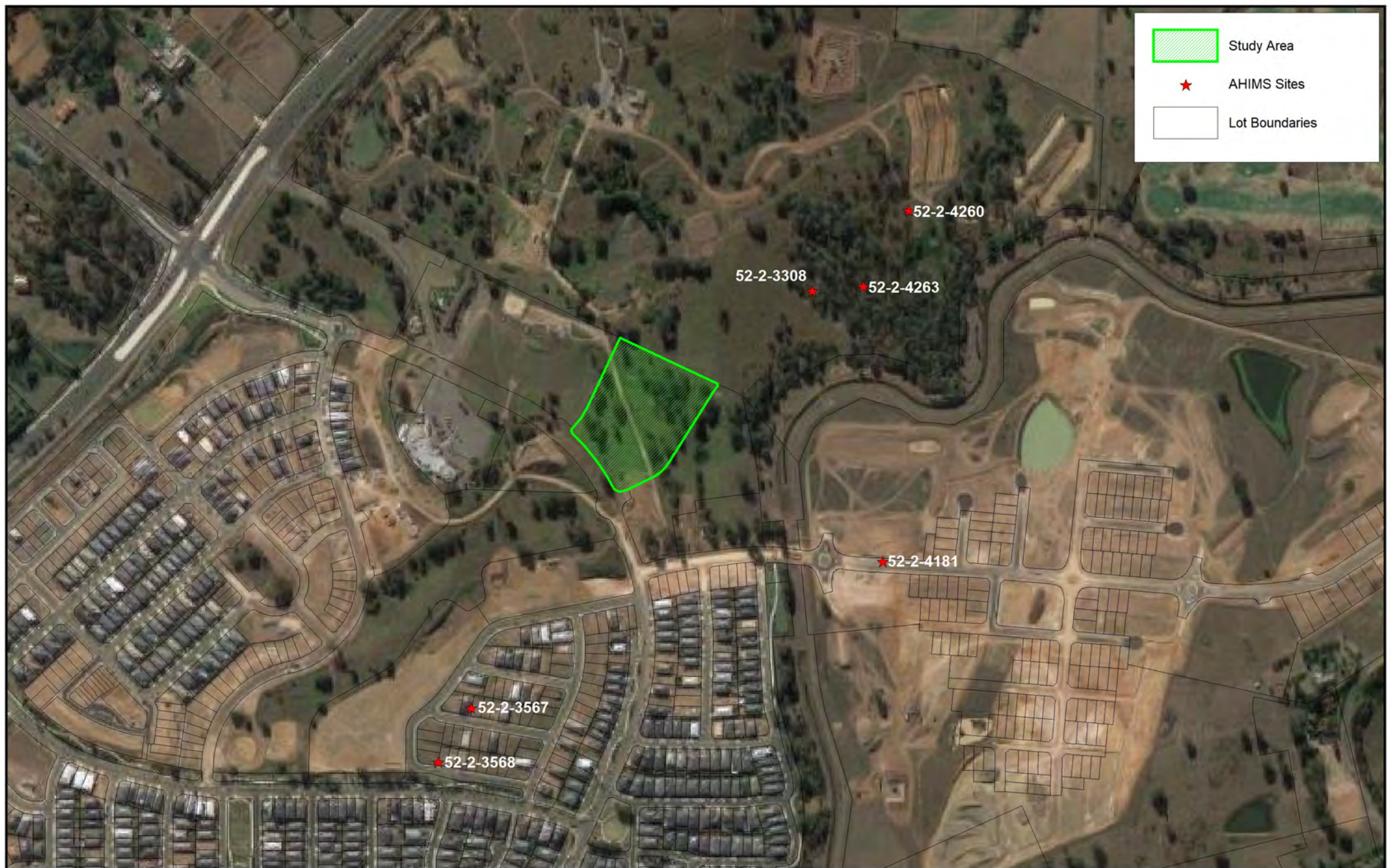
A search of an area 1km by 1km, centred on the study area, was conducted by Apex Archaeology on 31 July 2017, with a total of 6 Aboriginal archaeological sites identified, as shown in Table 1 below and in Figure 10.

