biosis

Aboriginal cultural heritage due diligence assessment: Lot 28 DP 479 Marys Mount Road, Bradfordville

FINAL REPORT

Prepared for Fraish Consulting

21 November 2017

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- Lauren Harley – for mapping

Contents

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Plates

Glossary

AHIMS	Aboriginal Heritage Information Management System
AMBS	Australian Museum Business Services
DECCW	Department of the Environment, Climate Change and Water
Due diligence code	*Due Diligence Code of Practice for the Protection of Aboriginal Objects in New South Wales* (DECCW 2010)
EP&A Act	*Environmental Planning and Assessment Act 1979*
GSV	Ground Surface Visibility
ICOMOS	International Council on Monuments and Sites
LEP	Local Environment Plan
LGA	Local Government Area
NPW Act	*National Parks and Wildlife Act 1974*
NSW	New South Wales
OEH	NSW Office of Environment and Heritage
PAD	Potential Archaeological Deposit
Study area	Lot 28 DP 479
The Code	The *Code of Practice for Archaeological Investigation of Aboriginal Objects in NSW* (DECCW 2010)

Summary

Biosis Pty Ltd has been commissioned by Fraish Consulting to undertake an Aboriginal Cultural Heritage Due Diligence Assessment for the proposed subdivision at Lot 28 DP 479, Marys Mount Road, Bradfordville, NSW (the Project). The Project will inform a development application to be prepared by Fraish Consulting on behalf of their client to Goulburn Mulwaree Council.

Background research did not identify any Aboriginal sites registered with Aboriginal Heritage Information Management System (AHIMS) within the study area; however, there are two AHIMS sites located within 200 metres. In addition, a review of the soil landscapes and landforms indicate that the primary geomorphological agents are likely to be sheet wash and stream flow causing a process of erosion and aggradation. Combined with exposure of soils by land clearing and agricultural practices over the past 130 years, the potential for cultural material and potential archaeological deposits to remain is low.

An archaeological survey was conducted on 11 October 2017. 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 relatively few ground surface exposures. Two Aboriginal objects were recorded during the survey and were located in highly disturbed contexts, one in an exposed area among rubbish and rubble piles. The artefacts were not in situ and were likely imported into the study area. This portion of the study area will be retained as a residential property; therefore, no impacts will occur to these sites.

Based upon the desktop assessment and archaeological survey, the entire study area is assessed as having low potential and the following recommendations made:

Recommendation 1: No further archaeological assessment is required

No further archaeological work is required in the study area due to the entire study area assessed as having low archaeological potential.

Recommendation 2: Discovery of Unanticipated Aboriginal Objects

All Aboriginal objects and Places are protected under the *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 has been commissioned by Fraish Consulting to undertake an Aboriginal Cultural Heritage Due Diligence Assessment for the proposed subdivision at Lot 28 DP 479, Marys Mount Road, Bradfordville, NSW (the Project). The Project will inform a development application to be prepared by Fraish Consulting on behalf of their client to Goulburn Mulwaree Council. It is understood that the submission will consists of two development applications, one for a single dwelling on land zoned RU6 (Transition) and one for the remaining subdivision of R2 (Low Density Residential) zoned land.

An assessment in accordance with the *Due Diligence Code of Practice for the Protection of Aboriginal Objects in New South Wales* (DECCW 2010a) has been undertaken for the study area in order to inform responsibilities with regards to Aboriginal cultural heritage in the area. In addition to the basic tasks required for a due diligence assessment, an extended background review, as well as an archaeological survey in accordance with the *Code of Practice for Archaeological Investigation of Aboriginal Objects in New South Wales* (DECCW 2010b) ('the Code') was conducted, in order adequately map areas of high, moderate and low archaeological sensitivity.

1.2 Location of the study area

The study area is located within the Goulburn Mulwaree Local Government Area (LGA), Parish of Narrangarril, County of Argyle (refer to Figure 1). The study area consists of Lot 28 DP 479 and is bounded by Marys Mount Road to the south, and farmland to the north, east and west (refer to Figure 2).

1.3 Planning approvals

The proposed development will be assessed against Part 4 of the *Environmental Planning and Assessment Act 1979* NSW (EP&A Act). Other relevant legislation and planning instruments that will inform the assessment include:

- *National Parks and Wildlife Act 1974* (NSW) *(*NPW Act)
- *National Parks and Wildlife Amendment Act 2010* (NSW)
- *Goulburn Mulwaree Local Environmental Plan 2009* (LEP)

1.4 Scope of the assessment

The following is a summary of the major objectives of the assessment:

- Conduct background research in order to recognise any identifiable trends in site distribution and location, including a search of the Aboriginal Heritage Information Management System (AHIMS).
- Undertake archaeological survey as per Requirement 5 of the Code, with particular focus on landforms with high potential for heritage places within the study area, as identified through background research.
- Record and assess sites identified during the survey in compliance with the guidelines endorsed by the NSW Office of Environment and Heritage (OEH).

- Determine levels of archaeological and cultural significance of the study area.
- Make recommendations to mitigate and manage any cultural heritage values identified within the study area.

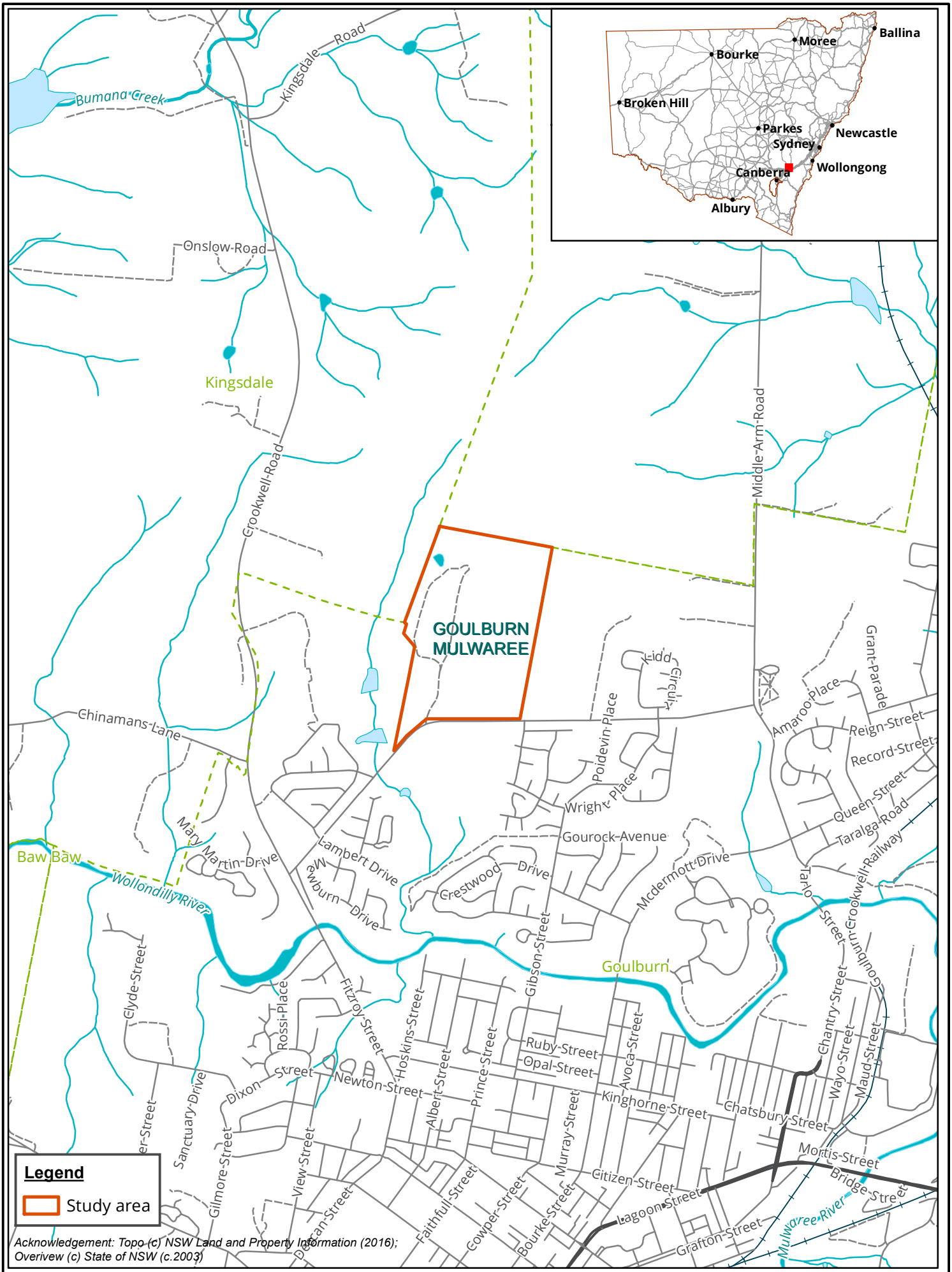

Figure 1: Location of the study area

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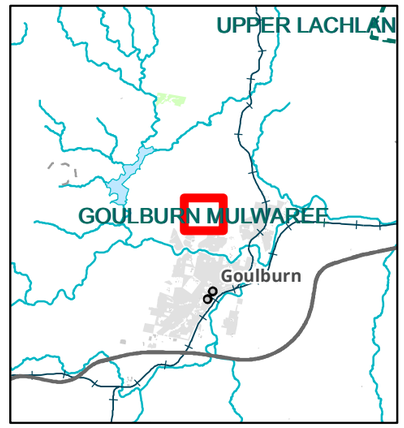

Legend

Study area

Acknowledgements: Basemap © Land and Property Information 2016; Nearmap 2017

Figure 2: Study area detail

0 50 100 150 200 250

Metres
Scale: 1:5,000 @ A3
Coordinate System: GDA 1994 NSW Lambert

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2 Desktop assessment

A brief desktop assessment has been undertaken to review existing archaeological studies for the study area and surrounding region. This information has been synthesised to develop some Aboriginal site predictive statements for the study area and 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.

