164-170 CROATIA AVENUE, EDMONDSON PARK, NSW

ABORIGINAL CULTURAL HERITAGE ASSESSMENT REPORT

Report to The Bathla Group

Liverpool LGA

February 2022

APEX ARCHAEOLOGY

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Executive Summary

Apex Archaeology have been engaged to assist The Bathla Group to undertake an Aboriginal Cultural Heritage Assessment (ACHA) to inform a Development Application (DA) for the proposed residential subdivision of land on Croatia Avenue, Edmondson Park.

The project is located within the Liverpool City Council (LCC) area. The study area is legally defined as Lots 7 & 8 of DP 25173. The study area is irregular in shape and covers an approximate area of 4.3 hectares. It is bound by Soldiers Parade to the west, Croatia Avenue to the north, and undeveloped land to the east and south.

This ACHA has been prepared in accordance with the *Guide to investigating, assessing and reporting on Aboriginal cultural heritage in NSW* (April 2011); the *Aboriginal Cultural Heritage Consultation Requirements for Proponents 2010* (DECCW, April 2010) (the ACHCRs); and the *Code of Practice for Archaeological Investigation of Aboriginal Objects in New South Wales* (September 2010) (the Code of Practice). It details the results of the archaeological assessment completed in accordance with the Code of Practice and the consultation undertaken with the Aboriginal community in accordance with the ACHCRs.

An initial due diligence assessment of the study area by ELA Australia (ELA) in 2020 identified a previously registered artefact site within the south eastern portion of the study area, one newly recorded artefact site in the southern portion of the study area, and an area of potential archaeological deposit across most of the southern portion of the study area. As a result, further investigation through an Aboriginal Cultural Heritage Assessment (ACHA) was recommended. ELA were initially engaged to prepare an ACHA for the site, but due to the sale of the property to The Bathla Group, Apex Archaeology were engaged to finalise the ACHA, including undertaking test excavations within the areas identified as containing PAD.

ELA had undertaken much of the required consultation for the project, and the proposed methodology had been provided to the RAPs for their review and comment at the point that Apex Archaeology were brought onto the project. Preparation of the methodology included a reassessment of the area of PAD within the study area to span either side of the watercourse running approximately east-west through the study area.

The consultation with the RAPs has been conducted in accordance with the Consultation Guidelines. The initial stages were completed by ELA and Apex Archaeology completed the process. A total of eighteen Aboriginal people and organisations registered an interest in being consulted for the project. The following list comprises the registered Aboriginal parties (RAPs) for the project:

- A1 Indigenous Services
- Aragung Aboriginal CHSA
- Barraby Cultural Services
- Biamanga
- Butucarbin Aboriginal Corporation
- Corroboree Aboriginal Corporation

- Didge Ngunawal Corp
- Ginninderra Aboriginal Corporation
- Goobah Developments
- Gulaga
- Gunjeewong Aboriginal Corporation
- Guntawong Aboriginal Resources
- Kamilaroi Yunkuntjatjara Working Group
- Ngambaa Cultural Connections
- Waawaar Awaa
- Wori Wooilywa
- Yulay Cultural Services
- Yurandaali Cultural Services

All RAPs have been included in the consultation process undertaken for the project, and a number of responses were received at various stages of the process. All have been supportive to date.

Test excavations were undertaken within the area identified as having potential for Aboriginal subsurface deposits to be present, with a total of seven lithic items recovered. These comprised four silcrete artefacts and three silcrete heat shatters. One artefact was recovered just south of the watercourse and is considered to be associated with site EPCS 3 (45-5-3909), while three others were concentrated around two test pits north of the watercourse and have been registered as a new site CA-AS-01 (AHIMS # pending).

The presence of silcrete cultural lithics indicated an Aboriginal presence around the watercourse running east – west through the study area. The presence of only a few lithics was consistent with other excavations within the wider region, which were considered to usually recover low densities of artefacts. Artefacts were probably discarded in the context of use or loss rather than manufacture. Heat breakage was considered likely to have affected some of the artefacts after discard.

The sample of artefacts recovered was too small to allow detailed statistical analysis. No meaningful pattern between the location of the artefacts and their distribution across the landscape can be identified. However, the assemblage confirmed that Aboriginal people had utilised the area to some extent and that evidence of this utilisation was visible in the landscape, despite later disturbance through a range of land use practices. The artefacts are likely to represent general discard or opportunistic, general artefact reduction rather than intensive occupation or manufacturing activities on site. The type of low density artefact scatter represented by this site is common across the region.

The results of the test excavation do not support the recommendation of any further archaeological salvage excavations within the site, although collection of the surface artefacts in accordance with an approved Aboriginal Heritage Impact Permit (AHIP) is warranted.

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

Recommendation 1: AHIP Application Required

Aboriginal cultural material is present within the study area and thus an application for an Aboriginal Heritage Impact Permit (AHIP) is required to permit harm to these items, namely:

- EPCS 3 (AHIMS #45-5-3909)
- CA-AS-01 (AHIMS # pending)

It is recommended that this AHIP permit surface collection of artefacts associated with EPCS 3 and unmitigated impact to CA-AS-01.

Recommendation 2: Maintain Aboriginal Community Consultation

Consultation with the RAPs regarding the project should continue, in order to keep the RAPs informed about the management of Aboriginal cultural heritage within the study area. This includes notifying the RAPs when an AHIP application is lodged, and also in the event an AHIP is issued.

Recommendation 3: Development Boundaries

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

Recommendation 4: Stop Work Provision

Should unanticipated Aboriginal archaeological material be encountered during site works after the recommended mitigation measures have been completed in accordance with an approved AHIP, all work must cease in the vicinity of the find and an archaeologist contacted to make an assessment of the find and to advise on the course of action to be taken. Further archaeological assessment and Aboriginal community consultation may be required prior to the recommencement of works. Any objects confirmed to be Aboriginal in origin must be reported to Heritage NSW.

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

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

RECOMMENDATION 5: REPORTING

One digital copy of this report should be forwarded to Heritage NSW to support the required AHIP application for the project, along with required supporting documentation.

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

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

Apex Archaeology acknowledges and pays respect to the past, present and future Traditional Custodians and Elders of this nation and in whose land this assessment took place, and to the continuation of cultural, spiritual and educational practices of Aboriginal and Torres Strait Islander peoples.

Document Control

The following register documents the development and issue of the document entitled '164-170 Croatia Avenue, Edmondson Park, NSW: Aboriginal Cultural Heritage Assessment Report', prepared by Apex Archaeology in accordance with its quality management system.

Revision	Prepared by	Reviewed by	Issue Date
1 – Draft	Jenni Bate	Leigh Bate	26 January 2022
2 – Draft	Jenni Bate	RAPs	28 February 2022

GLOSSARY OF TERMS

Aboriginal Object	An object relating to the Aboriginal habitation of NSW (as defined in the NPW Act), which may comprise a deposit, object or material evidence, including Aboriginal human remains.
ACHA	Aboriginal Cultural Heritage Assessment
ACHAR	Aboriginal Cultural Heritage Assessment Report
AHIMS	Aboriginal Heritage Information Management System maintained by Heritage NSW, detailing known and registered Aboriginal archaeological sites within NSW
AHIP	Aboriginal Heritage Impact Permit
ASIRF	Aboriginal Site Impact Recording Form
BP	Before Present, defined as before 1 January 1950.
Code of Practice	The DECCW September 2010 *Code of Practice for Archaeological Investigation of Aboriginal Objects in New South Wales*
Consultation	Aboriginal community consultation in accordance with the DECCW April 2010 *Aboriginal cultural heritage consultation requirements for proponents 2010.*
DA	Development Application
DECCW	The Department of Environment, Climate Change and Water (now Heritage NSW)
Disturbed Land	If land has been subject to previous human activity which has changed the land's surface and are clear and observable, then that land is considered to be disturbed
DPIE	Department of Planning, Industry and Environment
Due Diligence	Taking reasonable and practical steps to determine the potential for an activity to harm Aboriginal objects under the *National Parks and Wildlife Act 1974* and whether an application for an AHIP is required prior to commencement of any site works, and determining the steps to be taken to avoid harm
Due Diligence Code of Practice	The DECCW Sept 2010 *Due Diligence Code of Practice for the Protection of Aboriginal Objects in New South Wales*
GIS	Geographical Information Systems
GSV	Ground Surface Visibility
Harm	To destroy, deface or damage an Aboriginal object; to move an object from land on which it is situated, or to cause or permit an object to be harmed
Heritage NSW	Heritage NSW within the Department of Premier and Cabinet; responsible for overseeing heritage matters within NSW
ka	Kiloannus, a unit of time equating to 1,000 years
LALC	Local Aboriginal Land Council
LGA	Local Government Area
NPW Act	NSW *National Parks and Wildlife Act* 1974
NPWS	National Parks and Wildlife Service
OEH	The Office of Environment and Heritage of the NSW Department of Premier and Cabinet (now Heritage NSW)
PAD	Potential Archaeological Deposit
RAPs	Registered Aboriginal Parties

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APPENDICES

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1.0 Introduction

Apex Archaeology have been engaged to assist The Bathla Group to undertake an Aboriginal Cultural Heritage Assessment (ACHA) to inform a Development Application (DA) for the proposed subdivision of a property on Croatia Avenue, Edmondson Park.

