95 Great Southern Road Rezoning

Archaeological Survey Report

Report to Precise Planning
March 2017

artefact

Artefact Heritage
ABN 73 144 973 526
Level 4, Building B
35 Saunders Street
Pyrmont NSW 2009
Australia

+61 2 9518 8411
office@artefact.net.au

EXECUTIVE SUMMARY

Artefact Heritage has been engaged by Precise Planning to conduct an Aboriginal archaeological survey report for land at 95 Great Southern Road, Bargo. The property is currently zoned RU2 under the Wollondilly Local Environmental Plan (LEP) 2011, and has been proposed for rezoning for residential purposes. The study area comprises Lot 1 DP996286.

No previously recorded Aboriginal sites were identified within the study area, following an extensive search of the Aboriginal Heritage Information Management System (AHIMS). A survey of the study area was conducted on 8 May 2015 with representatives of Tharawal Local Aboriginal Land Council (TLALC) and Cubbitch Barta Native Title Claimants Aboriginal Corporation (CBNTCAC), in accordance with the OEH *Code of Practice for Archaeological Investigation of Aboriginal Objects in New South Wales* (2010) (Code of Practice). Site survey identified two new Aboriginal sites BDTC-GG01 (AHIMS # 52-2-4194) and BDTC-AS01 (AHIMS # 52-2-4195) and two new areas of potential archaeological deposit (PAD) (BDC-PAD01 and BDC-PAD02).

Overview of findings

It was found that:

- The study area proposed for rezoning contains two Aboriginal sites (AHIMS # 52-2-4194 and AHIMS # 52-2-4195).
- AHIMS # 52-2-4194 is a grinding groove site of high archaeological significance and would be conserved within the riparian corridor.
- AHIMS # 52-2-4195 is an artefact scatter site with an associated area of PAD. The PAD has high archaeological potential. The overall archaeological significance of AHIMS # 52-2-4195 is unknown. This site would be conserved within the riparian corridor.
- Two areas of PAD (BDC-PAD01 and BDC-PAD02) were identified within the study area. The PADs have moderate archaeological potential and their archaeological significance is unknown. BDC-PAD01 and BDC-PAD02 may be partially impacted.

Recommendations

It is therefore recommended that:

- AHIMS # 52-2-4194 and AHIMS # 52-2-4195 should be conserved. If impacts are to occur in the vicinity of AHIMS # 52-2-4194 and AHIMS # 52-2-4195, mitigative measures such as a buffer zone and fencing should be implemented in order to protect the sites.
- If impacts are to occur at, BDC-PAD01 or BDC-PAD02, test excavation under the Code of Practice would be required in order to assess the nature and extent of the archaeological deposit and its archaeological significance.
- An Aboriginal Heritage Impact Permit (AHIP) would be required if Aboriginal objects were to be impacted. If Aboriginal objects were located during test excavations an AHIP would be required prior to development of the site.

- If suspected human remains are located during any stage of the proposed works, work should stop immediately and the NSW Police and the Coroner's Office should be notified. The Office of Environment and Heritage, Aboriginal stakeholder groups and an archaeologist should be contacted if the remains are found to be Aboriginal.

CONTENTS

FIGURES

PLATES

TABLES

1.0 INTRODUCTION AND BACKGROUND

1.1 Introduction

Artefact Heritage has been engaged by Precise Planning to conduct an Aboriginal archaeological survey report (ASR) for land at 95, Great Southern Road, Bargo. The property is currently zoned RU2 under the Wollondilly Local Environmental Plan (LEP) 2011, and has been proposed for rezoning for residential purposes. The purpose of this ASR is to provide an assessment of known and potential Aboriginal Heritage values. This ASR also provides strategies and recommendations for further assessment at the development application stage to manage Aboriginal heritage values for the study area.

1.2 Study area

The study area is Lot 1 DP996286, an approximately one kilometre by 300 metre block of land within the Local Government Area (LGA) of Wollondilly, Camden County, Parish of Picton. The area is bound by the Great Southern Road to the west, private properties to the north and south and Government road to the east (Figure 1).

1.3 Proposed works

Lot 1 DP996286 is proposed to be rezoned for residential purposes. The property is currently zoned RU2 under the Wollondilly Local Environmental Plan (LEP) 2011. Concept designs for the rezoning of the property have not yet been finalised.

1.4 Objectives of Assessment

The objectives of this assessment are to:

- Identify, assess and map Aboriginal cultural heritage places, areas of archaeological potential and Aboriginal objects across the study area.
- Provide an overview of existing information regarding Aboriginal heritage within the study area and the broader regional context.
- Develop an archaeological predictive model.
- Assess the archaeological significance of Aboriginal sites within the study area.
- Outline Aboriginal community consultation and involvement and provide recommendations for Aboriginal stakeholder consultation, in accordance with the OEHs 2010 ‘Aboriginal Cultural Heritage Consultation Requirements for Proponents’, should community consultation be required
- Develop appropriate management recommendations and strategies for any areas of Aboriginal heritage significance on the subject site or the immediate vicinity.

