



Wilton South East Precinct: Stage 1 and 2 Archaeological Report

FINAL REPORT

Prepared for Walker Corporation

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Contents

Glossary.....	5
Summary	6
Introduction	9
1.1 Project background	9
1.2 Project area	9
1.3 Proposed development.....	10
1.4 Planning approvals	10
1.5 Objectives of the investigation.....	10
2 Investigators and contributors.....	12
3 Desktop assessment.....	16
3.1 Landscape context.....	16
3.1.1 Topography and hydrology	16
3.1.2 Soil landscapes	16
3.1.3 Landscape resources	17
3.1.4 Land use history	18
3.2 Previous archaeological work	19
3.2.1 Regional overview	20
3.2.2 Local overview.....	21
3.2.3 AHIMS site analysis	23
3.3 Predictive statements	26
4 Archaeological survey	28
4.1 Archaeological survey objectives.....	28
4.2 Archaeological survey methodology	28
4.2.1 Sampling strategy.....	28
4.2.2 Survey methods.....	28
4.3 Archaeological survey results.....	29
4.4 Discussion of archaeological survey results	32
5 Test excavation.....	33
5.1 Test excavation objectives	33
5.2 Test excavation methodology	33
5.3 Test excavation results	34
5.3.1 PAD 1.....	36
5.3.2 PAD 2.....	37
5.3.3 PAD 3.....	42
6 Analysis and discussion.....	46
6.1 Stone artefact analysis.....	46
6.2 Discussion of results	46

7	Scientific values and significance assessment.....	48
7.1	Introduction to the assessment process.....	48
7.2	Archaeological (scientific significance) values.....	49
7.2.1	Statements of archaeological significance	51
8	Impact assessment	53
8.1	Predicted physical impacts	53
8.2	Management and mitigation measures	53
9	Recommendations	55

Tables

Table 1	Investigators and contributors.....	12
Table 2	Soil landscapes within the study area (Hazelton and Tille 1990).	17
Table 3	Traditional Aboriginal plant resources and uses within the vicinity of the study area (Attenbrow 2010; Stewart and Percival 1997).	18
Table 4	AHIMS site type frequency.....	23
Table 5	Aboriginal site prediction statements.....	26
Table 6	Stratigraphic layer description	35
Table 7	Number and percentage of PAD sites tested in each landform unit	35
Table 8	Artefact Analysis	46
Table 9	Site content ratings	49
Table 10	Site condition ratings.....	50
Table 11	Site representativeness ratings.....	51
Table 12	Scientific significance ratings.....	51
Table 13	Scientific significance assessment of archaeological sites recorded within the study area.	51
Table 14	Statements of scientific significance for archaeological sites recorded within the study area.	51
Table 15	Summary of potential archaeological impacts	53

Figures

Figure 1	Location of the study area in a regional context	14
Figure 2	Project area detail	15
Figure 3	AHIMS search results.....	25

Plates

Plate 1	North-west facing photo of PAD	29
Plate 2	Ground visibility in open grassland vegetation on slopes and crests throughout the study area	30

Plate 3 Erosional disturbance on upper slope of crest that has been compounded by livestock.....	30
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Glossary

ACHAR	Aboriginal Cultural Heritage Assessment Report
AHIMS	Aboriginal Heritage Information Management System
Consultation requirements	<i>Aboriginal cultural heritage consultation requirements for proponents 2010</i> (DECCW 2010a)
DA	Determining Authority
DECCW	Department of Environment, Climate Change and Water (now OEH)
DP	Deposited Plan
EPA	Environment Planning and Assessment
GDA	Geocentric Datum of Australia
GPS	Global Positioning System
GSV	Ground Surface Visibility
ICOMOS	International Council on Monuments and Sites
LALC	Local Aboriginal Land Council
LEP	Local Environmental Plan
LGA	Local Government Area
MGA	Map Grid of Australia
NHL	National Heritage List
NPW Act	National Parks and Wildlife Act
NPWS	National Parks and Wildlife Service
NSW	New South Wales
NTSCORP	Native Title Services Corporation
OEH	NSW Office of Environment and Heritage
PAD	Potential Archaeological Deposit
Project area	Lot 16 Dp 253158 and Lot 51 Dp 626650
RAP	Registered Aboriginal Party
REF	Review of Environmental Factors
REP	Regional Environmental Plan
SEPP	State Environmental Planning Policy
The code	<i>Code of Practice for Archaeological Investigation of Aboriginal Objects in NSW</i> (DECCW 2010)

Summary

Biosis Pty Ltd was commissioned by Walker Corporation to undertake an Aboriginal cultural heritage assessment of the proposed subdivision and bulk earthworks within the proposed stages 1 and 2 of the Wilton South East Precinct (the study area). The study area is located in farmland approximately 28 kilometres south west of Campbelltown and approximately 80 kilometres direction of the Sydney central business district (CBD).

There are 69 Aboriginal cultural heritage sites registered with the Aboriginal Heritage Information Management System (AHIMS) register within the study area as well as in the vicinity of the site, which includes AHIMS sites 52-2-3590 and 52-2-3954 located within the site boundary.

Research in the use of the study area indicated that the land was established for cattle grazing and sheep grazing in the 1870's.

The Aboriginal community was consulted regarding the heritage management of the project throughout its lifespan. Consultation has been undertaken as per the process outlined in the DECCW document, *Aboriginal cultural heritage consultation requirements for proponents 2010* (DECCW 2010a) (consultation requirements).

The survey was conducted on the 10 and 11 November 2016. The overall effectiveness of the survey for examining the ground for Aboriginal sites was deemed low. This was attributed to vegetation cover restricting ground surface visibility combined with a low amount of exposures.

Two PADs were identified as high sensitivity and an area of moderate (archaeological) sensitivity were identified.

There is potential for development activities to impact Aboriginal sites and the identified sites or areas of (archaeological) sensitivity.

Strategies have been developed based on the archaeological (significance) of cultural heritage relevant to the study area. The strategies also take into consideration:

- Predicted impacts to Aboriginal cultural heritage
- The planning approvals framework
- Current best conservation practice, widely considered to include:
 - Ethos of the Australia International Council on Monuments and Sites (ICOMOS) Burra Charter
 - The *Code of Practice for Archaeological Investigation of Aboriginal Objects in NSW* (DECCW 2010) (the code)

The recommendations that resulted from the consultation process are provided below.

Management recommendations

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

Recommendation 1: Continued consultation with the registered Aboriginal parties

It is recommended that the proponent continue to inform these groups about the management of Aboriginal cultural heritage sites within the study area throughout the life of the project. This recommendation is in keeping with the consultation requirements.

Recommendation 2: Application for an Aboriginal heritage impact permit (AHIP)

It is recommended that the proponent apply to Office of Environment and Heritage (OEH) for an area wide Aboriginal Heritage Impact Permit (AHIP) the study area. **The AHIP should be for a term of five (5) years.** This site will be impacted by the proposed works; however, subsurface test excavations have confirmed these sites are of low integrity and scientific significance.

Advice preparing AHIPs

An AHIP is required for any activities likely to have an impact on Aboriginal objects or Places or cause land to be disturbed for the purposes of discovering an Aboriginal object. The Office of Environment and Heritage (OEH) issues AHIPs under Part 6 of the NPW Act. AHIPs should be prepared by a qualified archaeologist and lodged with the OEH. Once the application is lodged, processing time can take between 8-12 weeks. It should be noted that there will be an application fee levied by the OEH for the processing of AHIPs, which is dependent on the estimated total cost of the development project. Where there are multiple sites within one study area an application for an AHIP to cover the entire study area is recommended.

Recommendations 3: Areas of low archaeological potential

No further archaeological investigation are required for areas assessed as having low archaeological potential.

Recommendation 4: Preservation of Scarred Tree # 52-2-3590

Walker Corporation should consult further with the Registered Aboriginal Parties (RAPs) to develop a conservation strategy for the Scar Tree, This should include temporary protection strategies to be implemented during construction as well as a long term management plan.

Recommendation 5: Stop work provision for any potential heritage sites identified during construction which have not been identified as part of this assessment or approved for harm under the AHIP.

All Aboriginal places and objects are protected under the NPW Act. This protection extends to Aboriginal objects and places that have not been identified but might be unearthed during construction. If construction proceeds, work must cease if Aboriginal objects or places are identified which have not previously been identified as part of this assessment or have not been approved for harm under the AHIP. OEH and the archaeologist must be notified to make an assessment of the find and advise on subsequent management.

Historical archaeological sites are protected under the relic's provisions (s139 – 146) of the NSW Heritage Act 1977. Should any historical archaeological sites be identified during any phase of the proposed development, all works must cease in the vicinity of the find and the project archaeologist and OEH notified. Should the archaeological nature of the find be confirmed the Heritage Branch of the NSW Department of Planning, will require notification.

Recommendation 6: Stop work provision for any potential discovery of human remains

If any suspected human remains are discovered during any activity works, all activity in the vicinity must cease immediately. The remains must be left in place and protected from harm or damage. The following contingency plan describes the immediate actions that must be taken in instances where human remains or suspected human remains are discovered. Any such discovery at the study area must follow these steps:

1. Discovery: If suspected human remains are discovered all activity in the vicinity must stop to ensure minimal damage is caused to the remains; and the remains must be left in place, and protected from harm or damage.
2. Notification: Once suspected human skeletal remains have been found, the NSW Police must be notified immediately, and they will subsequently inform the Coroner's Office. Following this, and if the human remains are likely to be Aboriginal in origin, the find will be reported to the Aboriginal parties and OEH NSW. If the find is likely to be non-Aboriginal in origin and more than 100 years in age, the Heritage Council of NSW will be notified of the find under s.146 of the *Heritage Act 1977*.

Recommendation 7: Lodgement of Final Report

A copy of the final report will be sent to:

- The Registered Aboriginal Parties
- The Office of Environmental Heritage (OEH)

Introduction

1.1 Project background

Biosis Pty Ltd was commissioned by the Walker Corporation to undertake an Aboriginal Cultural Heritage Assessment (ACHA) for the proposed subdivision and bulk earthworks within the proposed stages 1 and 2 at 990-1140 Picton Road (Wilton South East Precinct), Wilton NSW (Figure 1 and Figure 2). An archaeological survey identified several PADs across a range of landforms. One PAD was identified in associated with AHIMS # 52-2-3954 in the north-western corner of the study area. Areas of archaeological potential were found to be associated with drainage lines featuring horizontal sandstone deposits such as Allens and Stringybark creek as these areas have potential for rock shelters, grinding grooves and art to be present. Areas of potential were assigned to flat, elevated landforms such as crests and ridges as these areas provided good views across the regions and were in close proximity to water sources, making them useful for habitation.

This investigation has been carried out under Part 6 of the *National Parks and Wildlife Act 1974* (NPW Act). It has been undertaken in accordance with the *Code of Practice for Archaeological Investigation of Aboriginal Objects in New South Wales* (DECCW 2010) ('the code'). The code has been developed to support the process of investigating and assessing Aboriginal cultural heritage by specifying the minimum standards for archaeological investigation undertaken in NSW under the NPW Act. The archaeological investigation must be undertaken in accordance with the requirements of the code.

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

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

1.2 Project area

The study area is located approximately 28 kilometres south west of Campbelltown and approximately 30 kilometres North West of the Wollongong (Figure 1). It encompasses 150 hectares of private land and the adjacent road reserves.

The study area is within the:

- Wollondilly Local Government Area (LGA).
- Parish of Wilton
- County of Camden

The study area is bounded by Picton Road to the north, and fire trail 11a to the south, with a number of allotments located along the north, south, east and west boundaries of the study area.

1.3 Proposed development

The proposed development will ultimately involve the development of 232 hectares of land for housing, 28 hectares for open spaces and primary school, 19 hectares for enterprise use including local centre, plus 164 hectares reserved for conservation. This report addresses the impacts associated with Stages 1 and 2 (see Figure 1)

The development footprint is defined as the land area within the site where infrastructure is proposed to be constructed and operate for the project life. The development footprint encompasses an area of 150 hectares, which has been refined through the project design process.

1.4 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 this assessment include:

- Commonwealth *Environment Protection and Biodiversity Conservation Act 1999*
- NSW *National Parks and Wildlife Act 1974* (NPW Act).
- NSW *National Parks and Wildlife Amendment Act 2010*.
- Infrastructure State Environmental Planning Policy 2007
- State Environment Planning Policy (Sydney regional growth centres) 2006

1.5 Objectives of the investigation

The objectives of the investigation can be summarised as follows:

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

- To recommend strategies for the management of Aboriginal cultural heritage within the context of the proposed development.

2 Investigators and contributors

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

Table 1 Investigators and contributors

Name and qualifications	Experience summary	Project role
Alex Beben MA Arch, BA (Hons) Arch	Alex has eleven years archaeological experience and has conducted over 200 heritage projects across Australia and internationally in the UK and Italy. He has extensive experience in the successful completion of Aboriginal and historical assessments, archaeological surveys, excavations, permit applications and management plans. Alex is accomplished in obtaining approvals under the NSW National Parks and Wildlife Act 1974 and NSW Heritage Act 1977. He has operated as the heritage consultant within large multidisciplinary teams tasked with managing heritage values under the NSW Environmental Planning and Assessment Act 1979 and Environment Protection and Biodiversity Act 1999. Due to his diverse experience across multiple regions, legislative frameworks and industry sectors, Alex has developed a detailed understanding of the urban and regional heritage values across NSW. This experience has enabled him to forge close relationships with Aboriginal stakeholders and government regulators. Alex is frequently able to utilise his experience and leverage industry relationships to formulate innovative methodologies to ensure that his projects meet the expectations of the parties involved.	<ul style="list-style-type: none"> • Project management • Quality assurance
Amanda Atkinson BA (Hons), GDip	Amanda has ten years' archaeological consulting experience across south-eastern and western Australia. She is experienced in all aspects of heritage consulting with specialisation in Aboriginal archaeology. Amanda has extensive experience in the successful completion of Aboriginal and historical assessments, archaeological surveys, excavations, permits and management plans. She is accomplished in obtaining approvals under the <i>National Parks and Wildlife Act 1974</i> and <i>Heritage Act 1977</i> . Amanda specialises in the archaeology of central and far western New South Wales, with particular research interests in the Lachlan River valley. She has operated as the heritage consultant within large multidisciplinary teams tasked with delivering Environmental Impact Assessments (EIAs) under the <i>Environmental Planning and Assessment Act 1979</i> (EP&A Act).	<ul style="list-style-type: none"> • Quality assistance • Field survey
Mathew Smith BA BSc (Hons)	Mathew is a field archaeologist with Biosis Pty Ltd, Wollongong. Mathew has two years of experience in archaeology. Mathew has worked on a number of Aboriginal cultural heritage projects in the Illawarra and Far West regions of NSW, where he has developed his skills in Aboriginal archaeology. As part of these projects Mathew has	<ul style="list-style-type: none"> • Field Survey

	conducted desktop assessments, archaeological surveys and Aboriginal excavations, as well as writing the archaeological reports following these assessments. Mathew specialises in lithic identification and analysis, and has conducted lithic analysis of assemblages from the Illawarra, Sydney and Far West regions.	
Amy Butcher BA Arch, GDip	Amy is a research assistant with Biosis Pty Ltd, Wollongong. Amy has one and a half years of experience in archaeology. Amy has experience in the Wilton and Wollondilly area, where she has developed skills in Aboriginal archaeology, Amy has worked on a number of Aboriginal cultural heritage projects, and as a part of this Amy has conducted desktop assessments, archaeological surveys, Aboriginal due diligences and Aboriginal excavations, as well as writing archaeological reports following these assessments.	<ul style="list-style-type: none"> • Archaeological excavations • Report writing