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1.1 Study Area and Project Brief

The project is located within the Liverpool City Council (LCC) area. The study area is legally defined as Lots 7 & 8 of DP 25173. The study area is irregular in shape and covers an approximate area of 4.3 hectares. It is bound by Soldiers Parade to the west, Croatia Avenue to the north, and undeveloped land to the east and south.

An initial due diligence assessment of the study area by ELA Australia (ELA) in 2020 identified a previously registered artefact site within the eastern portion of the study area, one newly recorded artefact site in the southern portion of the study area, and an area of potential archaeological deposit across most of the southern portion of the study area. As a result, further investigation through an Aboriginal Cultural Heritage Assessment (ACHA) was recommended. ELA were initially engaged to prepare an ACHA for the site, but due to the sale of the property to The Bathla Group, Apex Archaeology were engaged to finalise the ACHA, including undertaking test excavations within the areas identified as containing PAD.

This report collates the initial consultation undertaken by ELA and the additional consultation undertaken by Apex Archaeology, as well as the results of the test excavations undertaken within the study area.

1.2 Objectives of the Aboriginal Cultural Heritage Assessment

The archaeological investigation was undertaken to meet the requirements of the Code of Practice and ACHCRs.

The purpose of the archaeological investigation is to understand and establish the potential harm the proposed development may have on Aboriginal cultural heritage within the study area, both tangible and intangible.

Aboriginal community consultation was undertaken for the project with the aim of:

- Identifying the Aboriginal community members who can speak for Country within which the study area is located;
- Involving the Aboriginal community in making decisions about the management of their cultural heritage;
- Identifying, assessing and recording Aboriginal heritage values within the study area;
- Preparing an assessment of the cultural heritage values in consultation with the Aboriginal community;
- Identifying the potential impact of the proposed development on the assessed cultural heritage values; and
- Developing conservation and mitigation strategies for these values, with the aim of minimising impacts to cultural heritage wherever possible.

In addition, this report provides a significance assessment of the identified Aboriginal heritage values, as defined by the registered Aboriginal stakeholders (RAPs) for the project. Aboriginal people are the primary determinants of the significance of their cultural heritage and therefore Apex Archaeology cannot make a determination on the cultural significance without the input of the RAPs.

Any development works which disturb the ground surface have the potential to impact Aboriginal archaeological deposits and therefore an assessment of whether the study area contains such deposits is required prior to the commencement of construction works. An assessment of whether the proposed development would impact these deposits (if present) is also necessary, and identification of to what extent the deposits would be impacted is also required. The degree of impact which may be allowable is determined, in part, with consideration of the level of cultural significance attributed to the cultural values of the study area, both tangible and intangible.

1.3 Project Proponent

The proponent for the project is The Bathla Group. The project manager was Sahand Farooji of The Bathla Group.

1.4 Investigators and Contributors

This archaeological assessment was commissioned by The Bathla Group. Apex Archaeology thanks Sahand Farooji and Vandana of The Bathla Group for their assistance with the project. Thanks are also extended to the registered Aboriginal groups for their participation and assistance with the project, and special thanks to Declan Coman of ELA for providing details of the consultation completed by ELA for the project.

This report has been prepared by Jenni Bate, Director and Archaeologist with Apex Archaeology. The report was reviewed by Leigh Bate, Director and Archaeologist with Apex Archaeology. Both Jenni and Leigh have over fifteen years of archaeological consulting experience within NSW. Bonnie Clark assisted with the test excavation program. Project team roles and qualifications are shown in Table 1.

Table 1: Project team roles and qualifications

Name	Role	Qualifications
Jenni Bate	Project Manager; Report Author; Field Inspection; Review	B.Archaeology; Grad. Dip. CHM
Leigh Bate	Field inspection; Test Excavation; Report Author; Review; GIS	B.Archaeology; Grad. Dip. Arch; Dip. GIS
Bonnie Clark	Archaeological Assistant	B.Arch.Prac(Hons); PhD Evol.Bio (Palaeoanthropology)

1.5 LIMITATIONS

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

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

The consultation process was initiated by ELA and Apex Archaeology have relied on the information provided by ELA regarding the consultation undertaken to date.

It is recognised that Aboriginal people are the primary determinants of the significance of their cultural heritage, and as such, Apex Archaeology have relied on the Aboriginal community to provide cultural knowledge regarding the site, where they are willing and able to share such knowledge. However, there may be occasions where RAPs are unwilling or unable to share cultural knowledge regarding the site and thus our assessment of significance relies on scientific assessment only.

This report assesses Aboriginal cultural heritage matters only. No assessment of historical heritage has been made as part of this ACHA.

1.6 Report Structure

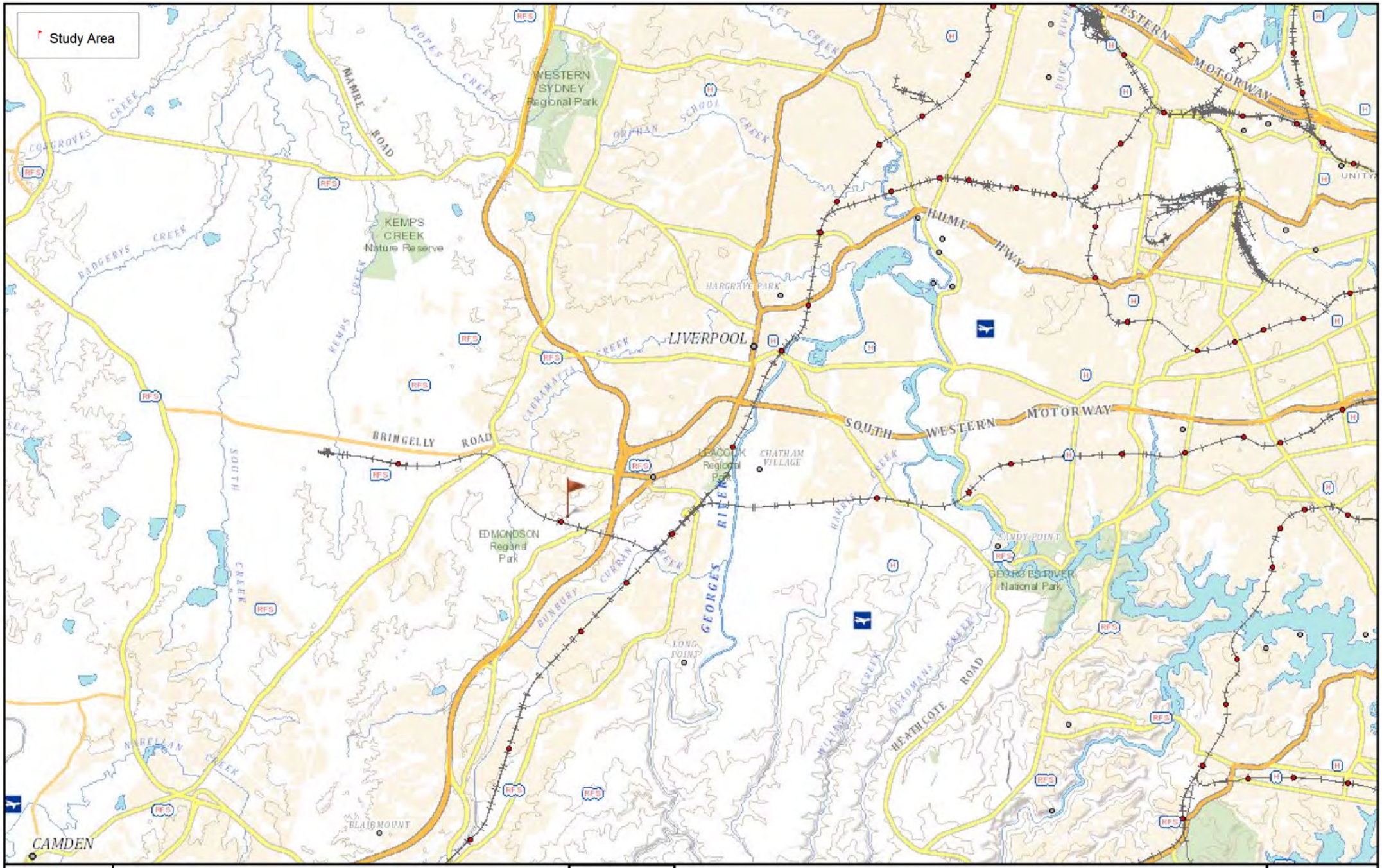
This report addresses the requirements of the *Guide to Investigating, Assessing and Reporting on Aboriginal Cultural Heritage in NSW* (The Guide), the Code of Practice and the ACHCRs. The Guide provides guidance as to what must be contained in an ACHAR. The following tables outline the requirements of both the Guide and the Code of Practice, and how they have been addressed in this report.