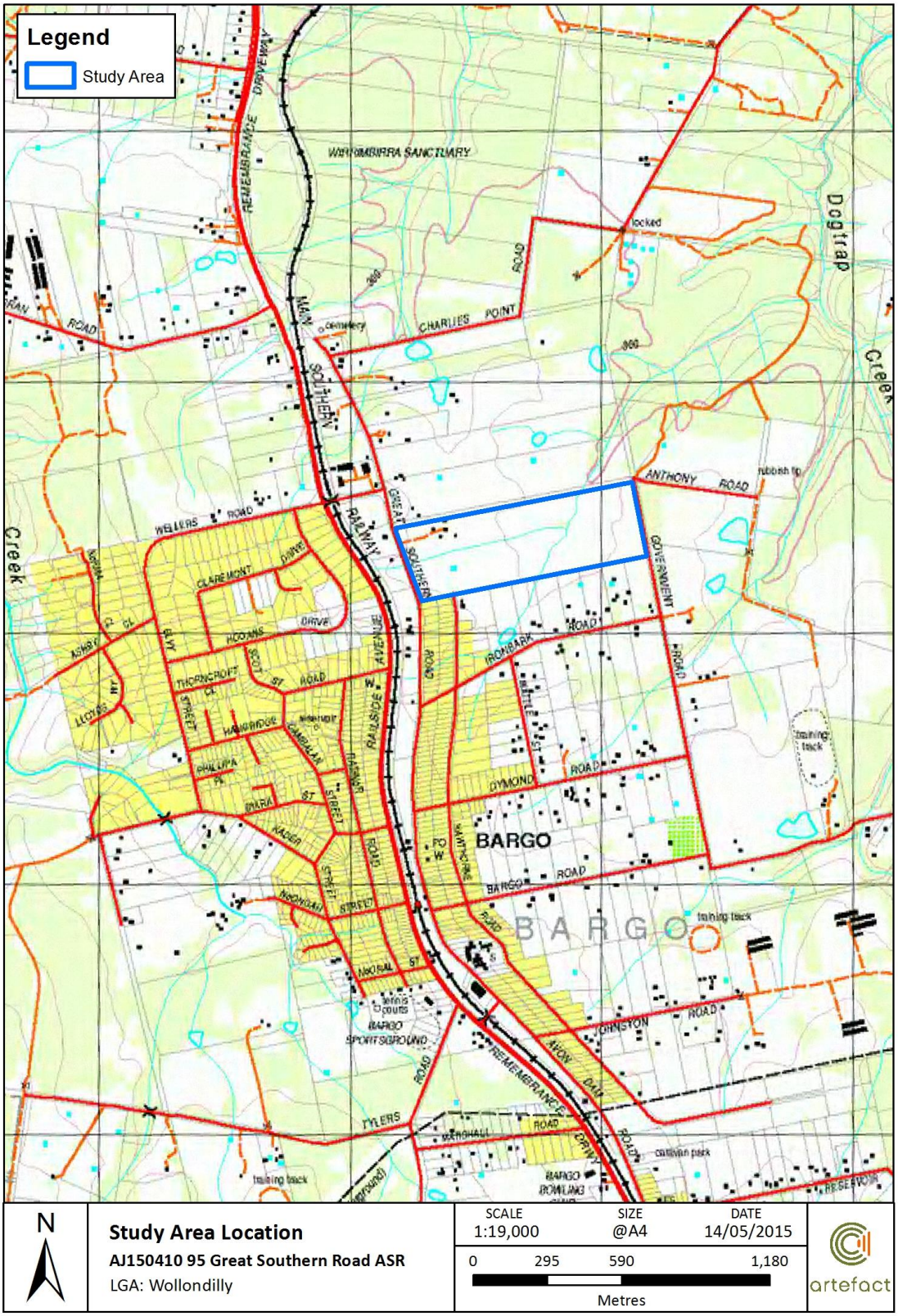
1.5 Investigators and Contributors

Archaeologists Claire Rayner and Alyce Howard prepared this report. Principal Archaeologist Dr Sandra Wallace provided management input and reviewed the report.

1.6 Aboriginal Consultation

Tharawal Local Aboriginal Land Council (TLALC) was represented by Abi Whillock and Glenda Chalker attended on behalf of Cubbitch Barta Native Title Claimants Aboriginal Corporation (CBNTCAC) on the day of survey.

Figure 1: Study area in its local context



2.0 STATUTORY CONTEXT

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

National Parks & Wildlife Act (1974)

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

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

The Act was recently amended (2010), with the legislative structure for seeking permission to impact on heritage items modified. An s.90 permit is now the only Aboriginal Heritage Impact Permit (AHIP) available and may only be granted by OEH. Various factors are considered by the OEH in the AHIP application process, such as site significance, Aboriginal consultation requirements, Ecologically Sustainable Development (ESD) principles, project justification and consideration of alternatives. The penalties and fines for damaging or defacing an Aboriginal object have also increased.

As part of the administration of Part 6 of the Act, OEH has developed regulatory guidelines on Aboriginal consultation, which are outlined in *Aboriginal Cultural Heritage Consultation Requirements for Proponents* (2010). Guidelines have also been developed for the processes of due diligence; *Due Diligence Code of Practice for the Protection of Aboriginal Objects in NSW* (2010), and for investigation of Aboriginal objects - *Code of Practice for Archaeological Investigation of Aboriginal Objects in New South Wales* (2010) in accordance with the 2010 amendment to the Act.

The Environmental Planning and Assessment Act 1979

The *Environmental Planning and Assessment Act 1979* (the EP&A Act) is administered by the Department of the Planning and Environment and provides planning controls and requirements for environmental assessment in the development approval process. This Act has three main parts of direct relevance to Aboriginal cultural heritage. Namely, Part 3 which governs the preparation of planning instruments, Part 4 which relates to development assessment process for local government (consent) authorities and Part 5 which relates to activity approvals by governments (determining) authorities.

Planning decisions within LGAs are guided by Local Environmental Plans (LEPs). Each LGA is required to develop and maintain an LEP that includes Aboriginal and historical heritage items which are protected under the EP&A Act and the *Heritage Act 1977.* The Wollondilly LEP (2011) (Part 5, Clause 5.10) makes standard provision for the protection of Aboriginal heritage items that applies to the current study area.

Development Control Plans (DCPs) provide specific and more detailed guidelines for certain types of development, or small sections within an LGA. These guidelines are in addition to the provisions of the LEP. Section 3.13 of The Wollondilly DCP (2011) lists the requirements relating to Aboriginal heritage within the Wollondilly area relevant to this study. The Wollondilly DCP states that "*an indigenous heritage and archaeological report must be prepared for any development application on land which contains a known Aboriginal object or Aboriginal place of heritage significance. The report*

must be prepared by a suitably qualified archaeologist. The report must be prepared in accordance with the Code of Practice" (Wollondilly DCP 2011:59-60)

Aboriginal Land Rights Act (1983)

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

Native Title Act (1994)

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

There are no Native Title claims registered within the study area.

3.0 ENVIRONMENTAL CONTEXT

3.1 Geology

The Hawkesbury Sandstone geological unit is described as medium to coarse grain quartz sandstone with minor spatially constricted lenses of shale and laminate (Clarke and Jones 1991). Hawkesbury sandstone is very susceptible to weathering processes (Huntley et al 2011, p 86). The homogenous nature of Hawkesbury sandstone country has been noted for its suitability for rock art production (Huntley et al 2011, p 86).

3.2 Soils

The study area is located within the Lucas Heights Soil Landscape, classed as a residual landscape, with gently undulating crests, ridges and plateau surfaces. Local relief is 10-50m, with slopes less than 10% gradient. Soils are Yellow Podzolic Soils, Yellow Soloths, Lateritic Podzolic Soils, Yellow Earths and Earthy Sands (Hazelton et al 1990).

3.3 Vegetation and Resources

Remnant vegetation within the region is grassy woodland, with a sparse overstorey of Forest Red Gum (Eucalyptus tereticornis) and dense understorey of both native and introduced grasses. In the past the region would have been vegetated by the Cumberland Plain Woodland, dominated by eucalypt species such as Forest Red Gum and Grey Box (Eucalyptus moluccana) (Benson and Howell 1990).

Aboriginal people were highly mobile hunter-gatherers. They used a range or resources, some of which were only available seasonally, and that therefore necessitated movement or trade (Attenbrow 2010: 78). Aboriginal people hunted kangaroo and wallaby and snared possums for food and skins. In marine or estuarine environments Aboriginal people caught fish and collected shellfish. There are European accounts of Aboriginal people in canoes on rivers and in the ocean, catching and cooking fish on small fires within the vessels (Collins 1798).

Plants were an important source of nutrition and were also used in the manufacture of tools. Gum and sap were used for binding or for hafting, such as in the manufacture of stone hatchets and plant fibres were used to make baskets, nets, ropes and hammocks (Saunders 2003). Plant products were also used in the manufacture of shelters, shields and other weapons, coolamons, used to carry food and water, and digging sticks.

3.4 Hydrology

The study area is located one kilometre west of Dog Trap Creek, tributaries of which flow through the study area in a north east to south west direction. The study area is located three kilometres east of the Bargo River and the Nepean River is located 5.5 kilometres to the west.

3.5 Historical Land Use Context

The Bargo area was first visited by European settlers in 1798 during an expedition led by John Wilson (Stead 1997). Early attempts to settle the area were generally unsuccessful due to the barren nature of the land and the thick scrub that covered the landscape (Stonequarry 2013). This lead to the exploration of areas further south and the identification of better and more fertile pastures in the area now known as Goulburn (Stead 1997). The Argyle Road was built through Bargo in the early 19th

century however, due to the infertile quality of land around the town and the impenetrable bushland, the area was not attractive to settlers (Stead 1997). The area remained isolated until the Southern Highlands Line (part of the Main Southern Line railway) was constructed through the town (Stead 1997). The township of Bargo flourished during the early 20th century as one of the main towns on the Hume highway (Stonequarry 2013). However, following realignment of the Hume Highway to the east, the town has since declined. The unsuitability of the area for agricultural activities has led to the establishment of several conservation areas around the town including the Bargo River Conservation Area and the Bargo State Conservation area.