2.1 Geology, soils and landforms

The study area is located within a landscape that is characterised by gently undulating rolling hills of low relief and covers an area of simple slopes and open depressions. An ephemeral drainage line runs down the eastern boundary of the study area into a wet marsh area in the middle along the southern boundary. This drainage line joins a first order creek 600 metres south of the study area, which drains into the Wollondilly River, which forms part of the Wollondilly catchment area. During wet periods, this is a wet marshy area that dries quickly after rain and is dry throughout the summer. It does not provide a water source except in times of floods. Furthermore, aerial imagery shows that the drainage line flowed through a series of ponds which would have filled and emptied as the seasons and rains went by. At times, the area may have held water or would have been dry in summer and drought periods.

The underlying geology of the study area consists of Forest Lodge Quartz overlaying the Rhyanna Formation of the Mount Fairy Group. The Forest Lodge Quartz is part of the Turrallo formation and consists of dark grey to greenish grey, medium-grained porphyritic quartz monzodiorite with large crystals of plagioclase. The Rhyanna Formation is a Silurian intrusion and consists of thin to medium bedded siltstone interbedded with silicified vitric and felsic tuff (Thomas et al. 2002). The Joppa Siltstone Member runs down the western boundary of the study area is characterised by fawn, buff and khaki laminated siltstone with starved ripples of fine-grained sandstone in places and rare thinly-bedded. The geological units within the study area are shown on Figure 3.

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 Monastry Hill Soil Landscape is present across the majority of the northern portion of the study area. This soil landscape has formed on teschenite intrusions that have penetrated Upper Silurian sediments (Hird, 1991). The crests and sideslopes consist of duplex orange coloured soils with acid to alkaline reaction and no development of an A horizon and massive to moderately structured upper B horizons. On the footslopes and in drainage lines, Prairie Soils, Grey Clays, and Alluvial Soils occur. Soils within the study area have formed insitu and from alluvial-colluvial material derived from the parent rock and are considered to be stable (Hird 1991:127).

The Sooley Soil Landscape unit is present across the majority of the southern part of the study area. This soil landscape has formed on a complex geological landscape including teschenite intrusions, metamorphosed mudstones and limestone outcrops. The soil distribution is complex with lithosols forming on crests and sideslopes and Prairie soils forming in the valleys. Minor areas of rock outcrops can occour. The soil landscapes for the study area are shown in Figure 4.

Geotechnical testing was carried out on 18 October 2017 in the south west corner of the study area to confirm the soil landscapes (Plate 1). Test pit 1 consisted of 180mm of dark brown silty topsoil, containing

grass roots, underlain by 320mm of highly fractured course limestone with coarse fragments between 20-50cm (Plate 2). Test pit 2 consisted of 150mm of dark brown silty topsoil with grass roots, and 300mm of highly weathered limestone that contained coarse fragments between 20-75mm (Plate 3). The results of the geotechnical testing confirmed the shallow nature of the soils along this ridgeline.

Plate 1 Location of test pits within the study area, which are marked with a blue star

Plate 2 Test pit 1

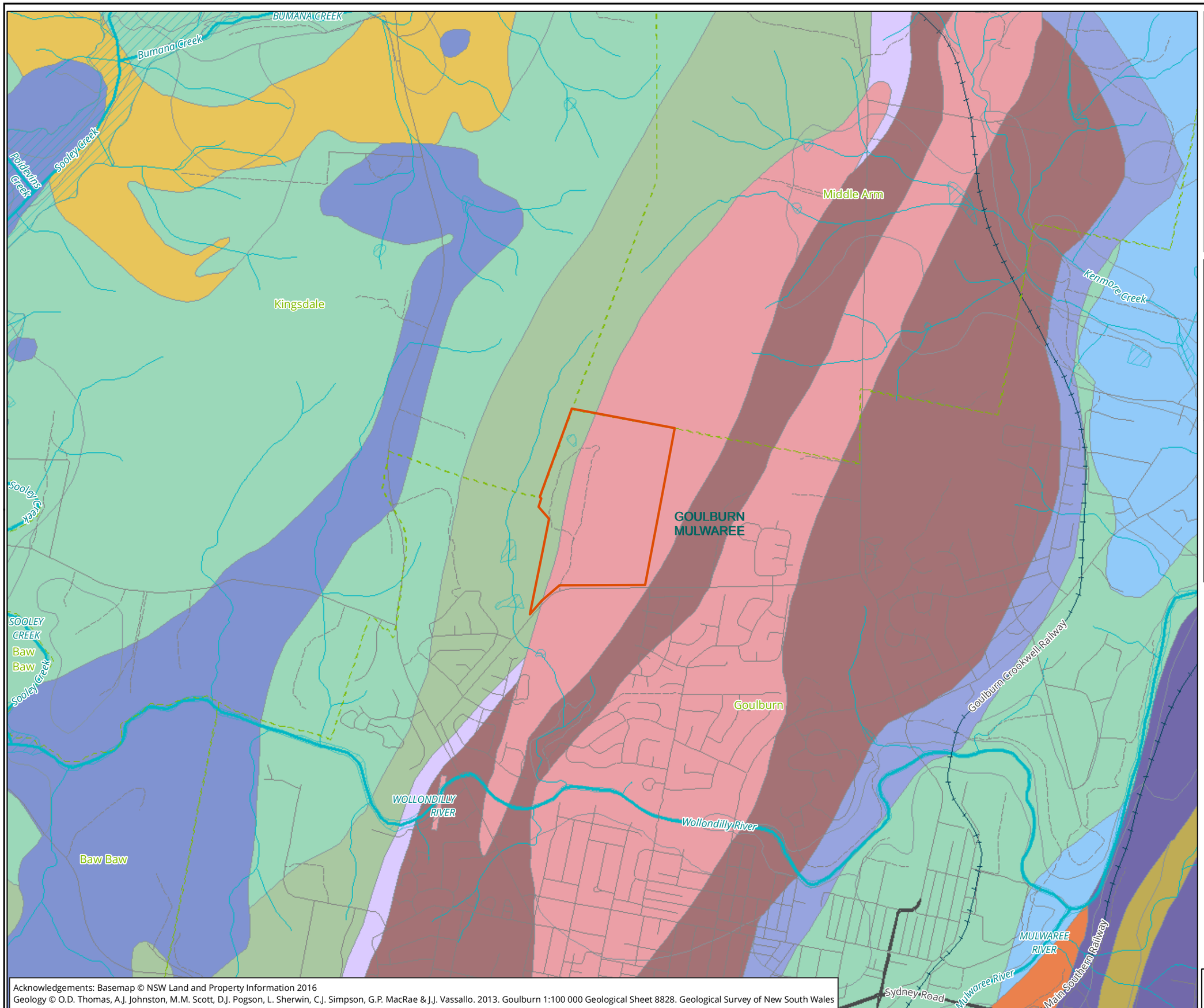
Plate 3 Test pit 2

2.2 Flora and fauna

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.

The study area would have comprised of a savannah woodland of yellow box and blakelys red gum. The open grasslands comprised of spear grass and kangaroo grass, while the around seepage areas and swamps common reed, cumbungi, rushes and sedges occur (Mitchell 2002). Women traditionally constructed nets from plant fibres which were used to carry items slung over the body – this could also include babies and infants. Govett (1977) recalls this practise of 'slinging' babies behind a mother's shoulders. Digging sticks consisting of hard wood approximately 1.5m long, burnt at one end to create a hardened point were carried by the women who gathered as they passed through country storing their cache in nets about them till the meal (Govett 1977, Lhotsky 1979). Spear grass, tussock grass, wallaby grass and a stand of yellowbox are the only remaining flora within the study area.

As well as being important food sources, animal products were also used for tool making and fashioning a myriad of utilitarian and ceremonial items. According to Govett (1977) the Wollondilly River was a focus of activity with eels, swans, ducks and other water birds being staples along with kangaroos, wallabies, possums, bandicoots, and emus. Govett also described the practice of fire stick farming to herd kangaroos for hunting that also has the benefit of encouraging new growth and attracting kangaroos to specific areas. Boswell (1890) described the clothing of the Mulwaree tribe which consisted of long possum cloaks, worn with the fur turned in for warmth and the tanned skins on the outside for waterproofing, while string belts for fastening the cloaks were made from possum or kangaroo hair. Personal adornment consisted of kangaroo incisors and possum tails for head dresses, headbands and necklaces, while white and red ochre was used to decorate the upper body and face (Bennett 1967).



Legend

Study area

Geological Units

- Unnamed
- Back Station Ignimbrite
- Bishopthorpe Dolerite
- Bradfordville Volcaniclastic
- Cookbundoon Formation
- Covan Creek Formation
- Forest Lodge Quartz
- Joppa Siltstone Member
- Kingsdale Limestone Member
- Rhyanna Formation
- Strathaird Formation
- Tarlo Formation