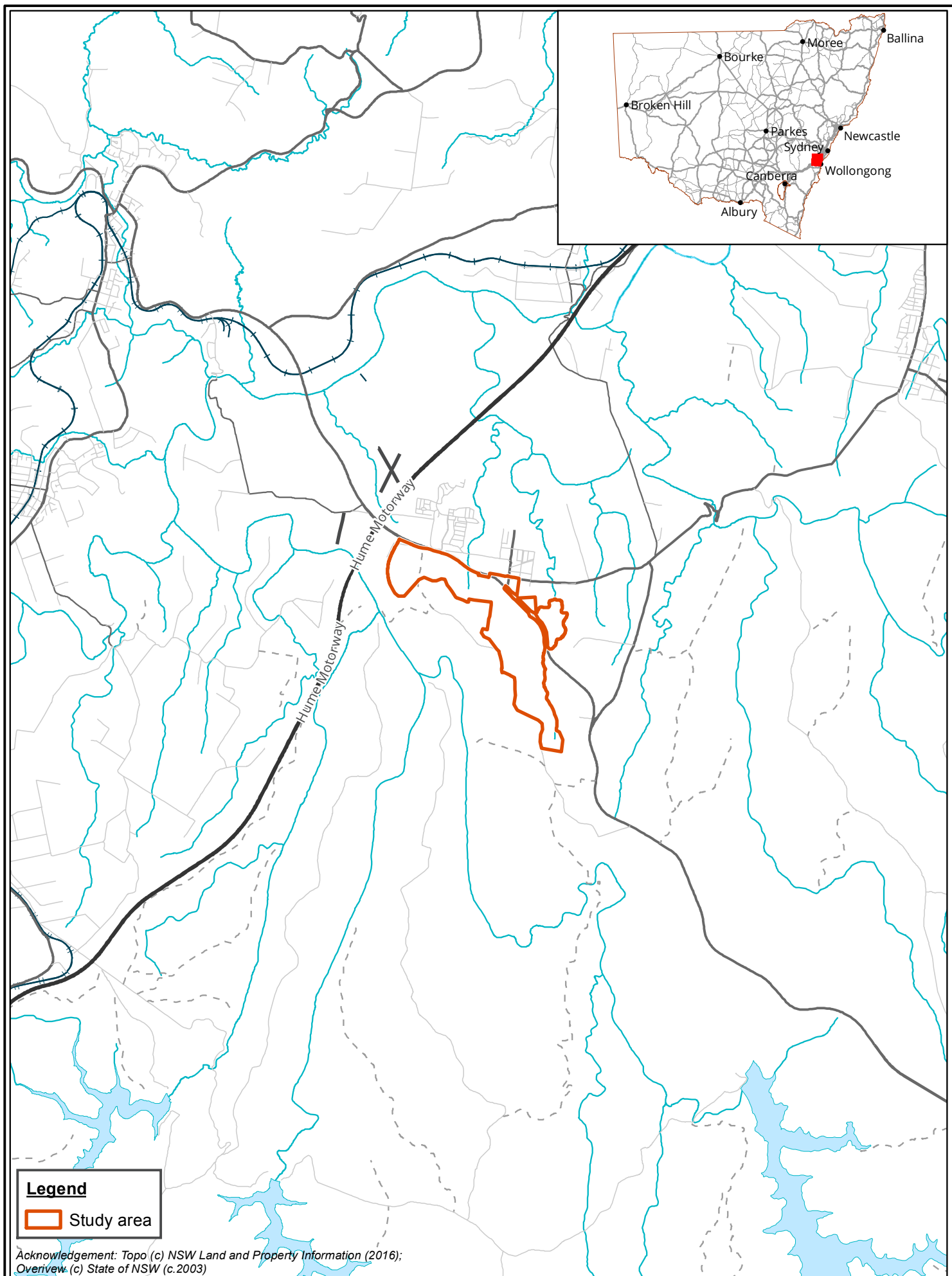
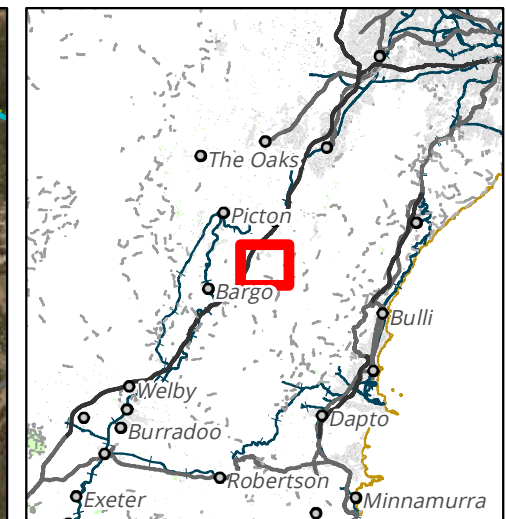
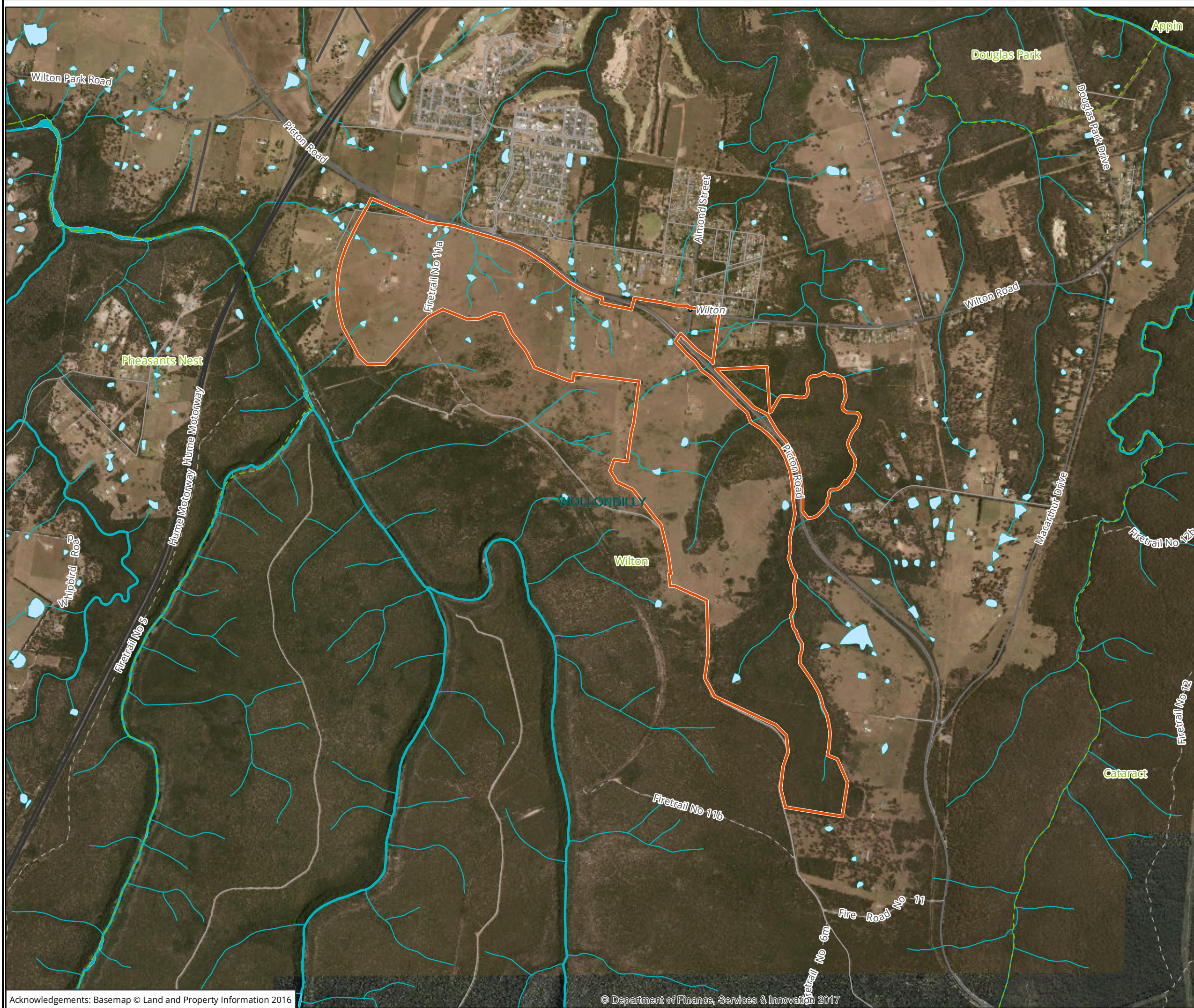


Figure 1: Location of the study area in a regional context



Legend

Study area

Figure 2: Study area detail

0 200 400 600 800 1,000
Metres

Scale: 1:25,000 @ A3
Coordinate System: GDA 1994 MGA Zone 56



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

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3 Desktop assessment

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

3.1 Landscape context

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

3.1.1 Topography and hydrology

The study area is located within the Sydney Basin of NSW and is underlain by the horizontal bedded sequence of rocks of the Ashfield shale (member of the Wiannamatta Group) which is then underlain by the Mittagong Formation (interbedded shale, laminate and fine medium grained quartz sandstone). The Mittagong formation overlies the middle Triassic Hawkesbury Sandstone, consisting of medium to coarse grained quartz sandstone with minor shale or laminate bands (Hazelton and Tille 1990:2-4).

The Ashfield Shale is confined to the upper slopes of spurs with the Hawkesbury Sandstone being located along the lower slopes and gullies. Sandstone is present in lower slope contexts and as steep cliff edges long the course of Allens and Clements Creeks and their associated tributaries and provides good resources for rock art, grinding grooves and rock shelter sites.

Water sources within the study area consist of the lower order Allens creek and Stringybark creek, in addition to several first and second order drainage lines. The Nepean and Cordeaux rivers are less than one kilometre south-west of the study area and would have provided useful resources to people in the region. Therefore there is higher potential for Aboriginal occupation at these locations over the study area, due to the close proximity of sandstone cliffs which would have been used for shelter.

3.1.2 Soil landscapes

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

There are two soil landscapes present within the study area; the Blacktown and Luddenham soil landscapes (see Table 2).

The Blacktown soil landscape is characterised by gently undulating rises of local relief up to 30 metres. Crests and ridges are broad (200-600 metres) with rounded, convex upper slopes grading into concave lower slopes and broad drainage depressions. Slopes in the Blacktown landscape range from less than 5 percent up to 10 percent (Hazelton and Tille 1990).

Luddenham landscapes consist of undulating to low rolling hills, convex narrow (20 – 300 metres) ridges and hillcrests with moderately inclined side slopes and drainage lines. Local relief ranges from 50 to 80 metres and slopes from 5 to 20 percent.

Table 2 Soil landscapes within the study area (Hazelton and Tille 1990).

Soil landscape	Description
Blacktown (bt)	Shallow to moderately deep (<150 cm) red podzolic and brown podzolic soils on crests, upper slopes and well drained areas; deep (150-300 cm) yellow podzolic soils and soloths on lower slopes and in drainage depressions.
Luddenham (lu)	Shallow (<100 cm) brown podzolic soils and massive earthy clays on crests; moderately deep (70-150 cm) red podzolic soils on upper slopes; moderately deep (<150 cm) yellow podzolic soils and prairie soils on lower slopes and near drainage lines.

3.1.3 Landscape resources

The study area comprises of several vegetation types associated with the Blacktown and Luddenham soil landscapes. Vegetation in the Blacktown soil landscape is characterised by almost completely tall open forest and woodland, with red gum, blackbutt, Sydney blue gum, narrow leaved ironbark and grey box common in pockets of original vegetation (Hazelton and Tille 1990).

The Luddenham landscape is characterised by extensively cleared open forest made up of spotted gum, forest red gum, grey box, ironbark woollybutt and forest oak (Hazelton and Tille 1990). The forest understory consist of blackthorn, coffee bush, hickory and clerodendrum, with grasses of wire grass, panic grass, paddock lovegrass and kangaroo grass (Hazelton and Tille 1990).

The Wilton region would have generally provided a number of resources used by Aboriginal inhabitants. The presence of the Hawksbury and Mittagong sandstone deposits along creek lines in the study area would have provided resources for rock art, and shelters, as well as suitable horizontal surfaces that could be used to make ground edge tools or for the preparation for foods and fibres.

The wider region included 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.

Many of the plants found within the study area were important resources to Aboriginal people for a number of reasons. Based on the known species that occur within the study area, Table 3 below summaries how those plants were utilised by Aboriginal people in the past. The list is not exhaustive, and is provided as an example of the cultural values associated with plants in the past and the present (Attenbrow 2010; Stewart and Percival 1997).

Table 3 Traditional Aboriginal plant resources and uses within the vicinity of the study area (Attenbrow 2010; Stewart and Percival 1997).

Species Present	Known Aboriginal Resource Use
Acacia Trees	Seeds were grinded for flour to make cake. Sweet gum is edible. Bark is used for making weapons, snake and walking sticks.
Blackbutt (<i>Eucalyptus Pilularis</i>)	An infusion was made to drink in order to alleviate stomach aches. Used as astringent to reduce bleeding from abrasions.
Black Sheoak (<i>Allocasuarina littoralis</i>)	Flower nectar was mixed with water to produce sweet drink. Wood was used for making implements and weapons. Seeds were roasted and eaten.
Red Bloodwood (<i>Corymbia gummifera</i>)	Nectar from flowers were sucked. Sap was used to stop fibre fishing lines from fraying. Red resinous sap was used to attract <i>Cryptococcus</i> insects which form sweet tasting galls. The exudate was also used internally and applied externally to treat sores.
Silvertop Ash (<i>Eucalyptus sieberi</i>)	Wood used for tool handles, such as axes and oars.
Smooth-barked Apple (<i>Angophora costata</i>)	Baskets were made from bark, from the hollowed knots (gnarls). Small balls were inserted in the tooth cavity to ease the pain of a toothache.
Stringybark Species (<i>Eucalyptus spp.</i>)	Bark was used to make cloaks and huts/shelters; may have been used for making canoes. Wood is used to make tools, dishes and bowls. Gums were applied directly to sores or abrasions or boiled in water and used as a wash. Water and manna from certain species can be eaten. Leaves were steamed or crushed to be inhaled for treating colds, headaches and fevers; infused into tea for coughs or diarrhoea; poulticed to be placed on sores, abrasions and boils.

3.1.4 Land use history

The earliest land grants issued in the Wilton district was made to Sir Thomas Mitchell (Surveyor General 1828-1855), in 1834. It is said that the development of the Wilton district was influenced by the establishment of Thomas Mitchell's "Park hall" (property and residence) in Douglas Park which a land grant was issued for a total of 3800 acres in 1835. A town plan was surveyed in 1842, and town lots were sold in 1844. In 1855 a land grant for 800 acres was issued to John A. Broughton, which formed the 'Hanging Rock' property. This property lies across from the 'Erins Vale' property. The original land owner is identified as David Chalmers and C.W. Wall, the acquisition of this land probably dates back to the mid 1850's (Steele 1904).

Wilton Park was an area which was previously owned by colonial poet Charles Tompson, was bought by Samuel Hordern, of the Sydney merchant family in the 1880s and became the centre for Hordern's horse breeding. The stables group at Wilton Park was built around 1892, the property was becoming one of the leading horse breeding studs in Australia.

By 1855, Wilton had sufficient population and was officially declared a town. This was due to the high influx of workers on the Upper Nepean water supply scheme. One of the first engineering feats was the construction of a tunnel about eight kilometres long which passed underneath Wilton and joins weirs at Pheasant's Nest and Broughton Pass. There are a number of air vents at Wilton, which are the only indicators of its existence (Navin Officer 1992).

From 1918 to 1926 Wilton was home to many workers on the construction of the Cordeaux Dam. During this period a light railway from Douglas Park to the Nepean River passed through Wilton carrying supplies. In 1872 Wilton gained a Post Office, which also served Douglas Park.

Up to the 1880's the main produce of the Appin-Campbelltown district was wheat, maize, barley and oats. Crops gradually diminished over this time due to lack of soil replenishment, and the increasing impact of 'rust' disease. By the 1800's wheat production has come to a substantial halt, and was replaced by the raising of cattle, sheep and pigs, with the production of hay. Milking cattle was introduced into the area in the 1870's and in the following decades dairying became a dominant regional industry. By 1905, there were eighty to ninety dairies in the Campbelltown region (Bayley 1965). The farming of cattle and sheep occurred on many properties in the later 1800's and the early 1900's.