The study area has largely been cleared and is currently used for light grazing. A derelict house and several agricultural structures are located at the western portion of the property close to the Great Southern Road. An unnamed tributary of Dog Trap Creek runs through the central portion of the property and features a dense tree line either side of the water way. This portion of the study area has been largely undisturbed by pastoral activities. Some old growth eucalypts remain either side of the tributary.

4.0 ARCHAEOLOGICAL CONTEXT

4.1 Aboriginal Material Culture

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

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

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

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

4.2 Aboriginal Ethno-historical Context

The study area is located near the boundaries of three Aboriginal groups: the Wodi Wodi, Tharawal (alternative spelling 'Dharawal') and Gandangara (Tindale 1974). The Wodi Wodi are described by Tindale (1974) as occupying an area extending from the Shoalhaven River, north to Wollongong and west as far as Picton, Marulan and Moss Vale. The Tharawal tribe are placed in the area directly to the north, from the south side of Botany Bay and Port Hacking to north of the Shoalhaven River and

inland to Campbelltown, Camden and Bargo. The Gandangara people are described as occupying the western portion of the Southern Highlands, including a boundary area with the Tharawal in the Camden and Bargo locality.

As traditional territorial boundaries were fluid it is uncertain which group(s) occupied the study area (Peterson 1976). The current state of knowledge about the fluidity of tribal boundaries is based partly on studies of contemporary Aboriginal communities in northern and central Australia who were less affected by European colonisation, and partly on observations of tribal groups to the west and south-west of Sydney who had been severely affected by the disconnection from their lands cause by European colonisation (Thomson 1985).

There is some evidence that Aboriginal people around the Camden area spoke a distinctly separate language group and their tribal area was known as Cubbitch-Barta after its white pipe clay (Russell 1914). Government records from the 1830s and 1840s identify an Aboriginal group known as the Cobbiti Barta as associated with the Camden area (JMCHM 2007:21).

There are also ethno-historical observations made by early explorers and settlers in the region, who first came into contact with the Aboriginal people of these areas in the 18th and 19th century. Wilson, during a 1798 expedition through the region, observed that people were wearing large skin cloaks. Major Mitchell noted in 1828 in the nearby Berrima district that two types of hut structures were in use: one consisting of a sheet of bark propped up against a tree and used by a single person, and another for family groups consisting of a few boughs as the framework, covered with bark and branches (Koettig 1981). When James Backhouse travelled to the region in 1836, he noted that skin cloaks were still worn, but some European clothes and blankets were also used, and that ceremonies such as tooth avulsion were also practised (Koettig 1981).

In the early 1800s relationships between the Aboriginal people of the area and the European settlers were in general amicable. Grace Karskens notes several examples of close relationships between land owners and local Aboriginal people, including John Kennedy who gave the Dharawal protection on Teston Farm at Appin in later, not so peaceful, times (Karskens 2010).

Relations between Aboriginal people and colonists did not remain amicable. A sustained drought during 1814 and 1815, and continued disenfranchisement of Aboriginal people from the land lead to tensions between farmers and Aboriginal people who remained to the southwest of Sydney. Aboriginal people were accused of stealing corn and potatoes and spearing cattle. A number of farmers were killed on their properties. In a dispatch Governor Macquarie wrote that “The Native Blacks of this country…have lately broken out in open hostility against the British Settlers residing on the banks of the River Nepean near the Cow Pastures”. Aboriginal people were targeted and it was ordered that Aboriginal men be strung from trees when they were killed as an example (Turbet 2011:234).

In 1816 the tensions culminated in the Appin massacre when Aboriginal people where pursued by a detachment led by Captain James Wallis. Fourteen Aboriginal people of the Dharawal nation were shot or driven over a cliff to their deaths by the soldiers. The bodies of two of the Aboriginal men were strung up at the site (Turbet 2011).

Overall the devastation of the Aboriginal culture did not come about through war with the British, but instead through disease and forced removal from traditional lands. It is thought that during the 1789 smallpox epidemic over half of the Aboriginal people of the Sydney region died. This loss of life meant that some of the Aboriginal groups who lived away from the coastal settlement of Sydney may have disappeared entirely before Europeans could observe them, or record their clan names (Karskens 2010:452).

Into the nineteen and twentieth century's descendants of the Gundungurra, Tharawal and Wodi Wodi Tribes continued to live across the southern margin of the Cumberland Plain along with Aboriginal people from other areas of NSW.

4.3 OEH Aboriginal Heritage Information

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

An extensive search of the Aboriginal Heritage Information System (AHIMS) database was undertaken on the 2 March 2017 for sites registered within the following coordinates:

GDA 1994 MGA 56	276182E – 279173E 6203120N – 6205553N
Buffer	200 m
Number of sites	16
AHIMS Search ID	170515

The distribution of recorded sites within the AHIMS search area is shown in Figure 2. The search located 14 registered sites within the vicinity of the study area and the two sites recorded for this study within the study area (not mapped on the AHIMS search map).

The frequency of recorded site types is summarised in Table 1 below.

Table 1: Frequency of site features within the AHIMS extensive search results

Site Feature	Frequency	Percentage
Art (pigment or engraving)	13	82
Grinding Grooves	2	12
Artefact	1	6

The most frequent site feature in the search area is rock art (n=13, 82%). Of these the majority are recorded in association with a shelter. The other site feature recorded within the search area is grinding grooves. AHIMS site Dog Trap Creek AGG-1 (52-2-3921) is recorded as two axe grinding grooves located on a sandstone platform adjacent to an unnamed tributary of Dog Creek.

There are no previously registered Aboriginal sites recorded within the study area, only the two sites recorded in 2015 as part of this study. The closest previously registered site is located 22 metres north from the north eastern corner of the study area. AHIMS site Bargo (52-2-1540) is recorded as a rock shelter with art.

4.4 Previous Archaeological Investigations

25 Government Road, Bargo (MDCA 2011)

In 2011 Mary Dallas Consulting Archaeologists (MDCA) conducted an archaeological due diligence assessment of 25 Government Road, Bargo, on the eastern side of Government Road, opposite the study area. The site was situated in a similar gently sloping landform context to the current study area, although the site at 25 Government Creek did not contain a natural watercourse. The closest

water course was approximately 200 metres to the west and east of the site respectively. The site had been subject to a moderate level of disturbance associated with the clearance of the land and its later use for agricultural purposes. No Aboriginal objects were identified during field investigation at 25 Government Road.

Crown Road Reserve between Proposed Waste Transfer Station and Wellers Road, Bargo (MDCA 2012)

In 2012 Mary Dallas Consulting Archaeologists (MDCA) conducted an archaeological due diligence assessment of the crown road reserve between the proposed waste transfer station and Wellers Road. The site runs along the northern border of the current study area and consists of a 20 metre wide corridor. There were no Aboriginal objects identified during the field investigation.

Tahmoor Colliery Bargo Exploration Program (Niche 2012a)

In 2012 Niche conducted an Aboriginal archaeological due diligence assessment of 20 seismic lines associated with Tahmoor Colliery's Bargo Exploration Program, approximately two kilometres northeast of the study area. The exploration program covered a 12 kilometre x 10 kilometre area, which included the township of Bargo and the current study area. A survey of each proposed seismic line was undertaken, of which the southern ends of 7, 8 and 9 were between 120 metres and 800 metres away from the current study area. The field investigation did not include survey of the current area.