Figure 3: Geology of the study area

0 200 400 600 800 1,000

Metres

Scale: 1:20,000 @ A3

Coordinate System: GDA 1994 NSW Lambert

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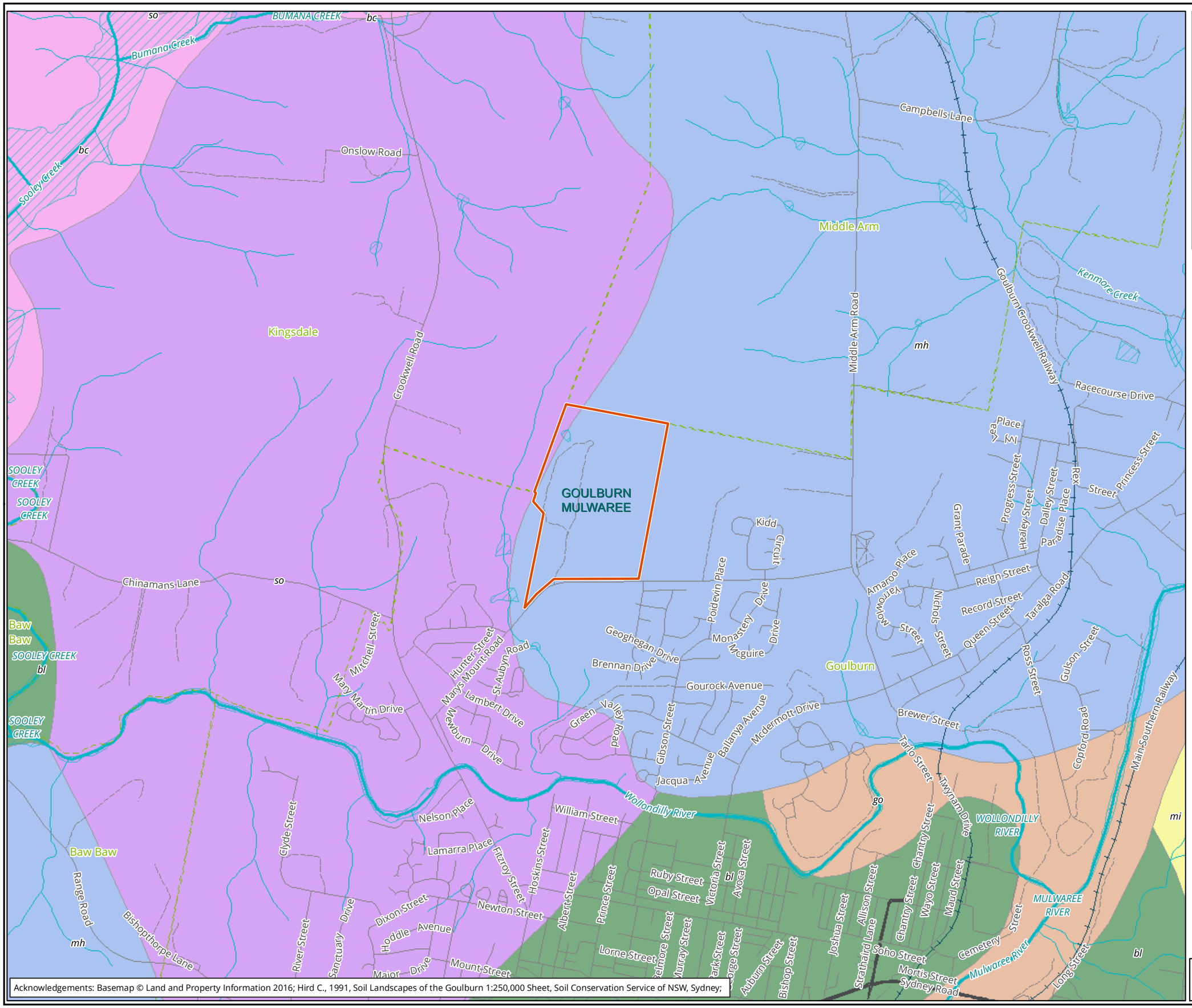
Acknowledgements: Basemap © NSW Land and Property Information 2016
Geology © O.D. Thomas, A.J. Johnston, M.M. Scott, D.J. Pogson, L. Sherwin, C.J. Simpson, G.P. MacRae & J.J. Vassallo. 2013. Goulburn 1:100 000 Geological Sheet 8828. Geological Survey of New South Wales



Legend

- Study area

Soil Landscape units

- bc - BLAKNEY CREEK
- bl - BULLAMALITA
- go - GOULBURN
- mh - MONASTRY HILL
- mi - MIDGEE
- so - SOOLEY

Figure 4: Soil landscapes in the study area

0 200 400 600 800 1,000

Metres

Scale: 1:20,000 @ A3

Coordinate System: GDA 1994 NSW Lambert

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3 Aboriginal context

3.1 Ethnohistory and contact history

Two major language groups were identified in the Goulburn region by Norman Tindale in his seminal work on Aboriginal tribal boundaries. There were the Gundungurra (Gandangara) to the north of Goulburn, and the Ngunawal (Ngunnawal) also known as the Yass tribe, Lake George Blacks or Molonglo tribe to the south. The boundaries of the Ngunawal ran to the south east where they met the Ngarigo at the Molonglo and the Wiradjuri in the Yass region (Tindale 1974).

Linguists have observed that a majority of the word lists from the Ngunawal and Gundungurra languages are identical (Koettig and Lance 1986, p. 13) with a difference in syntax. This similarity can either be a result of long contact between the two groups or as a result that Matthews, one of Tindale's main source of information, was not working in the region until the 1890s when the Aboriginal people of the area had already been impacted by the results of white settlements (Flood 1980, p. 27)

One of the best sources for observations of the Indigenous inhabitants of the Goulburn region is Charles MacAlister, who lived in the district from the 1830s and noted many features and traditions of Aboriginal life. His observations must be viewed from a white perspective and filtered through his cultural traditions as with all cross cultural ethnography; however, his work is a valuable reference for the region. MacAlister notes that the impact of white settlement was a general adoption of words and phrases to enable increased communication between the groups (MacAlister 1907, p. 89). He records that three tribes resided in the district, the Cookmai or Mulwarrie (Mulwaree), the Tarlo, and the Burra Burra (MacAlister 1907, p. 82). MacAlister notes that Aboriginal people travelled from the Lachlan River to visit Goulburn.

Gatherings of Aboriginal people occurred regularly in the area and records of corroborees are known from Rocky Hill near the East Goulburn Church of England, the old railway quarry on the Wollondilly River, Mulwaree Flats near the historic brewery, the All Saints church in Eastgrove and the Goulburn Railway Station (AMBS 2012, p.13; Tazewell 1991, p. 243; Wyatt 1972, pp. 111-112). The siting of two churches at known corroboree locations may not be coincidental as appropriation of cultural areas for church structures is a long standing practice in both the Anglican and Catholic missionary and establishment traditions.

The flat, rolling topography of the Goulburn region and the lack of natural physical barriers would have facilitated contact and movement through the region. In 1834, Lhotsky crossed the Breadalbane Plains meeting a party of approximately 60 Aboriginal people at Fish River. This group told Lhotsky that they travelled as far as Goulburn and Yass Plains but not so far as Limestone (Lhotsky 1979, p. 104-105). At a large gathering at Bathurst in 1837, Aboriginal people were present from Goulburn, the Monaro and as far away as the Hunter Region (Boswell 1890, pp. 7-8).

Smith (1992) states that Goulburn was an Aboriginal cross roads with six or more different bands within a day's travel from the town site. Some of these bands included the Cookmai, Parramarragoo, Tarlo, Burra Burra, Pajong and Wollondilly.

The Ngunawal gathered in the Southern Alps for the annual Bogong Moth gatherings and ceremonies. The Bogong moth that inhabits the mountain areas in great numbers was an important food source for the local Indigenous people, and it is believed the people travelled great distances during summer months to exploit this resource and participate in related ceremonial activity (Flood 1980, pp. 111-112). At these times, groups in the area are likely to have co-operated and participated in each other's ceremonies, as utilisation of the resource would have meant that groups would have more than likely crossed boundaries in their travels. Groups were able to trade with neighbours, and obtain resources from other areas, including the coast.

Disease followed the settlement of the area and may have preceded it with the smallpox epidemic originating in Sydney in 1789 possibly spreading throughout the region (Flood 1980, p. 32). This disease would have decimated the Aboriginal population and was followed by influenza in 1846. The notable decline of the number of the Aboriginal people was noted in 1845 at Bungonia and in 1848 at Goulburn by the Bench of Magistrates (Tazewell 1991, p. 244).

Violence between the white settlers and the Aboriginal populations occurred periodically as a result of land appropriation and barring of access to traditional sites. Conflicts reported in the newspapers and letters of prominent people in the district centre on the taking of women from the local tribes and the retaliatory actions of the men. Incidents of this nature occurred in 1824 at Bungendore and in 1826. The 1826 gathering of Aboriginal people resulted in the death of two white stockmen and fear and apprehension of attack were widespread through the region due to the large number of Aboriginal people who had gathered at Lake George and Inverary Park. In response, a detachment of troops were despatched to the County of Argyle to restore peace. The groups dispersed on the arrival of armed troops against which they stood no chance of success (Jackson-Nakano 2001, p. 25-26).

3.2 Regional context

The study area is located in the Goulburn Plains within the Southern Tablelands. Models for predicting the location and type of Aboriginal sites with a general applicability to the Goulburn region have also been formulated, some as a part of these investigations and others from cultural heritage investigations for relatively large developments (Koettig and Lance 1986, Fuller 1989). These large scale assessments have shown a general concentration of large sites adjacent to water bodies and sand bodies (Koettig 1983, Packard 1986) with smaller sites distributed in proximity to permanent water ways (Attenborough 1983).

Packard (1986) completed the most comprehensive survey of the area when he was commissioned by the National Parks and Wildlife Service to investigate the archaeological potential of sand deposits in the region. He located a number of large artefact scatters (+50 artefacts), small surface scatters and isolated finds on sand bodies. The sites were generally located on midslopes in conjunction with water courses and reflected camp sites with generalised utilisation activities. He concluded that a predictive model that located sites on midslopes and crests was applicable to areas containing sand deposit landscapes which were also located with access to water resources. The relationship between water and sand deposit sites was not considered conclusive at this time but later studies (Packard 1988, 1992, Hughes and Shawcross 1988) have shown a high correlation of identified sites and proximity to water and have classified areas of potential accordingly.

McIntyre (1993) completed the archaeological assessment for the proposed 132kV transmission line between Marulan and Goulburn. Survey effort was concentrated on high potential landforms such as creek lines in the area following the ranking of landforms developed by Fuller for the Goulburn region. The survey resulted in the identification of eight surface scatters, four isolated finds and one scarred trees all located on the Wollondilly River floodplain. This concentration on the Wollondilly River is a consistent finding of archaeological research in the region.

Sefton (1995 and 1996) undertook work for the proposed sewerage augmentation project for Marulan, which included linear pipelines 3 kilometres in length. The study area covered approximately 41 hectares on gently undulating terrain. The assessment resulted in the identification of seven artefact scatters and three isolated finds. All of the sites were located adjacent to a major local water sources. It was concluded that water resources were a focus for camping locations.