Table 1: Sites identified during AHIMS search

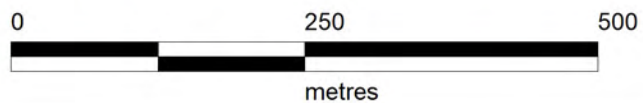
Site ID	Site Name	Context	Recorders
52-2-3567	TR-11	Artefact : 10	Jo McDonald Cultural Heritage Management
52-2-4263	Gledswood 9	Artefact : 1	Eco Logical Australia Pty Ltd - Sydney, Mr. Lyndon Patterson
52-2-4181	Gledswood Hills PAD 4	Artefact : -, Potential Archaeological Deposit (PAD) : -	Miss. Nicole Castle
52-2-4260	Gledswood 8	Artefact : 1	Eco Logical Australia Pty Ltd - Sydney, Mr. Lyndon Patterson
52-2-3568	TR-12	Artefact : 2	Jo McDonald Cultural Heritage Management
52-2-3308	CH9	Artefact : 5	Australian Museum Consulting (AM Consulting), Matthew Kelleher

These sites are all listed as open sites, comprising five artefact sites and one artefact site with associated potential archaeological deposits (PAD).

None of the registered sites fall within the study area boundaries.



PO Box 291
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NEW SOUTH WALES 2560



Projection:
MGA Zone 56 (GDA 94)
Base Map:
Google Earth Pro
FINAL Version 1

Figure10: Known Aboriginal sites within a 1km2 radius of the study area





4.4 PREDICTIVE MODEL

Based on the results of previous archaeological investigations within Gledswood and the wider area, a number of predictions regarding Aboriginal use of the area can be made. These predictions focus on the nature, extent and integrity of the remaining evidence.

The landscape characteristics of the area influence the prediction of the nature of potential sites within the landscape itself. Isolated finds and small artefact scatters are the most common site type identified within the wider area, and are predicted to be the most likely site type to be identified in future.

Site types associated with sandstone country, such as grinding grooves, rock art sites, petroglyph (rock engravings) and sandstone rockshelters with art/and or archaeological deposit are not considered likely to occur within the study area. Scarred trees are also not considered likely within the study area due to the high levels of historical clearing which have occurred within the landscape.

Distribution of sites is related to the landforms on which sites are known to be located. Generally, sites are focused on elevated landforms and reduce with increasing distance from water sources. This includes both artefact (isolated finds and artefact scatters) and areas of PAD. However, there is some evidence that artefact density within this landscape was not related to proximity to water, with evidence of a more uniform distribution of artefacts across much of the landscape.

Site disturbance and post-depositional processes heavily influence the integrity of archaeological sites. An assessment of these impacts must be considered when predicting the likelihood of Aboriginal sites being present within an area. Consideration of both natural and cultural ground disturbance must be made, and past land use must also be considered. Results of this assessment assist in the prediction of the integrity of potential sites within the study area.

Surface sites are likely to have been impacted by agricultural processes within the area over the historic period. Natural actions such as bioturbation are likely to have impacted at least the upper levels of archaeological deposits, as are cultural activities such as excavation, construction, ploughing, clearing and planting. Whilst these actions may impact the integrity of stratigraphy within the deposit, this does not necessarily mean associated archaeological objects will also be disturbed.

In general, Aboriginal use of an area is based on a number of factors, such as:

- Proximity to permanent water sources – generally permanent or areas of repeat habitation are located within approximately 200m of permanent water;
- Proximity to ephemeral water sources – generally sites near ephemeral water sources were utilised for one-off occupation;



- Ease of travel – ridgelines were often utilised for travel during subsistence activities; and
- The local relief – flatter areas were more likely to be utilised for long term or repeat habitation sites than areas of greater relief, especially if the slopes are at a distance from water.

In terms of the study area, sites are considered more likely to comprise:

- Isolated finds, which may occur anywhere across a landscape; and
- Open sites, in areas of high relief in close proximity to ephemeral or permanent water sources.



5.0 SAMPLING STRATEGY

Apex Archaeology prepared the following detailed methodology for field survey. The entire study area is proposed to be impacted and as such this methodology takes into account total survey coverage. The methodology was prepared and provided to the RAPs for comment. The works on site were conducted in accordance with the following methodologies.