Upper Nepean and Cataract Dam Works

The Pheasants Nest diversion weir was planned and constructed on the Nepean River, below the confluence of the Nepean River and the Cordeaux River, during the 1870's and 80's. The construction created diversion works which were designed to supply water from a broad catchment area into the Upper Canal and the Sydney water supply. The Cordeaux River catchment area, located south east of the study area, became a part of a series of protected reserves in 1880, 1915 and 1923. It is assumed that existing farm buildings and habitations within the catchment area were demolished. This includes any standing building in the study area (Beasley 1988).

3.2 Previous archaeological work

A large number of cultural heritage surface (surveys) and sub-surface (excavations) investigations have been conducted throughout the Macarthur region of New South Wales in the past 30 years. There has been an increasing focus on cultural heritage assessments in NSW due to ever increasing development, along with the legislative requirements for this work and greater cultural awareness of Aboriginal cultural heritage.

It is generally accepted that people have inhabited the Australian landmass for at least 65,000 years (Clarkson et al 2017). Dates of the earliest occupation of the continent by Aboriginal people are subject to continued revision as more research is undertaken. The timing for the human occupation of the Sydney Basin is still uncertain. Whilst there is some possible evidence for occupation of the region around 40,000 years ago, the earliest undisputed radiocarbon date from the region comes from a rock shelter site north of Penrith on the Nepean River, known as Shaws Creek K2, which has been dated to 14,700 ± 250 Before Present (BP) (Attenbrow 1987, 2002: 20). The assessment of the deposits concurred that the people living in the shelter exploited the food and resources from the nearby creeks and rivers, as well as the surrounding countryside. East of Campbelltown, a sandstone rock shelter site (known as Bull Cave) was excavated and yielded a basal

date of 1820 ± 90 BP (Koettig 1985). In general, the majority of both open and rock shelter sites in the Sydney region date to within the last 3,000 to 5,000 years.

Archaeological evidence of Aboriginal occupation of the broader Cumberland Plain area indicates that the area was intensively occupied from approximately 4,000 years BP (JMCHM 2007). Such 'young' dates are probably more a reflection of conditions of archaeological site preservation and sporadic archaeological excavation, rather than actual evidence of the presence or absence of an Aboriginal hunter-gatherer population prior to this time.

3.2.1 Regional overview

A number of Aboriginal cultural heritage investigations have been conducted for the Macarthur region. Models for predicting the location and type of Aboriginal sites with a general applicability to the Wilton area and thus relevant to the study area have also been formulated, some as a part of these investigations and others from cultural heritage investigations for relatively large developments.

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

JMCHM (1996; 2000) has developed a predictive model for Aboriginal site distribution on the Cumberland Plain that will be applicable to the study area. This has been developed using the Aboriginal occupation models proposed for the Camden area by Haglund (1989) and data collected from other areas of the Cumberland Plain where trends in the distribution of archaeological sites have been apparent. JMCHM's (1996; 2000) predictive model identified that the size (density and complexity) of archaeological features will vary according to permanence of water, landscape unit and proximity to stone resources in the following way:

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

JMCHM's (1996; 2000) also identified that sandstone features (overhangs or platforms) may have provided a focus for a number of activities including camping or art production or the sharpening of axes. Sandstone platforms may also have been used for the production of art (engravings), although these are very rare on the margins of the Cumberland Plain.

AMBS (1997) undertook a large scale regional Aboriginal heritage study of part of the Cumberland Plain, north of Maldon. The study examined all previously recorded archaeological sites and studies completed

across the region, including both field survey and subsurface investigation work. The Plumpton Ridge silcrete source work completed by McDonald in 1985 was used as a case study in determining accurate identification of silcrete artefacts from naturally spalled silcrete. The report concluded:

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

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

3.2.2 Local overview

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

Navin Officer (2003) completed an Aboriginal cultural heritage assessment for the Wollondilly LEP to rezone the land for residential development in Wilton. A survey was conducted across two landforms, gentle undulating slopes and gorges around Stringy Bark and Allens Creeks. During the survey six previously recorded Aboriginal sites were re-located, and fourteen new Aboriginal sites were identified. New sites consisted of eight shelters with art and/deposit and six open artefact scatters, with three shelters with PADs (Navin Officer 2003: 19). Shelters were identified in areas with suitable sandstone overhangs within the upper reaches of Stringy Bark and Allens Creeks. All six of the open artefact scatters were located in close proximity to the western tributary of Stringybark Creek. Further archaeological test excavations were recommended for three artefact scatters, Wilton Park 10, BC 10 (AHIMS 52-2-3034), Wilton Park 11, BC11 (AHIMS 52-2-3035) and Wilton Park 12, BC12 (AHIMS 52-2-3036). It was considered that the landform element these three sites are located on, a junction of the hillslope and the tops of the gorges along the Stringybark Creek, have moderate potential to contain sub-surface cultural material (Navin Officer 2003: 57).

Austral Archaeology (2004) was commissioned by Kellog Brown and Root Pty Ltd to undertake an archaeological survey of Picton where an Allied Mills flour mill was being developed, approximately 4 kilometres north of the study area. The area is bounded by Carriage Creek that flows into Nepean River and associated drainage lines. Survey was completed across a range of landforms including drainage lines and

hillslopes. The survey identified eight Aboriginal sites, including five isolated artefacts finds, two artefact scatters and one scarred tree. Although some of the sites were identified within disturbed context, others were found in relatively undisturbed or areas with minimal surface disturbance: AMP IF-1 (AHIMS 52-2-3212), AMP ST 1 (AHIMS 52-2-3219), AMP IF 5 (AHIMS 52-2-3216) and AMP OS 2 (AHIMS 52-2-3218). Considering that the area is in close proximity to Nepean River and four associated creeklines on gentle topography, it would have been conducive to occupation. Portions of the assessed area that went through minimal previous disturbance were assessed as having high potential to retain archaeological material (Austral Archaeology 2004: 33).

Navin Officer (2006) undertook a cultural heritage assessment of the Leaf's Gully power station for gas turbine. The area assessed is located approximately 10km north of the study area and consisted of a broad spurline crest and upper slopes situated adjacent to the steeply graded, south-west facing slopes of Leaf's Gully. One PAD was identified during the survey. It was located on a low gradient, upper slope and crest of the spurline descending west towards west to Leaf's Gully and north towards the Nepean River. Archaeological potential throughout the PAD was considered to be variable, from moderate on the lower slopes to low to moderate on the higher slopes (Navin Officer 2006: 25). Further archaeological subsurface testing was recommended across the entire PAD in order to determine the nature and significance of any archaeological material.

Biosis (2011) was commissioned by Wollondilly Shire Council to undertake an Aboriginal and non-Aboriginal cultural heritage assessment of the proposed rezoning for nine rural and industrial lots near Maldon, approximately 3km north of the study area. The assessed area was located to the immediate north of the Nepean River and Carriage Creek crossing over at its north-western part. A survey was completed across a range of landforms including undulating plains, river/creek banks and footslopes. No new Aboriginal archaeological sites were identified during the survey. One previously recorded site, shelter with art, Bulli Seam 12 (AHIMS 52-2-3692) was re-located. Areas of high, moderate and low sensitivity for Aboriginal archaeological sites were mapped, with highly sensitive areas considered to occur on the banks of Carriage Creek due to its associated open undulating plains that would have provided easy access to the Nepean River. Areas with moderate sensitivity were mapped within undulating plains above the Nepean River and Carriage Creek where low density artefact scatters were expected to be present. Sensitivity across footslopes was considered to be low, as Aboriginal occupation would have been transient. Stone artefact discard would be associated with tool maintenance or limited artefact manufacture (Biosis 2011: 60-61). It was stated that artefact numbers could be higher depending on how often the area was traversed and how many people used it. The most suitable locations for short term occupation would have been flatter areas on the crests of the adjacent hills; artefacts would also most likely to shift down the slopes. Test excavations were recommended in areas mapped as having high and moderate archaeological sensitivity (Biosis Research 2011: 87).

Archaeological and Heritage Management Solutions (AHMS 2012) completed an Aboriginal cultural heritage assessment for the rezoning of land at Cliffe Street in Picton, approximately 8km from the study area. The assessed area lies within alluvial flats to the immediate east of Stonequarry Creek, one of the main drainage systems flowing into the Nepean River. No Aboriginal sites were identified during the archaeological survey predominantly due to the very low ground surface visibility and the significant levels of previous disturbance in some areas (AHMS 2012: 41). Areas that were deemed to have high, moderate, low, very low or nil archaeological potential were mapped. Lands within 50 metres of waterways were considered to have high, within 100 metres moderate and within 200 metres low archaeological potential; areas with previous cut and fill material had nil, and all other areas very low archaeological potential (AHMS 2012: 42).

Kayandel Archaeological Services (KAS 2014) conducted an Aboriginal cultural heritage assessment and historic heritage assessment for the rezoning of Wilton Junction, Wilton on behalf of the Wilton Junction Land Owners Consortium. The assessments encompassed the entirety of the current study area, as well as areas

to the north of the Hume highway. KAS identified a total of 30 new sites within the study area, consisting of seven artefact scatters, ten isolated finds, eight rock shelters and five scarred trees. KAS proposed an occupation model centred on flat elevated positions associated with creek lines. KAS also identified 6 new heritage items in the study area, including 3 historic locations and 3 items of machinery. These 6 items pushed the total historical relics to a total of 12 in the study area. Recommendations following the survey were focused on further archaeological assessment if development of the site occurs.

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

3.2.3 AHIMS site analysis

A search of the OEH Aboriginal Heritage Information Management System (AHIMS) database (Client Service ID: 327164) identified 69 Aboriginal archaeological sites within a 5 x 5 kilometre search area, centred on the proposed study area. 10 of these registered sites are located *within* the study area (Figure 3). AHIMS search results are provided in Appendix 1. AHIMS search results are provided in Appendix 1. Table 2 following provides the frequencies of Aboriginal site types in the vicinity of the study area. 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.

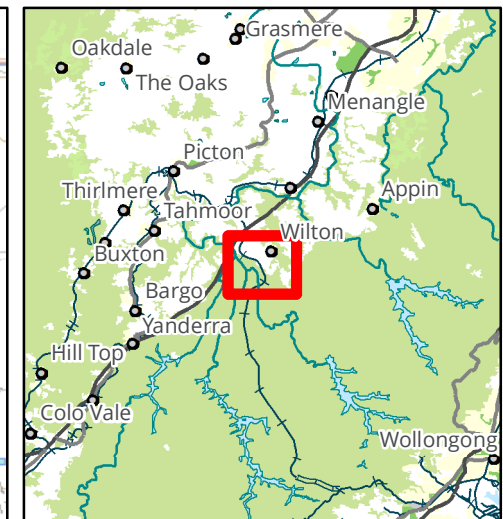
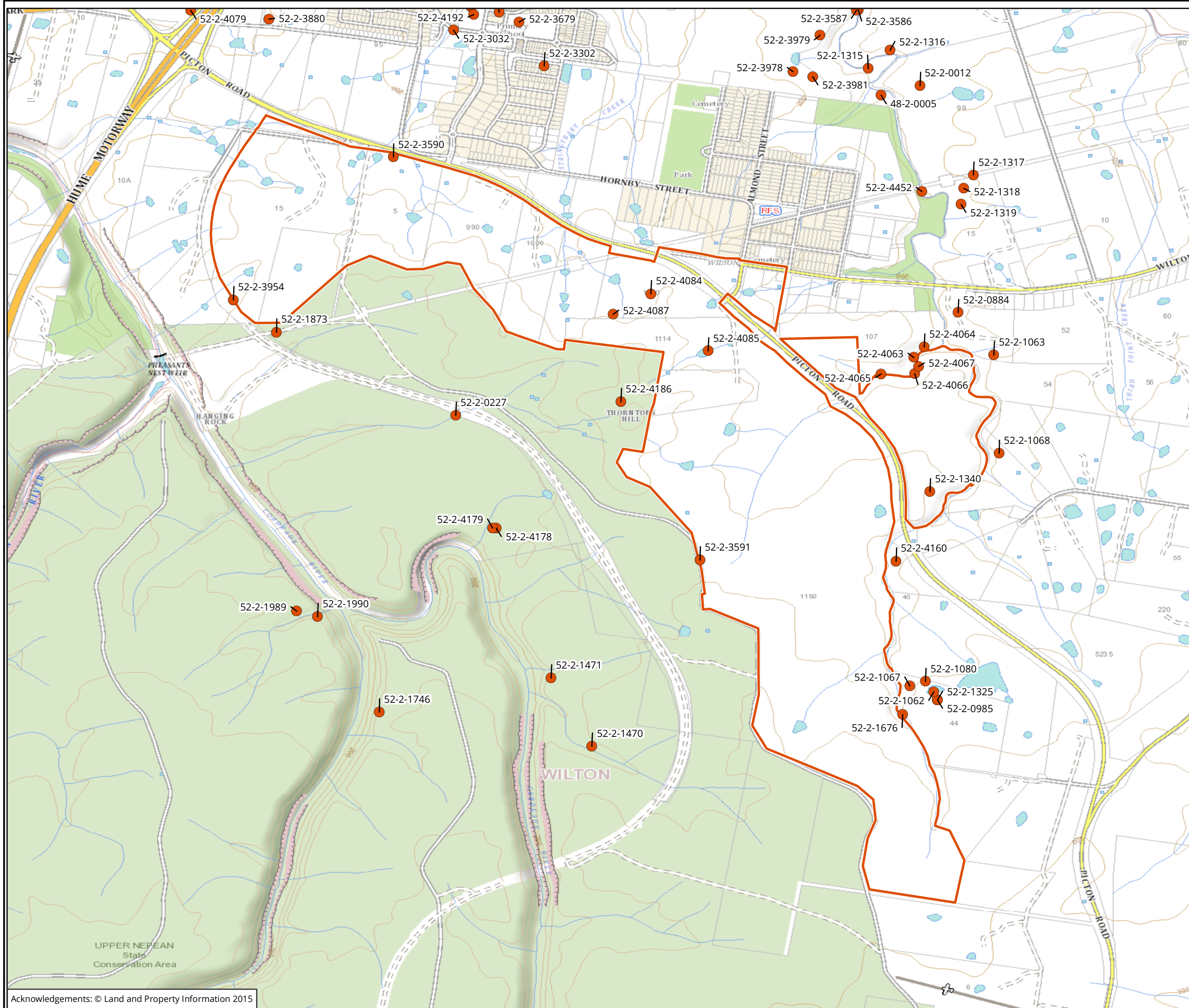
It should be noted that the AHIMS database reflects Aboriginal sites that have been officially recorded and included on the list. Large areas of NSW have not been subject to systematic, archaeological survey; hence AHIMS listings may reflect previous survey patterns and should not be considered a complete list of Aboriginal sites within a given area

Table 4 AHIMS site type frequency

Site type	Number of occurrences	Frequency (%)
Art (Pigment or Engraved)	21	30.4
Art (Pigment or Engraved), Artefact	3	4.3
Art (Pigment or Engraved), Shell, Artefact	2	2.9
Art (Pigment or Engraved), Potential Archaeological Deposit (PAD)	2	2.9
Artefact	16	23.2
Artefact, Potential Archaeological Deposit (PAD)	9	13.0
Grinding Groove	2	2.9
Habitation Structure, Potential Archaeological deposit (PAD)	1	1.4
Modified Tree (Carved or Scarred)	3	4.3
Potential Archaeological Deposit (PAD)	9	13.0
Potential Archaeological Deposit (PAD), Habitation Structure, Grinding Groove,	1	1.4

Site type	Number of occurrences	Frequency (%)
Artefact		
Total	69	100

A simple analysis of the Aboriginal cultural heritage sites registered within a 5 square kilometre area centred on the study area indicates that the dominant site type is Art (pigment or engraved), accounting for 30.4% of the total AHIMS sites (n=21). Including composite art sites in the study area, such as art sites with artefacts or PADS, the total number of sites with art is 40.5% (n=28). The second most common site found in the vicinity of the study area was artefacts, with 23.2% (n=16). The majority of recorded sites were clustered around water sources, such as Allens Creek, which features outcroppings of the sandstone useful for rock art and engravings. This could account of the high number of recorded art sites in the region.