Two Aboriginal sites were recorded as part of the assessment: Dog Trap Creek 1A-1 and Dog Trap Creek AGG. Dog Trap Creek AGG is located within the AHIMS search area, one kilometre to the north east of the study area. This site Dog Trap comprised two axe grinding grooves on a sandstone platform on an unnamed tributary of Dog Trap Creek. Both of these sites were assessed to be of low archaeological significance with limited potential to provide further information about Aboriginal occupation of the local area. No Aboriginal sites were located near the current study area.

Tahmoor Colliery Tahmoor South Exploration Program (Niche 2012b)

In 2012 Niche undertook an Aboriginal archaeological due diligence assessment of six proposed seismic lines associated with the Tahmoor Colliery's Tahmoor South Exploration Program, which covers an area similar to that of the Bargo Exploration Program. A survey of each proposed seismic line was conducted. Seismic line EW12 was located approximately 400 metres north and EW12 650 metres south of the study area. The field investigation did not include survey of the current study area.

No new Aboriginal sites were identified as part of the investigation. An isolated stone artefact site, East Buxton Isolated Find 1 (52-2-2046) was located close to proposed seismic line EW6. The site was assessed to be of low archaeological significance as it did not have the potential to provide further information about Aboriginal occupation in the local area.

4.5 Archaeological Implications for the Study Area

Beth White and Jo McDonald have contributed to the debate over site prediction on the Cumberland Plain. White & McDonald discussed the nature of Aboriginal site distribution as interpreted through lithic analysis of excavated sites in the Rouse Hill Development Area (RHDA) in 2010. This analysis brings together data from 631 dispersed one metre x one metre test squares from nineteen sample areas, which yielded 4,429 stone artefacts in total (White & McDonald 2010). The findings of the study generally support earlier models that predicted correlations between proximity to permanent water sources and site location, but also highlighted the relationship between topographical unit and Aboriginal occupation.

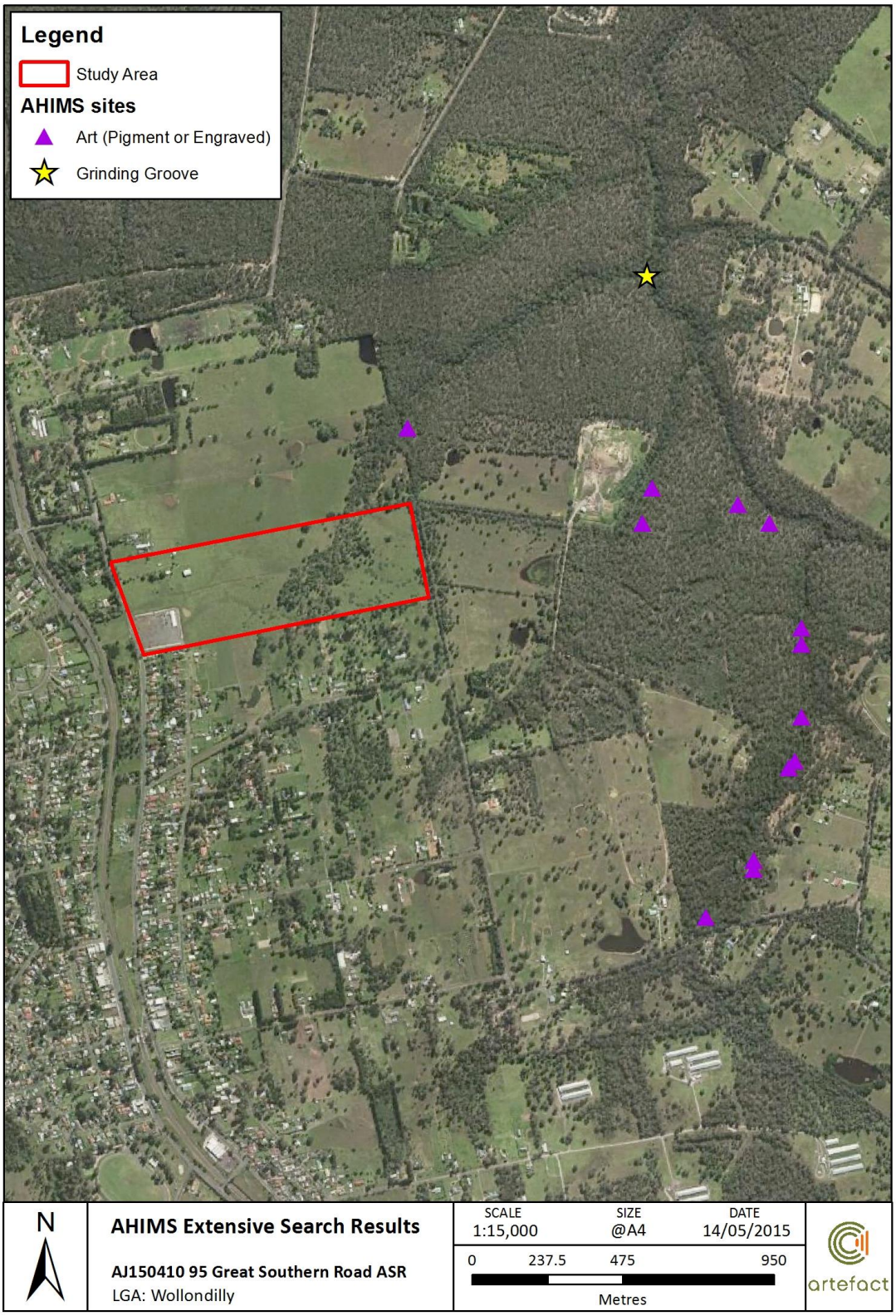
The major findings of the study were that artefact densities were most likely to be greatest on terraces and lower slopes within 100 metres of water (White & McDonald 2010). The stream order model was used to differentiate between artefact densities associated with intermittent streams as opposed to permanent water. It was found that artefacts were most likely within 50 to100 metres of higher (fourth) order streams, within 50 metres of second order streams, and that artefact distribution around first order streams was not significantly affected by distance from the watercourse (White & McDonald 2010: 33). Overall landscapes associated with higher order streams (second order or greater) were found to have higher artefact densities, higher maximum densities, and more continuous distribution that lower order intermittent streams. The analysis also concluded that while there were statistically viable correlations that demonstrated a relationship between stream order, land form unit and artefact distribution across the RHDA, the entire area should be recognised as a cultural landscape with varied levels of artefact distribution (White & McDonald 2010: 37). This predictive model can be transferred to other areas of the Cumberland Plain.

A model of Aboriginal occupation in the local area was developed as part of the Redbank Tunnel Subsistence Management Project in Tahmoor, approximately five kilometres north of the study area. It predicted that sites of Aboriginal occupation would be found in resource rich zones, that is, in areas where a number of natural resources could be found and/or, as also noted by White & McDonald (2010), along high order watercourses. Resource rich zones, or primary resource zones, were areas people visited more frequently and/or stayed for longer periods of time. It was therefore expected that a higher number of sites, or sites of higher densities would be located in such areas. It was also expected that sites located in resource rich zones and in close proximity to a watercourse would *"exhibit greater superimpositioning of activity areas, greater quantity and density of artefacts and evidence of different episodes in the form of in situ deposits with stratified or vertically separated evidence of activity events and datable material"* (South East Archaeology 2011: 19).