5.1 FIELD SURVEY SAMPLING STRATEGY

- The study area was visually inspected by pedestrian survey (1 day);
- The study area was surveyed utilising pedestrian transects, with each participant responsible for inspecting a 2m wide transect on each pass;
- If stone artefacts were identified on the ground, a flag was proposed to be placed at its location;
- The archaeologist recorded any identified items as per the lithic site recording form and lithic item recording form detailed below (no items were identified during the survey);
- The study area was recorded utilising survey recording forms. The following is a list of attributes that were recorded for each area surveyed:
 - Survey area;
 - Recorder name;
 - Date;
 - Landform element;
 - Slope;
 - Distance to watercourse;
 - Vegetation;
 - Land surface;
 - Rock outcrops;
 - Detection limiting factors;
 - Ground disturbance;
- The study area was divided into survey units based on landform and given ratings in the following categories:
 - Survey area (as defined by the length of area surveyed multiplied by two. A participant in this instance can only see 1m either side at a time. Survey area covered increases when more participants are added);
 - Total area surveyed;
 - Percentage of sample inspected;
 - Archaeological visibility (this is a percentage of potential within the landform);
 - Surface visibility;
 - Exposure type; &
 - Effective survey coverage
- Photos of each survey unit were recorded on the survey recording forms.



- Aboriginal lithic site recording forms were to be used to record artefact scatters and isolated finds (no items were identified during the survey). The following is a list of attributes that were to be recorded for each site identified:
 - Site Number;
 - Survey Area;
 - Date;
 - Recorder name;
 - Total number of artefacts recorded;
 - Visible extent of artefacts;
 - Extent of surface exposure;
 - GPS reading;
 - Sub-surface potential;
 - Research potential;
 - Raw stone material available;
 - Ground Disturbance;
 - Vegetation;
 - Photographs of site; &
 - Site plan.
- Each artefact would have been recorded using a lithic item recording form with the following attributes recorded:
 - Artefact number;
 - Locus;
 - Colour;
 - Stone material;
 - Lithic item type;
 - Length, Width & Thickness (mm);
 - Cortex Percentage;
 - Cortex type; &
 - Comments.

6.0 SURVEY RESULTS

A survey was undertaken on Tuesday 17 October 2017 by Apex Archaeology in conjunction with the RAPs for the study area as part of the assessment under the Code of Practice and Consultation Requirements. A total of eight representatives of seven RAPs participated in the site inspection.

Participants in the survey included:

- Leigh Bate, Apex Archaeology
- Glenda Chalker, Cubbitch Barta
- Jamie Eastwood, DACHA
- Justine Coplin, DCAC
- Paul Boyd, Didge Ngunawal
- Gordon Workman, DLO
- Johnathan Whitten, KYWG
- Marbuck Khan, KYWG
- Scott Franks, Tocomwall

The study area was surveyed in one pedestrian transect (Table 2) across one landform element (Table 3) by the eight survey participants. Each participant was responsible for inspecting a 2m wide portion of each transect walked. This meant that on each pass an area covering 16m would be observed for archaeological material.

Table 2: Survey Transects

Transect	Landform Element	Number of participants	Total Length
1	Simple Slope	8	700m

6.1 SURVEY COVERAGE

During the survey completed by Apex Archaeology the study area was inspected for Aboriginal archaeological evidence. An assessment of landform element and slope was made for the survey unit, with the results presented in Table 3.

Table 3: Survey area results

Survey Area #	Landform Element	Slope	Vegetation	Detection Limiting Factors	Ground Disturbance
GW01	Simple Slope	Gentle (>1.45°-5.45°)	Remnant Native trees (exotic grass)	vegetation/leaf litter/gravel/grass	moderate

The total survey coverage (meaning the areas physically inspected for archaeological evidence) was approximately 11,200m². The total area of the development impact is approximately 24,880m². A range of factors were considered and recorded during the survey, including the surface visibility (percentage of bare



ground within a survey unit); archaeological visibility (amount of bare ground within an area in which artefacts could be expected to be identified if present); exposure type (A or B soil horizon) and calculations of how effective the survey coverage was. The results of the survey coverage are presented in Table 4.

