

# Campbelltown Hospital Redevelopment (Stage 2): Aboriginal cultural heritage archaeological survey report

FINAL REPORT

Prepared for Root Partnerships

31 July 2018

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## Glossary

<b>AHIMS</b>	Aboriginal Heritage Information Management System
<b>Consultation requirements</b>	<i>Aboriginal cultural heritage consultation requirements for proponents 2010</i> (DECCW 2010a)
<b>DA</b>	Determining Authority
<b>DECCW</b>	Department of Environment, Climate Change and Water (now OEH)
<b>DP</b>	Deposited Plan
<b>EIS</b>	Environmental Impact Statement
<b>GDA</b>	Geocentric Datum of Australia
<b>GPS</b>	Global Positioning System
<b>GSV</b>	Ground Surface Visibility
<b>ICOMOS</b>	International Council on Monuments and Sites
<b>LEP</b>	Local Environmental Plan
<b>LGA</b>	Local Government Area
<b>MGA</b>	Map Grid of Australia
<b>NPW Act</b>	National Parks and Wildlife Act
<b>NSW</b>	New South Wales
<b>OEH</b>	NSW Office of Environment and Heritage
<b>PAD</b>	Potential Archaeological Deposit
<b>Project area</b>	Lot 6 DP 1058047
<b>REF</b>	Review of Environmental Factors
<b>SEPP</b>	State Environmental Planning Policy
<b>SSD</b>	State Significant Development
<b>The code</b>	<i>Code of Practice for Archaeological Investigation of Aboriginal Objects in NSW</i> (DECCW 2010)

## Summary

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Biosis Pty Ltd was commissioned by the Root Partnerships to undertake an Aboriginal cultural heritage assessment for the proposed Stage 2 of the Campbelltown Hospital Redevelopment, Campbelltown, NSW. The assessment will inform an Environmental Impact Statement (EIS) that is being prepared as part of a State Significant Development (SSD 9241) approval for the project.

The study area is located approximately 1.2 kilometres south west of the Campbelltown CBD and approximately 51 kilometres south west of Sydney CBD (Figure 1). The study area comprises of 19.33 hectares of public land and the adjacent road reserves, and is currently zoned SP2. It encompasses Lot 6 DP 1058047 and is bounded by Appin Road to the east, Therry Road to the south, Parkside Crescent to the west, and Campbelltown Private Hospital and IRT Macarthur Lifestyle Community to the north.

Background research identified that there are no Aboriginal sites registered with Aboriginal Heritage Information Management System (AHIMS) within the study area. An archaeological survey was conducted on 17 May 2018. The overall effectiveness of the survey for examining the ground for Aboriginal sites was considered to be low, due to both low ground surface visibility (GSV) predominantly due to vegetation cover (pasture grasses) and the extent of civic development within the study area. No new sites were discovered during the archaeological survey.

In addition, the significant disturbances that have occurred within the study area over a long period of time have impacted upon the preservation and integrity of any cultural materials that may have been present. This is consistent with two previous Aboriginal heritage assessments undertaken of the study area by GML (2011) and Austral Archaeology (2012) who both concluded that there was low archaeological potential for Aboriginal sites to be located within an intact subsurface context and the likelihood of impacting any sites during works would be low.

The following recommendations were made:

### **Recommendation 1: No further archaeological assessment is required in areas of low archaeological potential**

No further archaeological work is required in areas identified as having low archaeological potential except in the event that unexpected Aboriginal sites, objects or human remains are unearthed during development.

### **Recommendation 2: Discovery of Unanticipated Aboriginal Objects**

All Aboriginal objects and Places are protected under the NSW National Parks and Wildlife Act 1974. It is an offence to knowingly disturb an Aboriginal site without a consent permit issued by the Office of Environment and Heritage (OEH). Should any Aboriginal objects be encountered during works associated with this proposal, works must cease in the vicinity and the find should not be moved until assessed by a qualified archaeologist. If the find is determined to be an Aboriginal object the archaeologist will provide further recommendations. These may include notifying the OEH and Aboriginal stakeholders.

### **Recommendation 3: Discovery of Aboriginal Ancestral Remains**

Aboriginal ancestral remains may be found in a variety of landscapes in NSW, including middens and sandy or soft sedimentary soils. If any suspected human remains are discovered during any activity you must:

1. Immediately cease all work at that location and not further move or disturb the remains.

2. Notify the NSW Police and OEH's Environmental Line on 131 555 as soon as practicable and provide details of the remains and their location.
3. Not recommence work at that location unless authorised in writing by OEH.

# 1 Introduction

---

## 1.1 Project background

Biosis Pty Ltd was commissioned by the Root Partnerships to undertake an Aboriginal archaeological investigation for the proposed for Stage 2 of the Campbelltown Hospital Redevelopment, Campbelltown, NSW (Figure 3). The assessment will inform an Environmental Impact Statement (EIS) that is being prepared as part of a State Significant Development (SSD 9241) approval for the project.

Biosis understands from reviewing the heritage documents prepared as part of the Stage 1 EIS that there is limited potential for historical heritage values within the Campbelltown Hospital site. In addition, the study area has undergone two previous Aboriginal heritage assessment, also as part of the Stage 1 EIS (GHL 2011, Austral Archaeology 2012). Therefore, Biosis will utilise the results of both of these assessment in order to expedite the Stage 2 reporting process.

This investigation has been carried out under Part 5 of the *Environmental Planning and Assessment Act 1979 NSW*. It has been undertaken in accordance with the *Code of Practice for Archaeological Investigation of Aboriginal Objects in New South Wales* (DECCW 2010) ('the code'). The code has been developed to support the process of investigating and assessing Aboriginal cultural heritage by specifying the minimum standards for archaeological investigation undertaken in NSW under the NPW Act. The archaeological investigation must be undertaken in accordance with the requirements of the code.

It is stated in section 1.2 of the code that where the Aboriginal cultural heritage assessment concludes that the proposed activity will result in harm to Aboriginal objects or declared Aboriginal Places, an application for an Aboriginal Heritage Impact Permit (AHIP) will be required. This application must be supported by an Aboriginal Cultural Heritage Assessment Report (ACHAR).

The *Environmental Planning and Assessment Act 1979* (EP&A Act) includes provisions for local government authorities to consider environmental impacts in land-use planning and decision making. Each Local Government Area (LGA) is required to create and maintain an LEP that includes Aboriginal and historical heritage items. Local Councils identify items that are of significance within their LGA, and these items are listed on heritage schedules in the local LEP and are protected under the EP&A Act and *Heritage Act 1977*.

## 1.2 Project area

The study area is located approximately 1.2 kilometres south west of the Campbelltown CBD and approximately 51 kilometres south west of Sydney CBD (Figure 1 and Figure 2). The study area comprises of 19.33 hectares of public land and the adjacent road reserves, and is currently zoned SP2.

The study area is within the:

- Campbelltown Local Government Area (LGA).
- Parish of St Peters.
- County of Cumberland.

It encompasses Lot 6 DP 1058047 and is bounded by Appin Road to the east, Therry Road to the south, Parkside Crescent to the west, and Campbelltown Private Hospital and IRT Macarthur Lifestyle Community to the north.



### 1.3 Planning approvals

The proposed development will be assessed against Part 5 of the *Environmental Planning and Assessment Act 1979* NSW (EP&A Act). Other relevant legislation and planning instruments that will inform this assessment include:

- *State Environmental Planning Policy (State and Regional Development) 2011.*
- *Environmental Planning and Assessment Act 1979.*
- *Biodiversity Conservation Act 2016.*
- *NSW National Parks and Wildlife Act 1974* (NPW Act).
- *NSW National Parks and Wildlife Amendment Act 2010.*
- *Infrastructure State Environmental Planning Policy 2007.*
- *Campbelltown Local Environmental Plan 2015* (LEP).

### 1.4 Objectives of the investigation

The objectives of the investigation can be summarised as follows:

- To conduct additional background research in order to recognise any identifiable trends in site distribution and location.
- To search statutory and non-statutory registers and planning instruments to identify listed Aboriginal cultural heritage sites within the study area.
- To highlight environmental information considered relevant to past Aboriginal occupation of the locality and associated land use and the identification and integrity/preservation of Aboriginal sites.
- To summarise past Aboriginal occupation in the locality of the study area using ethnohistory and the archaeological record.
- To formulate a model to broadly predict the type and character of Aboriginal sites likely to exist throughout the study area, their location, frequency and integrity.
- To conduct a field survey of the study area to locate unrecorded or previously recorded Aboriginal sites and to further assess the archaeological potential of the study area.
- To assess the significance of any known Aboriginal sites in consultation with the Aboriginal community.
- To identify the impacts of the proposed development on any known or potential Aboriginal sites within the study area.
- To recommend strategies for the management of Aboriginal cultural heritage within the context of the proposed development.

### 1.5 Aboriginal consultation

It is recognised in NSW that Aboriginal people are the primary determinants of the significance of their cultural heritage. A landscape may hold intangible values that can be assessed only by the Aboriginal community. This assessment has been prepared without consultation with the Aboriginal community; however, consultation was previously undertaken by Austral Archaeology (2012) which met the standards of the *Draft Guidelines for Aboriginal Cultural Heritage Impact Assessment and Community Consultation* (DEC 2005)

and the *Aboriginal Cultural Heritage Consultation Requirements for Proponents* (DECCW 2010a). Six stakeholders registered for consultation and were provided with a copy of the assessment conducted by GML (2011) with a request for replies. The only registered Aboriginal stakeholder to respond was Peter Falks of PFC. No specific landscape values were raised by the local Aboriginal stakeholders during the consultation process.

## 1.6 Investigators and contributors

The roles, previous experience and qualifications of the Biosis project team involved in the preparation of this archaeological report are described below in Table 1.

**Table 1 Investigators and contributors**

Name and qualifications	Experience summary	Project role
<b>Alexander Beben</b> MA Arch, BA (Hons) Arch	Alex has eleven years' archaeological experience and has conducted over 200 heritage projects across Australia and internationally in the UK and Italy. He has extensive experience in the successful completion of Aboriginal and historical assessments, archaeological surveys, excavations, permit applications and management plans. Alex is accomplished in obtaining approvals under the <i>NSW National Parks and Wildlife Act 1974</i> and <i>NSW Heritage Act 1977</i> . He has operated as the heritage consultant within large multidisciplinary teams tasked with managing heritage values under the <i>NSW Environmental Planning and Assessment Act 1979</i> and <i>Environment Protection and Biodiversity Act 1999</i> .  Due to his diverse experience across multiple regions, legislative frameworks and industry sectors, Alex has developed a detailed understanding of the urban and regional heritage values across NSW. This experience has enabled him to forge close relationships with Aboriginal stakeholders and government regulators. Alex is frequently able to utilise his experience and leverage industry relationships to formulate innovative methodologies to ensure that his projects meet the expectations of the parties involved.	<ul style="list-style-type: none"> <li>• Quality assurance</li> <li>• Technical advice</li> </ul>
<b>Samantha Keats</b> BA (Hons)	Samantha is an archaeologist with Biosis Wollongong office. Samantha has two years' experience as an archaeologist, with a particular research focus on rock art assemblages and ochre in the north-west Kimberley region of Australia. Samantha has experience in conducting desktop assessments, archaeological survey and Aboriginal and historical excavation as well as consulting with Traditional Owners. She has participated in a number of European historical excavations and monitoring programs in NSW and has authored several Statement of Heritage Impact reports and Heritage Assessments.	<ul style="list-style-type: none"> <li>• Project manager</li> <li>• Field inspection</li> <li>• Reporting</li> </ul>