Secondary resource zones or areas located only in close proximity to a watercourse would, on the other hand, be areas of more sporadic occupation by smaller groups of people. It was predicted that sites would be located on level ground, adjacent to permanent watercourses and would contain lower densities of artefacts, compared to sites identified in primary resource zones.

Activities conducted outside these zones included hunting and/or gathering of natural resources by small groups of men and/or women and children and movement between places of interest. Aboriginal occupation in such areas was therefore, less intense than in primary and secondary resource zones. It was expected that sites in such areas would be situated on slope or on ridge or spur crest landforms and/or in close proximity to lower order watercourses. It was expected that fewer sites in such areas would be identified and that such sites could contain few artefacts.

Figure 2: Previously recorded sites identified in AHIMS search (sites recorded during this study not mapped)



5.0 PREDICTIVE MODEL

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

- Ethno historical evidence of Aboriginal land use.
- Landscape context and landform unit(s).
- Distribution of natural resources in the landscape.
- Results of previous archaeological investigations in the local area.
- Predictive models proposed in other archaeological investigations.

Predictive statements are as follows:

- Artefact scatters and isolated artefacts are likely to occur in areas of the study area in areas of exposure. Silcrete, quartz and chert artefacts may be identified and densities in the study area will most likely be low to moderate.
- Sites are most likely to be found near the two tributaries of Dog Trap Creek that flow through the study area.
- Intact sub-surface archaeological deposits are only likely in areas that have not been subject to high levels of disturbance. In addition, surface finds in highly disturbed areas are unlikely to be in their original context.
- Where old growth trees remain there is a possibility that scarred trees will be identified.
- There is potential for the occurrence of grinding grooves on sand stone platforms. These may occur in open contexts or within rock shelters
- Rock art in the form of engravings or pigment art may be identified on sandstone outcrops in open contexts or within rock shelters

6.0 FIELD METHODS

6.1 Site Definition

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

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

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

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

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

6.2 Survey Methodology and Limitations

A survey of the study area was undertaken on 8 May Friday 2015 with representatives of TLALC and CBNTCAC. The survey was carried out in accordance with the OEH Code of Practice. The survey units were delineated by the landforms within the study area (Figure 3). The entirety of the study area was accessible for survey.

Given the poor visibility of the study area, the survey targeted areas of exposure. This was generally limited to tracks, sandstone outcrops, tree bases and areas near the creek line. The survey was conducted on food, aerial photographs and topographic maps were carried by survey team members. A non-differential GPS was used to track the path of the survey team and to record the geographical coordinates of features within the study area.

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

7.0 SURVEY RESULTS

7.1 Survey Coverage

The survey covered all three survey units. Areas of exposure were targeted. All sandstone outcrops were inspected to identify features such as rock art and grinding grooves. The area covered by the survey is illustrated in Figure 3.

Survey was hindered in areas where dense vegetation such as grasses impeded visibility. As such visibility ranged from nil to 60 per cent.

Survey units are shown in Figure 3. Landforms in survey unit 1 and survey unit 3 comprised gentle slopes and flats. Survey unit 2 predominately comprised terraces and gentle slope landforms either side of the unnamed tributary of Dog Trap Creek, as well as an open depression along the alignment of the tributary.

Figure 3: Survey Units

7.2 Survey Observations

7.2.1 Survey Unit 1

Survey Unit 1 extends from the Great Southern Road east towards the Dog Trap Creek Tributary. The area is 305 metres by 333 metres. The area is bisected by an artificial drainage line and is characterised by dense grasses (Plate 1). There is a farm house and associated buildings located near the entry to the property (Plate 2). The south western corner of the area was previously used as a compound site, it has recently been rehabilitated and the area is now covered by dense grasses.

Visibility is generally nil to 5 per cent. Disturbance is generally associated with construction of the farm house, structures and compound site. The area is currently used for grazing cattle.

Plate 1: Dense grass coverage across majority of Survey unit one

Plate 2: Brick silo and associated farmhouse in the background

7.2.2 Survey Unit 2

Survey Unit 2 comprises the middle of the property and centres on the tributary of Dog Trap Creek. The creek line meanders northeast-southwest through the study area. The creek is approximately 310 metres long and is bordered by a moderately dense tree line of young eucalypts (Plate 3). Occasional sandstone platforms outcrop along the creek. One of these platforms was found to contain numerous grinding grooves (BDTC-GG01). Disturbance to the area appeared to be minimal. Some debris such as corrugated iron was identified along the creek line. This is likely due to have been washed into the area after recent heavy rains (Plate 4). Artefacts were identified that had eroded out of sediments surrounding the creek on the western bank (recorded as site BDTC-AS01). BDTC-AS01 also has an area of PAD associated with the artefact scatter, extending west from the creek bank where the artefacts were located.

Either side of the unnamed tributary of Dog Trap Creek, two additional areas of PAD were identified. BDTC-PAD01 is located on a terrace and gentle slope on the western side of the Dog Trap Creek tributary, north of BDTC-AS01. BDTC-PAD01 is separated from BDTC-AS01 by an area of disturbance associated with an artificial drainage channel which has been constructed on the property (visible on the aerial in Figure 4, running approximately east-west from the house and sheds toward the Dog Trap Creek tributary). BDTC-PAD02 is located north of BDTC-AS01, on the eastern back of the Dog Trap Creek tributary. Figure 4 details the location of all sites and areas of PAD identified during site survey. All three areas of PAD feature old growth eucalypts and stable, flat deposits, indicating relatively little disturbance has occurred. It is likely that intact archaeological deposits may remain in these areas.

Plate 3: Dog Trap Creek tributary

Plate 4: Debris washed into area after recent heavy rains

7.2.3 Survey Unit 3

Survey Unit 3 consists of the study area east of the Dog Trap Creek Tributary. The landform is gently sloping to flat. The vegetation is characterised by dense grasses and Eucalypts of various ages. There is very little disturbance to this portion of the study area aside from some trampling caused by cattle. Some exposures were noted around the trees however no aboriginal objects were found in these areas.

Plate 5: Dense grass and Eucalypts of varying ages

Plate 6: An area of exposure in survey unit 3

7.3 Summary of results

The current survey identified two new sites within the study area (BDC-GG01 and BDC-AS01). Visibility across the subject area was low due to thick grass coverage. Both sites were identified in exposures along the Dog Trap Creek Tributary.

Table 2: Summary of results

AHIMS #	Site Name	Feature	Survey Unit	Landform
52-2-4194	BDTC-GG01	Grinding Grooves	2	Open depression
52-2-4195	BDTC-AS01	Artefact Scatter	2	Open depression
n/a	BDTC-PAD01	PAD	2	Terrace/gentle slope
n/a	BDTC-PAD02	PAD	2	Terrace/gentle slope

7.4 Newly Recorded Aboriginal Sites

7.4.1 BDTC-GG01 (Bargo Dog Trap Creek Grinding Grooves 01) AHIMS# 52-2-4194

Landform: Open depression

Coordinates: 277918E, 6204487N (GDA94 MGA 56)

Site type: Grinding grooves

Site length: 5 metres

Site width: 3 metres

BDTC-GG01 consists of 27 grinding grooves located upon an exposed sandstone platform in the tributary of Dog Trap Creek that runs through the study area (Plate 7). It is likely that more grinding grooves could be located beneath the build-up of sediment and vegetation around the platform (Plate 8). This is evidenced by the continuation of some grinding grooves beneath the existing vegetation. The grooves are of varying depth and size with the average length being 27 centimetres (Plate 9Plate 10).