Table 2: Required contents of an ACHAR and where met in this report

Report requirements	Where met
Description of the Aboriginal objects and declared Aboriginal places located within the area of the proposed activity	Section 4.4
Description of the cultural heritage values, including the significance of the Aboriginal objects and declared Aboriginal places, that exist across the whole area that will be affected by the proposed activity	Section 7
The significance of the above values for the Aboriginal people who have a cultural association with the land	Section 7.3
How requirements for consultation with Aboriginal people have been met (as specified in clause 80C of the NPW Regulation)	Section 3
The views of those Aboriginal people regarding the likely impact of the proposed activity on their cultural heritage	Section 3; Section 7.3
Actual or likely harm posed to the Aboriginal objects or declared Aboriginal places from the proposed activity, with reference to the cultural heritage values identified	Section 8
Any practical measures that may be taken to protect and conserve those Aboriginal objects or declared Aboriginal places	Section 9
Any practical measures that may be taken to avoid or mitigate any actual or likely harm, alternatives to harm, or if this is not possible, to manage (minimise) harm	Section 9.3

Table 3: Requirements of Code of Practice and where met in this report

Requirement #	Where met
1 – Review previous archaeological work	Section 4.5
2 – Review the landscape context	Section 4
3 – Summarise and discuss the local and regional character of Aboriginal land use and its material traces	Section 4.5
4 – Predict the nature and distribution of evidence	Section 4.6
5 – Undertake an archaeological survey	Section 5.4
5a/b/c – Prepare an archaeological survey sampling strategy	Section 5.1; Appendix E
6 – Define identified sites	Section 5.4, 5.5; mapping
7 – Site recording	Section 5.4, 5.5
8 – Location information and geographic reporting	Report Figures
9 – Record survey coverage data	Section 5.2
10 – Analyse survey coverage	Section 5.3; 5.4
15a – Consultation prior to test excavation	Section 3
15b – Test excavation sampling strategy	Appendix G



PO Box 236
NOWRA
NEW SOUTH WALES 2541

0 5.5 11

metres

Projection:
MGA Zone 56 (GDA 94)
Base Map:
NearMaps 2021
Image Date: 25/10/2021
Final - Version 1

Figure 1: General location of the proposed development in its regional context.

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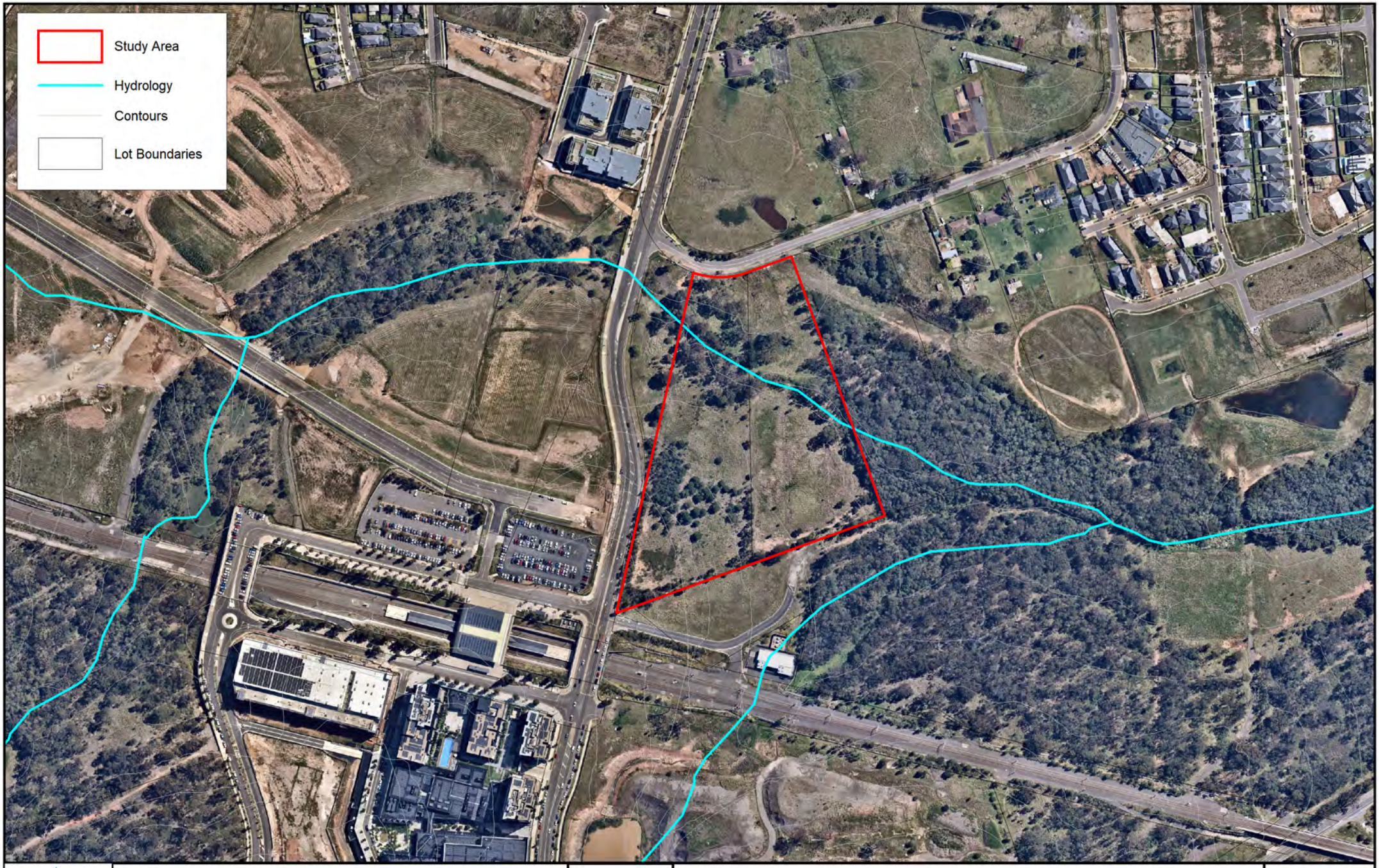

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NEW SOUTH WALES 2541

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Projection:
MGA Zone 56 (GDA 94)
Base Map:
NearMaps 2021
Image Date: 25/10/2021
Final - Version 1

Figure 2: Study area in its local context

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2.0 Statutory Context

Heritage in Australia, including both Aboriginal and non-Aboriginal heritage, is protected and managed under several different Acts. The following section presents a summary of the applicable Acts which provide protection to cultural heritage within NSW.

2.1 Commonwealth Legislation

2.1.1 Aboriginal and Torres Strait Islander Heritage Protection Act 1984

This Act provides for the preservation and protection of injury and/or desecration of areas and objects in Australia and its waters that are of significance to Aboriginal people, in accordance with Aboriginal tradition.

Under this Act, the responsible Minister has provision to make both temporary and/or long-term declarations, in order to provide protection to areas and objects which are at threat of injury or desecration. In some instances, this Act can override State or Territory provisions, or be invoked if State or Territory provisions are not enforced. An Aboriginal or Torres Strait Islander individual or organisation must invoke the Act.

No items within the study area are listed or protected under this Act.

2.1.2 Environment Protection and Biodiversity Conservation Act 1999

The EPBC Act provides protection to environmental sites of national significance, including places with cultural heritage values that contribute to Australia's national identity. The Act aims to respect the role of Indigenous peoples in the conservation and ecologically sustainable use of Australia's biodiversity, and to enhance the protection and management of important natural and cultural places. Additionally, the Act is designed to promote the use of Indigenous peoples' knowledge of biodiversity with the involvement of, and in cooperation with, the owners of the knowledge.

The National Heritage List provides a listing of natural, historic and Indigenous places of outstanding significance to the nation, while the Commonwealth Heritage List details the Indigenous, historic and natural places owned or controlled by the Australian Government.

Under the EPBC Act, approvals are required if any action is proposed that will have (or is likely to have) a significant impact on the National Heritage values of a National Heritage place. Therefore, actions must be referred to the Australian Government Minister for the Environment and Heritage. A decision will be made as to whether the proposed action will have a significant impact on any matters of national significance.

A search of both the NHL and the CHL did not identify any items within the study area.