Jo McDonald Cultural Heritage Management (1998) conducted salvage excavations at the Crookwell 1 wind farm site in Crookwell. A number of sites were identified from the field studies undertaken for the

project and a large site of over 2000 artefacts was interpreted as a single knapping event along a spur line. The site was located on a secondary spur with a westerly aspect and 1km from a major creek line.

Navin Officer Heritage Consultants (2002) completed a survey for the proposed quarry services depot near Marulan covering an area of approximately 40 hectares. Three surface scatters and four isolated finds were located within the undulating landscape. The sites were located adjacent to creek line features and gentle slopes.

Navin Officer Heritage Consultants (2003a) conducted an archaeological sub-surface testing program at Wombeyan Caves within the area of a proposed treatment plant. An artefact scatter, Wombeyan One, was found to include extensive sub-surface archaeological deposit with areas of moderate to high density. A total of 244 stone artefacts were recovered from three test pits. Site occupation was dated to approximately 11,300 and 14,000BP, which suggests that late Pleistocene environments at these altitudes did not prevent small-scale occupation.

Umwelt (2005) undertook an Aboriginal archaeological survey and assessment for the proposed Lynwood Quarry to the west of Marulan, 27 kilometres north-east of Goulburn. Fifty two new Aboriginal sites were identified. The majority of these sites were artefacts scatters followed by isolated finds and scarred trees. Site distribution pattern conformed to the predictive model, with the majority of sites being located along watercourses, with 50% within 30 metres of a watercourse, while crests or saddles contained 30% of the sites.

Austral Archaeology (2005) undertook the field survey for the proposed Capital Wind Farm Site. This study was extended in 2008 to cover additional areas of expansion of the Wind Farm. Only one isolated artefact was identified and several areas of low potential for sub surface deposits. This conforms to the predictive model with high hilltops away from water courses being classified as low potential for both surface sites and subsurface deposits.

Dibden (2008) undertook an Aboriginal archaeological assessment for Hawksbury/Nepean Catchment Management Authority of two areas for proposed erosion control works. The assessment included a background review and survey across two localities: "Hillview" property off Rhyanna Road north of Goulburn, and "Roseview" property south of Tarago. A total of 12 sites were located in the Goulbourn area and three sites in Tarago area. Overall archaeological sensitivity was deemed as low to low/moderate. It was concluded that both areas were utilised for episodic Aboriginal occupation in accordance with availability of local resources.

Biosis (2010) completed surveys for the Woodlawn Wind Farm on the shores of Lake George at Bungendore. This survey was focused on ridge top where power turbine tower were to be locationed and in areas of road construction which covered a range of land forms. The results showed sparse small density sites were often located along ridge lines that connected across the site allowing for movement along a level topography. No large sites were located, confirming a model of transient occupation along the ridge lines.

3.3 Local context

The regional studies that resulted in site location models for the Goulburn plains, centred on the township of Goulburn, are detailed in the following section. Only the most relevant projects have been summarised, due to the large body of work in the area.

Koettig and Lance (1986) undertook the Aboriginal Resources Planning Study for the City of Goulburn. Based on all available data, they developed an Aboriginal site location model for Goulburn. Four landscape zones based on topography (major watercourse, undulating hills and plains, hills and residential areas) were assigned archaeological sensitivity ratings. A review of previously identified sites within the Goulburn region found artefact scatters were the predominant site within the undulating hills and plains zones. The majority of

these sites are located on basal slopes close to major waterways. Lance and Koettig's predictive model is shown in the following table.

Table 1 Lance and Koettig's 1986 Model

Zone	Landform	Sensitivity/Potential	Significance
1	Major watercourses	High	High
2a	Undulating Hills and Plains – Lower slopes	High	Moderate
2b	Undulating Hills and Plains - Middle Slopes	Low	Low
3	Hill Slopes	Low	High
4	Built Up Areas	Moderate	Low

Fuller (1989) was engaged by Goulburn City Council to test Lance and Koettig's 1986 model by undertaking subsurface testing in areas designated as high sensitivity by the model. The results of this large excavation program, although supporting the overall model, concluded that all areas apart from major watercourses were of low potential and that further divisions were necessary in the undulating hills category if it was to be useful for predicting site locations. Fuller's refined model is shown in Table 3. Fullers system can best be explained in that sensitivity refers to the likelihood of a site occurring, and significance refers to the importance of the site when identified.

Table 2 Fullers 1989 Site Distribution Model

Zone	Landform	Sensitivity	Significance
1	Major Watercourses	High	High
2a	Lower slopes adjacent to major watercourses	High	Moderate
2b	Gently undulating land, or plains	Low	Low
2c	Hills – Low (<700 metres AGD)	Medium	Low
2d	Hills – Moderate (700-750 metres AGD)	Low	Low
2e	Hills – High (>750 metres AGD)	Low	High
3	Hill Tops	Low	High
4	Built up areas	Medium	Low

Paton (1990) undertook investigations for the Goulburn Bypass and excavated site AHIMS 51-6-0021 on the eastern banks of the Mulwaree River. He excavated in excess of 15,000 artefacts within a section of the site due to be destroyed by the construction of the Hume Highway. His analysis concluded that quartz made up 85% of the assemblage with silcrete (10%), chert, quartzite and volcanics making up the remainder. He interpreted the site to be a regularly visited base camp on the banks of the river providing access to resources across the region. The location of a large site within this context conformed to the revised model of Fuller (1989).

Williams (1992) carried out surface survey and test excavations along the proposed Optus fibre optic cable route between Goulburn and Campbelltown. His study area covered both sides of the Mulwaree River including G17 previously identified by Koettig (1983) and Paton (1990). He did not discover any new sites but

relocated Koettig's previously recorded sites. His predictive model built on the work of Fuller and his results conformed to the landscape model.

Australian Archaeological Survey Consultants (1993) undertook the archaeological assessment of the proposed Telstra optical fibre cable route from Goulburn to "the Forest", covering a total distance of 5km of linear survey. This survey crossed a variety of landforms consisting of undulating hills, creek lines and flats. The survey resulted in the identification of three surface scatters, four isolated finds and one possible scarred tree. The majority of artefacts were flakes constructed on quartz and chert, with a small proportion of silcrete.

Navin Officer Heritage Consultants (2003b) conducted cultural heritage assessment for the proposed Pictura Tourist Complex in Goulburn, 5km south-west of the current study area. The study area was located on a broad spur line and ridge and consisted of mid and upper slopes. A creek line bisected the northern corner of the 17 hectare property. One low density surface scatter was located on the spur line's upper slopes, which was over 700m from the watercourse.

Williams (2004) undertook a surface survey for the Tall Timbers Residential Development in south east Goulburn. He located one large surface scatter (AHIMS 51-6-0123) that consisted of approximately 300 artefacts. Located on upper undulating slopes close to a watercourse, Williams considered the area to possess high potential for subsurface artefacts. The area overlooks the Mulwaree River Flats, a rich resource area noted to be an attractive place to camp. The site was subsequently salvaged prior to development.

Heritage Concepts (2004) completed a Cultural Heritage Risk Assessment for a development at 48 Common Street, Goulburn on behalf of Parsons Brinckerhoff. Three low density artefact scatters and two isolated finds were identified across the 15 hectare study area. Heritage Concepts followed the predictive modelling of Fuller 1989, following review of work undertaken since the 1980s when the model was formulated. They concluded that the model was valid and the sites were located within Fullers (1989) category 2a – Undulating Hills and Plains – Lower Slopes. No subsurface testing was undertaken to confirm the presence or absence of subsurface deposits and the sites were classified as low significance.

Archaeological Heritage Surveys (2005) undertook surveys along the Wollondilly River in undulating hills across the river flats and lower slopes. Using Fullers predictive model two areas of PAD and one small surface site was identified. Overall the project area was found to hold low potential for large sites with any occupation focused on the alluvial flats along the river, which comprised of 13% of the project area.

New South Wales Archaeology (2007) was commissioned by Laterals Planning to undertake an Aboriginal archaeological assessment for a proposed subdivision of five rural residential lots in Kingsdale, approximately 4km north of the current study area. During the survey that was conducted across a range of landforms, a total of 13 Aboriginal artefact locales were recorded and 153 artefacts discovered. The majority of artefacts were found on either spur or ridge crests, and small artefact locales were located on basal slopes and creek margins. Overall low density artefact distribution was explained by people moving through the country for a variety of purposes including hunting and gathering forays, but not on long term or repeated basis.

Saunders (2007) conducted an archaeological assessment for proposed subdivision of a property some 6km south-west of the current study area. The area is located within rolling to hilly country. Five new Aboriginal sites and one PAD were identified during the survey. All the sites were located within crest, lower or upper slope landforms. The highest density artefact scatter consisted of 53 artefacts and was located on the upper slope of a ridge (Saunders 2007, p. 20). Saunders undertook a body of work during this time in similar landforms for further residential developments with similar results of isolated finds and small artefact scatters (2006a, b, c, d, e, f). All of these assessments used the predictive model developed by Fuller in 1989 for a ranking of land form potential.

Mills Archaeological and Heritage Services Pty Ltd (2009) undertook an Indigenous Heritage Assessment of a Powerline easement from the Rocky Hill Substation to the North Goulburn Substation. This assessment

identified eight Aboriginal sites and five European sites. The assessment explicitly states that it follows the landform predictive model of Lance and Koettig (1986) and Fuller (1989). The study area ran 2 kilometres to the east of the Marys Mount study area. This study was followed by subsurface testing of the proposed route with additional small density sites being located within the footslopes above a tributary of Gundary Creek, within 600 metre of the creek line.

AMBS (2012) conducted an Aboriginal Heritage Study for the entire Goulburn Mulwaree LGA for the Goulburn Mulwaree Council. This study followed on from the work of Lance and Koettig (1986) and Fuller (1989) and assessed the general importance of different landforms to the Aboriginal community and their sensitivity for archaeological potential. Previous work undertaken within the Goulburn region was concluded to support the predictive model of Fuller, finding that the model was still applicable. The findings of Fuller were used as the basis for classification of landform potential for predictive archaeological sensitivity mapping within the boundaries of the Goulburn LGA.