Legend

- AHIMS Records
- Study area

Figure 3: AHIMS records near the Study area

NOT TO BE MADE PUBLIC

0 200 400 600 800 1,000
Metres

Scale: 1:20,000 @ A3
Coordinate System: GCS GDA 1994



Biosis Pty Ltd
Albury, Ballarat, Melbourne,
Sydney, Wangaratta & Wollongong

Matter:
Date: 28 February 2018,
Checked by: gdavies, Generated by: gdavies
Location: \\bio-data-01\matters\125300s\125335\Mapping\25335_F3_AHIMS.mxd

3.3 Predictive statements

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

This model is based on:

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

Based on this information, a predictive model has been developed, indicating the site types most likely to be encountered during the survey and subsequent sub-surface investigations across the present study area (Table 5). 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.	High: Stone artefact sites are the second most recorded site type in the region. They have been located on level, raised landform in close proximity to reliable sources of fresh water. The study area contains or is in close proximity to several waters sources.
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 as the first order drainage line is not permanent water source.
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.	High: 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.
Modified trees	Trees with cultural modifications	Moderate: The vegetation around Allens Creek contains tree species known to have been used as a resource by Aboriginal People. There is moderate potential for scarred trees to occur in the vegetation around Allens Creek.

Site type	Site description	Potential
Axe grinding grooves	Grooves created in stone platforms through ground stone tool manufacture.	High: Suitable horizontal sandstone rock outcrops occur along drainage lines in the region.
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.	High: Rock shelters with art are the most common sites recorded in the region. The sites will only occur where suitable sandstone exposures or overhangs possessing sufficient sheltered space exist, which are 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

A field survey of the study area was undertaken on 10th and 11th November 2016. The field survey sampling strategy, methodology and a discussion of results are provided below.

4.1 Archaeological survey objectives

The objectives of the survey were to:

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

4.2 Archaeological survey methodology

The survey methods were intended to assess and understand the landforms and to determine whether any archaeological material from Aboriginal occupation or land use exists within the study Area.

4.2.1 Sampling strategy

Due to the size of the study area and the low levels of exposure, the survey targeted areas of exposure on landforms with potential archaeological sensitivity. There were also areas of the study area that were not surveyed as the field team lacked access, thus reducing the coverage of the survey.

4.2.2 Survey methods

The archaeological survey was conducted on foot with a field team of two members. 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 (Speight 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, Identification of natural soil deposits within the study area was undertaken. Photographs and recording techniques were incorporated into the survey including representative photographs of survey units, landform, vegetation coverage, ground surface visibility and the recording of soil information for each survey unit were possible. Any potential Aboriginal objects observed during the survey were documented and photographed. The location of Aboriginal cultural heritage and points marking the boundary of the landform

elements were recorded using a hand-held Global Positioning System and the Map Grid of Australia (94) coordinate system.

4.3 Archaeological survey results

The archaeological survey consisted of a general survey conducted by two archaeologists Amanda Atkinson and Mathew Smith. Due to the size of the study area and the low levels of exposure, the survey targeted areas of exposure on landforms with potential archaeological sensitivity.

The survey identified several areas of PAD in the study area, shown in **Error! Reference source not found.** of archaeological potential were found to be associated with drainage lines featuring horizontal sandstone deposits such as Allens and Stringybark creeks as these areas have potential for rock shelters, grinding grooves and art to be present. Areas of potential were also assigned to flat, elevated landforms such as crests and ridges as these areas provided good views across the regions and were in close proximity to water sources, making them useful for habitation.

No new sites were identified during the survey and attempts to relocate AHIMS sites already recorded in the study area, such as sites 52-2-4087, 52-2-4085, 52-2-4084 and 52-2-3590, were unsuccessful due to the low ground surface visibility and lack of exposures.

Parts of the study area were not able to be surveyed due to access constraints. The portion of the study area on the northern side of Picton Road could not be accessed without entering private land for which no access agreements had been negotiated at the time. The southern end of the study area along Allens Creek was also not surveyed as it was not accessible at the time of the survey. It is recommended that these areas be assessed prior to any potential impacts.



Plate 1 North-west facing photo of PAD



Plate 2 Ground visibility in open grassland vegetation on slopes and crests throughout the study area



Plate 3 Erosional disturbance on upper slope of crest that has been compounded by livestock

Discussion of archaeological survey results

A desktop constraints assessment of the proposed study area was undertaken to determine the likelihood of Aboriginal heritage sites occurring within the study area. A review of AHIMS listings in a 5 by 5 kilometre box centred on the study area identified a total of 66 AHIMS sites, including approximately 10 located in the study area. AHIMS sites within the study area consisted primarily of shelter with art sites (52-2-1067, 52-2-0985 and 52-2-1325) and artefacts, with modified tree sites also present. Most of the AHIMS sites were located on or in close proximity to drainage lines such as Allens Creek.

The assessment also reviewed a number of previous archaeological assessments undertaken in the region and study area. These assessments revealed that stone artefacts and shelters are common site types found the vicinity of the study area, especially in association with elevated landforms with flat surfaces and drainage lines that feature sandstone overhangs and horizontal surfaces.

Following the desktop assessment a site survey was conducted on 10 November 2016 by senior archaeologist Amanda Atkinson and archaeologist Mathew Smith. Due to the high vegetation cover causing low levels of surface visibility and lack of exposure the survey targeted areas of exposure on culturally sensitive landforms. No new sites were located, but several areas of potential archaeological deposits were identified on elevated landforms and in association with Allens Creek and Stringybark Creek. The survey also attempted to relocate several AHIMS sites recorded in the study area, including AHIMS sites 52-2-3591 and 52-2-4085. Due to the high levels of vegetation obscuring the ground surface these sites could not be relocated. The parts of the study area on the northern side of Picton Road were not surveyed as these areas were not accessible on the day of the survey due to a lack of landholder access permission. The southern end of the study area located around Allens Creek was also inaccessible and could not be surveyed. A sandstone pier that forms part of the Nepean Tunnel and is associated with the Upper Nepean Scheme was also located during the survey.

Due to the lack of access to parts of the study area and the nature of the assessment it is recommended that further Aboriginal and historical assessment be undertaken to target areas of archaeological potential and areas that were not able to be surveyed.

5 Test excavation

Following the result of the field survey a targeted test excavation program was undertaken in a selection of areas and archaeological sites identified as having PAD. The objectives, sampling strategy, methodology and results of the test excavation program are discussed below.

The archaeological test excavations were conducted over seven days from 22 January to 30 January 2018. Test excavations were undertaken by four Biosis archaeologists, and four Aboriginal community representatives. Test excavations were undertaken following the requirements of the code and industry best practice methodology.

5.1 Test excavation objectives

The aims of the testing program were to:

- Determine whether sub-surface archaeological deposits exist within the study area and to establish the extent and nature of such deposits.
- Identify if the archaeological material occurs in an intact, undisturbed context, by examining the soil profile and stratigraphy.
- Analyse and interpret any archaeological finds (such as stone artefacts, hearths, etc.) recovered during the testing program.
- Inform current knowledge of Aboriginal occupation and land use models of the region.
- Provide management and mitigation measures for Aboriginal archaeology objects located during the subsurface testing program.
- Test the predictive model and answer the research questions developed as part of this assessment.

5.2 Test excavation methodology

Based on the result of the archaeological field survey, Biosis recommends that up to 44 test pits be excavated across the two areas of archaeological potential:

Moderate potential archaeological deposits (AHIMS 52-2-3590): it was recommended that approximately 20 test pits are excavated in this area.

High potential archaeological deposit: it was recommended that approximately 24 test pits are excavated in this area.

Test excavations were conducted in accordance with Requirement 16a of the *Code of Practice for Archaeological Investigation of Aboriginal Objects in New South Wales* (DECCW 2010b). The methodology employed is outlined below:

- Test excavations were conducted in 50 x 50 centimetre units
- Test pits were excavated by hand (inclusive of trowels, spades and other hand tools) along transects at intervals of 30 metres.
- The first test pit within a site or PAD area was excavated in five centimetre spits; the subsequent test pits conducted within the site or PAD area were then excavated in 10 centimetre spits to the base of

Aboriginal object-bearing units being the removal of the A-horizon soil deposit down to the sterile clay or bedrock layer (B-horizon).

- If the depth of deposit prevents reaching sterile deposits within the 50x50 centimetre test pits, additional 50 x 50 centimetre test pits would be excavated adjacent to the original test pit (for example expanding the test pit to 50 x 100 centimetres) to reach the sterile deposits.
- Test pits may be combined and excavated as necessary in 50 x 50 centimetre units for the purposes of further understanding site characteristics.
- All excavated soil was sieved in 3mm sieves, dry sieving.
- All cultural material was collected, bagged and clearly labelled. They will be temporarily stored in the Biosis office for analysis (at 8 Tate Street, Wollongong, NSW).
- For each test pit that was excavated, the following documentation was taken:
 - Unique test pit identification number
 - GPS coordinate of each test pit
 - Munsell soil colour, and texture
 - Amount and location of cultural material within the deposit
 - Nature of disturbance where present
 - Stratigraphy
 - Archaeological features (if present)
 - Photographic records
 - Spit records
- Test excavation units will be backfilled as soon as practicable.
- Test excavations were ceased when enough information has been recovered to adequately characterise the objects present with regard to their nature and significance.

5.3 Test excavation results

Three PAD sites were identified as part of the initial archaeological survey. PAD 1 was identified in relation to AHIMS site 52-2-3590, which is a scarred tree in close proximity to a drainage line. PAD 2 is located in the north eastern portion of the study area that runs adjacently to Picton Road. PAD 2 was identified in association with AHIMS site 52-2-3954 and contains a large creek line that runs north to south PAD 2 is located within the north eastern portion of the study area. PAD 3 was identified on the top of a hill crest. PAD 3 is located along the southern boundary within the southern portion of the study area.

A total of 44 test pits were excavated within 3 PADs. One artefact was recovered from Pit 3, transect 5 within PAD 2. The artefact was located within the first 10 centimetres within a stratigraphic layer of sandy silt. Within the 200mm spit of T1 P1, PAD 1 a small amount of discarded glass shards were collected.

As per the methodology described above, test pits T1 P1 (PAD 1), T1 P2 (PAD 2), T2 P2 (PAD 2), T3 P3 (PAD 2), T4 P 2 (PAD 2), T5 P 2 (PAD 2), T 1 P1 (PAD3), were excavated in 5 centimetres spits, where the other pits were completed in 10 centimetres spits. All test pits were excavated to base (clay).

The majority of test pits reached base by the end of Spit 3 (300mm). However, shallower deposits were present in the mid slopes of PAD 2, of the study area where T2 P1, P3, P4 and P5 reached base before the end

of spit 1 (100 mm), Deeper deposits appeared to be contained mostly to higher areas within the crest landform unity, finished within spit 5 (400-500mm).

The soil profile indicated that there are three stratigraphic layers; these consist of dark yellowish brown topsoil layer underlain by moderately compacted brown silty, sandy loam, and finished on a heavily compacted, dry clay. All test pits revealed that there was a thin, non-existent top soil layer. This could be a result of vast vegetation clearance due to the extensive grazing and farming practices throughout the study area.

The soil profile of pits from transect 3, PAD 2 varied from that of transects 1, 2, 4 and 5 (PAD2). Transect three was placed on the southern boundary of PAD 2 and had been subject to less disturbance than that of the other transects. Transect 1 ran westerly along PAD 2 and was in close proximity to a large manmade dam. Transects 2 and 4 ran in close proximity to a second manmade dam within PAD 2. Where transect 5 ran north to south adjacent to transect 4. Although the soils of transect 5 were less likely to have been affected by the construction of these dams, it held similar soil profiles to that of transects 1, 2 and 4.

Table 6 Stratigraphic layer description

Context (Stratigraphic Layer)	Description
1	Soft, brown (10YR 3/4), Sandy silt. Thick grassroots throughout. Gravel content low <5%.
2	Brown (10YR 4/4) sandy, silty loams. Medium compaction. Approximately 5 % gravels (generally 10-30mm in size) throughout. Gravel content increasing towards base of stratigraphic layer.
3	Very dry clay. Highly compacted.

Table 7 Number and percentage of PAD sites tested in each landform unit

Landform unit	Total PADs recorded in landform unit type	Number of PAD's tested in Landform unit	% PADs per landform unit tested
Hill Crest	1	1	20
Creek Flat	2	2	50
Flat, simple slope	1	1	60
Mid-slope	1	1	60

5.3.1 PAD 1

Test Pit T1 P1

Test pit T1 P1 was excavated upon a flat, simple slope in 5 centimetre spits to a depth of 450 millimetres and finished on dry, highly compacted clay (Plate 4).

Soils at this location consisted of moderately soft brown silty sand with grass root inclusions and glass discard at 200 millimetres. This test pit finished on dry, compacted clay.

No artefacts were recovered from this pit.



Plate 4 Photo of test pit T1 P1

Test Pit T2 P4

Test Pit T2 P4 was excavated upon a flat, simple slope in 10 centimeter spits to a depth of 300 millimetres (Plate 5).

Soils at this location consisted of sandy silts (0-200 millimetres) and dry sandy loams with grass root inclusions (10%) throughout spit 1 (0- 100 millimetres). Spit 2 consisted of small charcoal inclusions (3-10%) throughout the entire spit (100-200 millimetres). From the base of 200 millimetres, the clay content increased heavily until the base of the test pit where the pit ceased (300 millimetres).

Test pit T2 P4 contained no artefactual material.



Plate 5 Photo of test pit T2 P4

5.3.2 PAD 2

Test Pit T1 P1

Test pit T1 P1 was located upon an upper-slope within PAD 2 of the study area. Test pit T1 P1 was excavated in 10 centimetres spits to a depth of 300 millimetres (Plate 6).

Soils at this located consisted of a sandy silt (0-100 millimetres) and silty sandy loam with grass root inclusions (5%) throughout spits 1 and 2 (50 – 200 millimetres). Clay content increased heavily at approximately 150 millimetres (20-30%). The test pit finished on dry, compacted clay.

No artefactual material was recovered from test pit T1 P1 (PAD2).



Plate 6 Photo of test pit T1 P1

Test Pit T2 P9

Test pit T2 P9 was located on a flat within PAD 2 of the study area. Test pit T1 P9 was excavated in 10 centimetre spits to a depth of 50 centimetres (Plate 7).

Soils at this location consisted of sandy silts (0-200 millimetres) with grass root inclusions. 200- 300 millimetres consisted of silty sand. From 300 millimetres, the clay content increased to 40%. The test pit finished at 500 millimetres on very dry, compacted clay.

No artefactual material was recovered from this pit.



Plate 7 Photo of test pit T2 P9

Test Pit T3 P4

Test pit T3 P4 was located on a flat within PAD 2 of the study area. Test pit T3 P4 was excavated in 10 centimetre spits to a depth of 30 centimetres (Plate 8).

Soils at this location consisted of sandy silts (0-200 millimetres) with grass root inclusions. 200- 300 millimetres consisted of silty sand. From 300 millimetres, the clay content increased to 40%. The test pit finished at 500 millimetres on very dry, compacted clay.

The soils within transect 3 varied from transect 1,2,4 and 5. Transect 3 was the only transect that was not in close proximity to a manmade dam. The transect ran east to west along the southern boundary of PAD 2 on a flat. The soil variation is likely to be a result of being situated in a less disturbed portion of the study area.

No artefactual material was recovered from this pit.



Plate 8 Photo of test pit T3 P4

Test Pit T4 P2

Test pit T4 P2 was located on a lower slope, adjacent to a creek line within PAD 2 of the study area. Test pit T4 P2 was excavated in 5 centimetre spits to a depth of 40 centimetres (Plate 9).