Table 4: Survey coverage results

Survey Area #	Total Area of Context (m ²)	Total Area Surveyed (m ²)	Surface Visibility (%)	Arch Vis (%)	Exposure Type (A/B)	Effective Coverage (m ²)	% Effective Survey Coverage of Context
GW01	24,880	11,200	10 to 15	10	A	222.1	0.89%

Surface visibility across the study areas was limited due to surface vegetation such as exotic grasses and leaf litter. Total effective survey coverage for the entire study area was 0.89%.

6.2 FIELDWORK RESULTS

During the Apex Archaeology survey, the area was noted to be heavily disturbed. No artefactual material was noted on the ground surface. The area was not considered to possess subsurface archaeological potential. No previously registered sites fall within the area.

The area has been graded and fill has been placed within the study area. Silt fences have been constructed. All these activities would have disturbed the ground surface.



Plate 1: General view across study area, showing graded surface and silt fence



Plate 2: General view across study area, showing silt fencing and grading of ground surface



Plate 3: Introduced fill along eastern boundary of site



Plate 4: General view of disturbance on site



6.3 DISCUSSION

The areas were noted to be consistently disturbed through various earthmoving activities. Historical aerial photographs show the area had been cleared of most vegetation by the 1940s.

While ploughing and clearance has occurred in many areas of the Cumberland Plain, this only affects the deposit up to 30-40cm deep, and even then ploughed knapping floors have been located which are still relatively intact (McDonald 1998).

The study area falls within an areas identified as being disturbed or possessing low archaeological potential (JMcDCHM 2007). However, there was no evidence of landforms with any archaeological potential within the study area during the site inspection. No archaeological material was identified on the ground surface and the site was not considered to have any potential for subsurface archaeological deposits to be present.



7.0 SIGNIFICANCE ASSESSMENT

In order to make decisions regarding heritage items, it is necessary to understand the significance of the item and explore the values which underpin the assessment of significance. Where development of an item or in the vicinity of an item is proposed, the level of significance associated with an item may influence the degree of impact which is considered acceptable.

7.1 ASSESSMENT CRITERIA

Archaeological significance is assessed based on the archaeological or scientific values of an area. These values can be defined as the importance of the area relating to several criteria. Criteria used for determining the archaeological significance of an area are as follows:

- **Research potential:** Can the site contribute to an understanding of the area/region and/or the state's natural and cultural history? Is the site able to provide information that no other site or resource is able to do?
- **Representativeness:** is the site representative of this type of site? Is there variability both inside and outside the study area? Are similar site types conserved?
- **Rarity:** is the subject area a rare site type? Does it contain rare archaeological material or demonstrate cultural activities that no other site can demonstrate? Is this type of site in danger of being lost?
- **Integrity/Intactness:** Has the site been subject to significant disturbance? Is the site likely to contain deposits which may possess intact stratigraphy?

Further, an assessment of the grade of significance is made, based on how well the item fulfils the assessment criteria. The Heritage Branch of the Department of Planning (now the Heritage Division of the Office of Environment and Heritage) 2009 guideline *Assessing Significance for Historical Archaeological Sites and 'Relics'* defines the grading of significance as follows:

Table 5: Grading of significance, from Heritage Branch 2009

Grading	Justification
Exceptional	Rare or outstanding item of local or State significance. High degree of intactness. Item can be interpreted relatively easily.
High	High degree of original fabric. Demonstrates a key element of the item's significance. Alternations do not detract from significance.
Moderate	Altered or modified elements. Elements with little heritage value but which contribute to the overall significance of the item.
Little	Alterations detract from significance. Difficult to interpret.
Intrusive	Damaging to the item's heritage significance.

Whilst this was developed for the assessment of significance of historical items, the criteria are applicable to Aboriginal significance assessments as well.



7.2 ARCHAEOLOGICAL SIGNIFICANCE ASSESSMENT

RESEARCH POTENTIAL

The study area is not considered to possess research potential.

REPRESENTATIVENESS

The site is highly disturbed and is not considered to have value under this criterion.

RARITY

The study area is not considered to be a rare landscape.

INTEGRITY/INTACTNESS

The site is considered to be highly disturbed and therefore is not considered to have integrity, nor be intact.