Plate 7: View south across BDTC-GG01, 2 m scale

Plate 8: Grinding grooves continue under vegetation, 10 cm scale

Plate 9: Detail of grinding grooves, 10 cm scale

Plate 10: Detail of grinding grooves, 10 cm scale

7.4.2 BDTC-AS01 (Bargo Dog Trap Creek Artefact Scatter 01) AHIMS# 52-2-4195

Landform: Open depression

Coordinates: 277847E, 6204392N (GDA94 MGA56)

Site type: Artefact Scatter

Site length: 10 metres

Site width: 10 metres

BDTC-AS01 is scatter with an associated area of PAD. The assemblage at BDTC-AS01 comprises five stone artefacts eroding out of the western creek bank. The artefacts consist of silcrete and quartz and include complete flakes as well as flake fragments. BDTC-AS01 is located approximately 120 metres south west of BDTC-GG01.

Table 3: Artefact characteristics at BDTC-AS01

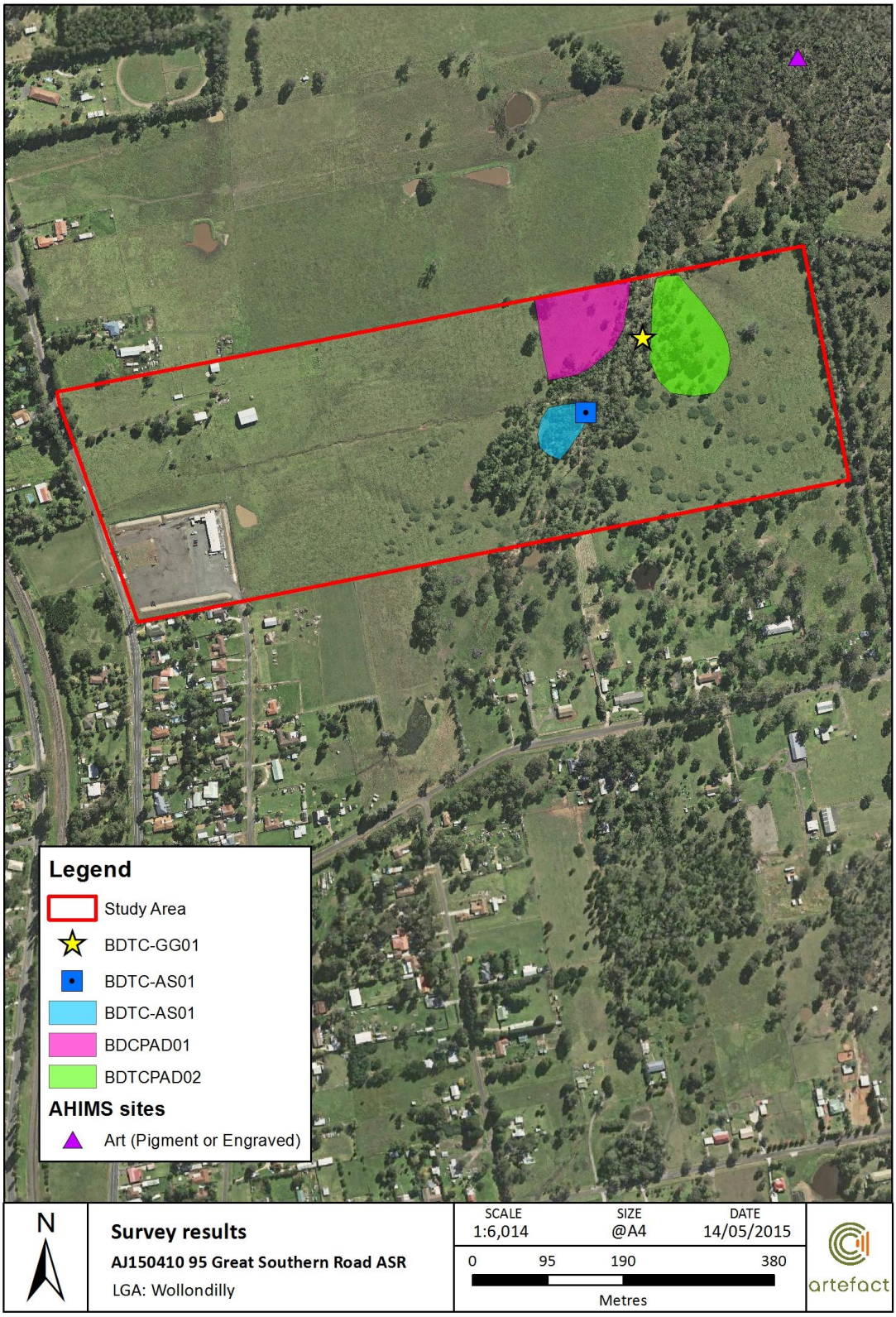
Raw Material	Colour	Reduction Type
Silcrete	Red	Complete flake
Quartz	Opaque white	Complete flake
Silcrete	Grey	Distal flake fragment
Silcrete	Red	Complete flake

Plate 11: Complete flake red silcrete, 10 cm scale

Plate 12: Complete flake quartz, 10 cm scale

Plate 13: Eroded creek bank were artefacts are located

Figure 4: Survey results



8.0 ANALYSIS AND DISCUSSION

Of the 14 Aboriginal sites registered in AHIMS search area, none were located within the study area.

Two new sites were identified during site survey. AHIMS# 52-2-4194 is a series of grinding grooves located on the unnamed tributary of Dog Trap Creek which runs through the study area. AHIMS# 52-2-4195 is an artefact scatter with an associated area of PAD, identified on an eroding section of the bank of the unnamed tributary of Dog Trap Creek which runs through the study area.

Visibility throughout the study area was generally impeded by thick grass, except in sections surrounding the unnamed tributary of Dog Trap Creek.

Disturbance across the site was generally low. The area west of the Dog Trap Creek tributary contains the highest levels of subsurface disturbance. This is associated with the construction of the house and farm buildings in the northwest corner and the use of the southwest corner as a compound site. There has been some erosion of the creek bank of the Dog Trap Creek tributary, likely caused by recent storms. However this area, plus the area to the east of the tributary demonstrate low levels of disturbance.

9.0 SIGNIFICANCE ASSESSMENT

9.1 Assessment Criteria

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

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

9.2 Archaeological Significance Assessment

Archaeological significance of BDC-GG01 and BDC-AS01 has been assessed based on observations made during site survey, previous archaeological investigations in the region as well as the landscape and archaeological context of the study area.

Table 4: Summary of significance values for Aboriginal sites

Site name	Research potential	Scientific/ educational value	Representative value	Rarity value	Overall archaeological significance
BDC-GG01 AHIMS# 52-2-4194	Moderate	High	High	High	**High**
BDC-AS01 AHIMS# 52-2-4195	Moderate	Unknown	Unknown	Unknown	**Unknown**

The grinding groove site AHIMS# 52-2-4194 is assessed as demonstrating high archaeological significance. This site demonstrates connectivity with other sites previously recorded in the wider region (note the numerous art sites identified in Figure 2 and previously recorded grinding groove site, AHIIMS site # 52-2-3921, located approximately 1 kilometre northeast of the study area). AHIMS# 52-2-4194 has the potential to contribute to the current understanding of Aboriginal use of the local landscape and resources. Furthermore, this site exhibits intensive use, with approximately ten times the number of grinding grooves present at AHIMS# 52-2-4194 than at AHIIMS site # 52-2-3921.