2.1.3 Native Title Act 1993

The *Native Title Act 1993*, as amended, provides protection and recognition for Native title. Native title is recognised where the rights and interests of over land or waters where Aboriginal and Torres Strait Islander practiced traditional laws and customs prior to the arrival of European settlers, and where these traditional laws and customs have continued to be practiced.

The National Native Title Tribunal (NNTT) was established to mediate native title claims made under this Act. Three registers are maintained by the NNTT, as follows:

- National Native Title Register
- Register of Native Title Claims
- Register of Indigenous Land Use Agreements.

Searching the NNTT registers allows identification of potential Aboriginal stakeholders who may wish to participate in consultation. A search of all three registers did not identify any claims over the study area.

2.2 New South Wales Legislation

2.2.1 National Parks and Wildlife Act 1974

The *National Parks and Wildlife Act 1974* provides protection for all Aboriginal objects and places within NSW. Aboriginal objects are defined as the material evidence of the Aboriginal occupation of NSW, while Aboriginal Places are defined as areas of cultural significance to the Aboriginal community. All Aboriginal objects are protected equally under the Act, regardless of their level of significance. Aboriginal Places are gazetted if the Minister is satisfied that the location was and/or is of special significance to Aboriginal people.

Following amendments to the NPW Act in 2010, approval to impact Aboriginal cultural heritage sites is only granted under a Section 90 Aboriginal Heritage Impact Permit (AHIP), which is granted by Heritage NSW of the Department of Premier and Cabinet.

2.2.2 Environmental Planning & Assessment Act 1979

Under the EP&A Act, it is necessary to consider environmental impacts, including impact to cultural heritage, as part of the land use process. Local Environmental Plans (LEPs) and Development Control Plans (DCPs) are also required to be prepared by Local Government Areas (LGAs) in order to provide guidance on the applicable level of environmental assessment. LGAs are required to maintain a list of locally significant heritage items as part of their LEP.

Under the EP&A Act, Part 3 describes the planning instruments at both local and regional levels; Part 4 relates to development assessment and consent processes, and Part 5 refers to infrastructure and environmental impact assessment.

2.2.3 LIVERPOOL LEP 2008

The *Liverpool Local Environmental Plan 2008* (LLEP) is the overarching planning instrument applicable to the Liverpool LGA. The study area is partially covered by the provisions of the LLEP, and partially by the provisions of the State Environmental Planning Policy (State Significant Precincts) 2005. The following provisions apply to the northern and eastern portions of the study area.

Clause 5.10(2) (e) identifies that no buildings may be erected on land within a heritage conservation area or which contains an Aboriginal object, without first obtaining development consent. Further, Clause 5.10(2) (c) states that archaeological sites may not be disturbed or excavated without development consent. Exceptions to the requirement for development consent are detailed by Clause 5.10(3) and include low impact activities, or activities for the maintenance of a heritage item.

Clause 5.10(8) requires that the effect of any development on an Aboriginal place of heritage significance must be considered, and the Aboriginal community must be notified of any proposed developments. This document details the notification to the registered Aboriginal community regarding the intention to develop the study area and the consultation undertaken regarding the proposed development's potential impact on Aboriginal cultural heritage in the area.

There are no heritage items, heritage conservation areas or archaeological sites identified on the LEP heritage maps within the study area.

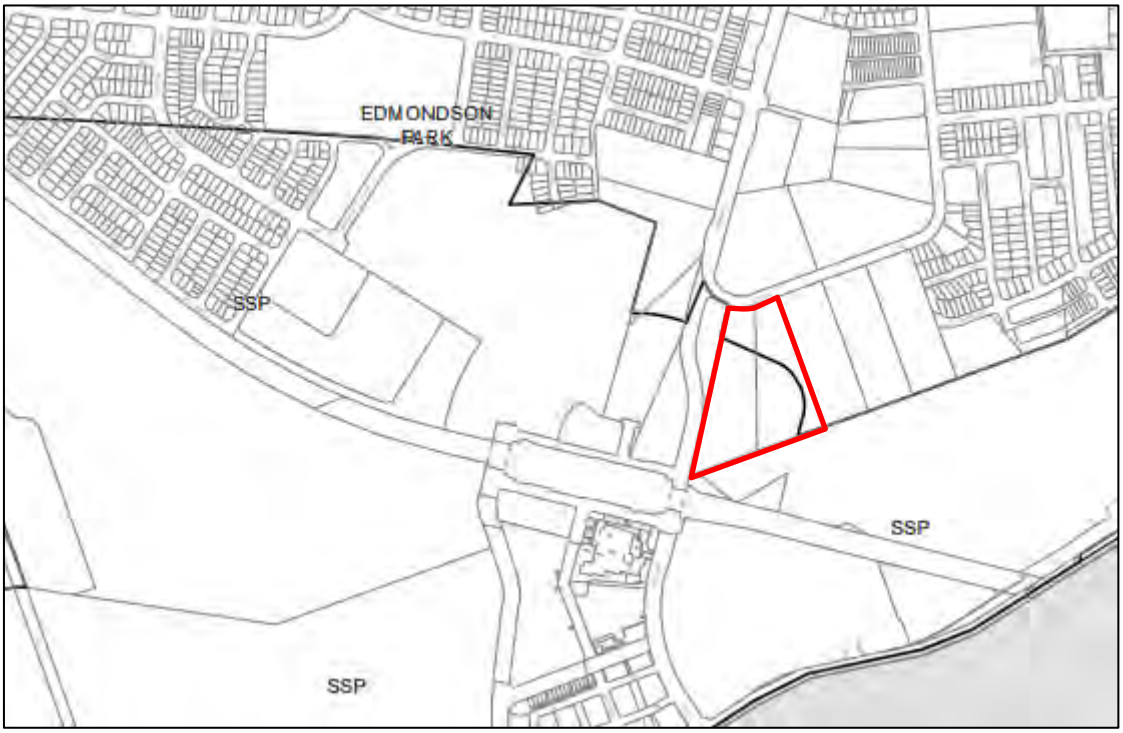


Figure 3: Detail of the LLEP Heritage Map. Approx study area outlined in red (Source: LLEP 2009 Heritage Map Sheet HER_009)

Although very few Aboriginal sites are listed in the LLEP 2014, the absence of nearby Aboriginal heritage items does not mean that the land has low Aboriginal cultural heritage significance.

2.2.4 SEPP (State Significant Precincts) 2005

The *State Environmental Planning Policy (State Significant Precincts) 2005* applies to the southern portion of the study area. Appendix 16 covers the Edmondson Park South Site, within which the study area is partially located, and Clause 33 addresses heritage conservation within this precinct. The objectives of the SEPP include 33(1)(d) to conserve places of Aboriginal heritage significance, where the requirement for when development consent is necessary is outlined in Clause 33(2)(e): disturbing or excavating a heritage conservation area that is a place of Aboriginal heritage significance.

Clause 33(8) outlines the manner in which places of Aboriginal heritage significance should be managed, noting that the consent authority (in this instance, LCC) must consider the effect of the proposed development on the heritage significance of the place and any Aboriginal object known or reasonably likely to be located at the place.

There are no heritage sites within the study area, although a heritage item is located approximately 500m to the south west of the study area, comprising the "Ingleburn Village Site". The proposal would not impact on the heritage values of this site giving the distance between the two locations.

This report has been prepared to address the requirements of both the SEPP and the LEP.

Figure 4: Detail of SEPP (SSP) 2005. Approx study area outlined in red (Source: SEPP (SPP) 2005 Edmondson Park South Heritage Map Sheet HER_001)

2.2.5 Edmondson Park South Development Control Plan 2012

The Edmondson Park South Development Control Plan 2012 (DCP) guides development within the Edmondson Park South precinct. Heritage mapping included within the DCP indicates one Aboriginal artefact is located within the study area. ELA identified this site as AHIMS site 45-5-3909, based on the recorded location of the AHIMS site in relation to that shown on the DCP mapping. The DCP does not show the study area as possessing any specific areas of Aboriginal heritage sensitivity within the study area, and no site-specific controls applicable for the study area outlined in the DCP. It is noted the DCP requires "the relevant recommendations and procedures outlined in the Aboriginal Cultural Heritage Assessment Report prepared by Kelleher Nightingale Consulting Pty Ltd dated November 2010 are to be satisfied". Review of this report noted that the site shown on the DCP mapping had not been identified during the KNC investigations in 2010 and as such, no specific management recommendations had been made in that report.