Soils at this location consisted of sandy silts (0-200 millimetres) with grass root and small gravel inclusions. 200- 300 millimetres consisted of silty sand. From 350 millimetres, the clay content increased to 30-40%. The test pit finished at 400 millimetres on very dry, compacted clay.

No artefactual material was recovered from this pit.



Plate 9 Photo of test pit T4 P2

Test Pit T5 P3

Test pit T5 P3 was located on an upper slope, adjacent to a creek line within PAD 2 of the study area. Test pit T5 P3 was excavated in 10 centimetre spits to a depth of 40 centimetres (Plate 10).

Soils at this location consisted of sandy silts (0-200 millimetres) with grass root and charcoal inclusions. 200-300 millimetres consisted of silty sand. From 350 millimetres, the clay content increased to 40%. The test pit finished at 400 millimetres on very dry, compacted clay.

A quartz flake was recovered from spit 1 (0-100 millimetres) of this pit.



Plate 10 Photo of test pit T5 P3

5.3.3 PAD 3

Test Pit T1 P1A

Test pit T1 P1A was located on an upper slope within PAD 3 of the study area. Test pit T1 P1A was excavated in 10 centimetre spits to a depth of 30 centimetres (Plate 11).

Soils at this location consisted of silty sandy clay throughout the entire pit (0-300 millimetres) with grass root and small gravel inclusions. 200- 300 millimetres included sandstone inclusions. The test pit finished at 300 millimetres on very dry, compacted clay.

No artefactual material was recovered from this pit.



Plate 11 Photo of test pit T1 P1A

Test Pit T2 P2

Test pit T2 P2 was located mid- slope within PAD 3 of the study area. Test pit T2 P2 was excavated in 10 centimetre spits to a depth of 35 centimetres (Plate 12)

Soils at this location consisted of sandy silt (0-200 millimetres) with grass root inclusions. From 300 millimetres the clay content increased by 30% .The test pit finished at 350 millimetres on very dry, compacted clay.

No artefactual material was recovered from this pit.



Plate 12 Photo of test pit T2 P2

Test Pit T3 P1

Test pit T3 P1 was located on the upper slope within PAD 3 of the study area. Test pit T3 P1 was excavated in 10 centimetre spits to a depth of 30 centimetres (Plate 13)

Soils at this location consisted of sandy silt (0-100 millimetres) with grass root inclusions. From 300 millimetres the clay content increased by 40%. The test pit finished at 400 millimetres on very dry, compacted clay.

No artefactual material was recovered from this pit.



Plate 13 Photo of test pit T3 P1

6 Analysis and discussion

6.1 Stone artefact analysis

The following artefact analysis has been undertaken for the subsurface artefact that was recovered from PAD 2, in association with AHIMS #52-2-3954 (M2D PAD 1).

The artefact collected during the subsurface investigations was collected and bagged according to the test excavation methodology. Analysis was undertaken using a standard digital Vernier caliper, a 10 x hand lens, and a Saxon microscope. All measurements were recorded in millimeters to one decimal place. All relevant artefact attributes were recorded allowing for a comprehensive typological, technological and metrical analysis of the assemblage to be undertaken.

One stone artefact was located within one test pit during the subsurface investigations. The artefact identified was confined to the upper slope landforms unit within the study area. Test excavations identified that artefacts did not extend to the mid and lower slopes of the study area.

Table 8 Artefact Analysis

Artefact type	Raw material	Width	Length	Thickness
Flake fragment	quartz	5mm	10mm	1mm

6.2 Discussion of results

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

Test excavations took place on all landscape types present within PADs 1, 2 and 3 within the study area. Within PAD 2 there was a large focus on investigating the creek flat and the mid-slopes as these were identified as areas of potential during the initial field investigations undertaken by Biosis (2016). PAD 2 was identified in association with AHIMS site #52-2-3954 (M2D PAD 1), the test excavations revealed a very low density archaeological deposit within an upper slope landform. The deposit was recovered from transect 5, pit 3, spit 1 (0 – 100 millimetres). The deposit was contained to one stratigraphic soil profile (sandy silt). The artefact is that of a quartz flake fragment. The test excavations identified that artefacts did not extend to the lower slopes of the study area.

The soil profile of the test pit were consistent with that of the test pits within PAD 2 excluding transect 3. Transect 3 consisted of test pits placed on the flat landform unit contained within PAD 2. This transect ran along the southern boundary of the study area and contained a different soil profile to all other transects within the entire study area. The majority of the pits consisted of fine sandy silty brown (10 YR 4/3) soils and would cease typically at spit 3 (200 – 300 millimetres) on dry sandy, loamy clay. The variation in the soil profile is likely to be a result of the transect being located in an area that has been less disturbed by the construction of two manmade dams that are located within PAD 2.

Across all test pits, it was observed that there was a limited top soil which is suggested is a result of extensive vegetation clearance for farming practices that took place in the early 1800's. Activities such as wheat production were prevalent in the area and only diminished due to the lack of soil replenishment. After wheat

farming had come to a halt, the land was used for cattle and sheep grazing which has carried on into the present time.

A review of a heritage assessment that was undertaken by Kayandel (2014) of the proposed "Wilton Junction", which included the study area. They identified that approximately 98% of the study area had undergone moderate levels of previous disturbance, with a small area having been identified as having undergone high levels of disturbance through a desktop study of aerial images. However, the current study was not investigated as part of their investigations of "Wilton Junction".

Previous archaeological assessments conducted in the Wilton area indicate that Aboriginal sites are more commonly identified wherever there are gorges, sandstone outcroppings and/or permanent water sources, as suggested in a statement provided by Haglund (1982a);

From such studies it is clear that rock shelters with art and/or archaeological deposit can be expected wherever there are sandstone gorges and that grinding grooves and engravings can be expected on exposures of homogenous sandstone. Archaeological deposits occur outside shelters, but are generally difficult or impossible to find, due to vegetation cover. A few are found by chance when this cover has been disturbed, the disturbance generally affecting also the archaeological deposit.

The provided statement is consistent with previous assessments of the Wilton area. It is a common theme throughout the assessments that sites were less likely to be found in open areas and open areas associated with undulating landforms. The Wilton area is abundant with sandstone gorges and outcrops that would have served as suitable shelters; moreover they are formed around the Nepean River, Avon River, Cordeaux River and Allens Creek. These permanent water sources would have provided year round resources for local Aboriginal People.

The limited artefactual material recovered from the study area suggests that the study area was not a desirable place for occupation as there were limited resources for shelter and the creek and drainage lines that are present within the study area would have only provided seasonal water sources.

7 Scientific values and significance assessment

The two main values addressed when assessing the significance of Aboriginal sites are cultural values to the Aboriginal community and archaeological (scientific) values. This report will assess scientific values while the Aboriginal Cultural Heritage Assessment Report will detail the cultural values of Aboriginal sites in the study area.

7.1 Introduction to the assessment process

Heritage assessment criteria in NSW fall broadly within the significance values outlined in the Australia International Council on Monuments and Sites (ICOMOS) Burra Charter (Australia ICOMOS 1999). This approach to heritage has been adopted by cultural heritage managers and government agencies as the set of guidelines for best practice heritage management in Australia. These values are provided as background and include:

- **Historical significance** (evolution and association) refers to historic values and encompasses the history of aesthetics, science and society, and therefore to a large extent underlies all of the terms set out in this section. A place may have historic value because it has influenced, or has been influenced by, an historic figure, event, phase or activity. It may also have historic value as the site of an important event. For any given place the significance will be greater where evidence of the association or event survives in situ, or where the settings are substantially intact, than where it has been changed or evidence does not survive. However, some events or associations may be so important that the place retains significance regardless of subsequent treatment.
- **Aesthetic significance** (Scenic/architectural qualities, creative accomplishment) refers to the sensory, scenic, architectural and creative aspects of the place. It is often closely linked with social values and may include consideration of form, scale, colour, texture, and material of the fabric or landscape, and the smell and sounds associated with the place and its use.
- **Social significance** (contemporary community esteem) refers to the spiritual, traditional, historical or contemporary associations and attachment that the place or area has for the present-day community. Places of social significance have associations with contemporary community identity. These places can have associations with tragic or warmly remembered experiences, periods or events. Communities can experience a sense of loss should a place of social significance be damaged or destroyed. These aspects of heritage significance can only be determined through consultative processes with local communities.
- **Scientific significance** (Archaeological, industrial, educational, research potential and scientific significance values) refers to the importance of a landscape, area, place or object because of its archaeological and/or other technical aspects. Assessment of scientific value is often based on the likely research potential of the area, place or object and will consider the importance of the data involved, its rarity, quality or representativeness, and the degree to which it may contribute further substantial information.

The cultural and archaeological significance of Aboriginal and historic sites and places is assessed on the basis of the significance values outlined above. As well as the ICOMOS Burra Charter significance values guidelines, various government agencies have developed formal criteria and guidelines that have application when assessing the significance of heritage places within NSW. Of primary interest are guidelines prepared by the Commonwealth Department of the Environment and Energy, , OEH and the Heritage Branch, NSW Department of Planning and Environment. The relevant sections of these guidelines are presented below.

These guidelines state that an area may contain evidence and associations which demonstrate one or any combination of the ICOMOS Burra Charter significance values outlined above in reference to Aboriginal heritage. Reference to each of the values should be made when evaluating archaeological and cultural significance for Aboriginal sites and places.

In addition to the previously outlined heritage values, the OEH Guidelines (DECC 2010) also specify the importance of considering cultural landscapes when determining and assessing Aboriginal heritage values. The principle behind a cultural landscape is that 'the significance of individual features is derived from their inter-relatedness within the cultural landscape'. This means that sites or places cannot be 'assessed in isolation' but must be considered as parts of the wider cultural landscape. Hence the site or place will possibly have values derived from its association with other sites and places. By investigating the associations between sites, places, and (for example) natural resources in the cultural landscape the stories behind the features can be told. The context of the cultural landscape can unlock 'better understanding of the cultural meaning and importance' of sites and places.

Although other values may be considered – such as educational or tourism values – the two principal values that are likely to be addressed in a consideration of Aboriginal sites and places are the cultural/social significance to Aboriginal people and their archaeological or scientific significance to archaeologists. The determinations of archaeological and cultural significance for sites and places should then be expressed as statements of significance that preface a concise discussion of the contributing factors to Aboriginal cultural heritage significance.

7.2 Archaeological (scientific significance) values

Archaeological significance (also called scientific significance, as per the ICOMOS Burra Charter) refers to the value of archaeological objects or sites as they relate to research questions that are of importance to the archaeological community, including indigenous communities, heritage managers and academic archaeologists. Generally the value of this type of significance is determined on the basis of the potential for sites and objects to provide information regarding the past life-ways of people (Burke and Smith 2004: 249,

Research potential

Research potential is assessed by examining site content and site condition. Site content refers to all cultural materials and organic remains associated with human activity at a site. Site content also refers to the site structure – the size of the site, the patterning of cultural materials within the site, the presence of any stratified deposits and the rarity of particular artefact types. As the site contents criterion is not applicable to scarred trees, the assessment of scarred trees is outlined separately below. Site condition refers to the degree of disturbance to the contents of a site at the time it was recorded.

Table 9 Site content ratings

Rating	Description
0	No cultural material remaining.
1	Site contains a small number (e.g. 0–10 artefacts) or limited range of cultural materials with no evident stratification.
2	Site contains a larger number, but limited range of cultural materials; and/or some intact stratified deposit remains; and/or are or unusual example(s) of a particular artefact type.
3	Site contains a large number and diverse range of cultural materials; and/or largely intact stratified deposit; and/or surface spatial patterning of cultural materials that still reflect the way in which the cultural materials

Rating	Description
	were deposited.

Table 10 Site condition ratings

Rating	Description
0	Site destroyed.
1	Site in a deteriorated condition with a high degree of disturbance; lack of stratified deposits; some cultural materials remaining.
2	Site in a fair to good condition, but with some disturbance.
3	Site in an excellent condition with little or no disturbance. For surface artefact scatters this may mean that the spatial patterning of cultural materials still reflects the way in which the cultural materials were laid down.

Pearson and Sullivan note that Aboriginal archaeological sites are generally of high research potential because ‘they are the major source of information about Aboriginal prehistory’ (1995: 149). Indeed, the often great time depth of Aboriginal archaeological sites gives them research value from a global perspective, as they are an important record of humanity’s history. Research potential can also refer to specific local circumstances in space and time – a site may have particular characteristics (well preserved samples for absolute dating, or a series of refitting artefacts, for example) that mean it can provide information about certain aspects of Aboriginal life in the past that other less or alternatively valuable sites may not (Burke and Smith 2004: 247-8). When determining research potential value particular emphasis has been placed on the potential for absolute dating of sites.

The following sections provide statements of significance for the Aboriginal archaeological sites recorded during the sub-surface testing for the assessment. The significance of each site follows the assessment process outlined above. This includes a statement of significance based on the categories defined in the Burra Charter. These categories include social, historic, scientific, aesthetic and cultural (in this case archaeological) landscape values. Nomination of the level of value—high, moderate, low or not applicable—for each relevant category is also proposed. Where suitable the determination of cultural (archaeological) landscape value is applied to both individual sites and places (to explore their associations) and also, to the Study Area as a whole. The nomination levels for the archaeological significance of each site are summarised below.

Representativeness

Representativeness refers to the regional distribution of a particular site type. Representativeness is assessed by whether the site is common, occasional, or rare in a given region. Assessments of representativeness are subjectively biased by current knowledge of the distribution and number of archaeological sites in a region. This varies from place to place depending on the extent of archaeological research. Consequently, a site that is assigned low significance values for contents and condition, but a high significance value for representativeness, can only be regarded as significant in terms of knowledge of the regional archaeology. Any such site should be subject to re-assessment as more archaeological research is undertaken.

Assessment of representativeness also takes into account the contents and condition of a site. For example, in any region there may only be a limited number of sites of any type that have suffered minimal disturbance. Such sites would therefore be given a high significance rating for representativeness, although they may occur commonly within the region.

The representativeness ratings used for archaeological sites are:

Table 11 Site representativeness ratings

Rating	Description
1	Common occurrence
2	Occasional occurrence
3	Rare occurrence

Overall scientific significance ratings for sites, based on a cumulative score for site contents, site integrity and representativeness are:

Table 12 Scientific significance ratings

Rating	Description
1-3	Low scientific significance
4-6	Moderate scientific significance
7-9	High scientific significance

Each site is given a score on the basis of these criteria – the overall scientific significance is determined by the cumulative score.

7.2.1 Statements of archaeological significance

The following archaeological significance assessment is based on Requirement 11 of the Code. Using the assessment criteria detailed in Scientific Values and Significance Assessment, an assessment of significance was determined and a rating for each site was determined. The results of the archaeological significance assessment are given in Table 13 below.

Table 13 Scientific significance assessment of archaeological sites recorded within the study area.

Site Name	Site Content	Site Condition	Representativeness	Scientific Significance
Wilton 01 AHIMS #52-2-3590	1	3	3	7- High
M2D PAD AHIMS #52-2-3954	1	3	1	1- Low

Table 14 Statements of scientific significance for archaeological sites recorded within the study area.

Site Name	Statement of Significance
Wilton 01 AHIMS #52-2-3590	Wilton 01 is a scarred tree that is located along the northern boundary of the study area by Picton Road. The archaeological test excavations conducted in association with 52-2-3590 did not identify any new artefactual material. Scarred trees are rare in the

	Wilton area and as such the scientific significance of this site has been assessed as high.
M2D PAD 1 AHIMS #52-2-3954	The archaeological test excavations conducted at PAD site 52-2-3954 have identified a very low density subsurface archaeological deposits within an upper slope landform unit. The deposit was contained to one stratigraphic soil profile (sandy silt). The deposit was that of a quartz flake fragment. The scientific significance of this site has been assessed as low.

8 Impact assessment

As previously outlined, Walker Corporation is proposing to construct a housing development within the entire study area (Wilton South East Precinct) The proposed works involve the subdivision of the study area for residential dwellings and associated infrastructure and services.

The following avoidance strategies have been examined as part of this assessment in order to mitigate harm to sites #52-2-3590 and #52-2-3954.