Biosis (2013) undertook an Aboriginal cultural heritage assessment directly to the south of the current study area, on the opposite side of Mary Mount Road. The field survey did not identify any new Aboriginal sites and the two AHIMS sites located in the study area could not be relocated. Two areas of PAD were test excavated to determine the presence and significance of any subsurface deposits. Sixteen test pits were excavated. The testing of su surface potential resulted in nil findings for PAD 2 and has led to a re-assessment of the PAD as holding low potential for subsurface sites or deposits to be present. These test excavations also resulted in the findings that AHIMS 51-6-0294 is a low density site with further potential but that the site holds low scientific significance.

Biosis (2015) completed test excavations at 13 Clyde Street, Goulburn for residential development. A previous heritage assessment had been undertaken over the study area, resulting in the identification and registration of one surface scatter (AHIMS 51-6-0208) and three areas of PAD. Three areas of PAD were test excavated to determine the presence and significance of any subsurface deposits, which consisted of 24 test pits. This testing of subsurface potential resulted in nil findings for CSPAD 1 and CSPAD2 and has led to a re-assessment of the PADs as holding low potential for subsurface sites or deposits to be present. These test excavations also resulted in the findings that CSPAD 3 contains a low density site with further potential but that the site holds low scientific significance.

Biosis (2016) was commissioned by Southern Region Land Engineering (SRLE) Pty Ltd to undertake an Aboriginal Cultural heritage assessment report over Lot 7 DP1184830 on Clyde Street Goulburn NSW. Two areas of PAD were test excavated to determine the presence and significance of any subsurface deposits, which consisted of 16 test pits. This testing of subsurface potential resulted in nil findings for PAD 2 and has led to a re-assessment of the PAD as holding low potential for subsurface sites or deposits to be present. These test excavations also resulted in the findings that AHIMS 51-6-0294 contains a low density site with further potential but that the site holds low scientific significance.

3.3.1 Identified Aboriginal archaeological sites

An extensive search of the AHIMS database was conducted on 3 October 2017 (Client service ID: 304853). The search identified 17 Aboriginal archaeological sites within a 5 kilometre search area, centred on the proposed study area (Table 2 and Table 3). None of these registered sites are located *within* the study area (Figure 5). 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.

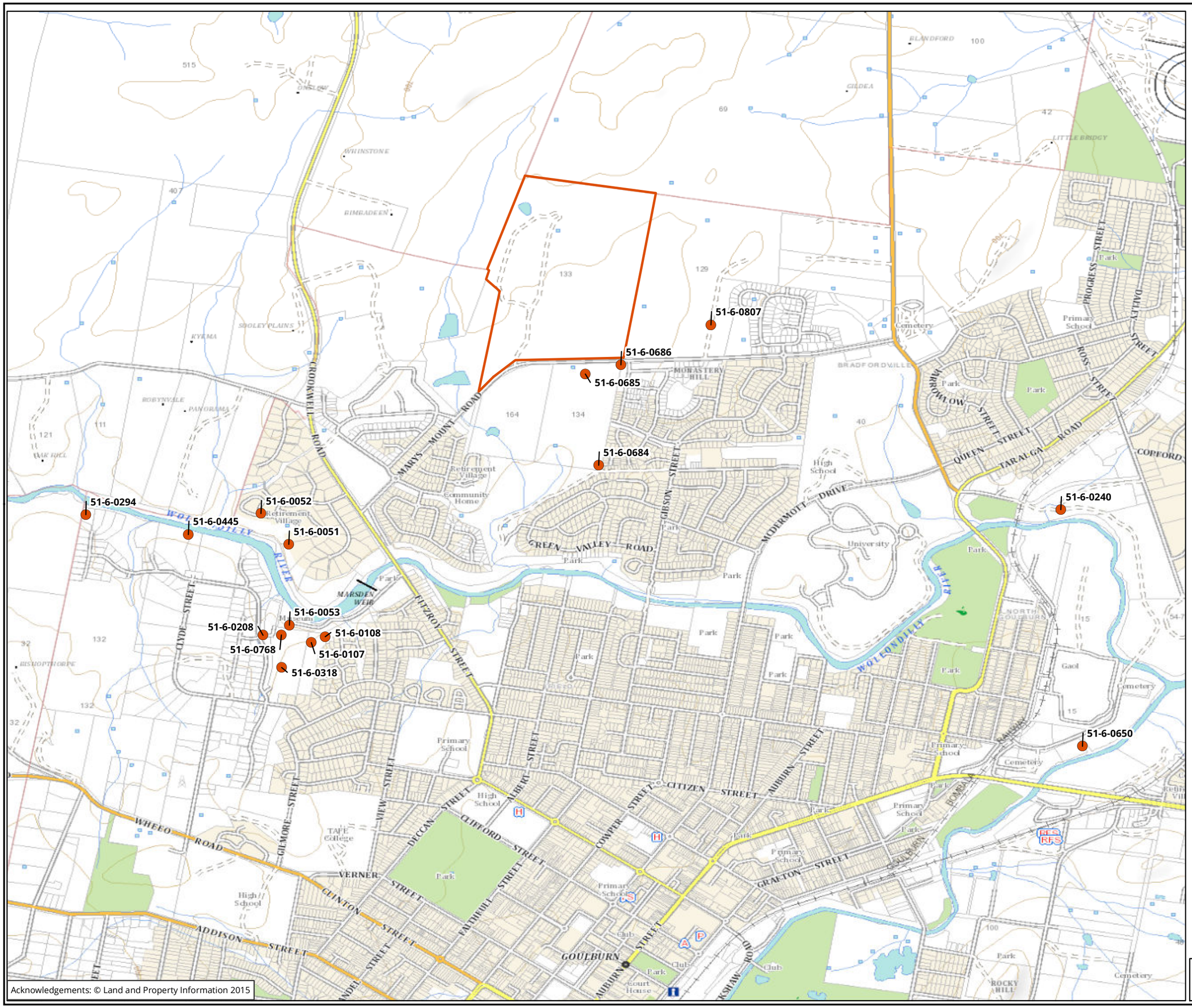
Table 3 AHIMS search results

AHIMS site no.	Site name	Site type
51-6-0445	Clyde Srteet Pipeline 3	Artefact
51-6-0684	MG5/IF1	Artefact
51-6-0685	MG5/IF2	Artefact
51-6-0686	MG5/1	Artefact
51-6-0051	GC15	Open camp site
51-6-0052	GC16	Open camp site
51-6-0053	GC17	Open camp site
51-6-0318	Paton J	Artefact
51-6-0240	Ross Street 1	Artefact
51-6-0208	CSA1	Artefact
51-6-0294	WRA 1	Artefact
51-6-0650	WR-OS-1 (Pole 31)	Artefact
51-6-0768	CSPAD3	Artefact
51-6-0107	Snow Gum Ridge 1	Artefact
51-6-0108	Snow Gum Ridge 2	Artefact
51-6-0421	Restriction applied.	Artefact
51-6-0807	Marys Mount IF1	Artefact

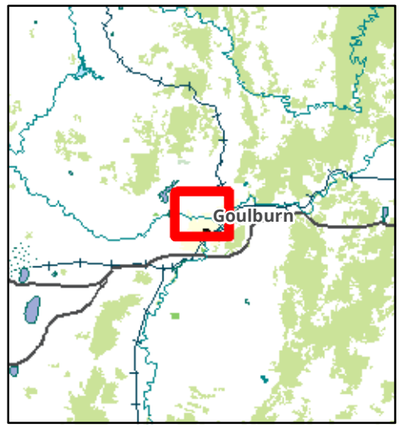
Table 4 AHIMS sites within the study area

Site type	Occurrences	Frequency (%)
Artefact	14	82.35
Artefact, PAD	2	11.76
Restricted	1	5.89
TOTAL	**17**	**100**

A simple analysis of the Aboriginal cultural heritage sites registered within 5km of the study area indicates that the dominant site type is artefact representing 82.35% (n=14), followed by artefact with PAD of 11.76% (n=2) and one restricted site represented by 5.89% (n=1). All the sites were located within close proximity to the reliable sources of water and were exposed by the land clearing works (artefact scatters).



Acknowledgements: © Land and Property Information 2015



Legend

- AHIMS Records
- Study area

Figure 5: AHIMS records near the study area

NOT TO BE MADE PUBLIC

0 190 380 570 760 950

Metres

Scale: 1:19,000 @ A3

Coordinate System: GCS GDA 1994

N

Biosis Pty Ltd

Ballarat, Brisbane, Canberra, Melbourne, Sydney,Wangaratta & Wollongong

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Location:P:\25900s\25951\Mapping\25951_ADD_F5_AHIMS.mxd

3.3.2 Predictive statements

A series of statements been formulated to broadly predict the type and character of Aboriginal cultural heritage sites likely to exist throughout the study area and where they are more likely to be located.

This model is based on:

- Local and regional site distribution in relation to landform features identified 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; and
- 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 5 Aboriginal site prediction statements

Site type	Site description	Potential
Flaked stone artefact scatters and isolated artefacts	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.	Moderate: 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 from permanent fresh water resources, the potential for artefacts to be present within the study area is assessed as moderate.
Shell middens	Deposits of shells accumulated over either singular large resource gathering events or over longer periods of time.	Low: 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 due to the distance to permanent water sources.
Quarries	Raw stone material procurement sites.	Low: There is no record of any quarries being within or surrounding the study area.
Potential Archaeological Deposits (PADs)	Potential sub surface deposits of cultural material.	Moderate: 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
Modified trees	Trees with cultural modifications	Low: Scarred trees have not been recorded within the vicinity of the study area. Due to extensive vegetation clearance only a small number of mature native trees have survived within the study area.
Grinding grooves	Grooves created in stone platforms through ground stone tool manufacture.	Low: Suitable horizontal sandstone rock outcrops do not occur within the study area.
Burials	Aboriginal burial sites.	Low: 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.
Rock shelters with art and / or deposit	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.	Low: The sites will only occur where suitable sandstone exposures or overhangs possessing sufficient sheltered space exist, which are not present within the study area.
Aboriginal Ceremony and Dreaming Sites	Such sites are often intangible places and features and are identified through oral histories, ethnohistoric data, or Aboriginal informants.	Low: There are currently no recorded mythological stories for the study area.
Post-Contact Sites	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.	Low: There are no post-contact sites previously recorded in the study area and historical sources do not identify one.
Aboriginal Places	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.	Low: There are currently no recorded Aboriginal historical associations for the study area.