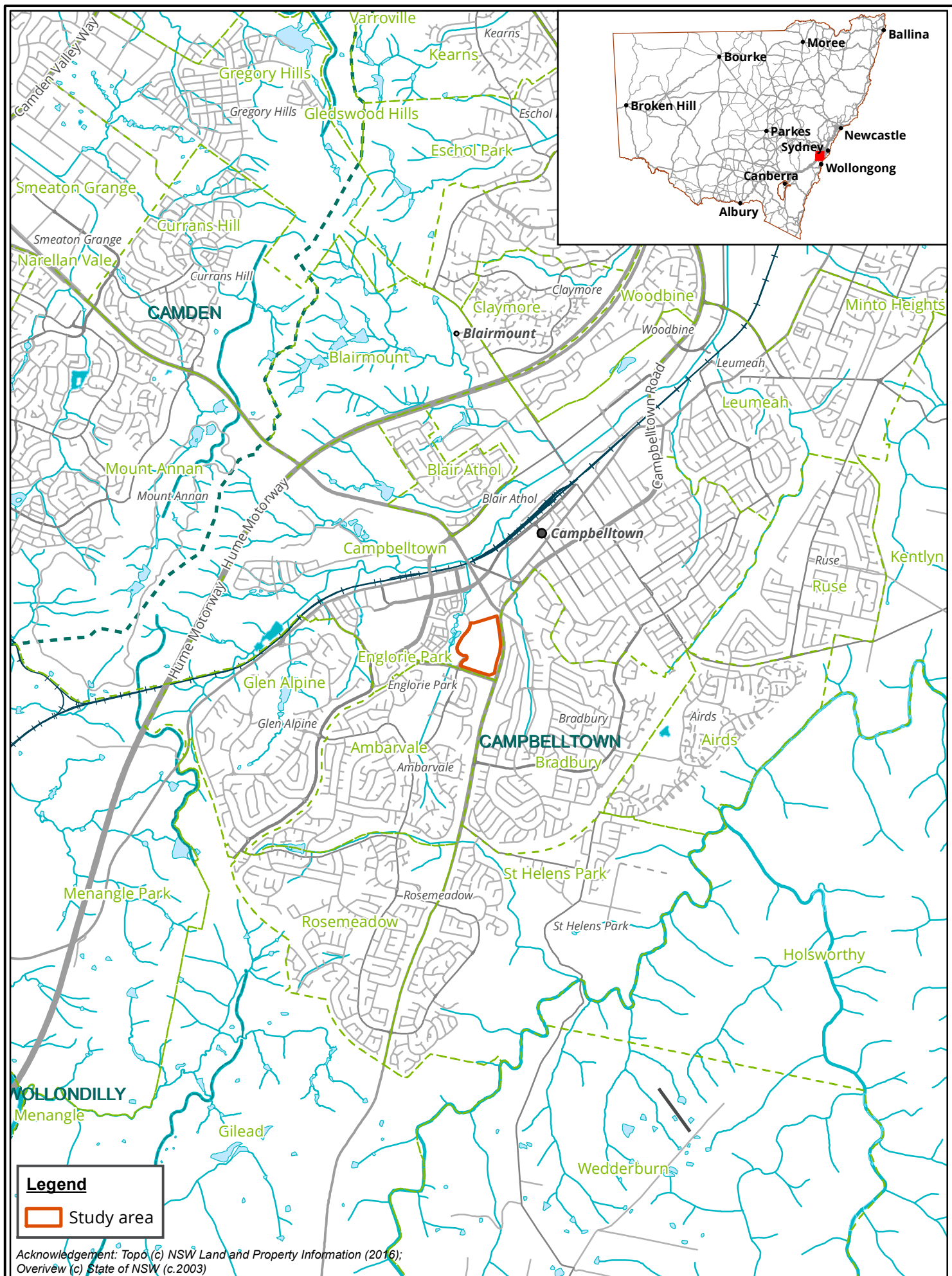
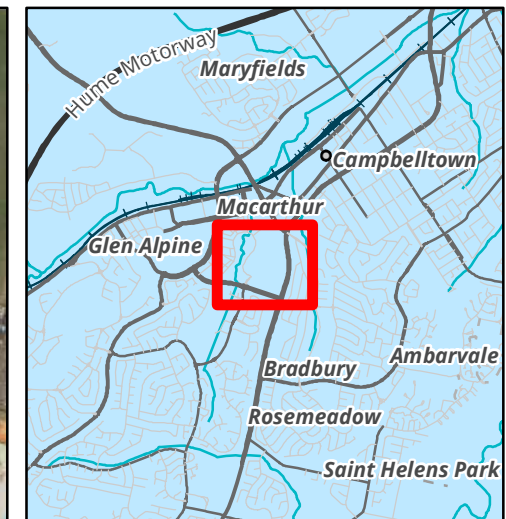


Figure 1: Location of the study area in a regional context





#### Legend

Study area

**Figure 2: Detail of the study area**

0 30 60 90 120 150  
Metres

Scale: 1:3,000 @ A3  
Coordinate System: GDA 1994 NSW Lambert



Albury, Ballarat, Melbourne,  
Newcastle, Sydney, Wangaratta & Wollongong

Matter: 27658  
Date: 30 May 2018,  
Checked by: SJK, Drawn by: LW, Last edited by: IWilson  
Location: P:\27600s\27658\Mapping\27658\_AR\_F2\_StudyArea



## 2 Proposed development

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Campbelltown Hospital Redevelopment Stage 2 includes the following works:

- Demolition of existing structures.
- Partial excavation of the site (due to the sloping topography).
- The construction of a new 13 storey (two of these levels are partially below ground) Clinical Services Building containing:
  - An Emergency Department
  - Operating Theatres
  - Intensive Care Unit
  - Mental Health
  - Birthing and Speciality Care Nursery
  - Surgical and Medical Beds
  - Helipad facilities
  - An Ambulance Bay
- Construction of a new Hospital Spine and connections to existing hospital buildings.
- Construction of augmented and new internal hospital access roads and links, including a connection to Appin Road and Therry Road.
- Construction of an at-grade car park.
- Tree removal.
- Associated building services.

Details of the proposed development are outlined in Figure 3.



## 3 Desktop assessment

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The desktop assessment involves researching and reviewing existing archaeological studies and reports relevant to the study area and surrounding region. This information is combined to develop an Aboriginal site prediction model for the study area, and to identify known Aboriginal sites and/or places recorded in the study area. This Desktop Assessment has been prepared in accordance with requirements 1 to 4 of the *Code of Practice for the Archaeological Investigation of Aboriginal Objects in New South Wales* (DECCW 2010).

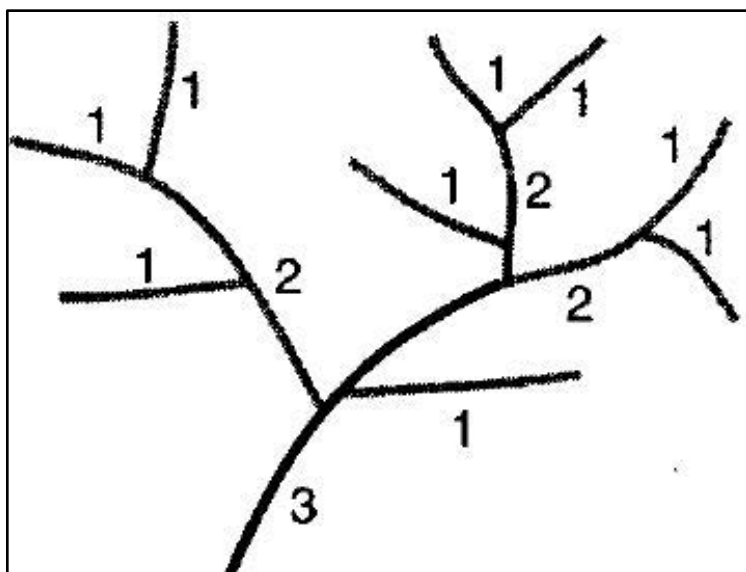
### 3.1 Landscape context

It is important to consider the local environment of the study area any heritage assessment. The local environmental characteristics can influence human occupation and associated land use and consequently the distribution and character of cultural material. Environmental characteristics and geomorphological processes can affect the preservation of cultural heritage materials to varying degrees or even destroy them completely. Lastly landscape features can contribute to the cultural significance that places can have for people.

#### 3.1.1 Topography and hydrology

The study area is located on the eastern margin of the Cumberland Plain and is formed on the sediments of the Wianamatta Group (Hazleton & Tille 1990). They comprise shale, with occasional calcareous claystone, laminite and coal. More recent Tertiary and Quaternary sediments overlie the shales along river and creek beds (Figure 4). The Cumberland Plain generally comprises gently undulating plains and low rolling hills, rising gradually from the flat, low-lying areas just above sea level in the north, to an altitude of around 300 metres on the hills of the Razorback Range in the south (Hazleton and Tille 1990).

Stream order is recognised as a factor which helps the development of predictive modelling in Aboriginal archaeology in NSW. Predictive models which have been developed for the region have a tendency to favour permanent water courses as the locations of campsites as they would have been more likely to provide a stable source of water and by extension other resources which would have been used by Aboriginal groups.



**Plate 1 Diagram showing Strahler stream order (Ritter et al. 1995, p. 151)**

The stream order system used for this assessment was originally developed by Strahler (1964). It functions by adding two streams of equal order at their confluence to form a higher order stream, as shown in Plate 1. As stream order increases, so does the likelihood that the stream would be a perennial source of water.

The study area is located between two small ephemeral creeks. Fishers Ghost Creek is a second order creek that is located 30 metres to the east and drains water from the low ridgeline in the south east corner of the study area. Birunji Creek is located 100 metres west of the study area and is also a second order creek that drains water from the lower slopes in the study area. Both creeks flow towards the north and eventually drain into Bow Bowing Creek and the Georges River.

### 3.1.2 Soil landscapes

Soil landscapes have distinct morphological and topological characteristics that result in specific archaeological potential. Because they are defined by a combination of soils, topography, vegetation and weathering conditions, soil landscapes are essentially terrain units that provide a useful way to summarise archaeological potential and exposure.

The Blacktown soil landscape covers the entire study area and is characterised as a residual landscape that consists of gently undulating rises without rock outcrops with a local relief of up to 30 metres with slopes less than 5% gradient (Figure 5). Broad rounded crests and ridges with gently inclined slopes are the dominant topography of this landscape (Hazelton and Tille 1990, p. 27). The soils consist of shallow to moderately deep podzols. Due to their age and slow accumulation, residual soil landscapes have reasonable potential to contain archaeological deposits in an open context, such as stone artefacts derived from occupation sites. Other occupation evidence might include scarred trees where remnant vegetation survives. However, the slow accumulation and high impact of extensive land clearing (usually associated with pastoral and civic development) during more recent times often results in poor preservation of archaeological material.

**Table 2 Blacktown soil landscape characteristics (Hazelton and Tille 1990)**

Soil material	Description
<b>Blacktown 1 (bt1)</b>	Friable brownish-black loam. This is a friable brownish-black loam to clay loam with moderately pedal sub-angular blocky structure and rough-faced porous ped fabric. This material occurs as topsoil (A1 horizon).
<b>Blacktown 2 (bt2)</b>	Hardsetting brown clay loam. This is a hardsetting brown clay loam to silty clay loam with apedal massive to weakly pedal structure and slowly porous earthy



Soil material	Description
	fabric. It commonly occurs as an A2 horizon.
<b>Blacktown 3 (bt3)</b>	Strongly pedal, mottled brown light clay. This is a brown light to medium clay with strongly pedal polyhedral or subangular-blocky structure and smooth-faced dense ped fabric. This material usually occurs as subsoil (B horizon).
<b>Blacktown 4 (bt4)</b>	Light grey plastic mottled clay. This is a plastic light grey silty clay to heavy clay with moderately pedal polyhedral to sub-angular blocky structure and smoothfaced dense ped fabric. This material usually occurs as deep subsoil above shale bedrock (B3 or C horizon).