Complete avoidance through redesign

52-2-3954, M2D PAD1 encompasses a small portion of the development area. In order to avoid the site completely, the subdivision would need to be redesigned around the conservation of the site. The site will be impacted by several residential blocks. However, there is potential for the conservation of 52-2-3590 through minor changes to the design of the subdivision. Moreover, this should be discussed in further consultation with RAPS.

8.1 Predicted physical impacts

The following activities will or have the potential to impact the entirety of PAD site 52-2-3954 and scarred tree 52-2-3590.

- Bulk earthworks
- Construction of houses, roads, and associated amenities
- Installation of services and infrastructure such as electricity, water etc.
- Landscaping activities.

The impacts of these sites by the proposed works will be direct with a total loss of value.

A summary of impacts is provided below in Table 15 Summary of potential archaeological impacts.

Table 15 Summary of potential archaeological impacts

AHIMS site no.	Site name	Significance	Type of harm	Degree of harm	Consequence of harm
52-2-3590	Wilton 01	High	Direct	Total	Total loss of value
52-2-3954	M2D PAD1	Low	Direct	Total	Total loss of value

8.2 Management and mitigation measures

Ideally, heritage management involves conservation of sites through the preservation and conservation of fabric and context within a framework of “doing as much as necessary, as little as possible” (Australian ICOMOS 2013). In cases where conservation is not practical, several options for management are available. For sites, management often involves the salvage of features or artefacts, retrieval of information through excavation or collection (especially where impact cannot be avoided) and interpretation.

Avoidance of impact to archaeological and cultural heritage sites through the design of the development is the primary mitigation and management strategy, and should be implemented where practicable.

As noted above, the proposed works could avoid impacts on sites #52-2-3590 through redesign of the development.

The following measures are recommended in order to mitigate against harm:

- Scarred tree site 52-2-3590 should be conserved and clearly fenced off to prevent any unintentional impacts during the redevelopment stage of the study area.
- Scarred tree site 52-2-3590 should be discussed with all RAPs, in terms of the conservation and how it can be incorporated into the residential subdivision site.

9 Recommendations

Strategies have been developed based on the archaeological (significance) of cultural heritage relevant to the study area. The strategies also take into consideration:

- Predicted impacts to Aboriginal cultural heritage
- The planning approvals framework
- Current best conservation practice, widely considered to include:
 - Ethos of the Australia International Council on Monuments and Sites (ICOMOS) Burra Charter
 - The *Code of Practice for Archaeological Investigation of Aboriginal Objects in NSW* (DECCW 2010) (the code)

The recommendations that resulted from the consultation process are provided below.

Recommendation 1: Continued consultation with the registered Aboriginal parties

It is recommended that the proponent continue to inform these groups about the management of Aboriginal cultural heritage sites within the study area throughout the life of the project. This recommendation is in keeping with the consultation requirements.

Recommendation 2: Application for an Aboriginal heritage impact permit (AHIP)

It is recommended that the proponent apply to Office of Environment and Heritage (OEH) for an area wide Aboriginal Heritage Impact Permit (AHIP) the study area. **The AHIP should be for a term of five (5) years.** This site will be impacted by the proposed works; however, subsurface test excavations have confirmed these sites are of low integrity and scientific significance.

Advice preparing AHIPs

An AHIP is required for any activities likely to have an impact on Aboriginal objects or Places or cause land to be disturbed for the purposes of discovering an Aboriginal object. The Office of Environment and Heritage (OEH) issues AHIPs under Part 6 of the NPW Act. AHIPs should be prepared by a qualified archaeologist and lodged with the OEH. Once the application is lodged, processing time can take between 8-12 weeks. It should be noted that there will be an application fee levied by the OEH for the processing of AHIPs, which is dependent on the estimated total cost of the development project. Where there are multiple sites within one study area an application for an AHIP to cover the entire study area is recommended.

Recommendations 3: Areas of low archaeological potential

No further archaeological investigation are required for areas assessed as having low archaeological potential.

Recommendation 4: Preservation of Scarred Tree # 52-2-3590

Walker Corporation should consult further with the Registered Aboriginal Parties (RAPs) to develop a conservation strategy for the Scar Tree, This should include temporary protection strategies to be implemented during construction as well as a long term management plan.

Recommendation 5: Stop work provision for any potential heritage sites identified during construction which have not been identified as part of this assessment or approved for harm under the AHIP.

All Aboriginal places and objects are protected under the NPW Act. This protection extends to Aboriginal objects and places that have not been identified but might be unearthed during construction. If construction proceeds, work must cease if Aboriginal objects or places are identified which have not previously been identified as part of this assessment or have not been approved for harm under the AHIP. OEH and the archaeologist must be notified to make an assessment of the find and advise on subsequent management.

Historical archaeological sites are protected under the relic's provisions (s139 – 146) of the NSW Heritage Act 1977. Should any historical archaeological sites be identified during any phase of the proposed development, all works must cease in the vicinity of the find and the project archaeologist and OEH notified. Should the archaeological nature of the find be confirmed the Heritage Branch of the NSW Department of Planning, will require notification.

Recommendation 6: Stop work provision for any potential discovery of human remains

If any suspected human remains are discovered during any activity works, all activity in the vicinity must cease immediately. The remains must be left in place and protected from harm or damage. The following contingency plan describes the immediate actions that must be taken in instances where human remains or suspected human remains are discovered. Any such discovery at the study area must follow these steps:

3. Discovery: If suspected human remains are discovered all activity in the vicinity must stop to ensure minimal damage is caused to the remains; and the remains must be left in place, and protected from harm or damage.
4. Notification: Once suspected human skeletal remains have been found, the NSW Police must be notified immediately, and they will subsequently inform the Coroner's Office. Following this, and if the human remains are likely to be Aboriginal in origin, the find will be reported to the Aboriginal parties and OEH NSW. If the find is likely to be non-Aboriginal in origin and more than 100 years in age, the Heritage Council of NSW will be notified of the find under s.146 of the *Heritage Act 1977*.

Recommendation 7: Lodgement of Final Report

A copy of the final report will be sent to:

- The Registered Aboriginal Parties
- The Office of Environmental Heritage (OEH)

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Appendices

Appendix 1 AHIMS results

THE FOLLOWING APPENDIX IS NOT TO BE MADE PUBLIC

AHIMS Web Services (AWS)

Extensive search - Site list report

Your Ref/PO Number : 25335

Client Service ID : 327164

SiteID	SiteName	Datum	Zone	Easting	Northing	Context	Site Status	SiteFeatures	SiteTypes	Reports
52-2-1990	Tahani Lea 31;Avon catchment Area;	AGD	56	285800	6206560	Closed site	Valid	Art (Pigment or Engraved) : -	Shelter with Art	
	<u>Contact</u>	<u>Recorders</u>	<u>Permits</u>							
52-2-0012	Wilton;Allens Creek;	AGD	56	288551	6209619	Closed site	Valid	Artefact : -, Art (Pigment or Engraved) : -	Shelter with Art,Shelter with Deposit	
	<u>Contact</u>	<u>Recorders</u>	<u>Permits</u>							
52-2-1312	Allen Creek;	AGD	56	288347	6210232	Closed site	Valid	Art (Pigment or Engraved) : -	Shelter with Art	1333
	<u>Contact</u>	<u>Recorders</u>	<u>Permits</u>							
52-2-1313	Allens Creek;	AGD	56	288368	6210222	Closed site	Valid	Art (Pigment or Engraved) : -	Shelter with Art	
	<u>Contact</u>	<u>Recorders</u>	<u>Permits</u>							
52-2-1314	Allens Crk..	AGD	56	288350	6210161	Closed site	Valid	Art (Pigment or Engraved) : -	Shelter with Art	
	<u>Contact</u>	<u>Recorders</u>	<u>Permits</u>							
52-2-1316	Allens Crk.	AGD	56	288406	6209815	Closed site	Valid	Art (Pigment or Engraved) : -	Shelter with Art	
	<u>Contact</u>	<u>Recorders</u>	<u>Permits</u>							
52-2-1470	Tega site 16;	AGD	56	287100	6205860	Closed site	Valid	Art (Pigment or Engraved) : -, Shell : -, Artefact : -	Shelter with Art,Shelter with Midden	1853
	<u>Contact</u>	<u>Recorders</u>	<u>Permits</u>							
52-2-1471	Tega site 17;	AGD	56	286900	6206240	Closed site	Valid	Art (Pigment or Engraved) : -, Shell : -, Artefact : -	Shelter with Art,Shelter with Midden	1853
	<u>Contact</u>	<u>Recorders</u>	<u>Permits</u>							
52-2-0884	Wilton;Allens Creek Bridge;	AGD	56	288759	6208343	Closed site	Valid	Art (Pigment or Engraved) : -	Shelter with Art	
	<u>Contact</u>	<u>Recorders</u>	<u>Permits</u>							
52-2-1317	Allens Ck.;	AGD	56	288813	6209120	Closed site	Valid	Art (Pigment or Engraved) : -	Shelter with Art	1333
	<u>Contact</u>	<u>Recorders</u>	<u>Permits</u>							
52-2-1318	Allen Crk; No 13	AGD	56	288770	6209044	Closed site	Valid	Art (Pigment or Engraved) : -	Shelter with Art	
	<u>Contact</u>	<u>Recorders</u>	<u>Permits</u>							
52-2-1319	Allens Crk..	AGD	56	288758	6208954	Closed site	Valid	Art (Pigment or Engraved) : -	Shelter with Art	
	<u>Contact</u>	<u>Recorders</u>	<u>Permits</u>							

Report generated by AHIMS Web Service on 09/02/2018 for Samantha Keats for the following area at Datum :GDA, Zone : 56, Eastings : 284552 - 289552, Northings : 6205450 - 6210450 with a Buffer of 50 meters. Additional Info : Site analysis. Number of Aboriginal sites and Aboriginal objects found is 69

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AHIMS Web Services (AWS)

Extensive search - Site list report

Your Ref/PO Number : 25335

Client Service ID : 327164

SiteID	SiteName	Datum	Zone	Easting	Northing	Context	Site Status	SiteFeatures	SiteTypes	Reports
52-2-1325	Wilton;Allens Creek;	AGD	56	288711	6206157	Closed site	Valid	Art (Pigment or Engraved) : -	Shelter with Art	
	<u>Contact</u>	<u>Recorders</u>	Ms.Laila Haglund							
52-2-0985	Allen`s Creek No 3 Wilton duplicate of 52-2-1325	AGD	56	288711	6206157	Closed site	Valid	Art (Pigment or Engraved) : -	Shelter with Art	652
	<u>Contact</u>	<u>Recorders</u>	Mrs.Caryll Sefton,Ms.Laila Haglund							
52-2-1340	Wilton Bypass 1	AGD	56	288650	6207330	Closed site	Valid	Artefact : -	Shelter with Deposit	1724,1738
	<u>Contact</u>	<u>Recorders</u>	Elizabeth Rich,Mrs.Caryll Sefton							
52-2-0743	Douglas Park;	AGD	56	289420	6210150	Closed site	Valid	Art (Pigment or Engraved) : -	Shelter with Art	
	<u>Contact</u>	<u>Recorders</u>	Norris							
52-2-0576	Wilton;Clements Creek;	AGD	56	289410	6210170	Closed site	Valid	Artefact : -, Art (Pigment or Engraved) : -	Shelter with Art,Shelter with Deposit	
	<u>Contact</u>	<u>Recorders</u>	Aiden Ridgeway,Mrs.Jessie Ridgeway							
52-2-1676	Wilton AC1;Allens Creek; duplicate of 52-2-1080	AGD	56	288550	6206070	Closed site	Valid	Art (Pigment or Engraved) : -	Shelter with Art	1738
	<u>Contact</u>	<u>Recorders</u>	Ms.Laila Haglund							
52-2-3586	Wilton 2 (W2)	GDA	56	288357	6210229	Closed site	Valid	Potential Archaeological Deposit (PAD) : -		
	<u>Contact</u>	<u>Recorders</u>	Heritage Concepts							
52-2-3587	Wilton 3 (W3)	GDA	56	288349	6210228	Closed site	Valid	Artefact : 5		
	<u>Contact</u>	<u>Recorders</u>	Heritage Concepts							
52-2-3590	Wilton 01	GDA	56	286199	6209350	Open site	Valid	Modified Tree (Carved or Scarred) : 1		103104
	<u>Contact</u>	<u>Recorders</u>	Heritage Concepts							
52-2-3591	Wilton 02	GDA	56	287686	6207111	Open site	Valid	Artefact : 1		
	<u>Contact</u>	<u>Recorders</u>	Heritage Concepts							
52-2-1989	Tahani Lea 30;Avon catchment Area;	AGD	56	285700	6206590	Closed site	Valid	Art (Pigment or Engraved) : -	Shelter with Art	
	<u>Contact</u>	<u>Recorders</u>	Mrs.Caryll Sefton							
52-2-1315	Allens Crk.	AGD	56	288306	6209710	Closed site	Valid	Art (Pigment or Engraved) : -	Shelter with Art	
	<u>Contact</u>	<u>Recorders</u>	Warren Bluff							
52-2-1873	Pheasant's Nest Weir 1;	AGD	56	285570	6208160	Open site	Valid	Artefact : -	Open Camp Site	3160
	<u>Contact</u>	<u>Recorders</u>	Helen Brayshaw							

Report generated by AHIMS Web Service on 09/02/2018 for Samantha Keats for the following area at Datum :GDA, Zone : 56, Eastings : 284552 - 289552, Northings : 6205450 - 6210450 with a Buffer of 50 meters. Additional Info : Site analysis. Number of Aboriginal sites and Aboriginal objects found is 69

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AHIMS Web Services (AWS)

Extensive search - Site list report

Your Ref/PO Number : 25335

Client Service ID : 327164

SiteID	SiteName	Datum	Zone	Easting	Northing	Context	Site Status	SiteFeatures	SiteTypes	Reports
52-2-1062	Allen's Creek No 4;Wilton;	AGD	56	288693	6206202	Closed site	Valid	Art (Pigment or Engraved) : -	Shelter with Art	
	<u>Contact</u>	<u>Recorders</u>	Ms.Laila Haglund,Mrs.Caryll Sefton					<u>Permits</u>		
52-2-1063	Wilton;Allens Creek Bridge.	AGD	56	288931	6208108	Closed site	Valid	Artefact : -	Shelter with Deposit	
	<u>Contact</u>	<u>Recorders</u>	Mrs.Caryll Sefton,Mrs.Laila Haglund					<u>Permits</u>		
52-2-1067	Allen's Creek No 1;Wilton;	AGD	56	288580	6206234	Closed site	Valid	Art (Pigment or Engraved) : -	Shelter with Art	
	<u>Contact</u>	<u>Recorders</u>	Mrs.Caryll Sefton,Mrs.Laila Haglund					<u>Permits</u>		
52-2-1068	Wilton;Allen Ck Lisa Rd;	AGD	56	288968	6207554	Closed site	Valid	Art (Pigment or Engraved) : -, Artefact : -	Shelter with Art,Shelter with Deposit	
	<u>Contact</u>	<u>Recorders</u>	Ms.Laila Haglund,Mrs.Caryll Sefton					<u>Permits</u>		
52-2-1746	Ricki Lee 19;	AGD	56	286100	6206030	Closed site	Valid	Art (Pigment or Engraved) : -	Shelter with Art	
	<u>Contact</u>	<u>Recorders</u>	Mrs.Caryll Sefton					<u>Permits</u>		
52-2-1080	Allens Creek No 2;Wilton; duplicate of 52-2-1676	AGD	56	288653	6206260	Closed site	Valid	Art (Pigment or Engraved) : -	Shelter with Art	
	<u>Contact</u>	<u>Recorders</u>	Ms.Laila Haglund,Mrs.Caryll Sefton					<u>Permits</u>		
52-2-0227	Wilton;	AGD	56	286420	6207710	Open site	Valid	Grinding Groove : -	Axe Grinding Groove	
	<u>Contact</u>	<u>Recorders</u>	Bill Sullivan					<u>Permits</u>		
52-2-3026	Wilton Park 2, BC2	GDA	56	287134	6210462	Closed site	Valid	Potential Archaeological Deposit (PAD) : -, Habitation Structure : -, Grinding Groove : -, Artefact : -		103104
	<u>Contact</u>	<u>Recorders</u>	Doctor.Julie Dibden,Kayandel Archaeological Services,Mr.Lance Syme					<u>Permits</u>	1965	
52-2-3031	Wilton Park 7 (Unavailable)	AGD	56	286403	6210037	Open site	Valid	Potential Archaeological Deposit (PAD) : -, Artefact : -		103104
	<u>Contact</u>	<u>Recorders</u>	Unknown Author					<u>Permits</u>	1965	
52-2-3032	Wilton Park 8, BC8	AGD	56	286361	6209882	Open site	Valid	Artefact : -, Potential Archaeological Deposit (PAD) : -		103104
	<u>Contact</u>	<u>Recorders</u>	Doctor.Julie Dibden					<u>Permits</u>	1965,2193	