4 Archaeological survey

An archaeological survey of the study area was undertaken on 11 October 2017. The survey sampling strategy, methodology and a discussion of results are provided below.

4.1 Archaeological survey aims

The principle aims 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 Aboriginal archaeological and cultural sensitivity.

4.2 Survey methods

The survey was conducted on foot. 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 elements, distinguishable areas of land approximately 40m across or with a 20m radius (CSIRO 2009).
- Photographs of the site indicating landform.
- Ground surface visibility (GSV) and areas of exposure.
- Observable past or present disturbances to the landscape from human or animal activities; and,
- Aboriginal artefacts, culturally modified trees or any other Aboriginal sites.

Where possible, the 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 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. The study area has a low GSV due to the extensive grass coverage across the study area and relatively small areas of exposure.

4.4 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 4). Small areas of GSV were present around fencing and gateways, access tracks and areas of animal grazing.

Plate 4 South facing showing native grass coverage and low visibility (scale = 1 metre)

4.5 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 10% due to extensive grass coverage. Areas of limited exposure were located along vehicle tracks and drainage ditches where erosion was high (Plate 5 and Plate 6).

Plate 5 West facing photo showing areas of exposure (scale = 1 metre)

Plate 6 North facing photo showing exposure along the driveway (scale = 1 metre)

4.6 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 recent human action are prevalent in the study area and cover large sections of the land surface. The agents include residential development such as landscaping and construction of residential buildings; farming practices,

such as initial vegetation clearance for creation of paddocks, fencing and stock grazing; agricultural practices such as fruit orchards; and creation of artificial dams within the study area.

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. These areas include access roads (Plate 7), houses and sheds (Plate 8), and four dams (Plate 9). Minor surface disturbances caused by cattle trampling also resulted in the removal of topsoil and rabbit burrowing would have disturbed any subsurface deposits (Plate 10 and Plate 11). Furthermore, historical records state that the property was extensively ploughed and contained a large orchard (Plate 12).

Plate 7 North facing photo showing unsealed driveway leading to the residential houses (scale = 1 metre)

Plate 8 East north photo showing disturbance associated with Teneriffe (scale = 1 metre)

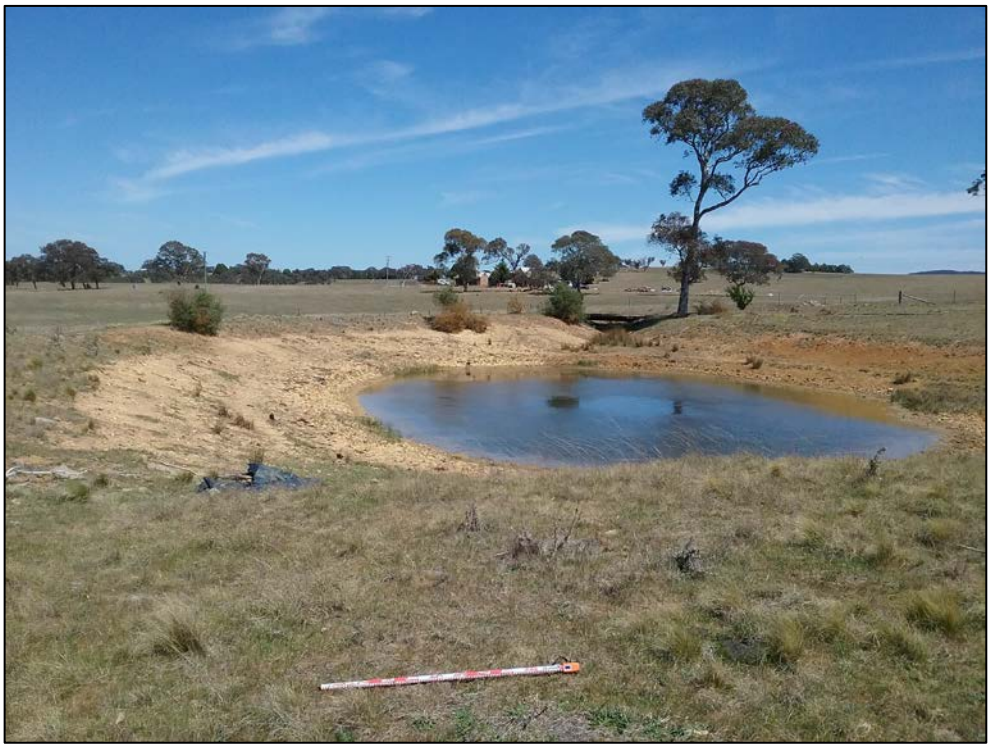


Plate 9 East south photo showing disturbance associated with the construction of dams (scale = 1 metre)

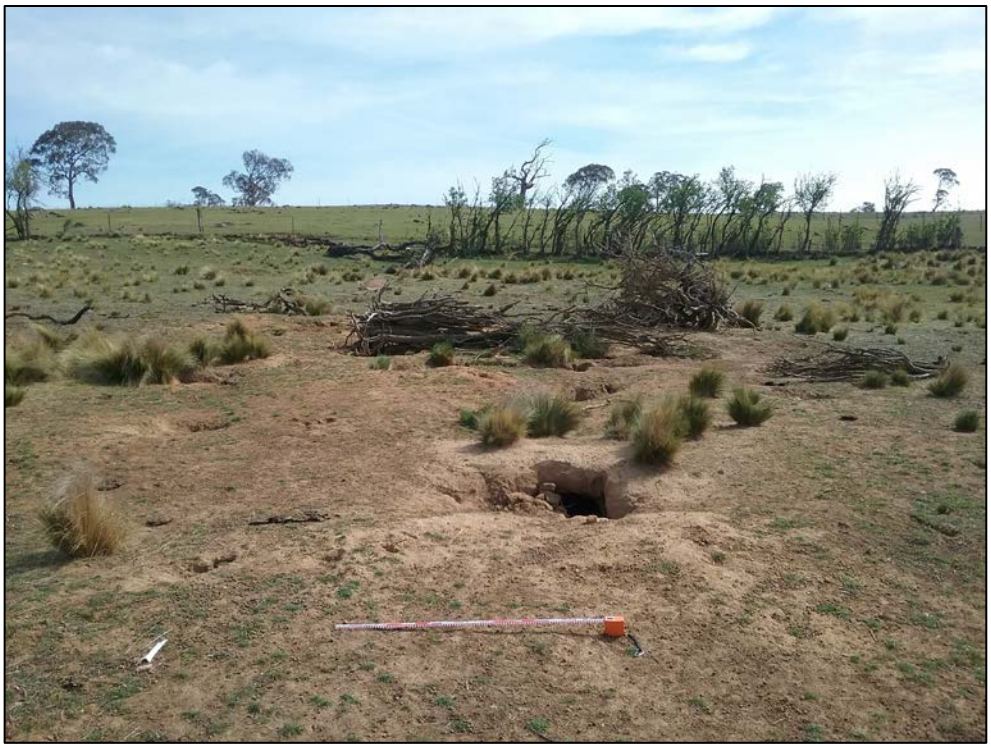


Plate 10 North facing photo showing rabbit burrowing and disturbance (scale = 1 metre)

Plate 11 South facing photo showing disturbance from cattle and the foundations of a building (scale = 1 metre)

Plate 12 1967 aerial image showing the extensive orchard in the north east corner of the study area (shown in red)

4.7 Survey results and discussion

The archaeological survey consisted of a total of 12 transects that were walked across the entire study area. The results of the field survey are provided in Figure 6. The assessment for areas that have low, moderate or high archaeological potential within the study area is 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 is located within a gently undulating rolling hills landform with crests, simple slopes, and open depressions with an ephemeral drainage line running down the eastern boundary into a wet marsh area in the middle of the southern boundary. The drainage line eventually drains into the Wollondilly River but does not provide a water source except in times of flooding. The landscape is geologically complex and soils consists of lithosols that have formed on crests and sideslopes, while in the valleys Prairie soils have formed.

A review of the soil landscape and landforms indicates the primary geomorphological agents are likely to be sheet wash and stream flow causing a process of erosion and aggradation. Within the study area, the soil landscape indicates that older material is being washed down slopes and crests to form alluvial soil deposits in the creek flats and drainage lines. The creek flats and drainage lines are likely to be also subject to stream flow and associated processes of erosion and aggradation. Land clearance is likely to have exposed soils and exasperated effects of sheet wash and stream flow, potentially eroding away archaeological deposits.

The Monastry Hill Soil Landscape in the northern part of the study area has no A horizon development, which would limit the potential for subsurface artefacts or deposits to be present. In the southern part of the study area, the Sooley Soil Landscape has a complex soil distribution and is characterised by a dark brown silty loam up to 180mm in depth underlain by extremely weathered, highly fractured limestone. Geotechnical testing in the south western corner of the study area confirmed this. Test pit 1 consisted of 180mm of dark brown silty topsoil underlain by 320mm of highly fractured course limestone, while test pit 2 displayed the same soil profile but at a shallower depth of 450mm. These types of soil landscapes indicate that the potential for cultural material and potential archaeological deposits to remain is low.

In addition, the survey revealed that the majority of the study area had been subject to previous significant ground disturbance. The study area has been occupied for over 130 years and the construction of residential buildings, outbuildings, dams, and access roads, along with the accumulated effects of farming practices and animal disturbances, would have displace surface cultural material and may have also affected deeper buried archaeological deposits.