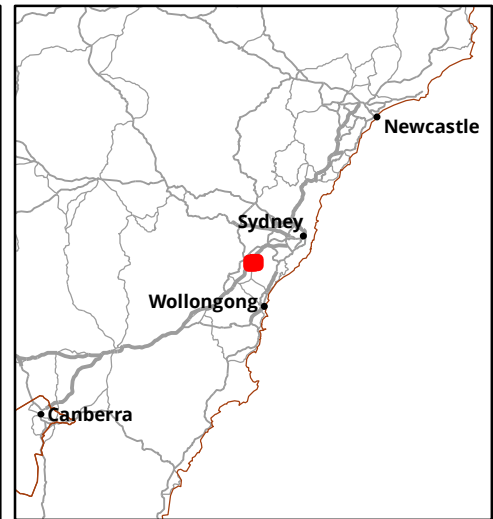
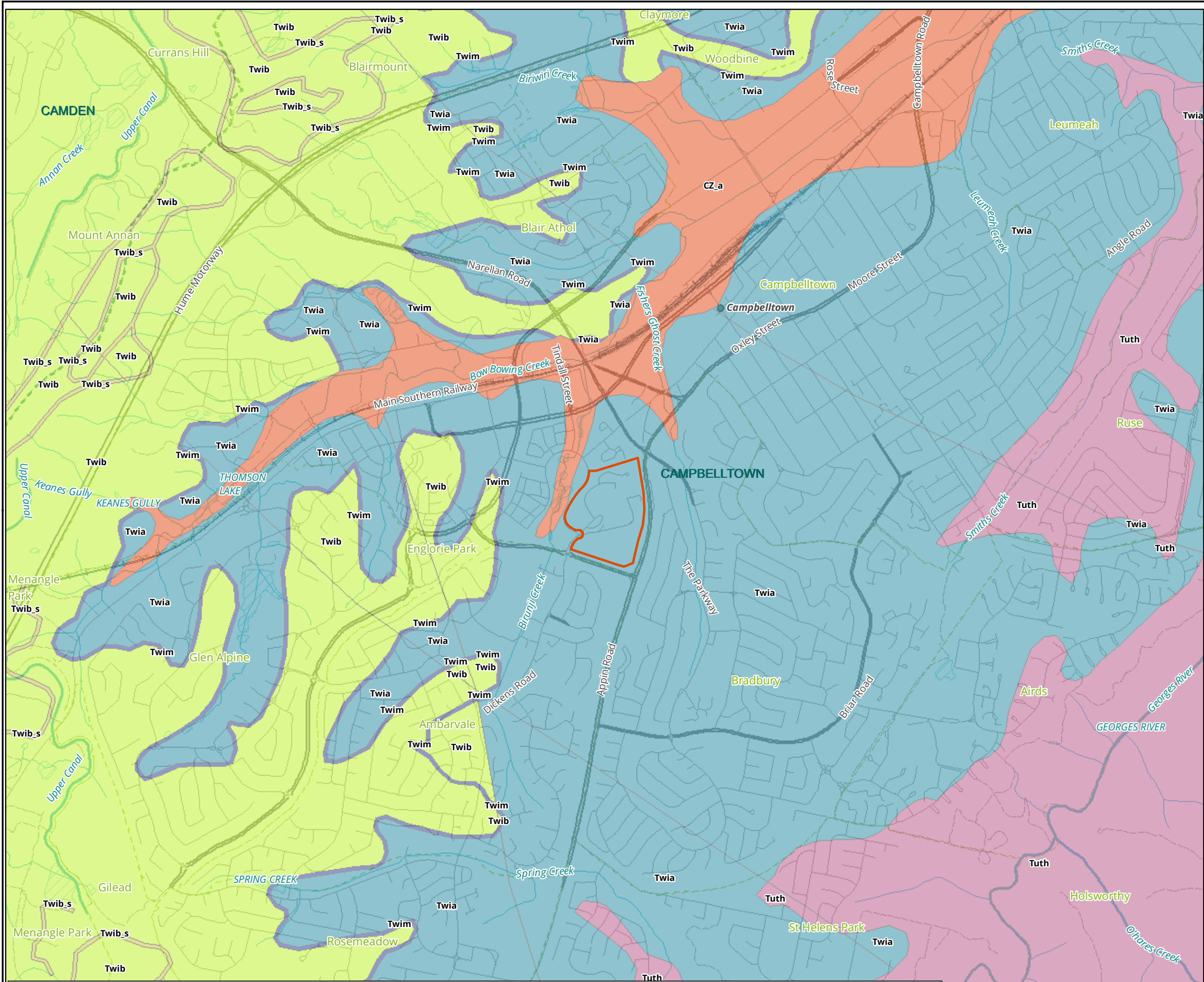
### 3.1.3 Landscape resources

The Campbelltown region would have generally provided a number of resources used by Aboriginal inhabitants. The wider region includes distinct ecological zones, including open forest and open woodland, with riparian vegetation extending along many of the watercourses. Each ecological zone hosts a different array of floral and faunal species, many of which would have been utilised according to seasonal availability. Aboriginal inhabitants of the region would have had access to a wide range of avian, terrestrial and aquatic fauna and repeated firing of the vegetation would have opened up the foliage allowing ease of access through and between different resource zones.

Prior to settlement, the dominant vegetation community consisted of Cumberland Plain woodland and open forest of grey box, forest red gum, narrow-leaved ironbark, thin-leaved stringybark, cabbage gum while the poorly drained valley floors, often salt affected, were dominated by with swamp oak and paperbark. Many of the plants found within the area were important to Aboriginal people and could be used for numerous purposes. These include using the wood to make implements, berries leaves and tubers for food and medicines as well as bark for shelters. One of the plants exploited may have been the eucalypt, whose leaves can be crushed and used for medicinal purposes, while the sap can be used as a sweet sugary food source and the bark could be used to make bowls and shelters (Rhoads and Dunnet 1985).

The various fauna species present within the study area would have provided a range of resources for Aboriginal people. Terrestrial and avian resources were not only used for food, but also provided a significant contribution to the social and ceremonial aspects of Aboriginal life through their use as ritual implements or even simply through fashioning as personal adornments (Attenbrow 2010, p. 107-10). Mammals such as kangaroos and wallabies and arboreal mammals such as possums were used as a food source and also for tool making. Bones and teeth were used as points or barbs for hunting spears and fishing spears. Tail sinews are known to have been used as a fastening cord, whilst 'bone points' frequently occur in rock shelters (Attenbrow 2010, p. 99). Animal skin, fur and sinews were also used for personal adornment and in making cloaks. Animals such as Brush-tailed Possums were highly prized for their fur, with possum skin cloaks recorded by the first settlers in the area. The cloaks were worn fastened over one shoulder and under the other. Kangaroo teeth were incorporated into decorative items such as head bands and beads were made from reeds and teeth. Aquatic species such as freshwater crayfish, fish and eels would have been easily accessible in larger waterways, such as the Nepean River (Rosen 1995).

The geology of the region provides an abundant supply of raw materials. Silcrete is the main stone raw-material type suitable for Aboriginal tool manufacture that is likely to occur in the vicinity of the study area in any abundance. It would have been available in the form of rock outcrops exposed on the Cumberland Plain. Elsewhere in the region, the potential raw materials for stone artefact making include silicified wood, siliceous tuff, mudstone, quartz, quartzite and basalt. River gravels and cobbles containing silcrete, chert, and other fine grained volcanic rocks were also used (Attenbrow 2010, Dallas 1982).