Report generated by AHIMS Web Service on 09/02/2018 for Samantha Keats for the following area at Datum :GDA, Zone : 56, Eastings : 284552 - 289552, Northings : 6205450 - 6210450 with a Buffer of 50 meters. Additional Info : Site analysis. Number of Aboriginal sites and Aboriginal objects found is 69

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AHIMS Web Services (AWS)

Extensive search - Site list report

Your Ref/PO Number : 25335

Client Service ID : 327164

SiteID	SiteName	Datum	Zone	Easting	Northing	Context	Site Status	SiteFeatures	SiteTypes	Reports
52-2-3033	Wilton Park 9, BC9	AGD	56	286572	6209988	Open site	Valid	Artefact : -, Potential Archaeological Deposit (PAD) : -		103104
	Contact	Recorders	Doctor.Julie Dibden					Permits	1965,2580	
52-2-3035	Wilton Park 11, BC11	AGD	56	286788	6210309	Open site	Valid	Artefact : -, Potential Archaeological Deposit (PAD) : -		103104
	Contact	Recorders	Doctor.Julie Dibden					Permits	1965,3191	
52-2-3038	Area of Assessed Archaeological Sensitivity 1 (Unavailable)	AGD	56	286440	6210015	Open site	Valid	Potential Archaeological Deposit (PAD) : -		103104
	Contact	Recorders	Unknown Author					Permits	1965	
52-2-3679	BGIA1	GDA	56	286771	6210124	Open site	Destroyed	Artefact : 1		103104
	Contact	Recorders	Miss.Melanie Thomson,Ms.Jenni Bate					Permits	3281	
52-2-3978	CT-AS-01	GDA	56	288059	6209874	Open site	Valid	Artefact : 1		
	Contact	Recorders	Kayandel Archaeological Services,Mr.Lance Syme					Permits		
52-2-3979	CT-PAD-01	GDA	56	288181	6210081	Open site	Valid	Potential Archaeological Deposit (PAD) : 1		
	Contact	Recorders	Kayandel Archaeological Services,Mr.Lance Syme					Permits		
52-2-3980	CT-PAD-02	GDA	56	288251	6210279	Open site	Valid	Potential Archaeological Deposit (PAD) : 1		
	Contact	Recorders	Kayandel Archaeological Services,Mr.Lance Syme					Permits		
52-2-3981	CT-PAD-03	GDA	56	288153	6209848	Open site	Valid	Potential Archaeological Deposit (PAD) : 1		
	Contact	Recorders	Kayandel Archaeological Services,Mr.Lance Syme					Permits		
52-2-3954	M2D PAD 1	GDA	56	285469	6208528	Open site	Valid	Potential Archaeological Deposit (PAD) : 1		
	Contact	Recorders	Navin Officer Heritage Consultants Pty Ltd					Permits		
52-2-3880	Wilton Zone Substation	GDA	56	285599	6210114	Open site	Valid	Artefact : 1		103104
	Contact	Recorders	Miss.Deirdre Lewis-Cook					Permits	3497	
52-2-4186	Wilton trig TRE01	GDA	56	287296	6207995	Open site	Valid	Modified Tree (Carved or Scarred) : -		
	Contact	Recorders	Mr.Mark Simon					Permits		

Report generated by AHIMS Web Service on 09/02/2018 for Samantha Keats for the following area at Datum :GDA, Zone : 56, Eastings : 284552 - 289552, Northings : 6205450 - 6210450 with a Buffer of 50 meters. Additional Info : Site analysis. Number of Aboriginal sites and Aboriginal objects found is 69

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AHIMS Web Services (AWS)

Extensive search - Site list report

Your Ref/PO Number : 25335

Client Service ID : 327164

SiteID	SiteName	Datum	Zone	Easting	Northing	Context	Site Status	SiteFeatures	SiteTypes	Reports
52-2-4201	WP7 Eastern PAD	GDA	56	286547	6210215	Open site	Valid	Potential Archaeological Deposit (PAD) : -		
	<u>Contact</u>	<u>Recorders</u>	Mr.Jakub Czastka <u>Permits</u>							
52-2-4178	Upper Nepean SCA GDG002	GDA	56	286729	6207269	Open site	Valid	Grinding Groove : 10		
	<u>Contact</u>	<u>Recorders</u>	Mr.Mark Simon <u>Permits</u>							
52-2-4179	Upper Nepean SCA ART01	GDA	56	286712	6207270	Open site	Valid	Art (Pigment or Engraved) : -		
	<u>Contact</u>	<u>Recorders</u>	Mr.Mark Simon <u>Permits</u>							
52-2-4192	BG-AS-002	GDA	56	286557	6210161	Open site	Valid	Artefact : -		
	<u>Contact</u>	<u>Recorders</u>	Mr.Lance Syme <u>Permits</u> 4149							
52-2-4193	BG-AS-003	GDA	56	286616	6210247	Open site	Partially Destroyed	Artefact : -, Potential Archaeological Deposit (PAD) : -		
	<u>Contact</u>	<u>Recorders</u>	Mr.Lance Syme <u>Permits</u> 4149							
52-2-4450	RAPHAEL 10	GDA	56	289526	6210404	Closed site	Valid	Art (Pigment or Engraved) : -, Artefact : -		
	<u>Contact</u>	<u>Recorders</u>	Illawarra Prehistory Group,Mr.Bruce Howell <u>Permits</u>							
52-2-4452	RAPHAEL 15	GDA	56	288678	6209212	Closed site	Valid	Artefact : -		
	<u>Contact</u>	<u>Recorders</u>	Illawarra Prehistory Group,Mr.Bruce Howell <u>Permits</u>							
48-2-0005	Wilton Park PAD 1	AGD	56	288370	6209560	Closed site	Valid	Habitation Structure : 1, Potential Archaeological Deposit (PAD) : -		
	<u>Contact</u>	<u>Recorders</u>	Doctor.Julie Dibden <u>Permits</u>							
48-2-0011	Wilton Park BC 7	AGD	56	286403	6210037	Open site	Valid	Artefact : 2, Potential Archaeological Deposit (PAD) : -		103104
	<u>Contact</u>	<u>Recorders</u>	Doctor.Julie Dibden <u>Permits</u>							
52-2-3072	BC1, Bradcorp	AGD	56	288230	6210070	Closed site	Valid	Art (Pigment or Engraved) : 4		
	<u>Contact</u> T Russell	<u>Recorders</u>	Doctor.Julie Dibden <u>Permits</u>							
52-2-3302	Wilton Park WIF1 (Unavailable)	AGD	56	286790	6209690	Open site	Valid	Artefact : -		103104
	<u>Contact</u>	<u>Recorders</u>	Mr.Lance Syme <u>Permits</u> 2581							
52-2-4160	WB-IF-001	GDA	56	288604	6207125	Open site	Valid	Artefact : -		
	<u>Contact</u>	<u>Recorders</u>	Elizabeth Rich <u>Permits</u>							

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AHIMS Web Services (AWS)

Extensive search - Site list report

Your Ref/PO Number : 25335

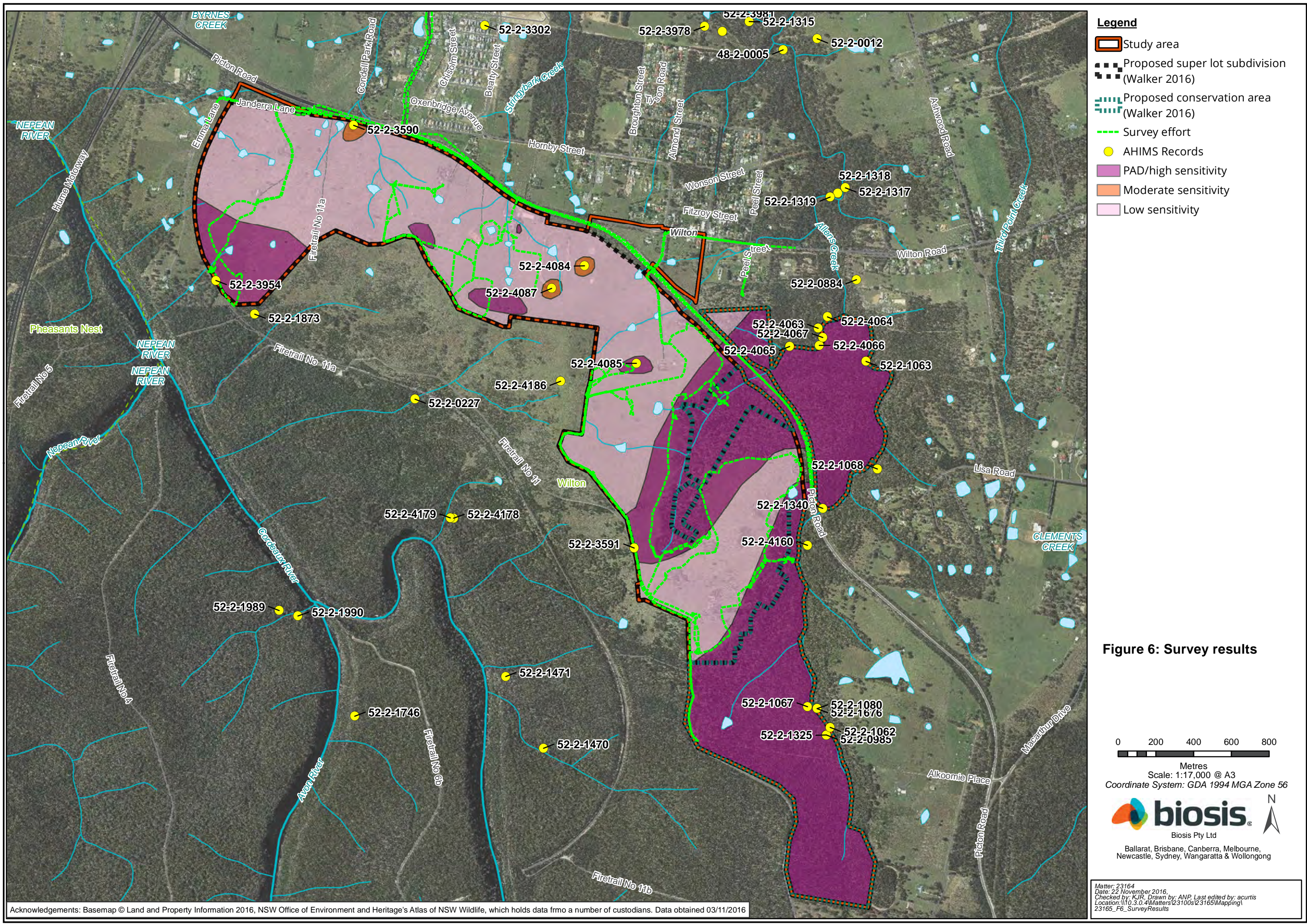
Client Service ID : 327164

SiteID	SiteName	Datum	Zone	Easting	Northing	Context	Site Status	SiteFeatures	SiteTypes	Reports
52-2-4079	WJ-ST-04	GDA	56	285232	6210155	Open site	Valid	Modified Tree (Carved or Scarred) : 1		
	Contact	Recorders	Kayandel Archaeological Services,Mr.Tom Knight							
52-2-4084	WJ-IF-09	GDA	56	287423	6208606	Open site	Valid	Artefact : 1		
	Contact	Recorders	Kayandel Archaeological Services,Mr.Tom Knight							
52-2-4085	WJ-IF-10	GDA	56	287698	6208290	Open site	Valid	Artefact : 1		
	Contact	Recorders	Kayandel Archaeological Services,Mr.Tom Knight							
52-2-4087	WJ-IF-08	GDA	56	287248	6208486	Open site	Valid	Artefact : 1		
	Contact	Recorders	Mr.Tom Knight							
52-2-4089	WJ-IF-05	GDA	56	285258	6210466	Open site	Valid	Artefact : 1		
	Contact	Recorders	Kayandel Archaeological Services,Mr.Tom Knight							
52-2-4063	PS-RS-04	GDA	56	288661	6208275	Closed site	Valid	Potential Archaeological Deposit (PAD) : 1		
	Contact	Recorders	Ms.Bridget Walker							
52-2-4064	PS-RS-05	GDA	56	288709	6208335	Closed site	Valid	Art (Pigment or Engraved) : 1, Potential Archaeological Deposit (PAD) : 1		
	Contact	Recorders	Ms.Bridget Walker							
52-2-4065	PS-RS-01	GDA	56	288510	6208179	Closed site	Valid	Potential Archaeological Deposit (PAD) : 1		
	Contact	Recorders	Ms.Bridget Walker							
52-2-4066	PS-RS-02	GDA	56	288667	6208185	Closed site	Valid	Artefact : 1, Potential Archaeological Deposit (PAD) : 1		
	Contact	Recorders	Ms.Bridget Walker							
52-2-4067	PS-RS-03	GDA	56	288685	6208226	Closed site	Valid	Artefact : 1, Potential Archaeological Deposit (PAD) : 1		
	Contact	Recorders	Ms.Bridget Walker							
52-2-4151	BG-RS-01	GDA	56	287168	6210479	Closed site	Valid	Artefact : -, Potential Archaeological Deposit (PAD) : -		
	Contact	Recorders	Kayandel Archaeological Services							

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Appendix 2 Survey results



Appendix 3 Test excavation results

PA D	Trans ect	Test Pit Numb er	Spit	Start Depth (mm)	End Depth (mm)	Colour (Munsell Code)	Compaction	Texture	Disturbance	Notes	Inclusions	pH
1	1	1	1	0	50	10 YR 4/3 BROWN	Low	Sandy Silt	Grass roots	Brown silty sand	Small amounts of gravels	5
1	1	1	2	50	100	10 YR 4/3 BROWN	Low	Sandy Silt	Glass fragments	Brown silty sand	Broken glass fragments throughout spit.	5
1	1	1	3	100	150	10 YR 6/4 LIGHT YELLOWISH BROWN	Low	Sandy Silt	Grass roots	Yellowish brown silty sand	Small amounts of gravels	5
1	1	1	4	150	200	10 YR 6/4 LIGHT YELLOWISH BROWN	Medium	Sandy Loam	Grass roots	Yellowish, brown sandy loam. Clay content beginning to increase.	N/A	6
1	1	1	5	200	250	10 YR 6/4 LIGHT YELLOWISH BROWN	Medium	Silty Sandy Loam	Grass roots	Yellowish, brown silty sandy loam. Clay content beginning to increase, extremely dry soils.	N/A	6
1	1	1	6	250	300	7.5 YR 5/8 STRONG BROWN	Medium	Silty Sandy Loam	Grass roots	Very dry soils.	N/A	6
1	1	1	7	300	350	7.5 YR 5/8 STRONG BROWN	Medium	Sandy Loam	Grass roots	Extremely dry soils	N/A	7
1	1	1	8	350	400	7.5 YR 5/8 STRONG BROWN	High	Sandy Clay Loam	Grass roots	Extremely dry soils	N/A	7
1	2	4	1	0	100	10 YR 4/4 DARK YELLOWISH BROWN	Low	Sandy Silt	Grass roots	Brown silty sand, little top soil	Small gravel inclusions	5.5
1	2	4	2	100	200	10 YR 5/4 YELLOWISH BROWN	Low	Sandy Silt	Grass roots	Brown silty sand	Small gravel inclusions	5.5
1	2	4	3	200	300	7.5 YR 5/6 STRONG BROWN	Medium	Sandy Clay Loam	Grass roots	Very dry clay	N/A	5.5
2	1	1	1	0	100	10 YR 5/4 YELLOWISH BROWN	Low	Sandy Silt	Grass roots	Limited top soils	Small gravels	5
2	1	1	2	100	200	10 YR 4/4 DARK YELLOWISH BROWN	Medium	Sandy Clay Loam	Grass roots	Extremely dry clay	N/A	5
2	1	1	3	200	300	7.5 YR 5/6 STRONG BROWN	Medium	Sandy Clay Loam	Grass roots	Extremely dry clay	N/A	6
2	2	9	1	0	100	10 YR 4/3 BROWN	Low	Sandy Silt	Grass roots	Limited top soil, small gravel inclusions	Gravels 5%	5