AHIMS# 52-2-4195 has been assessed as having unknown archaeological significance. Artefact scatter sites are common within the wider Cumberland Plain context. However, AHIMS# 52-2-4195

demonstrates potential for further research as the lower slope to the west of the artefact scatter exhibits little disturbance and has the potential to retain intact archaeological deposits. The archaeological potential of the study area is discussed in section 9.3 below.

9.3 Analysis of Archaeological Potential

The archaeological potential of an area is determined by its landform, its location and the level of disturbance. Certain landforms, such as gentle slopes, are conducive to Aboriginal occupation and the survivability of sub-surface archaeological deposit, while others, such as steep slopes, are not. The location of appropriate landforms in relation to natural resources, in particular their proximity to permanent water sources, increases their archaeological potential. Correlations between site location and proximity to permanent water have been proven in previous archaeological investigations where the number of sites and their densities is highest in close proximity to watercourses. In areas where there is a high level of disturbance however, the archaeological potential is lowered.

- High: Intact archaeological deposits are likely to be found in this area.
- Moderate: Intact archaeological deposits may be found in this area.
- Low-Moderate Limited potential for intact archaeological deposits in this area.
- Low: Unlikely that intact archaeological deposits will be found in this area.

The area of PAD associated with AHIMS# 52-2-4195 has been assessed as demonstrating high archaeological potential. The presence of artefacts eroding out of the nearby bank of the unnamed tributary of Dog Trap Creek, along with the lack of disturbance evident in the area, indicate that intact archaeological deposits are likely be found here. The extent of the area of PAD associated with AHIMS# 52-2-4195 is shown in Figure 4.

Two other areas of PAD were identified during site survey. BDC-PAD01 and BDC-PAD02 are located north of AHIMS# 52-2-4195, and are similarly undisturbed contexts on the terrace and gentle slopes either side of the Dog Trap Creek Tributary. It is assessed that archaeological deposits may be found at BDC-PAD01 and BDC-PAD02. These areas of PAD have therefore been assessed as demonstrating moderate archaeological potential.

9.4 Aboriginal cultural significance

During site survey, the representative of TLALC and CBNTCAC indicated that AHIMS# 52-2-4194 is of high cultural significance (per comm TLALC and CBNTCAC 2015). While other grinding groove sites have been identified in the local area, few represent such intensive use. Due to the rarity and high cultural value of AHIMS# 52-2-4194, conservation of the site is a priority.

Further investigation, such as test excavation, would be necessary to determine archaeological significance of AHIMS# 52-2-4195, BDC-PAD01 and BDC-PAD02.

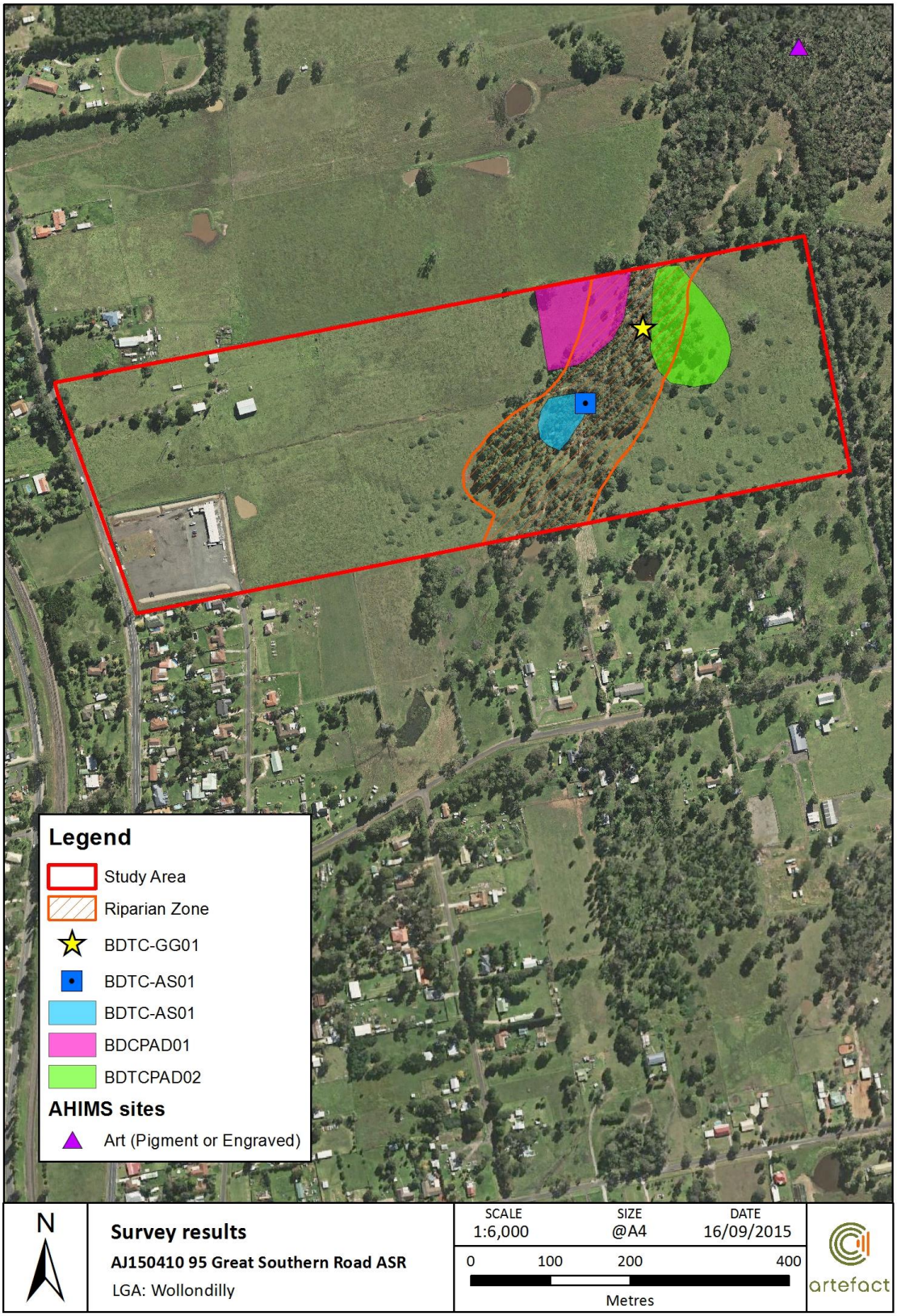
10.0 IMPACT ASSESSMENT

It is understood that a riparian corridor is proposed as part of the rezoning and that impacts are not proposed within the riparian corridor.

Site AHIMS# 52-2-4194 and site AHIMS# 52-2-4195 with associated PAD are located within the riparian corridor and would not be impacted by the proposal.

BDC-PAD01 and BDC-PAD02 are partially within the riparian corridor so these section of the PADs would be conserved. Section of the PADs outside the riparian corridor may be impacted by the proposed subdivision. It therefore likely that BDC-PAD01 and BDC-PAD02 would be partially impacted. Where possible the full extent of both PADs should be avoided. If section of the PADs are to be impacted archaeological test excavation would be required.

Figure 5: Overlay of riparian corridor and site locations



11.0 MANAGEMENT AND MITIGATION MEASURES

11.1 Guiding Principles

The overall guiding principle for cultural heritage management is that where possible Aboriginal sites should be conserved. If conservation is not practical, measures should be taken to mitigate impacts to Aboriginal sites.

The nature of the mitigation measures recommended is primarily based on an assessment of archaeological significance.