#### Legend

Study area

#### Geological Units

CZ\_a - Alluvium

Tuth - Hawkesbury Sandstone

Twia - Ashfield Shale

Twib - Bringelly Shale

Twib\_s - Bringelly Shale - sandstone

Twim - Minchinbury Sandstone

**Figure 5: Geology within the study area**

0 200 400 600 800 1,000  
Metres

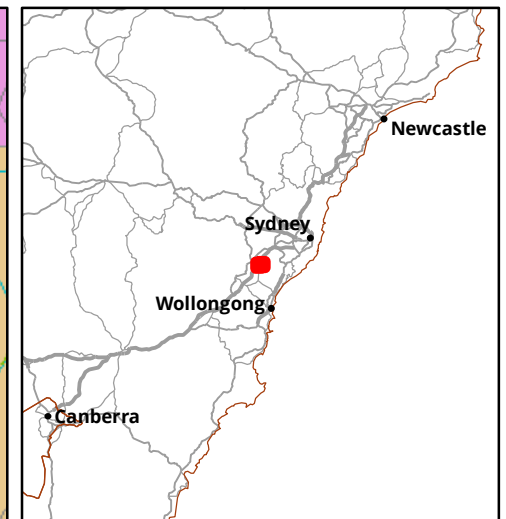
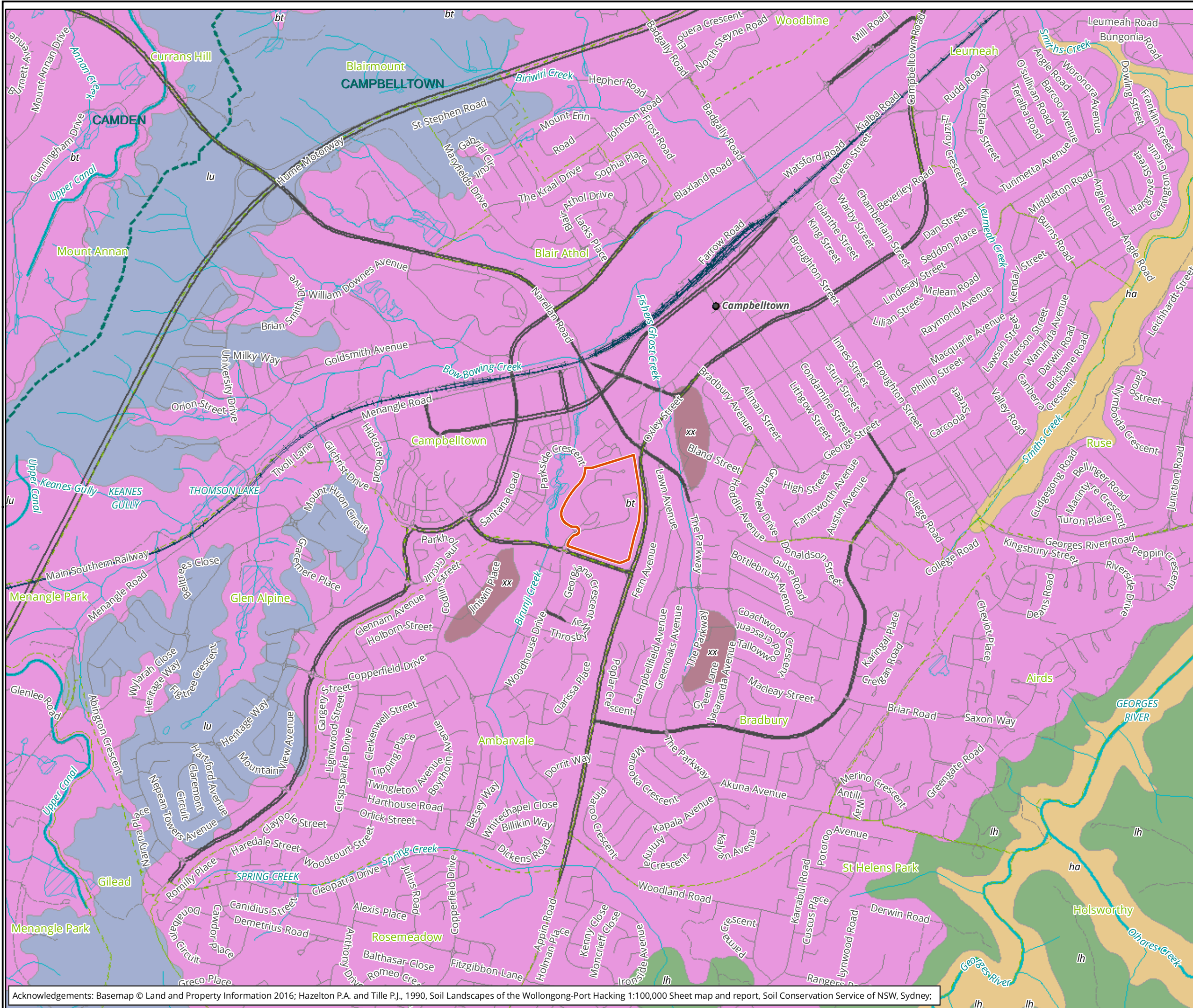
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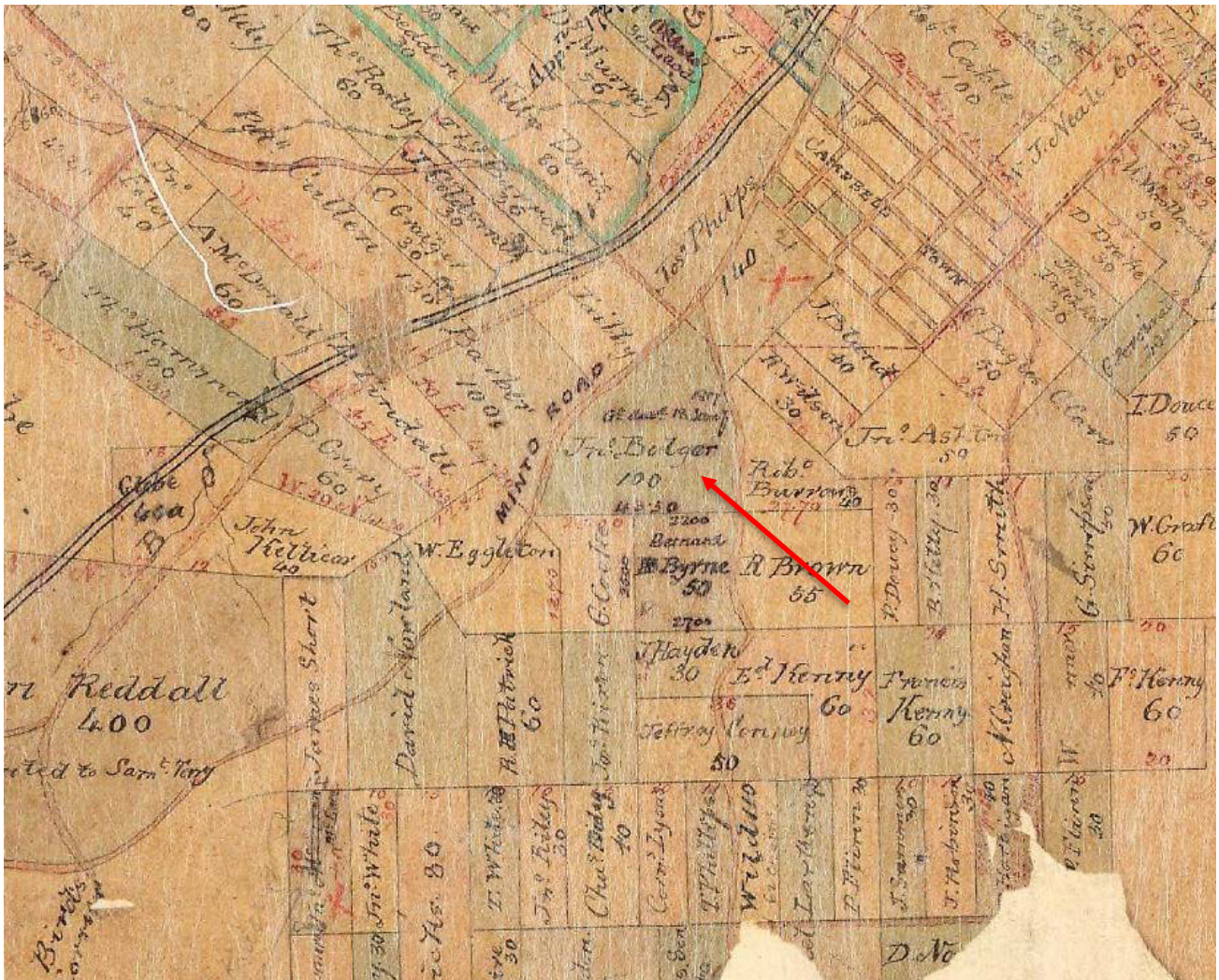


Acknowledgements: Basemap © Land and Property Information 2016; Hazelton P.A. and Tille P.J., 1990, Soil Landscapes of the Wollongong-Port Hacking 1:100,000 Sheet map and report, Soil Conservation Service of NSW, Sydney;



### 3.1.4 Land use history

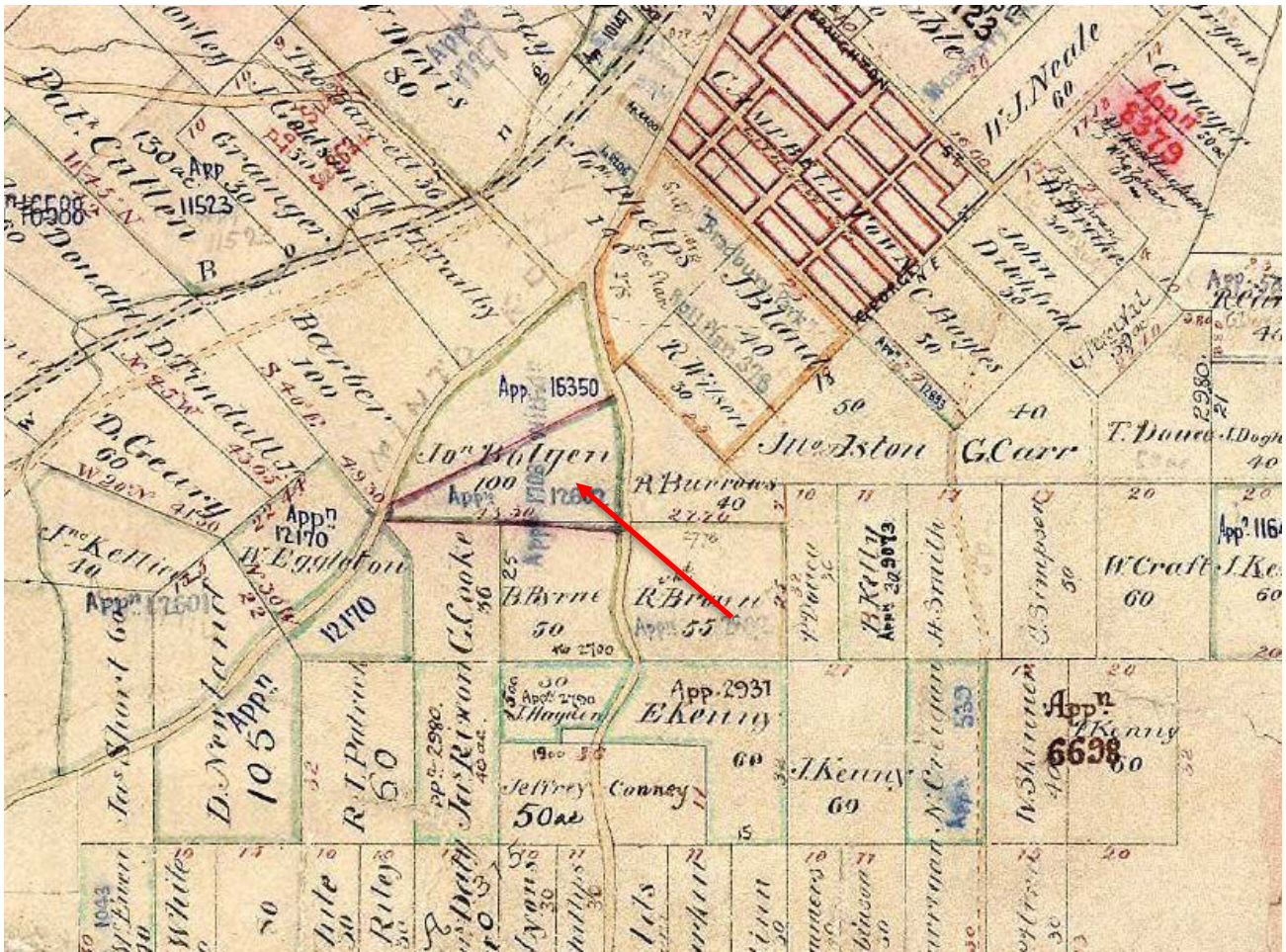
The study area lies within land that was originally part of 100 acres (Portion 71) granted to John Bolger by Governor Macquarie in 1817 (Plate 2). Soon after it was granted, former convict and government surveyor James Meehan purchased the property. Bolger's 100 acres was most likely tenanted by farmers as Meehan's main farm was Macquarie Fields at Ingleburn (Perry 1967). Meehan died in 1826 and his son Thomas inherited his father's property; however, eight years later Thomas died leaving his wife in Liverpool Asylum and two infant daughters. One the daughters, Elizabeth, inherited the land and in 1865 married Frederick Barker.



**Plate 2** Parish map showing John Bolger's 100 acre grant marked in red (Source: NSW Land Registry Services).

Frederick and Elizabeth were unable to meet their mortgage repayments and the land was subdividing into two farms in 1874 (Plate 3). The northern portion was purchased by Daniel Fowler and the southern portion purchased by James Fitzpatrick. Both Fowler and Fitzpatrick had major land holdings in the Campbelltown region and the purchase of Bolger's land added to their property holdings (GML 2011, p6).





**Plate 3** 1882 parish map showing the subdivision of Bolger's 100 acres into two farms (Source: NSW Land Registry Services).

Daniel Fowler owned the northern portion of land until his death in 1899, when his son William Fowler inherited the land. George Spearing, a local butcher from Campbelltown, purchased the 59 acres in 1914 and the land remained within the Spearing family until 1953 until it was bought by Donald McDonald.

Adjoining the land to the north, a nine hole golf course was built in 1926. It was rough course that was watered by rain and attended to by its members (Plate 4). The golf course comprised of 47 acres and had been leased to the club until it was purchased by Campbelltown Council. It soon became clear that the golf club facilities were inadequate due to the influx of returning servicemen in the 1950s and the residential development that followed (GHL 2001, p. 8). The new 18 hole championship golf course opening in 1957; however, an international standard course was constructed in 1978 just south of the original course in an area that became known as Glen Alpine. The original course was closed, with a portion of it transferred to Lend Lease, and the remaining 30 acres was acquired by the NSW Health Commission in 1980 to enlarge Campbelltown Hospital.