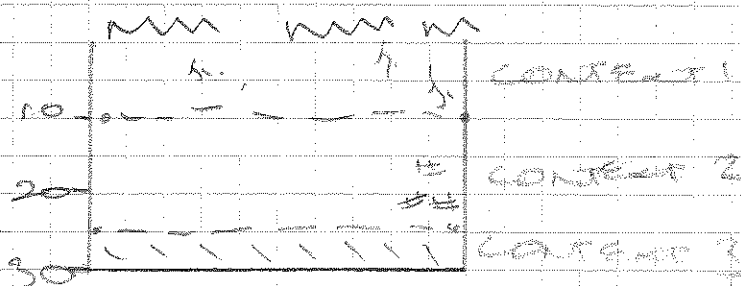
2	2	9	2	100	200	10 YR 4/3 BROWN	Low	Sandy Silt	Grass roots	Gravels increasing. Clay content increasing	Gravels 10%	5
2	2	9	3	200	300	10 YR 5/4 YELLOWISH BROWN	Medium	Sandy Loam	Grass roots	Gravels increasing, Clay content increasing. .	Charcoal and small gravel inclusions	5
2	2	9	4	300	400	10 YR 6/6 BROWNISH YELLOW	Medium	Sandy Clay Loam	Grass roots.	Extremely dry clay	N/A	6
2	2	9	5	400	500	10 YR 6/8 BROWNISH YELLOW	Medium	Sandy Clay Loam	Grass roots	Extremely dry clay	N/A	6
2	3	4	1	0	100	10 YR 4/3 BROWN	Low	Sandy Silt	Grass roots and insects.	Small gravels, limited top soil	Small gravel inclusions	5
2	3	4	2	100	200	10 YR 4/4 DARK YELLOWISH BROWN	Medium	Sandy Loam	Grass roots and insects.	Small gravels	Small gravels	5
2	3	4	3	200	300	10 YR 4/4 DARK YELLOWISH BROWN	Medium	Sandy Clay Loam	Grass roots	Clay content increasing	Ironstone inclusions	5
2	4	2	1	0	50	10 YR 5/4 YELLOWISH BROWN	Low	Sandy Silt	Grass roots	Silty Sand	Small gravel inclusions	5
2	4	2	2	50	100	10 YR 5/4 YELLOWISH BROWN	Low	Sandy Silt	Grass roots	Sandy Silt, gravel.	Gravels 10-15%	5
2	4	2	3	100	150	10 YR 5/4 YELLOWISH BROWN	Low	Sandy Silt	Grass roots	Sandy Silt, increase in gravel	Gravels 20-25%	5
2	4	2	4	150	200	10 YR 5/4 YELLOWISH BROWN	Low	Sandy Silt	Grass roots	Sandy silt, with gravel mixed through.	Gravels 20-25%	5
2	4	2	5	200	250	10 YR 6/4 LIGHT YELLOWISH BROWN	Medium	Sandy Loam	Grass roots	Sandy loam, with gravel mixed through. Very dry soils	Gravels 25-30%%	6
2	4	2	6	250	300	10 YR 6/4 LIGHT YELLOWISH BROWN	Medium	Sandy Loam	Grass roots	Sandy loam, with gravel mixed through. Very dry soils	Gravels 25-30%	6
2	4	2	7	300	350	10 YR 5/6 YELLOWISH BROWN	Medium	Sandy Clay Loam	Grass roots	Sandy loam, with gravel mixed through. Very dry clay	Gravels 20-25%	6
2	4	2	8	350	400	10 YR 5/6 YELLOWISH BROWN	Medium	Sandy Clay Loam	Grass roots	Very dry clay	N/A	6
2	5	3	1	0	100	10 YR 5/4 YELLOWISH BROWN	Low	Sandy Silt	Grass roots and insects.	Sandy Silt	Small gravels	5
2	5	3	2	100	200	10 YR 5/4 YELLOWISH BROWN	Low	Sandy Silt	Grass roots	Quartz flake fragment located.	Small gravel inclusions	5

2	5	3	3	200	300	10 YR 6/6 BROWN	Medium	Sandy Loam	Grass roots	Very dry soils	Gravels 5%	6
2	5	3	4	300	400	7.5 YR 5/6 STRONG BROWN	Medium	Sandy Clay Loam	Grass roots	Very dry clay	N/A	6
3	1	1A	1	0	100	10 YR 4/6 YELLOWISH BROWN	Medium	Loamy sand	Grass roots	Loamy sands with small gravels	Gravels 5%	5
3	1	1A	2	10	200	7.5 YR 5/6 STRONG BROWN	Medium	Sandy Clay Loam	Grass roots	Clay and gravels increasing.	Gravels 10-15%	5
3	1	1A	3	200	300	7.5 YR 4/6 STRONG BROWN	High	Sandy Clay Loam	Grass roots	Clay and gravels increasing, finishing on extremely dry clay	Gravels 10-15%	5
3	2	2	1	0	100	10 YR 4/6 DARK YELLOWISH BROWN	Low	Sandy Silt	Grass roots	Sandy silt	Gravels 0-5%	5
3	2	2	2	100	200	10 YR 4/6 DARK YELLOWISH BROWN	Low	Sandy Silt	Grass roots	Very dry soils	Gravels 5%	5
3	2	2	3	200	300	7.5 YR 4/36 STRONG BROWN	Medium	Sandy Clay Loam	Grass roots	Brown sandy loam.	Gravels 0- 5%	6
3	2	2	4	300	350	17.5YR 5/6 STRONG BROWN	High	Sandy Clay	Grass roots	Very dry clay	N/A	6
3	3	1	1	0	100	7.5 YR 5/6 STRONG BROWN	Medium	Sandy silt	Grass roots	Brown sandy silt	Gravels 0-5%	5
3	3	1	2	100	200	7.5 YR 5/6 STRONG BROWN	Medium	Sandy Loam	Grass roots	Brown sandy loams, clay and gravels increasing.	Gravels 0-5%%	5
3	3	1	3	200	300	7.5 YR 4/6 STRONG BROWN	High	Sandy Clay	Grass roots	Extremely dry clay	N/A	5

25335 AMB 22/1/18 SCAR 1100

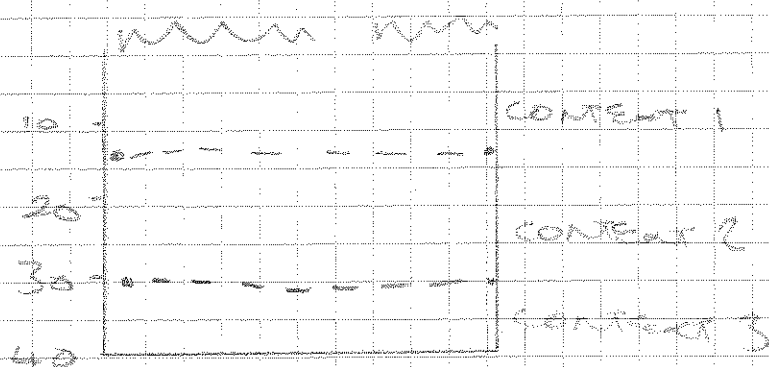
PAD1 TRANSECT 2 PIT 4

- CHARCOAL
|| - CLAY
S - GRASS
ROCKS



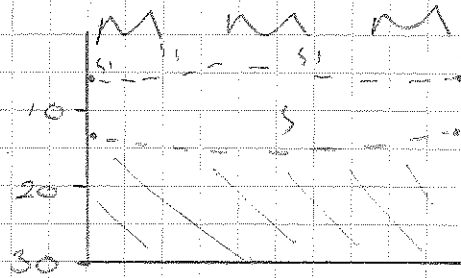
25335 22/1/18 AMB SCALE 1:100

PAD: TRANSECT 1 TP 1 - CONTROL



25335 23/1/18 AMB SCAR 1100

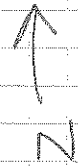
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CONTEXT 1

CONTEXT 2

CONTEXT 3

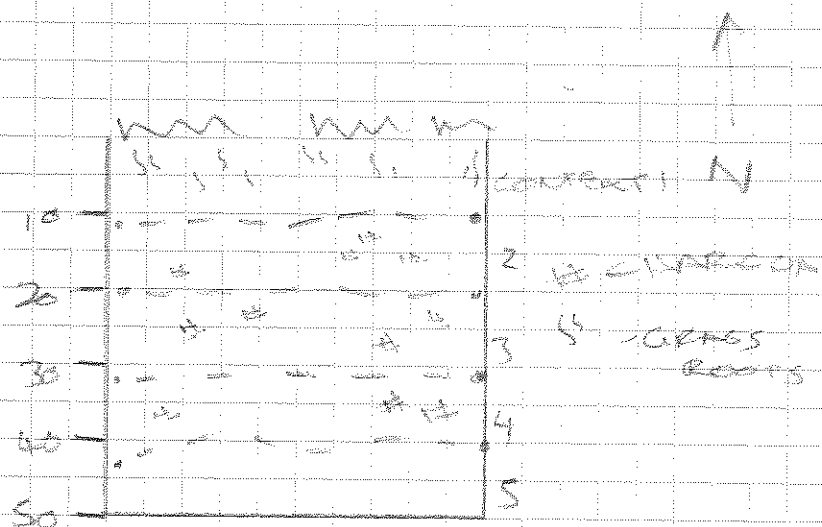


SS - GRASS
ROOTS.

/// - CLAY

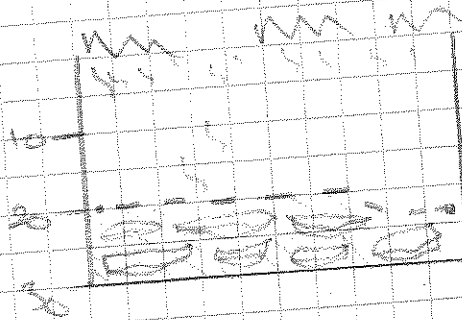
25335 24/1/18 AMB SCENE 1:00

RAD 2 TEMPERATURE 0.79



25335 24 118 AMB SCALE 1:100

PHOTO 2 - TERN SECT 3 P. 14

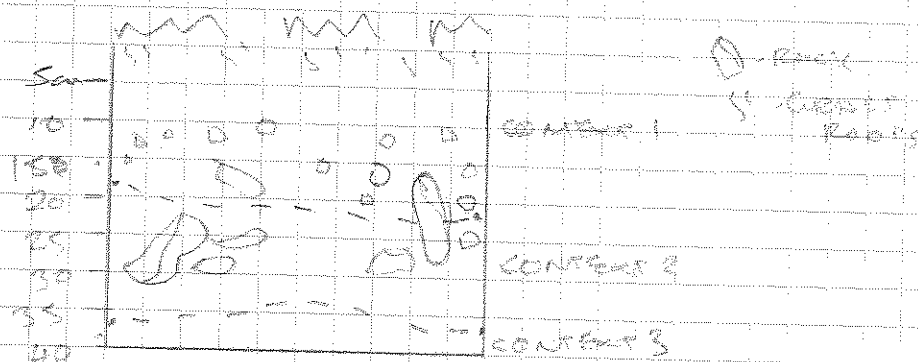


IRONSTONE

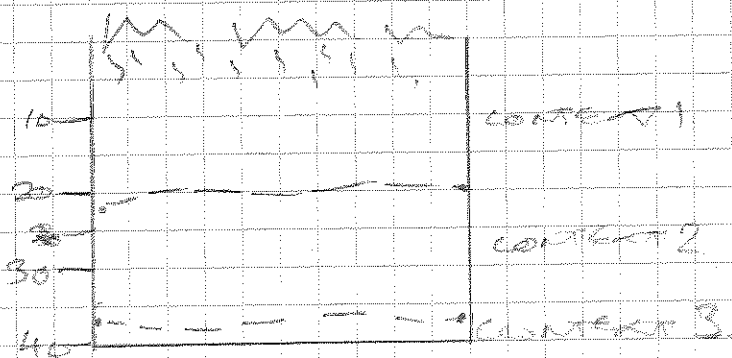
GRASS POND

25835 29/1/18 AMB SCALE 1100

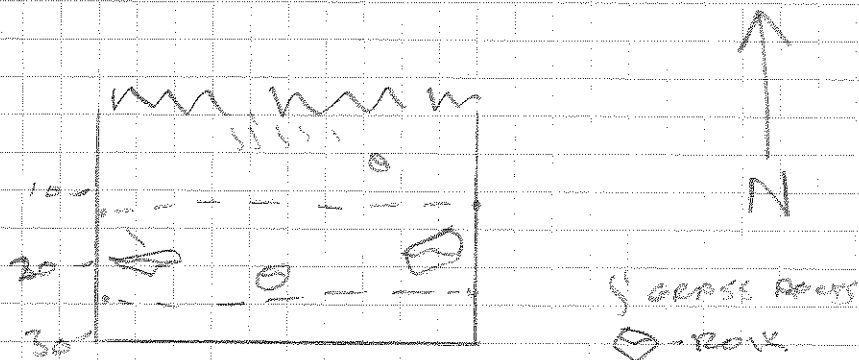
Pit 2 TRANSFER 4 PIT 2
(CONTROL)



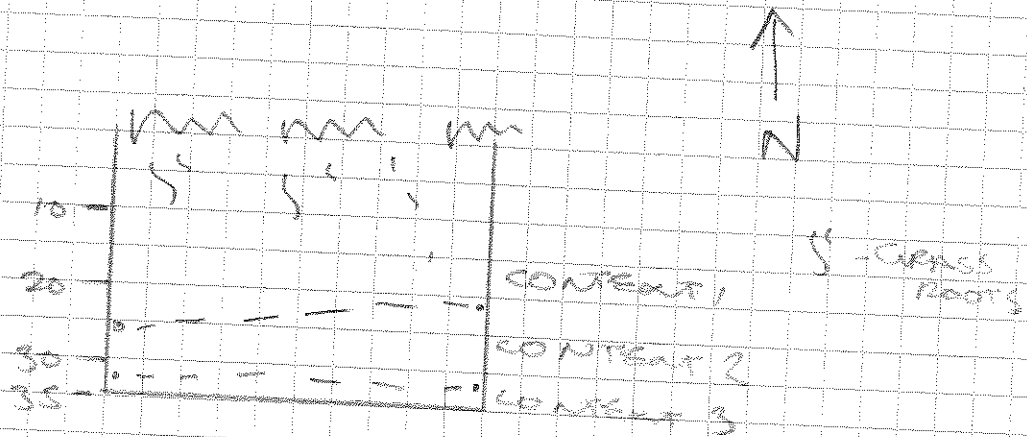
PAD 2 TRANCECT 5 PIT 3



25535 29/1/18 AMB SCALE 1:100
PAD 3 TRANSECT 1 TEST PIT 1A



25335 29/1/18 AMB SCALE 1:100
PAD 3 TRAVERSE 2 PIT 2



ZS335 29/1/18 AMB SCALE 1:100

PAD 3 TRAISECT 3 PIT 1