The survey also identified two Aboriginal objects in close proximity to the house, which consisted of two complete flakes (Plate 13 and Plate 14). Both artefacts were located in highly disturbed contexts, one in an exposed area among rubbish and rubble piles (Plate 15), and the other was imbedded within an access road (Plate 16). Due to the highly disturbed nature of the surrounding area, it is likely that the artefacts are not in situ and may have been imported into the study area. In addition, this portion of the study area will be retained as a residential property; therefore, no impacts will occur to these sites.

Plate 13 Complete flake

Plate 14 Complete flake

Plate 15 Location of above silcrete flake in an exposed area among rubbish and rubble piles

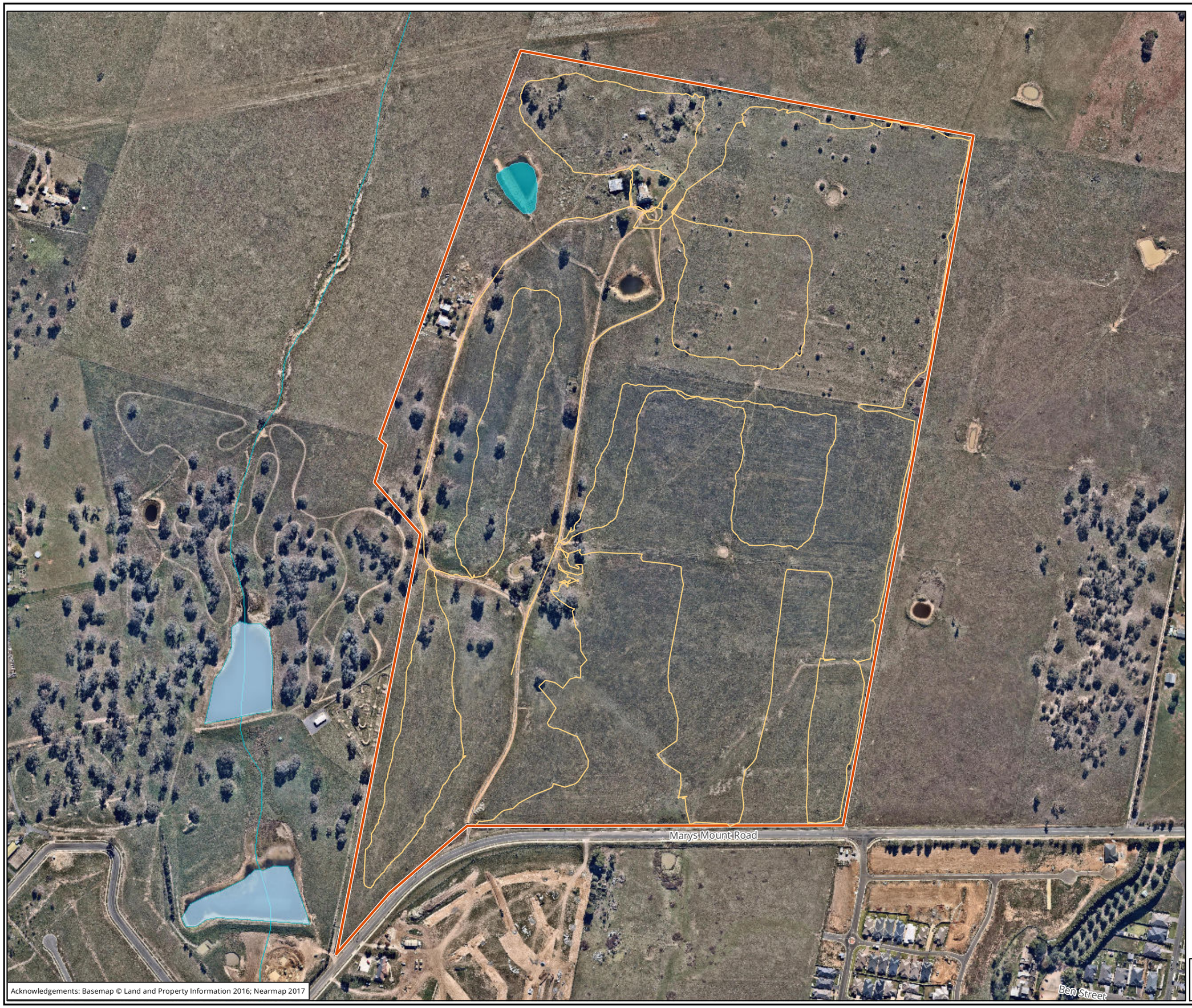
Plate 16 Location of above silcrete embedded in an access road to the house

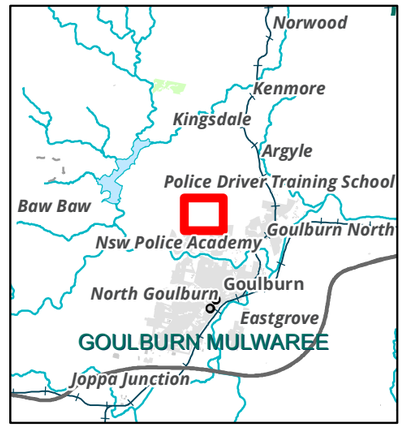
A review of previous archaeological studies, surveys, test excavations and regional predictive modelling indicates that all landforms within the study area were utilised to some degree by Aboriginal people in the past. However, the majority of sites will be located on the alluvial flats associated with the Wollondilly and Mulwaree Rivers and Gundary Creek (Fuller 1989). Areas that are further away from permanent water sources have fewer archaeological sites with small density and range of cultural material present. Ethnographic accounts suggest that Aboriginal groups of the Goulburn region were highly mobile, largely

dispersed and were moving seasonally for resource exploitation and/or ceremonial activities. Due to the Wollondilly River being over 1 kilometre from the study area, it is likely that the crest that traverses the western boundary of the study area was one of the many travelling corridors that eventually led to the river. Any Aboriginal occupation within this landform would have been transient, isolated events.

A predictive model has been developed to broadly predict the type and character of Aboriginal cultural sites likely to exist(ed) throughout the study area and where they are more likely to be located. The model is based primarily on Lance and Koettig (1986) and Fuller's (1989) prediction models as well as the landscape context and ethnohistory of the region. This model has been tested multiple times with the majority of results from these studies conforming to the model. Using Fuller's (1989) model, the study area is located with two zones: Zone 2b (Gently, undulating land) and Zone 2c (Hills – Low <700m). Both of these zones have low significance and, within the context of Fuller's model, Zone 2c is likely to have medium potential for sites to occur. However, the long distance from reliable water sources combined with the high disturbance present and nature of the soil landscape has resulted in the entire study area being assessed as low.

Test excavations conducted by Biosis (2013) at Lot A DP 912692 and Lot 11 DP912247 on the opposite side of Marys Mount Road, confirms the low potential of the study area. The original assessment by Williams (2005) identified one quartz core and two possible glass scrappers, a quartzite flake, and a black volcanic angular fragment. These sites were unable to be relocated; however, a program of 34 test pits were excavated across the study area, which were located on two separate landforms – creek flats and lower slopes. This testing of sub surface potential resulted in nil findings and led to an assessment of the study area as holding low potential for sub surface sites or deposits to be present. The artefact assemblage from the original recording of these three sites was very small and indicated that the area was not optimal for long or short term human occupation. Following the test excavations, it was concluded that the study area contained no further known cultural heritage sites other than the three registered AHIMS sites and that there is extremely low potential for unidentified surface sites or sub surface deposits to be present.





Legend

Study area

Survey tracks

Figure 7: Survey effort

0 40 80 120 160 200

Metres

Scale: 1:4,500 @ A3

Coordinate System: GDA 1994 NSW Lambert

N

biosis

Biosis Pty Ltd

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

Acknowledgements: Basemap © Land and Property Information 2016; Nearmap 2017

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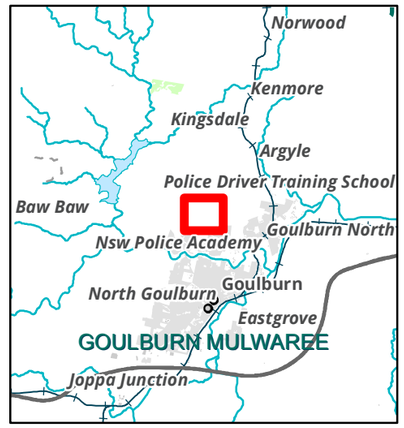

Legend

- Study area
- Surface artefacts

Areas of archaeological potential

- Low

Disturbance

- High disturbance

Figure 8: Survey results

0 40 80 120 160 200

Metres

Scale: 1:4,500 @ A3

Coordinate System: GDA 1994 NSW Lambert

N

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

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Date: 27 October 2017,
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Acknowledgements: Basemap © Land and Property Information 2016; Nearmap 2017

5 Conclusions and recommendations

5.1 Conclusions

This assessment has identified that the entire study area has low archaeological potential. This assessment was made based on background research that identified that the entire study area had been subjected to past land clearance and agricultural use, and that sheet wash and stream flow has caused erosion and aggradation. The soil landscapes present also indicate that the potential for cultural material and potential archaeological deposits to remain is low.

During the field inspection, two Aboriginal stone artefacts were recorded. However, there were located in a highly disturbed context and were likely imported into the study area along large amounts of building materials and rubble. This portion of the development will retained as a residential lot, therefore no impacts will occur to these sites.

Using Fuller's (1989) model, it was determined that the study area is located with two zones: Zone 2b (Gently, undulating land) and Zone 2c (Hills – Low <700m). Both of these zones have low significance, while Zone 2c is likely to have medium potential for sites to occur. Although, the long distance from reliable water sources combined with the high disturbance present and nature of the soil landscape has resulted in the entire study area being assessed as low (Figure 7).

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

No further archaeological work is required in the study area due to the entire study area assessed as having low archaeological potential.