**Plate 4 c.1950 photograph of Campbelltown Golf Course looking south. Appin Road is on the left and the site of the future hospital is marked with a red arrow (Source: Campbelltown and Airds Historical Society).**

The southern portion of James Bolger's land was owned by James Fitzpatrick from 1874 until his death in 1888. Fitzpatrick was one of 42 protesters transported to NSW from Ireland in 1822 and in 1825 acquired his ticket of leave. During the 1840s and 1850s, he purchased many farms south and west of Campbelltown and by the 1860s, he owned the majority of farms west from Campbelltown to Narellan and south towards Menangle (Robinson 1976, p. 162-168). Fitzpatrick died three months after the death of his wife in 1888, leaving three young children and vast estates, which were managed by Trusts for many years. The 54 acres was purchased by a grazier, Samuel Allen, in 1925 and the following year purchased by another farmer, Clarence Ducat. The Ducat's owned the farm until 1961, when King Dairy acquired the property. Seven years later it was resumed by the State Planning Authority of NSW as part of the strategic planning for growth in the Campbelltown area. In 1973, it was decided that the land be transferred to the Hospital Commission for Stage 1 of the Campbelltown Hospital Complex (GHL 2011, p. 8).

During the 1840s, Campbelltown had several resident doctors; however, medical services were expensive and the sick and elderly relied on support of their family or on charitable institution such as the asylum for the destitute in Liverpool (Liston 1988, p. 112). In 1896, the Parliamentary Standing Committee on Public Works proposed building a new hospital in Campbelltown for the chronically ill to take the pressure off the facilities at Rookwood. A 700 acre site was approved by the Public Works Committee; however, the project cost was large and the project was never constructed (Liston 1988, p. 158).

The Camden Cottage Hospital was opened in 1902 and for the next 70 years, this was the closest hospital to Campbelltown. During the 1920s, the Campbelltown Auxiliary Committee met to raise funds for Camden District Hospital, the Hospital for Infants and the Liverpool Ambulance Service. It was this committee that in



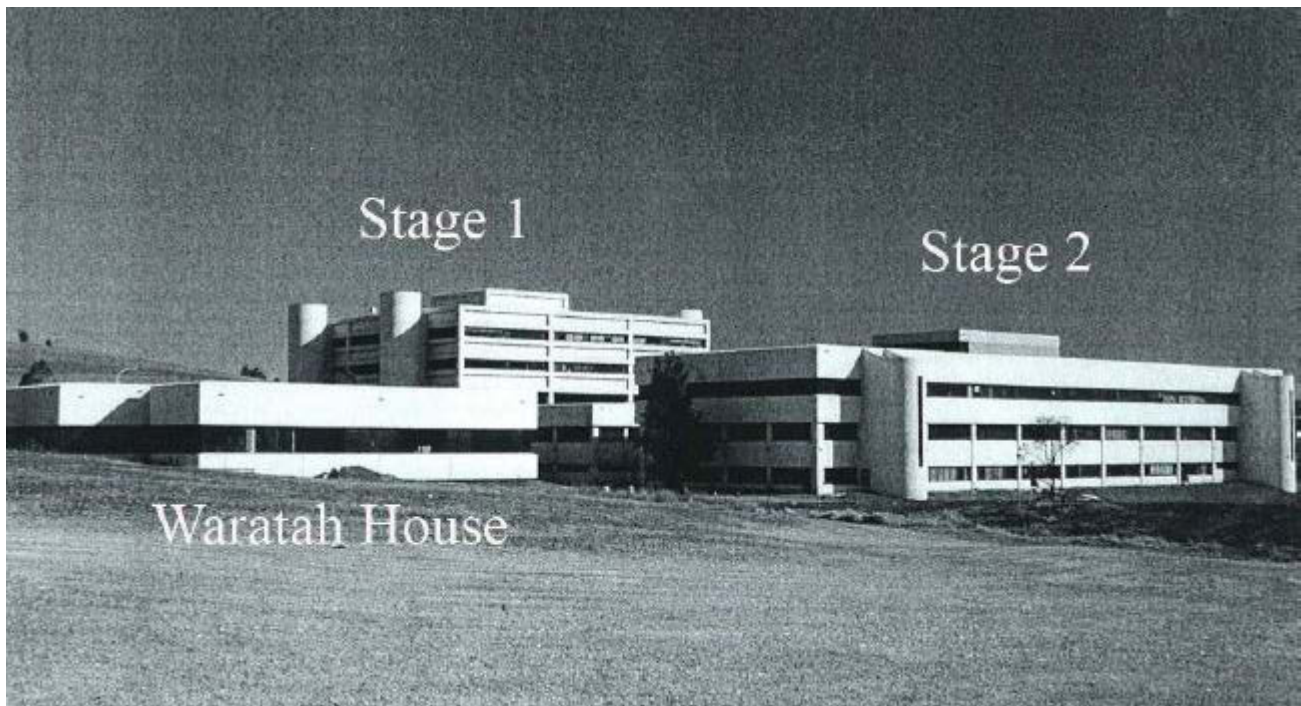
1952 concentrated their efforts to bring the long awaited hospital to Campbelltown (Liston 1988, p. 158). Construction began in 1974 just weeks following Gough Whitlams' release of funding.

Stage 1 of the hospital was designed by Barry Patten from Yuncken Freeman Architects Pty Ltd of Melbourne. The first stage of the hospital rose above the surrounding landscape as a visually imposing representation of the new civic era of Campbelltown with its externally expressed circular stair towers paired around central public and emergency entrances (Plate 5). Also part of Stage 1 was the construction of a day surgery unit in 1980 located between the main hospital and the circular carpark.



**Plate 5      Opening of the Campbelltown Hospital in 1977 (Source: Campbelltown and Airs Historical Society).**

Stage 2 began construction in March 1984 on part of the former golf course that had been set aside for this purpose by the State Government in 1980. Designed by Leighton Irwin Architects and Health Facility Planners, the new Stage 2 building continued to use curved, externally expressed stairs within a more subtle building (Plate 6). Stage 2 also included the construction of Waratah House, a psychiatric unit linked to the hospital by a service corridor, and a single storey extension to the western façade of the main building to create a new entrance with office and outpatient facilities.



**Plate 6** 1986 photograph showing the completion of Stage 2 and Waratah House (Source: Campbelltown City Library).

Stage 3 saw a major redevelopment of the hospital, which took place between 1998 and 2004. Construction of a new five storey clinical block began in 1998 and contained operating theatres, emergency department, intensive care unit, and a new main entrance built on a lower level between Block A and B. The single storey Cancer Treatment Centre (CTC) was also part of Stage 3 construction works and housed two linear accelerator bunkers, as was the single storey Paediatric Ward attached to the Stage 2 maternity block. In 2003, an adolescent Mental Health Building (GNA KA LUN) for youth under 18 years was constructed, which was followed in 2004 by the Youth Mental Health Building (BIRUNJI) for children under 14 years.

In 2011, the NSW Premier promised \$194 million for improvement to the hospital. The Campbelltown Hospital Redevelopment Stage 1 comprised of a new six-storey acute services building with new inpatient wards, ambulatory care, outpatient, allied health services, pathology and clinical information. The redevelopment also included construction of a new covered walkway, new patient drop off zone, six visitor parking spaces and service vehicle access from Parkside Crescent, new landscaped entry driveway, internal landscaped courtyards and new communal café, the refurbishment and reconfiguration of the existing maternity department, paediatric outpatients, and emergency department and support services within the existing hospital buildings. Construction commenced in 2013 and was completed in 2015.

### 3.2 Aboriginal context

It is generally accepted that Aboriginal peoples have inhabited Australia for the last 65,000 years (Clarkson et al. 2015). Dates of the earliest occupation of the continent by Aboriginal people are subject to continued revision as more research is undertaken. The timing for the human occupation of the Sydney Basin is still uncertain. Whilst there is some possible evidence for occupation of the region around 40,000 years ago, the earliest undisputed radiocarbon date from the region comes from a rock shelter site north of Penrith on the Nepean, known as Shaws Creek K2, which has been dated to 14,700 +/- 250 BP (Attenbrow 2010, p. 20). This site is along the Nepean River. To the south, along the coast just north of Shellharbour the site of Bass Point



has been dated at 17,101 +/- 750 BP (Flood 1999). Closer to the study area on the Woronora Plateau the oldest date for Aboriginal occupation so far recorded is 2,200 +/- 70 BP at Mill Creek 11 (Koettig 1985). Such a 'young' date is more likely a reflection of conditions of archaeological site preservation and sporadic archaeological excavation, than actual evidence of the presence or absence of an Aboriginal hunter-gatherer population prior to this time.

Our knowledge of Aboriginal people and their land-use patterns and lifestyles prior to European contact is mainly reliant on documents written by non-Aboriginal people. The inherent bias of the class and cultures of these authors necessarily affect such documents. They were also often describing a culture that they did not fully understand, a culture that was in a heightened state of disruption given the arrival of settlers and disease. Early written records can, however, be used in conjunction with archaeological information and surviving oral histories from members of the Aboriginal community in order to gain a picture of Aboriginal life in the region.

The study area is recognised as being within the traditional lands described as Wodi Wodi. The traditional Wodi Wodi boundary extended from around Stanwell Park to the Shoalhaven River, and as far inland as Picton, Moss Vale and Marulan. The Wodi Wodi spoke the Dharawal language, however Dharawal (Tharwal) was not a word they had heard of or used themselves (Tindale 1974, Navin Officer 2000, p. 20).

The arrival of settlers in the region and new competition for resources began to restrict the freedom of movement of Aboriginal hunter-gatherer inhabitants from the early 1800's. European expansion along the Cumberland Plain was swift and soon there had been considerable loss of traditional lands to agriculture. This led to violence and conflict between Europeans and Aboriginal people as both groups sought to compete for the same resources. In the Cowpastures region, it began following the murder of an Aboriginal woman and her children, which resulted in violent clashes between several Aboriginal men and European settlers between 1814 and 1816 (Liston 1988, p. 50). The violence had escalated by 1816 following the outlaw proclamation by Macquarie, resulting in the massacre of 14 Aboriginal people hiding at Appin (Liston 1988, p. 54). This event is known as the 'Appin Massacre' and is regarded as a pivotal part of the history of the destruction of the Aboriginal people in the region.

### **3.3 Previous archaeological work**

A large number of cultural heritage surface (surveys) and sub-surface (excavations) investigations have been conducted throughout the Cumberland Plain in the past 30 years. There has been an increasing focus on cultural heritage assessments in NSW due to ever increasing development, along with the legislative requirements for this work and greater cultural awareness of Aboriginal cultural heritage. Archaeological evidence of Aboriginal occupation of the broader Cumberland Plain area indicates that the area was intensively occupied from approximately 4,000 years BP (JMCHM 2007). Such 'young' dates are probably more a reflection of conditions of archaeological site preservation and sporadic archaeological excavation, rather than actual evidence of the presence or absence of an Aboriginal hunter-gatherer population prior to this time.

#### **3.3.1 Regional overview**

Results of archaeological work completed in the northern, central and southern Cumberland Plain region have clearly identified that the predominant recorded sites on the Cumberland Plain are open camp sites (Kohen 1986; Smith 1989; Haglund 1989; McDonald 1992; JMCHM 2006, 2007; Dibden 2003). Towards the peripheries of the plain on Hawkesbury sandstone, shelters with art and/or deposit and grinding grooves have been recorded. Most recent archaeological studies have been impact driven assessments in response to increasing development activity in the region and changing legislation requirements. The most accepted regional modelling on the Cumberland Plain is summarised below.

**JMCHM (1996; 2000)** developed a predictive model for Aboriginal site distribution on the Cumberland Plain that will be applicable to the study area. This has been developed using the Aboriginal occupation models proposed for the Camden area by Haglund (1989) and data collected from other areas of the Cumberland Plain where trends in the distribution of archaeological sites have been apparent. The following predictive model for the Cumberland Plain has been taken from JMCHM (2000) and will be used to devise the site prediction model for the study area (Section 3.4.1).