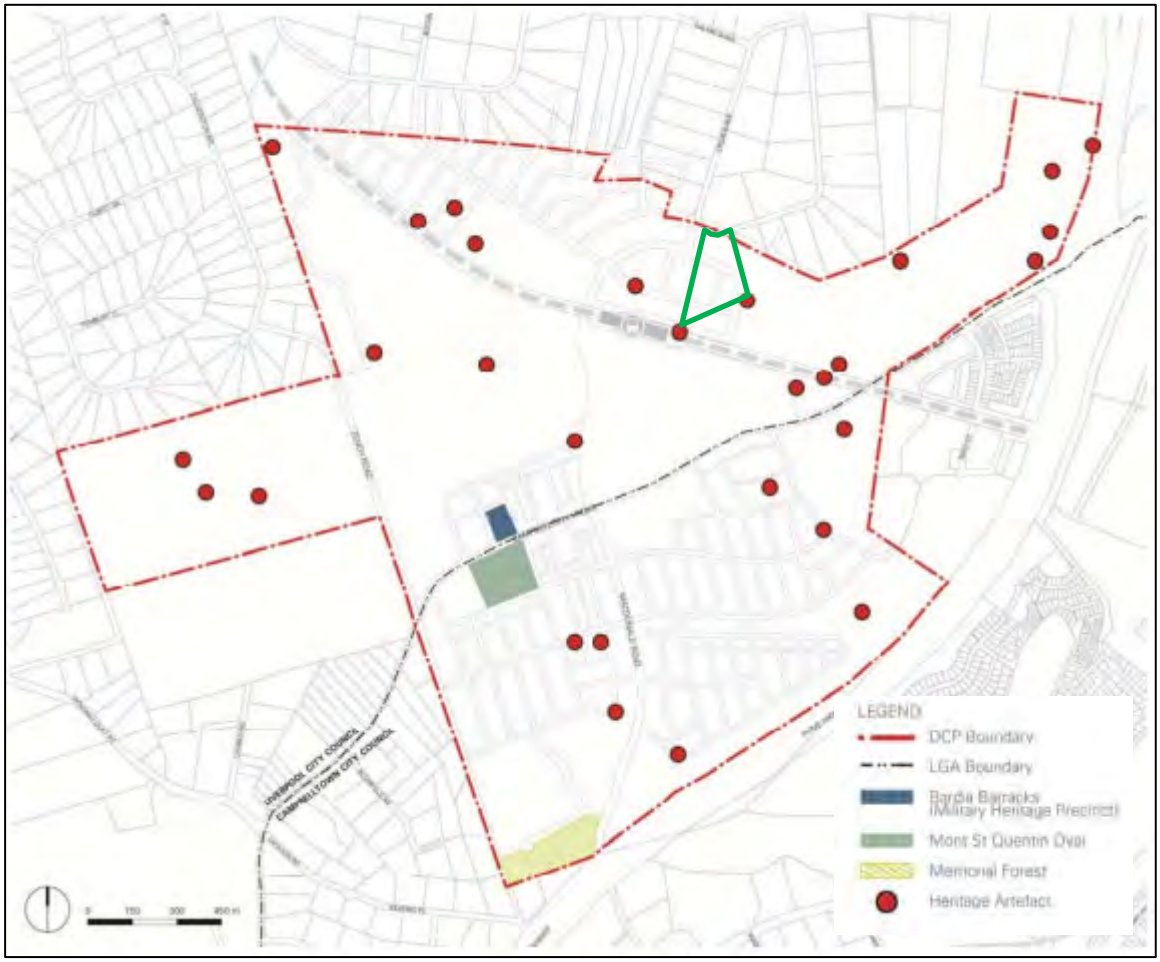


Figure 5: Figure 20 from Edmondson Park South DCP. Study area shown in green

3.0 Aboriginal Consultation Process

This section details the Aboriginal community consultation undertaken to assist in the heritage assessment of the study area. Aboriginal consultation in accordance with the *Aboriginal cultural heritage consultation requirements for proponents 2010* was undertaken by Apex Archaeology for this project.

Aboriginal community consultation is a requirement in order to make assessments of Aboriginal cultural values, as Aboriginal people are the primary determinants of the significance of their cultural heritage and therefore Apex Archaeology cannot make a determination on the cultural significance without the input of the RAPs. Aboriginal people often have a strong connection to their Country and to their ancestors, both past and present.

Material evidence of past Aboriginal occupation of an area is a tangible link to the intangible traditions, lore, customs, beliefs and history. These intangible values provide a sense of belonging for Aboriginal people, and cultural heritage and cultural practices are kept alive through being incorporated into everyday life, which helps maintain a connection to the past and to the present. It is a vital part of the identity of Aboriginal people.

Therefore, it is important that Aboriginal people are afforded the opportunity to understand, comment on and have input into projects that may impact areas which may be culturally sensitive, or damage items of cultural significance. The process of Aboriginal community consultation provides this opportunity, and this ACHAR details the results of the consultation undertaken for this project.

Consultation for the project was initially undertaken by ELA, who completed the process up to requesting comments on the proposed methodology for the cultural heritage assessment. Apex Archaeology then completed the consultation process in accordance with the ACHCRs.

3.1 The Consultation Process

The *Aboriginal cultural heritage consultation requirements for proponents 2010* provide the process for undertaking consultation with the Aboriginal community. This process includes identification, registration, engagement and consultation with those Aboriginal people who may have cultural knowledge which is relevant to determining the cultural significance of Aboriginal objects and places which may be within the study area. The consultation log detailing all stages of consultation undertaken for the project are outlined in Appendix A.

The Consultation Guidelines detail a number of stages for consultation, as follows:

- Identification of those people who should be consulted for the project
- Inviting Aboriginal people to register their interest in being consulted for the project

- Providing information regarding the nature and scope of the project to the Aboriginal people who have registered an interest in being consulted – the registered Aboriginal parties (RAPs)
- Providing opportunities for RAPs to comment on the proposed methodology for cultural heritage consultation
- Presenting information about the potential impacts of the proposed development for the RAPs to comment on
- Providing opportunities for RAPs to comment on the cultural significance of the proposed development area
- Providing opportunities for RAPs to comment on the draft reports detailing the results of the archaeological and cultural assessments for the project

3.2 Stage 1 Consultation: Commencement

Stage 1 requires a list of Aboriginal people who may have cultural knowledge relevant to the area to be prepared from several sources of information. The first step requires enquiries to be made of certain statutory bodies regarding whether they are aware of Aboriginal people or organisations that may have an interest in the study area, and their contact details. Any Aboriginal people or organisations identified in this step must be contacted and invited to register an interest in the project. In addition, a notification must be placed in local print media requesting Aboriginal people or organisations to register their interested in the project. A list of those who register an interest must be compiled. A minimum of 14 days from the date of the letter or newspaper advertisement must be allowed for registrations of interest.

As a result of the Stage 1 activities, a list of Aboriginal people who wish to be consulted for the project is developed. These Aboriginal people become the registered Aboriginal parties – the RAPS – for the project.

Letters requesting the details of Aboriginal people who may hold cultural knowledge relevant to the study area and who may wish to be consulted for the project were sent by ELA to several statutory agencies on 22 January 2021. Copies of these letters and responses are attached in Appendix B. These Step 1 letters were sent to the following agencies:

- Heritage NSW
- Greater Sydney Local Land Services (GSLLS)
- Liverpool City Council (LCC)
- Tharawal Local Aboriginal Land Council (TLALC)
- Office of the Registrar, *Aboriginal Land Rights Act 1983 (NSW)* (ORALRA)
- Native Title Services Corp (NTSCorp)
- National Native Title Tribunal (NNTT)

Responses were received from Heritage NSW, LCC, ORALRA, and NNTT. Heritage NSW provided a list of Aboriginal people and organisations with 58 people or organisations identified. These 58 individuals and organisations were invited to participate in consultation for the project.

LCC provided a list of 11 individuals and organisations to contact; however a number of these were included on the Heritage NSW list. As a result, a total of 62 individuals and organisations were invited to register their interest in consultation.

The Aboriginal people and organisations identified during this initial stage were contacted by ELA via letter (email if provided or via post if no email address given) on 8 February 2021, inviting them to register an interest in the project. Registrations were accepted until 24 February 2021. This is Step 2 of Stage 1 of consultation. Copies of these letters are attached in Appendix C.

In addition, an advertisement was placed in the *Liverpool City Champion* on 10 February 2021, inviting registrations of interest from people who may have cultural knowledge of the project area. A copy of the advertisement is attached in Appendix D.

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

- A1 Indigenous Services
- Aragung Aboriginal CHSA
- Barraby Cultural Services
- Biamanga
- Butucarbin Aboriginal Corporation
- Corroboree Aboriginal Corporation
- Didge Ngunawal Corp
- Ginninderra Aboriginal Corporation
- Goobah Developments
- Gulaga
- Gunjeewong Aboriginal Corporation
- Guntawong Aboriginal Resources
- Kamilaroi Yunkuntjatjara Working Group
- Ngambaa Cultural Connections
- Waawaar Awaa
- Wori Wooilywa
- Yulay Cultural Services
- Yurandaali Cultural Services

3.3 Stage 2 & 3 Consultation: Presentation and Gathering of Information

During Stage 2, information about the proposed project is provided to the RAPs, including location, scale, proposed development plans, timeframes, methodologies and any other relevant details relating to the project. This information can be provided in writing or at a meeting (or both), and an opportunity for the RAPs to visit the site may also be provided.