7.3 STATEMENT OF ARCHAEOLOGICAL SIGNIFICANCE

The study area for Gledswood Public School is not considered to have archaeological significance, due to its highly disturbed nature.



8.0 IMPACT ASSESSMENT

8.1 PROPOSED DEVELOPMENT

The proposed development involves the construction of a new public school for Gledswood. This would involve the construction of buildings, installation of associated infrastructure such as electricity, gas and water, construction of roads, landscaping, and other construction activities as required.

The proposed works would impact on the entire area.

8.2 POTENTIAL IMPACT

No surface artefacts were identified within the study area, and therefore the proposed development will not impact any surface artefacts. The study area is not considered likely to have subsurface potential for archaeological deposits, and therefore the proposal is unlikely to impact these. Therefore, the proposed development is not considered to have an impact on Aboriginal archaeological values within the study area.



9.0 MANAGEMENT AND MITIGATION MEASURES

9.1 GUIDING PRINCIPLES

Wherever possible and practicable, it is preferred to avoid impact to Aboriginal archaeological sites. In situations where conservation is not possible or practicable, mitigation measures must be implemented.

The Burra Charter: The Australia ICOMOS Charter for Places of Cultural Significance, 2013 (The Burra Charter) provides guidance for the management of culturally sensitive places. The Burra Charter is predominantly focussed on places of built heritage significance, but the principles are applicable to other places of significance as well.

The first guiding principle for management of culturally significant sites states that “places of cultural significance should be conserved” (Article 2.1). A cautious approach should be adopted, whereby only “as much as necessary but as little as possible” (Article 3.1) should be changed or impacted.

Mitigation measures depend on the significance assessment for the site. Cultural significance of sites should also be considered in consultation with the Aboriginal community during community consultation.

9.2 MITIGATION MEASURES

The site is not considered to possess archaeological values and therefore mitigation measures are not required.

10.0 RECOMMENDATIONS

The following recommendations are made on the basis of:

- The statutory requirements of the NP&W Act 1974
- The requirements of HCC
- The results of the archaeological assessment
- An assessment of the likely impacts of the proposed development
- The interests of the registered Aboriginal stakeholders and the cultural heritage record.

It was found that:

- The study area was subject to a previous AHIP (AHIP #1106218). This AHIP expired 30 October 2016.
- There are no registered Aboriginal sites within the study area.
- No surface expressions of artefacts were identified within the study area.
- The area was not considered to have potential for subsurface archaeological material to be present.
- The area was considered to be heavily disturbed.

Therefore, the following recommendations have been made.

RECOMMENDATION 1: NO FURTHER ARCHAEOLOGICAL ASSESSMENT REQUIRED

This report and the accompanying ATR detail the archaeological potential of the site, which has been assessed as nil. No further archaeological assessment is required for the site. No AHIP application is necessary.

RECOMMENDATION 2: DEVELOPMENT BOUNDARIES

The proposed development works must be contained within the assessed boundaries for this project. If there is any alteration to the boundaries of the proposed development to include areas not assessed as part of this archaeological investigation, further investigation of those areas should be completed to assist in managing Aboriginal objects and places which may be present in an appropriate manner.

RECOMMENDATION 3: STOP WORK PROVISION

Should unanticipated archaeological material be encountered during site works, all work must cease in the vicinity of the find and an archaeologist contacted to make an assessment of the find and to advise on the course of action to be taken. Further archaeological assessment and Aboriginal community consultation may be required prior to the recommencement of works. Any objects confirmed to be Aboriginal in origin must be reported to the OEH under Division 1, Section 89A of the NPW Act.

In the unlikely event that suspected human remains are identified during construction works, all activity in the vicinity of the find must cease immediately and the find protected from harm or damage. The NSW Police and the Coroner's Office



must be notified immediately. If the finds are confirmed to be human and of Aboriginal origin, further assessment by an archaeologist experienced in the assessment of human remains and consultation with both OEH and the RAPs for the project would be required.

This recommendation should be included in any Construction Environmental Management Plan developed for the site.

RECOMMENDATION 4: REPORTING

One digital copy of this report should be forwarded to the Office of Environment and Heritage for inclusion on the Aboriginal Heritage Information Management System (AHIMS).

One copy of this report should be forwarded to each of the registered Aboriginal stakeholders for the project.



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