1) The size (density and complexity) of archaeological features will vary according to permanence of water, landscape unit and proximity to stone resources in the following way:

- At the headwaters of upper tributaries (first order creeks) archaeological evidence will be sparse and will comprise little more than background scatters of stone artefacts;
- At the middle reaches of minor tributaries (second order creeks) archaeological evidence will be sparse but indicate focused activity;
- At the lower reaches of tributary creeks (third order creeks) archaeological evidence will indicate more frequent occupation and evidence of repeated, more concentrated activities;
- On major creek lines and rivers (fourth order creeks) archaeological evidence will indicate more permanent occupation, which is of greater complexity;
- Creek junctions and swamps may provide foci for site activity;
- Ridgetop locations between drainage lines will usually contain limited archaeological evidence.

2) Where sandstone features occur (overhangs or platforms), these may have provided a focus for a number of activities including camping or art production or the sharpening of axes. Sandstone platforms may also have been used for the production of art (engravings), although these are very rare on the margins of the Cumberland Plain.

**AMBS (1997)** undertook a large scale regional Aboriginal heritage study of part of the Cumberland Plain that focused on assessing the concept of representativeness of Aboriginal sites on the Cumberland Plain, assessing the planning framework in relation to achieve the aims of heritage management, and producing guidelines on the recognition of silcrete artefacts. To assess these aims, the study examined all previously recorded archaeological sites and studies completed across the region, including both field survey and subsurface investigation work. The Plumpton Ridge silcrete source work completed by McDonald in 1985 was used as a case study in determining accurate identification of silcrete artefacts from naturally spalled silcrete. The report concluded:

- Previous archaeological investigation on the Cumberland Plain has not contributed significantly to a hole / drill developed understanding of Aboriginal occupation and settlement patterns of the region. This was attributed to the isolated, small scale nature of the archaeological investigations dispersed throughout the region, and the use of intuitive and simple pattern recognition models and research designs. Further, where large scale research projects and models have been developed, they have not been adequately tested by ensuing investigations (AMBS 1997, p. i)
- Excavation projects have been limited and techniques have been restrictive and not interpreted the spatial structure of open sites adequately, as the focus of analysis has been on technology of the assemblages, limiting the interpretive potential of many archaeological investigations;
- The correct identification of silcrete artefacts is problematic, and the analysis of material excavated by McDonald (1985) at the Plumpton Ridge silcrete source revealed that a number of the artefacts did not exhibit attributes of cultural modification, but were naturally fractured or broken from farm machinery

- Regional planning approaches are inadequate for the assessment and conservation of Aboriginal heritage throughout the region. This was attributed to development pressures, minor reserve coverage and limited opportunities for establishing new protected areas.

More recent archaeological work (AECOM 2010) has indicated that while the most recognised Cumberland Plain predictive modelling is most relevant, it is not always typical. Archaeological material tends to occur anywhere on the Cumberland Plain and that while the size and frequency of sites can be linked with stream order, the complexity of sites cannot.

### 3.3.2 Local overview

A number of development driven assessments have been undertaken within the region surrounding the study area. The findings from this work have contributed towards a more informed understanding of Aboriginal cultural heritage across the Cumberland Plains and the Nepean River. Those most relevant and available are summarised below.

**Navin Officer (2003)** completed an Aboriginal cultural heritage assessment for the Wollondilly Local Environmental Plan to rezone the land for residential development in Wilton. A survey was conducted across two landforms, gentle undulating slopes and gorges around Stringy Bark and Allens Creeks. During the survey six previously recorded Aboriginal sites were re-located, and 14 new Aboriginal sites were identified. New sites consisted of eight sandstone overhangs with art and/deposit, six open artefact scatters, and three shelters with Potential Archaeological Deposit (PAD). Shelters were identified in areas with suitable sandstone overhangs within the upper reaches of Stringy Bark and Allens Creeks. All six of open artefact scatters were located within the western tributary of Stringy Bark Creek within close proximity to the drainage line. Further archaeological test excavations were recommended for three artefact scatters, Wilton Park 10, BC 10 (AHIMS 52-2-3034), Wilton Park 11, BC11 (AHIMS 52-2-3035) and Wilton Park 12, BC12 (AHIMS 52-2-3036). It was considered that the landform element these three sites are located on, a junction of the hillslope and the tops of the gorges along the Stringy Bark Creek, have moderate potential to contain sub-surface cultural material.

**Austral Archaeology (2004)** was commissioned by Kellogg Brown and Root Pty Ltd to undertake an archaeological survey of Picton at the Allied Mills flour mill development site. It is bounded by Carriage Creek that flows into Nepean River and associated drainage lines. Ground survey was completed across two main landforms; drainage lines and hillslopes. The survey identified eight Aboriginal sites, including five isolated artefacts finds, two artefact scatters and one scarred tree. Although some of the sites were identified within disturbed context, others were found relatively undisturbed or within areas with minimal surface disturbance: AMP IF-1 (AHIMS 52-2-3212), AMP ST 1 (AHIMS 52-2-3219), AMP IF 5 (AHIMS 52-2-3216) and AMP OS 2 (AHIMS 52-2-3218). Considering that the area is in close proximity to Nepean River and four associated creeklines on gentle topography, it would have been conducive to Aboriginal occupation. Portions of the assessed area that exhibited minimal previous disturbance were considered to be of high potential to retain archaeological material (Austral Archaeology 2004: 33).

**Navin Officer (2006)** undertook a cultural heritage assessment of the Leaf's Gully gas fired power station. It included a broad spur line crest and upper slopes situated adjacent to the steeply graded, south-west facing slopes of Leaf's Gully that empties into the Nepean River. One new PAD was identified during the survey. It was located on the low gradient, upper slopes and crests on the spurline that descends towards west to Leaf's Gully and north towards Nepean River. Archaeological potential across the PAD was considered to be variable, from moderate on the lower slopes to low to moderate on the higher slopes. Further archaeological subsurface testing was recommended across the entire PAD in order to determine the nature and significance of any archaeological material.

**Biosis (2011)** was commissioned by Wollondilly Shire Council to undertake an Aboriginal and non-Aboriginal cultural heritage assessment of the proposed rezoning for nine rural and industrial lots near Maldon. The

assessed area was located to the immediate north of Nepean River and Carriage Creek crossing over at its north-western part. Survey was completed across a range of landforms including undulating plains, river/creek banks and footslopes. No new Aboriginal archaeological sites were identified during the survey. One previously recorded site, shelter with art, Bulli Seam 12 (AHIMS 52-2-3692) was re-located. Areas of high, moderate and low sensitivity for Aboriginal archaeological sites were mapped. Highly sensitive areas were considered to occur on the banks of Carriage Creek due to its location; adjacent to open undulating plains while providing easy access to Nepean River. Areas with moderate sensitivity were mapped within undulating plains above Nepean River and Carriage Creek where low density artefact scatters were expected to be present. Sensitivity across footslopes was considered to be low, as Aboriginal occupation would have been transient. Stone artefact discard would be associated with tool maintenance or limited artefact manufacture. It was stated that artefact numbers could be higher depending on how often the area was traversed and how many people used it. The most suitable locations for short term occupation would have been flatter areas on the crests of the adjacent hills; artefacts would also most likely to shift down the slopes. Test excavations were recommended in areas mapped as having high and moderate archaeological sensitivity to confirm the predictive modelling.

**Archaeological and Heritage Management Solutions (AHMS 2012)** completed an Aboriginal cultural heritage assessment for the rezoning of land at Cliffe Street in Picton. The assessed area lies within alluvial flats to the immediate east of Stonequarry Creek, one of the main drainage systems flowing into the Nepean River. No Aboriginal sites were identified during the archaeological survey due to the very low ground surface visibility and the significant levels of previous disturbance in some areas. Areas that were deemed to have high, moderate, low, very low or nil archaeological potential were mapped. Lands within 50 metres of waterways were considered to have high, within 100 metres moderate and within 200 metres low archaeological potential; areas with previous cut and fill material had nil, and all other areas very low archaeological potential.

**Kayandel Archaeological Services (KAS 2014)** conducted an Aboriginal cultural heritage assessment and historic heritage assessment for the rezoning of Wilton Junction near Wilton on behalf of the Wilton Junction Land Owners Consortium. KAS identified a total of 30 new Aboriginal sites within the IR study area, consisting of seven artefact scatters, ten isolated finds, eight rock shelters with PAD and five scarred trees. KAS proposed an occupation model centred on flat elevated positions associated with creek lines. KAS also identified 6 new European heritage items in the study area, including three historic locations and three items of machinery. These six items pushed the total historical relics to a total of 12 in the wider study area. Recommendations following the survey were focused on further archaeological assessment if development of the properties occurs.

**Biosis (2016)** undertook an Aboriginal cultural heritage constraints assessment for the rezoning and revelopment of 990-1140 Picton road. The assessment covered the entire study area and targeted areas of exposure on culturally sensitive landforms. Potential Archaeological Deposits (PAD) were identified in the study area across a number of landforms, including level, elevated landforms near Stringybark Creek, a flat raised area in close proximity to a drainage line and AHIMS sites #52-2-3954, and along Allens Creek and the vegetated area surrounding it. Attempts were made to relocate AHIMS sites 52-2-3591 and 52-2-4085, but due to vegetation coverage these sites could not be relocated.

**Biosis (2018)** was commissioned by Walker Corporation to undertake an Aboriginal cultural heritage assessment of the proposed subdivision and bulk earthworks within the proposed stages 1 and 2 of the Wilton South East Precinct. The survey identified two areas of PADs as high sensitivity and an area of moderate (archaeological) sensitivity. There is potential for development activities to impact Aboriginal sites and the identified sites or areas of (archaeological) sensitivity; therefore it was recommended that an area wide Aboriginal Heritage Impact Permit (AHIP) be obtained for the study area. Following the result of the field survey a targeted test excavation program was undertaken in a selection of areas and archaeological sites

identified as having PAD. The test sub surface investigations at the “Wilton South East Precinct” excavated 44 test pits within 3 areas of identified PAD, which were identified during the initial archaeological survey of the study area. From the investigations, one artefact was recovered from one pit within PAD 2.

### 3.3.3 AHIMS site analysis

A search of the OEH Aboriginal Heritage Information Management System (AHIMS) database (Client Service ID: 347480) identified 23 Aboriginal archaeological sites within a 2 x 2 kilometre search area, centred on the proposed study area. None of these registered sites are located *within* the study area (Figure 6). AHIMS search results are provided in Appendix 1. The mapping coordinates recorded for these sites were checked for consistency with their descriptions and location on maps from Aboriginal heritage reports where available. These descriptions and maps were relied where notable discrepancies occurred.

It should be noted that the AHIMS database reflects Aboriginal sites that have been officially recorded and included on the list. Large areas of NSW have not been subject to systematic, archaeological survey; hence AHIMS listings may reflect previous survey patterns and should not be considered a complete list of Aboriginal sites within a given area. Some recorded sites consist of more than one element, for example artefacts and a modified tree, however for the purposes of this breakdown and the predictive modelling, all individual site types will be studied and compared. This explains why there are 25 results presented here, compared to the 23 sites identified in AHIMS.

**Table 3 AHIMS site type frequency**

Site type	Number of occurrences	Frequency (%)
Artefact	21	84
Modified tree	1	4
PAD	3	12
<b>Total</b>	<b>25</b>	<b>100</b>

A simple analysis of the Aboriginal cultural heritage sites registered within the 2 x 2 km buffer of the study area indicates that artefacts are the dominant site type, accounting for 84% (n=21) of the total AHMIS sites. The second most common site found in the vicinity of the study area are PADs, with 12 % (n=3). All the sites were located within close proximity to reliable sources of water and were exposed by the land clearing works.