During Stage 3, RAPs are invited to share information about the cultural significance of the study area, which can assist in the assessment of the cultural significance of the Aboriginal objects and/or places within the study area. The cultural heritage assessment informs and integrates with the scientific assessment of significance and therefore can assist in the development of mitigation and management measures for the project. A methodology detailing how this information will be gathered must be provided to the RAPs for comment and a minimum of 28 days must be allowed for responses to be received. Any feedback must be considered and implemented as appropriate into the methodology.

Stage 2 and 3 can be undertaken concurrently. The information about the project and the methodology for seeking cultural knowledge can be provided in the same written documentation or at the same meeting.

Details of the proposed project and the proposed methodology for undertaking the cultural heritage and archaeological assessments for the project were provided in writing by ELA to each of the RAPs on 16 April 2021. Comments were accepted until 14 May 2021. Responses were received from:

- A1 Indigenous Services
- KYWG
- Gulaga
- DNC
- GARI
- Barraby
- Yurrandaali
- Aragung
- Naamba Cultural Connections
- Yulay Cultural Services
- Wori Wooilywa
- Gunjeewong

All responses were supportive and no amendments were requested by any of the RAPs. No other responses were received. The RAP responses are attached in Appendix E.

No cultural information was received from any of the RAPs for the project during this stage of consultation.

3.4 Stage 4: Review of Draft Report

Stage 4 sees the preparation of the draft ACHAR, which details the results of the cultural heritage assessment. The draft is provided to the RAPs for their review and comment. A minimum of 28 days to comment on the ACHAR must be allowed. All comments must be addressed in the final document and the proponent's response to RAP comments must be included. Copies of any submissions received from RAPs must be included in the final ACHAR.

The draft report was provided to all RAPs on 26 January 2022, with comments accepted until 25 February 2022. A total of three responses were received. DNC emailed to state they supported the recommendations made in the report. Waawaar Awaa emailed to advise they also supported the recommendations of the report. GARI emailed to state "due to the lack of involvement in this study are[a] GARI has nothing to offer". No other responses were received.

4.0 Aboriginal Cultural Heritage

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

This section presents information about both the physical and cultural landscape in which the study area is located, based on previous archaeological and ethnohistorical studies, to provide context and background to the existing knowledge of Aboriginal culture in the area.

4.1 Existing Environment

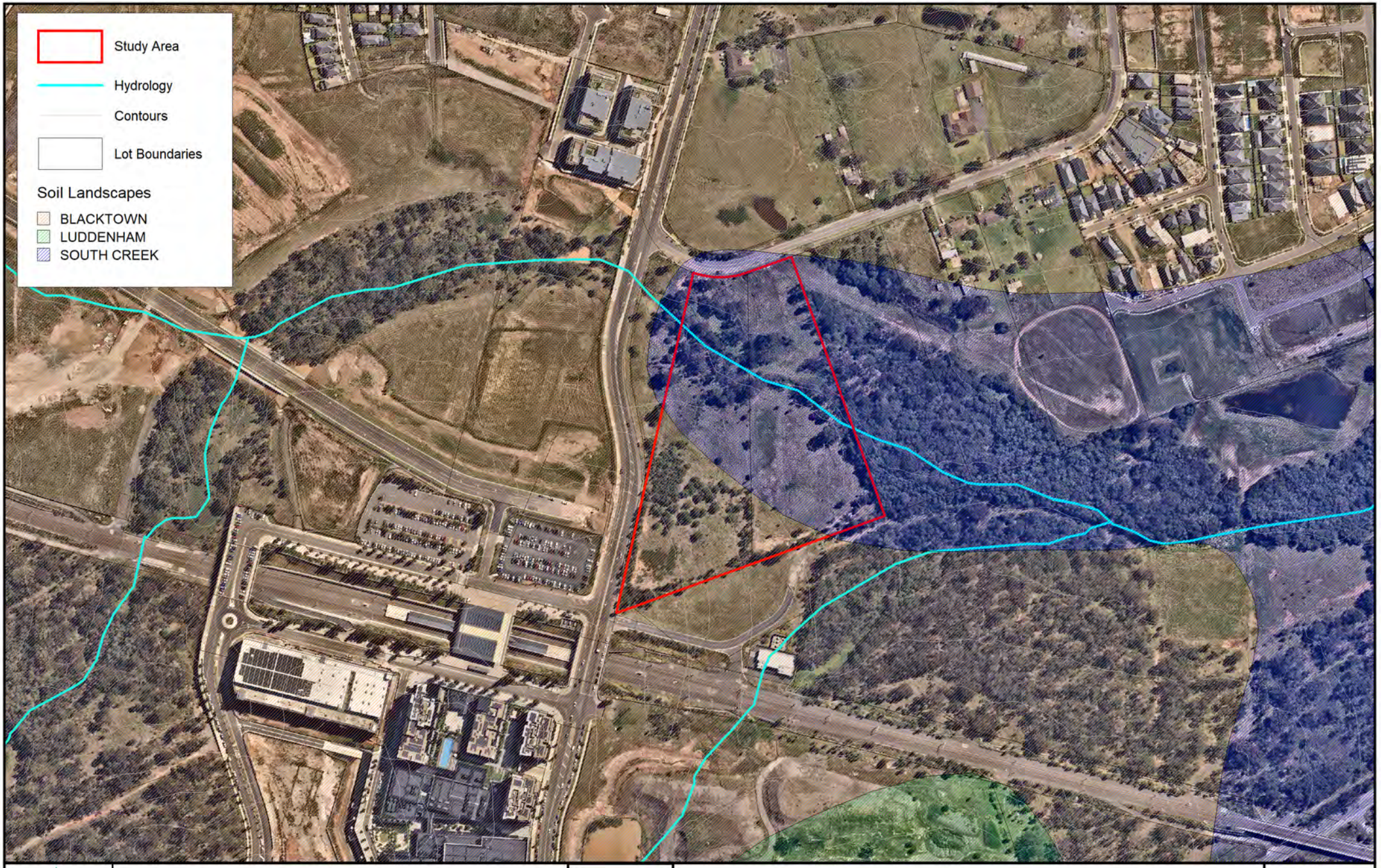
The study area falls within the Sydney Basin, which is roughly bounded by the Great Dividing Range to the west, the coast to the east, Newcastle to the north and Wollongong to the south. It is the geographic extent of the Hawkesbury sandstone (McDonald 2008). The Cumberland Plain is located within the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

Soils and Geology

The underlying geology of the study area consists of Hawkesbury Sandstone which is made up of medium to coarse-grained quartz sandstone with minor shale and laminite lenses. Sandstones are either massive or crossbedded sheet facies with vertical or subvertical joint sets. The combination of bedding planes and widely spaced joints gives sandstone outcrops a distinctive blocky appearance, which does not include a good selection of lithic materials for stone tool manufacture.

The study area falls across two soil landscapes, comprising the Blacktown soil landscape and the South Creek soil landscape. The Blacktown soil landscape is a shallow to moderately deep soil found across the Wianamatta Group shales. This soil landscape is a residual landscape in which the soils form *in situ.* There is limited erosion within this landscape which means bedrock exposures are also rare.

The South Creek soil landscape is characterised by floodplains, valley flats and drainage depressions of the channels on the Cumberland Plain. It is a highly erosional landscape with frequent flooding events. Soils are usually deep layered sediments over bedrock.



PO Box 236
NOWRA
NEW SOUTH WALES 2541

0 175 350
metres

Projection:
MGA Zone 56 (GDA 94)
Base Map:
NearMaps 2021
Image Date: 25/10/2021
Final - Version 1

Figure 6: Study area in relation to soil landscapes within the Edmondson Park area.

N

TOPOGRAPHY

The topography of the study area is generally level, with by very gentle slopes towards the watercourse. The study area is highly modified due to past land practices, particularly in the southern portion of the site, and around the watercourse and northern portion significant vegetation regrowth is present.

FLORA AND FAUNA

The original vegetation of the area would have comprised tall open forest and open woodland, with forest red gum, narrow-leaved ironbark, and grey box present (Chapman & Murphy 1989).

These species and the understorey which would have comprised sclerophyllous shrubs would have supported a range of fauna species. Both floral and faunal resources would have been exploited by the Aboriginal people in the area.