11.2 Mitigation and Management Measures

Mitigation measures recommended vary depending on the assessment of archaeological significance of an area, which is based on the research potential, rarity, representativeness and educational value. In general the significance of a site would involve the following mitigation measures:

- Low archaeological significance – No further investigations required.
- Moderate archaeological significance – Conservation where possible. If conservation was not practicable further archaeological investigation may be required.
- High archaeological significance – Conservation as a priority. Further archaeological investigation may be required.

Conservation of the grinding groove site AHIMS# 52-2-4194 should be a priority. The grinding groove site is within the riparian corridor and would be conserved within land that is to be donated to Council. Indirect impacts to the site should be avoided.

It is understood that impacts to AHIMS# 52-2-4195 would be avoided as the site and associated PAD are located within the riparian corridor.

It is understood that BDC-PAD01 and BDC-PAD02 may be partially impacted by the proposed residential subdivision. If impacts are proposed archaeological test excavation under the Code of Practice would be required in order to assess the archaeological significance of the PADs.

If Aboriginal objects were located during test excavation an AHIP would be required prior to development.

12.0 RECOMMENDATIONS

The following recommendations were based on consideration of:

- Statutory requirements under the *National Parks and Wildlife Act 1974* as amended.
- The results of background research.
- An archaeological survey of the study area.
- The interests of the Aboriginal stakeholder groups.

It was found that:

- The study area proposed for rezoning contains two Aboriginal sites (AHIMS# 52-2-4194 and AHIMS# 52-2-4195).
- AHIMS# 52-2-4194 is a grinding groove site of high archaeological significance and would be conserved within the riparian corridor.
- AHIMS# 52-2-4195 is an artefact scatter site with an associated area of PAD. The PAD has high archaeological potential. The overall archaeological significance of AHIMS# 52-2-4195 is unknown. This site would be conserved within the riparian corridor.
- Two areas of PAD (BDC-PAD01 and BDC-PAD02) were identified within the study area. The PADs have moderate archaeological potential and their archaeological significance is unknown. BDC-PAD01 and BDC-PAD02 may be partially impacted.

It is therefore recommended that:

- AHIMS# 52-2-4194 and AHIMS# 52-2-4195 should be conserved. If impacts are to occur in the vicinity of AHIMS# 52-2-4194 and AHIMS# 52-2-4195, mitigative measures such as a buffer zone and fencing should be implemented in order to protect the sites.
- If impacts are to occur at, BDC-PAD01 or BDC-PAD02, test excavation under the Code of Practice would be required in order to assess the nature and extent of the archaeological deposit and its archaeological significance.
- An Aboriginal Heritage Impact Permit (AHIP) would be required if Aboriginal objects were to be impacted. If Aboriginal objects were located during test excavations an AHIP would be required prior to development of the site.
- If suspected human remains are located during any stage of the proposed works, work should stop immediately and the NSW Police and the Coroner's Office should be notified. The Office of Environment and Heritage, Aboriginal stakeholder groups and an archaeologist should be contacted if the remains are found to be Aboriginal.

13.0 REFERENCES

Attenbrow, V. 2010 *Sydney's Aboriginal Past: Investigating the Archaeological and Historical Records* University of New South Wales Press Ltd, Sydney.

Collins, D. 1798. (1975). *An Account of the English Colony of New South Wales,* Volume 1, edited by B.H. Fletcher, A.H. & A.W. Reed in association with the Royal Australian Historical Society, Terry Hills, NSW.

Department of Environment, Climate Change & Water [now OEH] 2010 *Aboriginal cultural heritage consultation requirements for proponents 2010*.

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

Hiscock, P. and Attenbrow, V. 2005. Australia's Eastern Regional Sequence Revisited: Technology and Change at Capertee 3. *Oxford: BAR Monograph Series 1397* Archaeopress.

Huntley, J, Watchman, A, Dibden, J 2011. Characteristics of a Pigment Art Sequence: Woronora Plateau, NSW in *Rock Art Research* vol 28, no 1, pp. 85-97

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

JMCHM. 2006. *Archaeological Salvage Excavation of the Colebee Release Area, Schofields, NSW, Volume 1.* Report prepared for Medallist Golf Holdings Pty Ltd.

JMCHM. 2007. *Archaeological investigation of the Oran Park Precinct in the South West Growth Centre, Camden, NSW.* Report to APP.

Karskens, G. 2010 *The Colony: A History of Early Sydney.* Allen and Unwin, Sydney.

Koettig, M. 1981 *Archaeological Survey for Aboriginal Sites from Collector to the ACT Border (Federal Highway Number 3).* Report to NSW Department of Main Roads.

Mary Dallas Consulting Archaeologists, 2011. *25 Government Road, Bargo – Lot 252 DP257510: Due Diligence Aboriginal Cultural Heritage*. Report to Precise Planning.

Mary Dallas Consulting Archaeologists, 2012. *Due Diligence Aboriginal Heritage Assessment for Crown Road Reserve between Proposed Waste Transfer Station and Wellers Rd, Bargo*. Report to Precise Planning

McCarthy, F. D., Brammell, E., and Noone, H. V. V. 1948. The stone implements of Australia. *Memoirs of the Australian Museum* 9, 1-94.

Nanson, G.C., Young, R.W., & Stockton, E.D. 1987. Chronology and palaeoenvironment of the Cranebrook Terrace (near Sydney) containing artefacts more than 40,000 years old. *Archaeology in Oceania*, 22 (2): 72-78.

Niche Environment and Heritage, 2012a. *Bargo Exploration Program, Survey 7 – February 2012, Review of Environmental Factors*. Report prepared for the NSW Division of Resources and Energy, Department of Trade and Investment, Regional Infrastructure Services (DTIRIS).

Niche Environment and Heritage, 2012b. *Tahmoor South Exploration Program, Survey 10 – May 2012, Review of Environmental Factors*. Report prepared for the NSW Division of Resources and Energy, Department of Trade and Investment, Regional Infrastructure Services (DTIRIS).

Ngara Consulting Pty Ltd *2003b Archaeological Assessment of Aboriginal Heritage: Reservoir Entry Lands: Prospect.* Report to Conybeare Morrison.

Peterson, N. 1976. Tribes and Boundaries in Australia. *Social Anthropology Series No 10*. AIAS, Canberra.

South East Archaeology. 2011. *Tahmoor Coal Redbank Tunnel Subsistence Management Project, Tahmoor, Wollondilly Shire, Southern Highlands of New South Wales: Aboriginal Heritage Impact Assessment*.

Tench, W. 1789, 1793. *Sydney's first four years: being a reprint of a narrative of the expedition to Botany Bay and a complete account of the settlement at Port Jackson.* Reprinted in 1961. (Angus and Robertson in association with RAHS).

Thomson, N. 1985. Review of available Aboriginal mortality data, 1980-1982. *Medical Journal of Australia* 143 (9): 46-49.

Tindale, NB. 1974. *Aboriginal Tribes of Australia. Their Terrain, Environmental Controls, Distribution, Limits and Proper Names.* ANU Press, Canberra.

Turbet, P. 2010 *The First Frontier: The Occupation of the Sydney Region: 1788 to 1816*. Rosenberg Press.

White, E. and J. McDonald. 2010 Lithic Artefact Distribution in the Rouse Hill Development Area, Cumberland Plain, New South Wales. *Australian Archaeology* 70:29-38.

Wollondilly Development Control Plan (DCP). 2011.

Wollondilly Local Environmental Plan (LEP). 2011.

artefact

Artefact Heritage

ABN 73 144 973 526
Level 4, Building B
35 Saunders Street
Pyrmont NSW 2009
Australia

+61 2 9518 8411
office@artefact.net.au
www.artefact.net.au