**Figure 6 AHIMS search results**

**NOT TO BE MADE PUBLIC**

## 3.4 Discussion

Summarise and discuss the local and regional character of Aboriginal land use and its material traces.

### 3.4.1 Predictive model

A model has been formulated to broadly predict the type and character of Aboriginal cultural heritage sites likely to exist(ed) throughout the study area and where they are more likely to be located.

This model is based on:

- Site distribution in relation to landscape descriptions within the study area.
- Consideration of site type, raw material types and site densities likely to be present within the study area.
- Findings of the ethnohistorical research on the potential for material traces to present within the study area.
- Potential Aboriginal use of natural resources present or once present within the study area.
- Consideration of the temporal and spatial relationships of sites within the study area and surrounding region.

Based on this information, a predictive model has been developed, indicating the site types most likely to be encountered during the survey and subsequent sub-surface investigations across the present study area (Table 4). The definition of each site type is described firstly, followed by the predicted likelihood of this site type occurring within the study area.

**Table 4 Aboriginal site prediction statements**

Site type	Site description	Potential
<b>Flaked stone artefact scatters and isolated artefacts</b>	Artefact scatter sites can range from high-density concentrations of flaked stone and ground stone artefacts to sparse, low-density 'background' scatters and isolated finds.	<b>Moderate:</b> Stone artefact sites have been previously recorded in the region on level, well-drained topographies in close proximity to reliable sources of fresh water. Due to the distance to permanent fresh water resources, the potential for artefacts to be present within the study area is assessed as moderate.
<b>Shell middens</b>	Deposits of shells accumulated over either singular large resource gathering events or over longer periods of time.	<b>Low:</b> Shell midden sites have not been recorded within the vicinity of the study area. There is a very low potential for shell middens to be located in the study area as the first order drainage line is not permanent water source.
<b>Quarries</b>	Raw stone material procurement sites.	<b>Low:</b> There is no record of any quarries being within or surrounding the study area.
<b>Potential archaeological deposits (PADs)</b>	Potential sub surface deposits of cultural material.	<b>High:</b> PADs have been previously recorded in the region across a wide range of landforms. PADs are likely to be present within areas adjacent to water courses or on high points in undisturbed landforms.



Site type	Site description	Potential
<b>Modified trees</b>	Trees with cultural modifications	<b>Moderate:</b> Due to extensive vegetation clearance only a small number of mature native trees have survived. There is one previously recorded scarred tree within the study area.
<b>Axe grinding grooves</b>	Grooves created in stone platforms through ground stone tool manufacture.	<b>Moderate:</b> Suitable horizontal sandstone rock outcrops occur along drainage lines.
<b>Burials</b>	Aboriginal burial sites.	<b>Low:</b> Aboriginal burial sites are generally situated within deep, soft sediments, caves or hollow trees. Areas of deep sandy deposits will have the potential for Aboriginal burials. The soil profiles associated with the study area are not commonly associated with burials.
<b>Rock shelters with art and / or deposit</b>	Rock shelter sites include rock overhangs, shelters or caves, and generally occur on, or next to, moderate to steeply sloping ground characterised by cliff lines and escarpments. These naturally formed features may contain rock art, stone artefacts or midden deposits and may also be associated with grinding grooves.	<b>Low:</b> These sites will only occur where suitable sandstone exposures or overhangs possessing sufficient sheltered space exist, which are not present within the study area.
<b>Aboriginal ceremony and Dreaming Sites</b>	Such sites are often intangible places and features and are identified through oral histories, ethnohistoric data, or Aboriginal informants.	<b>Low:</b> There are currently no recorded mythological stories for the study area.
<b>Post-contact sites</b>	These are sites relating to the shared history of Aboriginal and non-Aboriginal people of an area and may include places such as missions, massacre sites, post-contact camp sites and buildings associated with post-contact Aboriginal use.	<b>Low:</b> There are no post-contact sites previously recorded in the study area and historical sources do not identify one.
<b>Aboriginal places</b>	Aboriginal places may not contain any "archaeological" indicators of a site, but are nonetheless important to Aboriginal people. They may be places of cultural, spiritual or historic significance. Often they are places tied to community history and may include natural features (such as swimming and fishing holes), places where Aboriginal political events commenced or particular buildings.	<b>Low:</b> There are currently no recorded Aboriginal historical associations for the study area.



## 4 Archaeological survey

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A field survey of the study area was undertaken on 17 May 2018. The field survey sampling strategy, methodology and a discussion of results are provided below.

### 4.1 Archaeological survey objectives

The objectives of the survey were to:

- To undertake a systematic survey of the study area targeting areas with the potential for Aboriginal heritage.
- Identify and record Aboriginal archaeological sites visible on the ground surface.
- Identify and record areas of potential archaeological deposits (PADs).

### 4.2 Archaeological survey methodology

The survey methods were intended to assess and understand the landforms and to determine whether any archaeological material from Aboriginal occupation or land use exists within the study area. The archaeological survey was conducted on foot with a field team of one member. Recording during the survey followed the archaeological survey requirements of the code and industry best practice methodology. Information that recorded during the survey included:

- Aboriginal objects or sites present in the study area during the survey.
- Survey coverage.
- Any resources that may have potentially have been exploited by Aboriginal people.
- Landform.
- Photographs of the site indicating landform.
- Evidence of disturbance.
- Aboriginal artefacts, culturally modified trees or any other Aboriginal sites.

Where possible, Identification of natural soil deposits within the study area was undertaken. Photographs and recording techniques were incorporated into the survey including representative photographs of survey units, landform, vegetation coverage, ground surface visibility and the recording of soil information for each survey unit were possible. Any potential Aboriginal objects observed during the survey were documented and photographed. The location of Aboriginal cultural heritage and points marking the boundary of the landform elements were recorded using a hand-held Global Positioning System and the Map Grid of Australia (94) coordinate system.

### 4.3 Archaeological survey results

The archaeological survey was undertaken by one archaeologist and consisted of a pedestrian survey that targeted areas of exposure across all landforms in the study area. This method was chosen as the high grass coverage and dominance of buildings and structure across the study area made it difficult to identify surface artefacts outside of areas of exposure. No Aboriginal sites or PADs were identified in the study area.

#### **4.3.1 Constraints to the survey**

With any archaeological survey there are several factors that influence the effectiveness (the likelihood of finding sites) of the survey. The factors that contributed most to the effectiveness of the survey within the study area were ground surface visibility. High levels of civic development and vegetation cover resulted in low ground visibility and made it difficult to identify surface artefacts.

#### **4.3.2 Visibility**

In most archaeological reports and guidelines visibility refers to ground surface visibility, and is usually a percentage estimate of the ground surface that is visible and allowing for the detection of (usually stone) artefacts that may be present on the ground surface (DECCW 2010b). Ground surface visibility across the study area was typically low (15%) due to extensive grass coverage (Plate 7) and large expanses of bitumen roadway, car parking areas and hospital buildings (Plate 8). Small areas of GSV were present around pedestrian traffic areas and where erosion had occurred.



**Plate 7 Ground surface visibility within the study area was low due to extensive grass coverage**



**Plate 8 Ground surface visibility within the study area was low due to the high level of development**

#### **4.3.3 Exposure**

Exposure refers to the geomorphic conditions of the local landform being surveyed, and attempts to describe the relationship between those conditions and the likelihood the prevailing conditions provide for the exposure of (buried) archaeological materials. Whilst also usually expressed as a percentage estimate, exposure is different to visibility in that it is in part a summation of geomorphic processes, rather than a simple observation of the ground surface (Burke and Smith 2004, p. 79, DECCW 2010b). Overall, the study area displayed areas of exposure of less than 20% due to extensive grass coverage and the built landscape. Areas of exposure were observed where the landscape had been modified (Plate 9) and in areas where high pedestrian traffic had occurred (Plate 10).



**Plate 9 Areas of exposure were observed where the landscape had been modified**





**Plate 10 Areas of exposure were observed where high pedestrian activity had occurred**

#### **4.3.4 Disturbances**

Disturbance in the study area is associated with natural and human agents. Natural agents generally affect small areas and include the burrowing and scratching in soil by animals, such as wombats, foxes, rabbits and wallabies, and sometimes exposure from slumping or scouring. Disturbances associated with human action are prevalent in the study area and cover large sections of the land surface. The agents include the construction of Campbelltown Hospital and the modification of the surrounding landscape.

There were a number of disturbances observed within the study area, which would have resulted in the removal of topsoil and its replacement with introduced materials of varying degrees. The major disturbance is the construction of the hospital buildings and associated structures. Since the initial development of the hospital in 1977, the site has undergone many phases of construction that has resulted in the majority off the study area being covered by buildings, roadway, walkways, carparks and ancillary structures (Plate 11).

Disturbances can also be seen in the modification of the landscape. As new buildings and carparks have been constructed, large parts of the landscape have been benched to create large flat expansive areas (Plate 12). The area adjacent to Birunji Creek has also been significantly modified. The once natural creek is now a series of management water detention ponds designed to prevent flooding in the immediate vicinity, which is evident in the 10 meter high levee banks. The crest in the south western corner has seen substantial disturbance from erosion, ploughing, dumping of fill, and the excavation of soils to create a flat platform (Plate 13).



**Plate 11 The high level of development within the study has covered the majority of the landscape**



**Plate 12 Large parts of the landscape have been benched to create large flat expansive areas for use as carparks**



**Plate 13 The crest in the south west corner of the study area shows significant disturbances**

#### 4.4 Discussion of archaeological survey results

The archaeological survey consisted of a random foot transect across the entire study area. The survey did not identify any Aboriginal sites or objects, possibly due to the significant disturbance that has occurred within the study area. The assessment for areas that have low, moderate or high archaeological potential within the study area are based on a number of factors, including environmental conditions, geomorphological processes, past land use activities, and results of previous archaeological studies, surveys and test excavations. The study area has been assessed as low potential, which is due to a number of factors discussed below.

The study area is located within a gently undulating landform between to ephemeral creeks. A review of the soil landscape and landforms indicates that the primary geomorphological agents associated with this landform are (Speight 1998, p. 27-29):

- Erosion on crests, ridges and hill slopes from sheet wash
- Erosion and aggradation on foot slopes and flats from sheet wash
- Erosion on depressions from channel flow

The effect of sheet wash erosion is likely to be greater on areas cleared of vegetation and steeper slopes. The soils consist of shallow to moderately deep podzols and, due to their age and slow accumulation, residual soil landscapes have reasonable potential to contain archaeological deposits in an open context. However, the slow accumulation of the Blacktown soil landscape and the high impact of extensive land clearing followed by major civic development have resulted in poor preservation of archaeological material.

The survey revealed that the study area had been subject to significant ground disturbance due to farming activities, and the construction of buildings and landscaping activities associated with Campbelltown Hospital. The entire study area has been entirely stripped of natural vegetation, which most likely occurred during the initial European occupation of the land. Subsequent ploughing and farming of the study area would have



disturbed any Aboriginal objects or sites present. The 1951 aerial of the study area demonstrates the extent of vegetation clearing and ploughing (Plate 14).