The diet of Aboriginal people varied depending on the resources that were available to them and which were related to the landscape in which people lived. The Box Hill area is considered a hinterland area, and as such diets were different to those of the people on the coast. Within the hinterland, small animals such as wallabies, kangaroos, possums, small birds, fresh water fish and water birds would have formed part of the Aboriginal peoples' diet (Attenbrow 2010) as well as berries, tubers, seeds, leaves and nectar. Plant resources were available year-round, and within the western Cumberland Plain a number of important fruits were available in the autumn and winter months, with a greater variety available all year round (Kohen in Attenbrow 2010).

HYDROLOGY

An unnamed second-order drainage line is located within the study area, running northwest to southeast through the central portion of the study area. This drains into Maxwells Creek, a permanent third order watercourse located approximately 600m to the east of the study area. Stream order is determined according to the Strahler system as used by DPI Water (Figure 7). Watercourse classification ranges from first order through to fourth order (and above) with first order being the lowest, ie a minor creek or ephemeral watercourse.

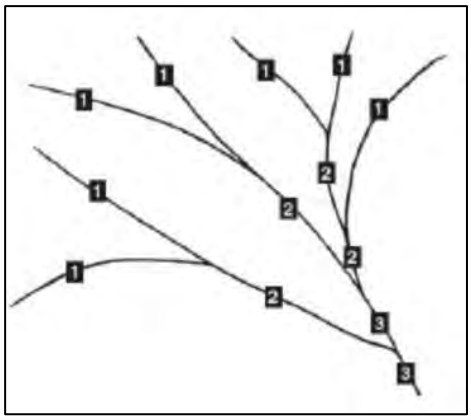


Figure 7: The Strahler system (Source: Department of Planning and Environment 2016).

4.2 Historical Land Use

Indigenous Occupation

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

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

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

Several of the oldest dated sites in the Sydney region have been located within rockshelter deposits or deep alluvial deposits such as those located on the banks of large rivers including the Parramatta River and the Hawkesbury-Nepean. Archaeological work within the Parramatta sand sheet, which is considered to be a Pleistocene sand body (McDonald 2008) revealed the oldest secure date for the Cumberland Plain, dating to approximately 30.7 ka. McDonald considers that initial occupation of the sand body occurred during the Late Pleistocene, and artefact assemblages of the time comprised mostly silicified tuff artefacts, with the upper limits of this assemblage considered to be 6-8 ka. Overlying these assemblages were heat treated silcrete artefacts, and backed artefacts which were dated to before 2-3 ka. The work completed within the Parramatta sands demonstrated a "distinct and clear change in the archaeological record through time", based on a typological analysis of the assemblages (McDonald 2008).

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

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

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

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

Land Use History

ELA prepared a brief land use history as part of their due diligence assessment for the study area, based on analysis of historical aerial imagery. They state:

> *Aerial imagery of the study area dated to 2013 and 2014 shows that significant change has taken place within and adjacent to the study area in the last few years. These aerial images show that large portions of both properties were being used for agricultural purposes until recently, and that a residential dwelling in the study area's north has since been demolished. Additionally,*

construction of Soldiers Parade and the Edmondson Park railway station adjacent the study area has significantly modified the local landscape. (ELA 2020:14).

Plate 1: 2013 aerial. (Source: ELA 2020 Fig 7)

Plate 2: 1987 aerial. (Source: ELA 2020 Fig 8)

The study area contained market gardens within the southern portion of the study area which were noted to considerably disturb the ground surface. A small portion in the south eastern corner appears to be less disturbed than the remainder of the southern portion, although erosional scours are visible in both aerials (Plate 1 &Plate 2).

4.3 ETHNOHISTORY

Ethnohistorical evidence is based on the reports of colonisers and do not tend to include the Aboriginal perspective, leading to a Eurocentric view of Aboriginality. Additionally, historical records can be contradictory and incomplete regarding the exact tribal boundaries and locations of ceremonial or domiciliary activities of Aboriginal people pre-contact. Phil Boot (202:58) notes:

> *The problem associated with ethnohistoric documents include their tendency to record unusual, rather than everyday events, and their focus on religious behaviour to the exclusion of woman and children (Attenbrow 1976:34; Sullivan 1983:12.4).*

The original Aboriginal inhabitants of the Edmondson Park region were clans of the Darug (Daruk/Dharuk/Dharruk/Dharug) language group (Tindale 1974). Mathews (in Attenbrow 2010:32) records the following:

> *The Dharruk speaking people adjoined the Thurrawal on the north, extending along the coast the Hawkesbury River, and inland to what are now Windsor, Penrith, Campbelltown and intervening towns.*
>
> *The Dhar'-rook dialect, very closely resembling the Gundungurra, was spoken at Campbelltown, Liverpool, Camden, Penrith, and possibly as far east as Sydney, where it merged into the Thurrawal. A very old Dharrook blackfellow, named "Jimmy Lownds", only recently deceased, informed us that the Gundungurra and Dharrook natives could converse together with but little difficulty.*

Aboriginal society in general was constructed of a hierarchy of social levels and groups, with fluid boundaries (Peterson 1976). The smallest group comprised a family of a man and his wife/wives, children and some grandparents. The next level consists of bands, which were small groups of several families who worked together for hunting and gathering purposes. The third level comprised regional networks with a number of bands, and these bands generally shared a common language dialect and/or had a belief in a common ancestor. Networks would come together for specific ceremonial purposes. The highest level is the tribe, which is usually described as a linguistic unit with flexible territorial boundaries (Peterson 1976); although Attenbrow (2010) argues that "these groups were not tribes in the current anthropological sense of the word".

Aboriginal people utilised a wide range of subsistence resources in the past, with ethnohistorical sources recording the diet of Aboriginal people including kangaroo, possum, kangaroo rat, lizards, birds, platypus, wallaby and a range of plants and insects as well as fish and shell fish (Pearson 1981). A wide range of native animals, including birds and reptiles, have been identified within the wider environment around Marulan, and are likely to have been utilised as food resources by Aboriginal people in the past.

The traditional lifestyles of Aboriginal groups depended largely on the environment in which they lived. Whilst coastal groups utilised marine and estuarine resources, hinterland groups relied on freshwater and terrestrial animals and plants. Marulan falls within the hinterland region. Within the hinterland, small animals such as wallabies, kangaroos, possums, small birds, fresh water fish and water birds would have formed part of the Aboriginal peoples' diet (Attenbrow 2010) as well as berries, tubers, seeds, leaves and nectar. Plant resources were available year-round, and within the Illawarra region a number of important fruits were available in the autumn and winter months, with a greater variety available all year round (Kohen in Attenbrow 2010).

4.3.1 Raw Materials

A wide range of raw materials were selected by Aboriginal people for flaking to create stone implements. Material types ranged from high quality to poor quality for flaking purposes, depending on the geology of the area and readily available material types. The following is a description of a range of raw material types known to have been utilised by Aboriginal people for the creation of stone artefacts.

Breccia

Breccias are coarse, angular volcanic fragments cemented together by a finer grained tuffaceous matrix.

Chalcedony

Chalcedony is a microcrystalline, siliceous rock which is very smooth and can be glossy. Introduction of impurities can produce different coloured versions of chalcedony, including yellow/brown (referred to as carnelian), brown (sard), jasper (red/burgundy) and multicoloured agate. It flakes with a sharp edge and was a prized material type for the creation of stone artefacts in parts of Australia (Kuskie & Kamminga 2000: 186).

Chert

Chert is a highly siliceous sedimentary rock, formed in marine sediments and also found within nodules of limestone. Accumulation of substances such as iron oxide during the formation process often results in banded materials with strong colours. Chert is found in the Illawarra Coal Measures and also as pebbles and colluvial gravels. It flakes with durable, sharp edges and can range in colour from cream to red to brown and grey.

Petrified Wood

Petrified wood is formed following burial of dead wood by sediment and the original wood being replaced by silica. Petrified wood is a type of chert and is a brown and grey banded rock and fractures irregularly along the original grain.

Quartz

Pure quartz is formed of silicon dioxide, and has a glossy texture and is translucent. Introduction of traces of minerals can lead to colouration of the quartz, such as pink,

grey or yellow. The crystalline nature of quartz allows for minute vacuoles to fill with gas or liquid, giving the material a milky appearance.
Often quartz exhibits internal flaws which can affect the flaking quality of the material, meaning that in general it is a low-quality flaking material (Kuskie & Kamminga 2000: 186). However, quartz is an abundant and widely available material type and therefore is one of the most common raw materials used for artefact manufacture in Australia. Flaking of quartz can produce small, very sharp flakes which can be used for activities such as cutting plant materials, butchering and skinning.

QUARTZITE

Formed from sandstone, quartzite is a metamorphic stone high in silica that has been heated or had silica infiltrate the voids found between the sand grains. Quartzite ranges in colour from grey to yellow and brown.