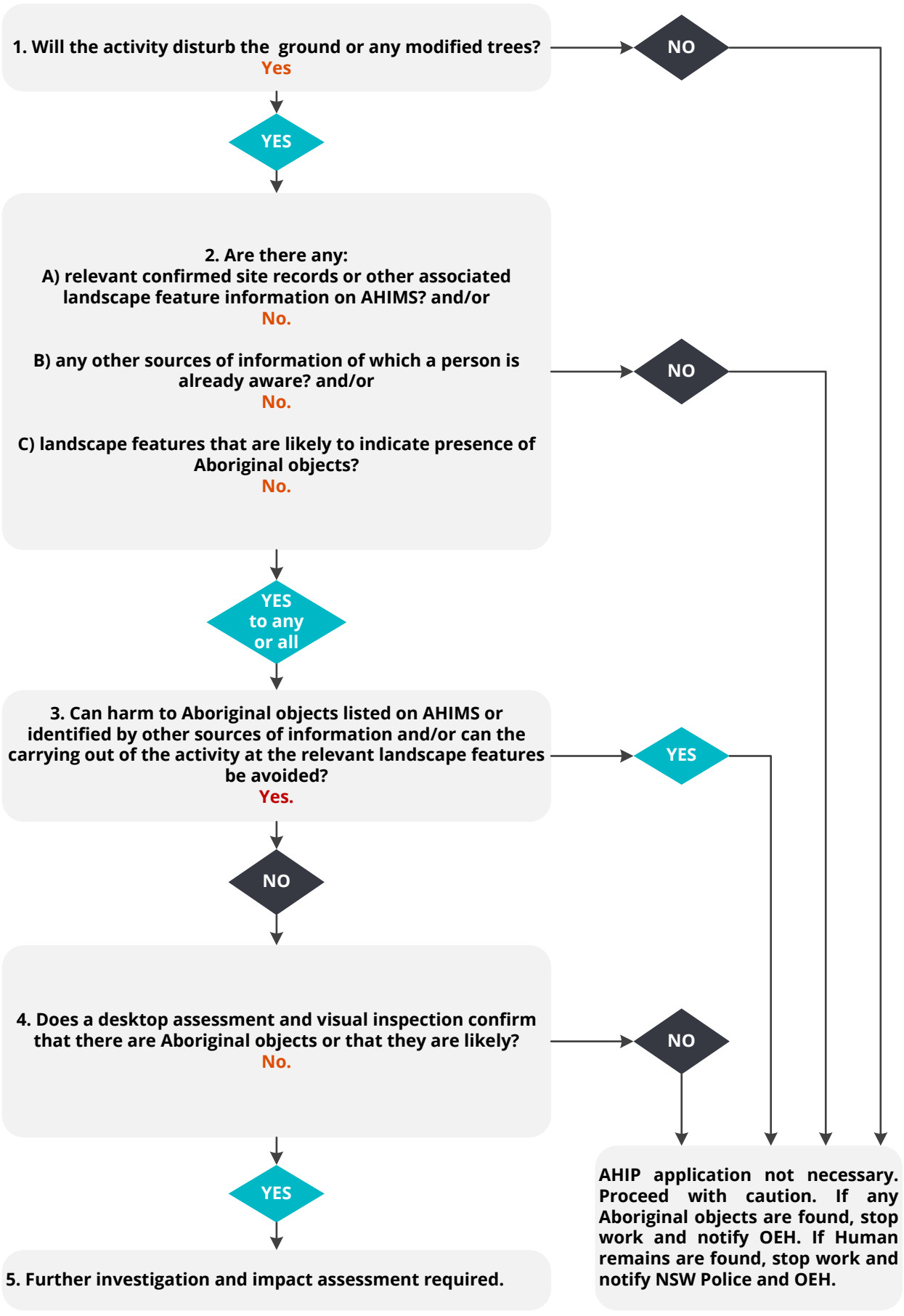
Recommendation 2: Discovery of Unanticipated Aboriginal Objects

All Aboriginal objects and Places are protected under the NPW Act. It is an offence to knowingly disturb an Aboriginal site without a consent permit issued by the 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:

4. Immediately cease all work at that location and not further move or disturb the remains
5. 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
6. Not recommence work at that location unless authorised in writing by OEH.


1. Will the activity disturb the ground or any modified trees?
Yes
NO
YES
2. Are there any:
A) relevant confirmed site records or other associated landscape feature information on AHIMS? and/or
No.
B) any other sources of information of which a person is already aware? and/or
No.
C) landscape features that are likely to indicate presence of Aboriginal objects?
No.
NO
YES to any or all
3. Can harm to Aboriginal objects listed on AHIMS or identified by other sources of information and/or can the carrying out of the activity at the relevant landscape features be avoided?
Yes.
YES
NO
4. Does a desktop assessment and visual inspection confirm that there are Aboriginal objects or that they are likely?
No.
NO
YES
5. Further investigation and impact assessment required.
AHIP application not necessary. Proceed with caution. If any Aboriginal objects are found, stop work and notify OEH. If Human remains are found, stop work and notify NSW Police and OEH.

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Appendices

Appendix 1 AHIMS search results

This Appendix is not to be made public.

AHIMS Web Services (AWS)

Extensive search - Site list report

Your Ref/PO Number : 25951

Client Service ID : 304853

SiteID	SiteName	Datum	Zone	Easting	Northing	Context	Site Status	SiteFeatures	SiteTypes	Reports
51-6-0445	Clyde Steet Pipeline 3	AGD	55	746822	6152996	Open site	Valid	Artefact : 1		
	Contact S Scanlon	**Recorders**	Pejar Local Aboriginal Land Council					**Permits**		
51-6-0684	MG5/IF1	GDA	55	748780	6153506	Open site	Valid	Artefact : 1		102238,103052,103053
	Contact	**Recorders**	Ironbark Heritage & Environment,Mr.Glenn Willcox					**Permits**	3662	
51-6-0685	MG5/IF2	GDA	55	748734	6154001	Open site	Valid	Artefact : 1		102238,103052,103053
	Contact	**Recorders**	Ironbark Heritage & Environment,Mr.Glenn Willcox					**Permits**	3662	
51-6-0686	MG5/1	GDA	55	748895	6154047	Open site	Valid	Artefact : -		102238,103052,103053
	Contact	**Recorders**	Ironbark Heritage & Environment,Mr.Glenn Willcox					**Permits**	3662	
51-6-0051	GC15	AGD	55	747270	6152930	Open site	Valid	Artefact : -	Open Camp Site	1578
	Contact	**Recorders**	Ms.N Fuller					**Permits**		
51-6-0052	GC16	AGD	55	747150	6153100	Open site	Valid	Artefact : -	Open Camp Site	1578
	Contact	**Recorders**	Ms.N Fuller					**Permits**		
51-6-0053	GC17	AGD	55	747261	6152492	Open site	Valid	Artefact : -	Open Camp Site	1578
	Contact	**Recorders**	Ms.N Fuller					**Permits**		
51-6-0318	Paton J	AGD	55	747220	6152264	Open site	Valid	Artefact : 3		
	Contact T Russell	**Recorders**	Mr.Justin Boney					**Permits**	3831	
51-6-0240	Ross Street 1	AGD	55	750729	6153024	Open site	Valid	Artefact : 1		99848
	Contact T Russell	**Recorders**	Mr.Justin Boney					**Permits**		
51-6-0208	CSA1	AGD	55	747142	6152441	Open site	Valid	Artefact : -		103084
	Contact Searle	**Recorders**	Ms.Trish Saunders					**Permits**	3831	
51-6-0294	WRA 1	AGD	55	746366	6153116	Open site	Valid	Artefact : 5, Potential Archaeological Deposit (PAD) : -		103490
	Contact Searle	**Recorders**	Ms.Trish Saunders					**Permits**	3960	
51-6-0650	WR-OS-1 (Pole 31)	AGD	55	750790	6151740	Open site	Valid	Artefact : 11		101434
	Contact	**Recorders**	Mills Archaeological & Heritage Services Pty Ltd					**Permits**	3222	
51-6-0768	CSPAD3	GDA	55	747336	6152624	Open site	Valid	Artefact : -, Potential Archaeological Deposit (PAD) : -		
	Contact	**Recorders**	Ms.Lyn O'Brien					**Permits**	3831	
51-6-0107	Snow Gum Ridge 1	AGD	55	747357	6152394	Open site	Valid	Artefact : -		
	Contact	**Recorders**	Mr.Tim Hill					**Permits**		
51-6-0108	Snow Gum Ridge 2	AGD	55	747419	6152425	Open site	Valid	Artefact : 30		
	Contact	**Recorders**	Mr.Tim Hill,Mr.Dean Freeman					**Permits**		

Report generated by AHIMS Web Service on 03/10/2017 for Samantha Keats for the following area at Datum :GDA, Zone : 55, Eastings : 746389 - 751028, Northings : 6151853 - 6157211 with a Buffer of 0 meters. Additional Info : Due diligence assessment. Number of Aboriginal sites and Aboriginal objects found is 17

AHIMS Web Services (AWS)

Extensive search - Site list report

Your Ref/PO Number : 25951

Client Service ID : 304853

SiteID	SiteName	Datum	Zone	Easting	Northing	Context	Site Status	SiteFeatures	SiteTypes	Reports
51-6-0421	Restriction applied. Please contact ahims@environment.nsw.gov.au.					Open site	Valid			
	Contact Searle	**Recorders**	Mr.Justin Boney						**Permits**	
51-6-0807	Marys Mount IF1	GDA	55	749303	6154253	Open site	Valid	Artefact : -		
	Contact	**Recorders**	Mr.Matthew Barber,NGH Heritage - Fyshwick						**Permits**	

Report generated by AHIMS Web Service on 03/10/2017 for Samantha Keats for the following area at Datum :GDA, Zone : 55, Eastings : 746389 - 751028, Northings : 6151853 - 6157211 with a Buffer of 0 meters. Additional Info : Due diligence assessment. Number of Aboriginal sites and Aboriginal objects found is 17