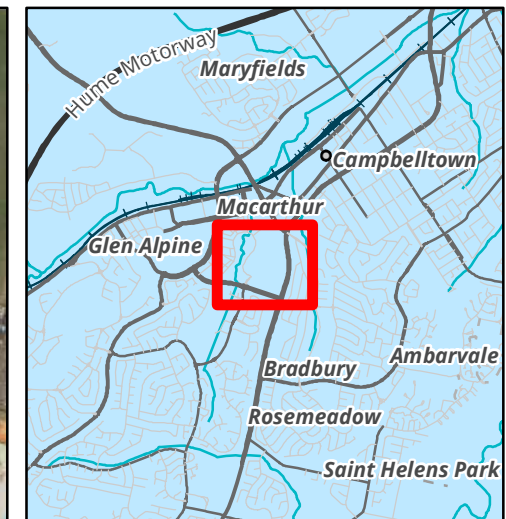
**Plate 14 1951 aerial showing the extensive vegetation clearance and ploughing of the study area (NSW Department of Finance, Services & Innovation).**

The study has experienced many phases of the development and construction of Campbelltown Hospital from the 1970s to the present day. The disturbances associated with the construction of the hospital would have included the stripping of top soil, large-scale excavation, cutting and benching of the landscape, importing of material for fill, installation of services, construction of underground carparks, installation of roadways, and landscaping of the grounds. The extent of these activities can be seen in the 2005 aerial (Plate 15). All of these activities would have resulted in the mass movement of soils and the removal of any intact sub-surface deposits or surface artefacts.



**Plate 15** 2005 aerial showing that nearly the entire study area has been developed and modified (NSW Department of Finance, Services & Innovation).





#### Legend

Study area

#### Archeological potential

Low

**Figure 7: Survey results**

0 30 60 90 120 150  
Metres

Scale: 1:3,000 @ A3  
Coordinate System: GDA 1994 NSW Lambert



Albury, Ballarat, Melbourne,  
Newcastle, Sydney, Wangaratta & Wollongong

Matter: 27658  
Date: 30 May 2018,  
Checked by: SJK, Drawn by: LW, Last edited by: IWilson  
Location: P:\27600s\27658\Mapping\27658\_AR\_F7\_SurveyResults



## 5 Conclusions and recommendations

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### 5.1 Conclusions

This assessment has identified that the entire study area has low archaeological potential. This assessment was based on background research and the significant disturbances that have occurred within the study area over a long period of time. These disturbances include the stripping of top soil, large-scale excavation, cutting and benching of the landscape, importing of material for fill, installation of services, construction of underground car parks, installation of roadways, and landscaping of the grounds. The combined effects of these activities have impacted upon the preservation and integrity of any cultural materials that may have been present.

This assessment is consistent with two previous Aboriginal heritage assessments undertaken by GML and Austral Archaeology. GML (2011, p. 27) stated that 'the subject area contains no previously recorded Aboriginal sites and has no archaeological potential for Aboriginal sites to be located within an intact subsurface context', which was supported with consultation from registered stakeholders. Austral Archaeology (2012) agreed with GML's assessment and stated that 'there is a low likelihood of Aboriginal cultural material or deposits being impacted by the proposed works'.

### 5.2 Recommendations

The following management recommendations have been developed relevant to the study area and influenced by:

- Predicted impacts to Aboriginal cultural heritage.
- The planning approvals framework.
- Current best conservation practise, widely considered to include:
  - Ethos of the Australia ICOMOS Burra Charter (2013)
  - The code

Prior to any impacts occurring within the study area, the following is recommended:

#### **Recommendation 1: No further archaeological assessment is required in areas of low archaeological potential**

No further archaeological work is required in areas identified as having low archaeological potential except in the event that unexpected Aboriginal sites, objects or human remains are unearthed during development.

#### **Recommendation 2: Discovery of Unanticipated Aboriginal Objects**

All Aboriginal objects and Places are protected under the NSW National Parks and Wildlife Act 1974. It is an offence to knowingly disturb an Aboriginal site without a consent permit issued by the Office of Environment and Heritage (OEH). Should any Aboriginal objects be encountered during works associated with this proposal, works must cease in the vicinity and the find should not be moved until assessed by a qualified archaeologist. If the find is determined to be an Aboriginal object the archaeologist will provide further recommendations. These may include notifying the OEH and Aboriginal stakeholders.

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### **Recommendation 3: Discovery of Aboriginal Ancestral Remains**

Aboriginal ancestral remains may be found in a variety of landscapes in NSW, including middens and sandy or soft sedimentary soils. If any suspected human remains are discovered during any activity you must:

1. Immediately cease all work at that location and not further move or disturb the remains.
2. Notify the NSW Police and OEH's Environmental Line on 131 555 as soon as practicable and provide details of the remains and their location.
3. Not recommence work at that location unless authorised in writing by OEH.

## References

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- AECOM. 2010. Environmental Assessment, Northern Expansion of the Camden Gas Project. A report prepared for AGL.
- Archaeological and Heritage Management Solutions (AHMS). 2014. Aboriginal Cultural Heritage Assessment: Stonequarry Commercial Picton; Lot 7 DP 1072259 and Lot 4 Section 13 DP 939379, Cliffe Street, Picton, NSW. Report for Michael Brown Planning Strategies.
- Allen J and O'Connell JF. 2003. The long and the short of it: archaeological approaches to determining when humans first colonised Australia and New Guinea. *Australian Archaeology*, 57:5-19.
- Austral Archaeology. 2004. Proposed Allied Mills Flour Mill, Picton, NSW. Aboriginal Heritage Assessment. Report for KBR Pty Ltd on behalf of Allied Mills Pty Ltd.
- Austral Archaeology Pty Ltd. 2012. Campbelltown Hospital Stage 1 Redevelopment: Aboriginal Archaeological and Cultural Heritage Assessment. Report for NSW Health Infrastructure.
- Australia ICOMOS 1999. 'Australia ICOMOS Charter for the Conservation of Places of Cultural Significance (the Burra Charter), revised edition'. Australia ICOMOS, Canberra.
- Australian Museum Business Services (AMBS). 1997. Cumberland Plain Regional Archaeological Study: Stage 1. Report to NSW National Parks and Wildlife Services.
- Attenbrow VJ. 2010. *Sydney's Aboriginal Past. Investigating the Archaeological and Historical Records*. University of New South Wales Press Ltd, Sydney.
- Biosis. 2011. Maldon Planning Study: Aboriginal and Non-Aboriginal Cultural Heritage Assessment. Report for Wollondilly Shire Council.
- Biosis 2016. 990-1140 Picton Road, Wilton: Aboriginal cultural heritage constraints assessment. Prepared for Country Garden.
- Biosis. 2018. Wilton SE Precinct Aboriginal Cultural Heritage Assessment. Report for Walker Corporation.
- Burke, H. and Smith C. 2004. *The Archaeologist's Field Handbook*, Allen and Unwin, Crows Nest.
- Dallas, M. 1982. An Archaeological Survey at Riverstone, Schofields and Quakers Hill, NSW. Prepared for the Land Commission of NSW.
- Clarkson C., Smith M., Marwick B., Fullagar, R, Wallis LA., Faulkner P., Manne T., Hayes E., Roberts RG., Jacobs Z., Carah X., Lowe KL., Matthews J., and Florin SA. 2015. The archaeology, chronology and stratigraphy of Madjedbebe (Malakunanja II): A site in northern Australia with early occupation. *Journal of Human Evolution*, Volume 83, pp. 46-64.
- Department of Environment, Climate Change and Water (DECCW) 2010a. *Due Diligence Code of Practice for the Protection of Aboriginal Objects in New South Wales*. NSW Department of Environment, Climate Change and Water, Sydney NSW.
- Department of Environment, Climate Change and Water (DECCW) 2010b. *Code of Practice for the Archaeological Investigation of Aboriginal objects in New South Wales*. NSW Department of Environment, Climate Change and Water, Sydney NSW.
- Department of Public Works and Services, Heritage Group 1998. Kiama Harbour Conservation Management Plan. Prepared for Department of Land and Water Resources (South Coast Region).

- Dibden J. 2003. Camden Gas Project Stage 2 – Camden New South Wales: Archaeological and Heritage Assessment. An unpublished report to Sydney Gas Operations Pty Ltd.
- GML 2011. Campbelltown Hospital Stage 1 Redevelopment: Heritage Assessment. Report for Capital Insight Pty Ltd.
- Haglund L. 1985. Department of Housing Project 144 residential estate – Narellan. Preliminary archaeological investigation of archaeological sites 2 and 5. Report to Benjamin Chow & Associates.
- Hazelton PA & Tille PJ. 1990. *Soil Landscapes of the Wollongong-Port Hacking 1:100 000 Sheet*, Soil Conservation Service of NSW, Sydney.
- JMCHM. 1996. Camden Bush Corridor Management Plan. An unpublished report for Edaw on behalf of Camden Shire Council.
- JMCHM. 2006. Archaeological Salvage Excavation of the Colebee Release Area, Schofields, NSW. Draft report prepared for Medallist Developments.
- JMCHM. 2007. Archaeological investigation of the Turner Road and Oran Park Precincts within the South West Growth Corridor, Camden, NSW. An unpublished report to APP on behalf of the Growth Centres Commissions and Camden City Council.
- Koettig MK. 1985. Archaeological investigation of three sites on Upper Mill Creeks, near Lucas Heights, Sydney. Unpublished report to MWDA. Report held by NSW NPWS.
- Kohen J. 1986. Prehistoric Settlement in the West Cumberland Plain: resources, environment and technology. An unpublished PhD Thesis, Macquarie University, Sydney.
- Liston C. 1988. *Campbelltown: The Bicentennial History*. Allen and Unwin, Sydney.
- McDonald J. 1992. Archaeological Survey of Spring Farm, Camden. An unpublished report to PPK Consultants, Camden.
- National Parks and Wildlife Services. 1997. 'Aboriginal Cultural Heritage: Standards and Guidelines Kit'. Department of Environment, Climate Change and Water, NSW.
- Navin Officer. 2000. Shellharbour City Council Area Aboriginal Heritage Study. Report to Shellharbour City Council.
- Navin Officer. 2003. Proposed "Wilton Park" Residential Development, Wilton, NSW Archaeological Assessment. A Report to Bradcorp Holdings Pty Limited.
- Navin Officer. 2006. Gas Turbine Power Station, Leafs Gully, NSW Cultural Heritage Assessment. A report for URS Australia Pty Ltd.
- NSW NPWS 2002, *Interpretation Guidelines for the Native Vegetation Maps of the Cumberland Plain, Western Sydney*. Threatened Species Unit, Conservation Programs and Planning Division Central Directorate. NSW National Parks and Wildlife Service.
- Perry TM. 1967. Meehan, James (1774–1826). Australian Dictionary of Biography, National Centre of Biography, Australian National University. Accessed on 25 May 2018:  
<http://adb.anu.edu.au/biography/meehan-james-2443/text3257>
- Rhodes, J and G. Dunnett 1985 *Aboriginal Resources Planning Study: City of Penrith*. Prepared for the Department of Anthropology University of Sydney for Penrith City Council.
- Robinson ME. 1976. *The NSW Wheat Frontier 1851-1911*. Australian National University, Canberra.
- Rosen S. 1995. Heritage Assessment for Nepean Tunnel Amplification Project. A report for Sydney Water.

Smith L. 1989. Aboriginal Site Planning Study: The Cumberland Plain. Unpublished report to the NSW National Parks and Wildlife Services.

Speight JG. 2009. 'Landform' in McDonald, R.C. & R.F. Isbell (eds.) Australian Soil and Land Survey Field Handbook, p9-57. Goanna Print, Canberra Australian.

Tindale 1974. Aboriginal tribes of Australia: their terrain, environmental controls, distribution, limits, and proper names. ANU Press, Canberra.

## Appendices

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## Appendix 1 AHIMS results

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**THE FOLLOWING APPENDIX IS NOT TO BE MADE PUBLIC**