SILCRETE

Silcrete is a siliceous material formed by the cementing of quartz clasts with a matrix. These clasts may be very fine grained to quite large. It ranges in colour from grey to white, brown, red or yellow. Silcrete flakes with sharp edges and is quite durable, making silcrete suitable for use in heavy duty woodworking activities and also for spear barbs (Kuskie & Kamminga 2000:184).

TUFF/INDURATED MUDSTONE

There is some disagreement relating to the identification of lithic materials as tuff or indurated mudstone. The material is a finely textured, very hard yellow/orange/reddish-brown or grey rock. Kuskie and Kamminga (2000: 6, 180) describe that identification of lithic materials followed the classification developed by Hughes (1984), with indurated mudstone described as a common stone material in the area. However, Kuskie and Kamminga's analysis, which included x-ray diffraction, identified that lithics identified as 'indurated mudstone' was actually rhyolitic tuff, with significant differences in mineral composition and fracture mechanics between the stone types. They define mudstone as rocks formed from more than 50% clay and silt with very fine grain sizes and then hardened.

The lithification of these mudstones results in shale (Kuskie & Kamminga 2000: 181) and thus 'indurated mudstone', in the opinion of Kuskie and Kamminga, do not produce stones with the properties required for lithic manufacture.

In 2011, Hughes, Hiscock and Watchman undertook an assessment of the different types of stones to determine whether tuff or indurated mudstone is the most appropriate terminology for describing this lithic material. The authors undertook thin section studies of a number of rocks and determined that the term 'indurated mudstone' is appropriate, with an acknowledgment that some of this material may have been volcanic in origin. They also acknowledge that precise interpretation of the differences between material types is difficult without detailed petrological

examination, and suggest that artefacts produced on this material are labelled as 'IMT' or 'indurated mudstone/tuff'.

VOLCANIC

Both volcanic and acid volcanic stones are a commonly used raw material type. Without detailed petrological analysis it can be difficult to identify the specific raw material, and for the purposes of archaeological assessment these fine grained materials are referred to as volcanic. Material such as obsidian is however separated and visually quite different to other volcanic material, which is often grey in colour and heavy for its size.

4.3.2 PROCUREMENT

Assemblage characteristics are related to and dependent on the distance of the knapping site from raw materials for artefact manufacture, and different material types were better suited for certain tasks than other material types. Considerations such as social or territorial limitations or restrictions on access to raw material sources, movement of groups across the landscape and knowledge of source locations can influence the procurement behaviour of Aboriginal people. Raw materials may also have been used for trade or special exchange between different tribes.

4.3.3 MANUFACTURE

A range of methodologies were used in the manufacture of stone artefacts and tools, through the reduction of a stone source. Stone may have been sourced from river gravels, rock outcrops, or opportunistic cobble selection. Hiscock (1988:36-40) suggests artefact manufacture comprises six stages, as follows:

1. The initial reduction of a selected stone material may have occurred at the initial source location, or once the stone had been transported to the site.
2. The initial reduction phase produced large flakes which were relatively thick and contained high percentages of cortex. Generally the blows were struck by direct percussion and would often take advantage of prominent natural ridges in the source material.
3. Some of these initial flakes would be selected for further reduction. Generally only larger flakes with a weight greater than 13-15 grams would be selected for further flaking activities.
4. Beginning of 'tranchet reduction', whereby the ventral surface of a larger flake was struck to remove smaller flakes from the dorsal surface, with this retouch applied to the lateral margins to create potential platforms, and to the distal and proximal ends to create ridges and remove any unwanted mass. These steps were alternated during further reduction of the flake.
5. Flakes were selected for further working in the form of backing.
6. Suitable flakes such as microblades were retouched along a thick margin opposite the chord to create a backed blade.

Hiscock (1986) proposed that working of stone materials followed a production line style of working, with initial reduction of cores to produce large flakes, followed by heat treatment of suitable flakes before the commencement of tranchet reduction. These steps did not necessarily have to occur at the same physical location, but instead may have been undertaken as the opportunity presented.

4.4 AHIMS Results

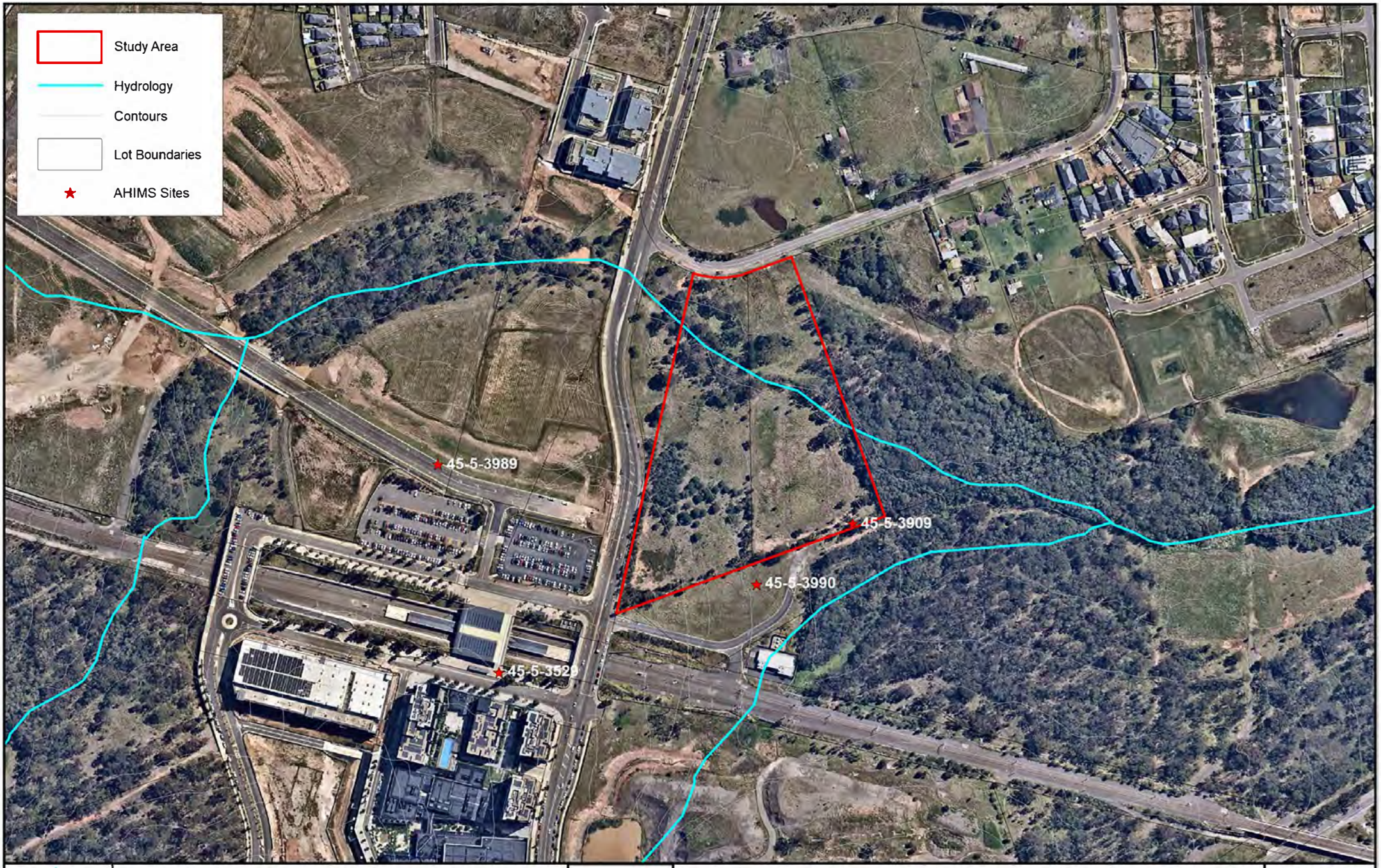
A search of the study area was conducted by ELA on 1 September 2020 as part of the due diligence assessment of the study area. A total of 85 sites were identified within the search area, and one artefact site within the south eastern corner of the study area was identified, along with a previously destroyed artefact scatter on the southern border.

As the search was undertaken more than 12 months previously, an updated extensive search was completed on 24 January 2022 over Lot 26 DP228850 with a buffer of 200m. A total of four sites were located within the search area. The registered sites are shown on Figure 8 below. A copy of the search results is appended in Appendix F.

Site ID	Site Name	Site Features	Site Status
45-5-3529	EPCS4	Artefact : 2	Destroyed
45-5-3909	EPCS 3	Artefact : 1	Valid
45-5-3990	SWRL 14	Artefact : 4	Destroyed
45-5-3989	SW2	Artefact : 1	Valid

All four sites within the vicinity of the study area are registered as artefact concentrations, and two have been destroyed by previous development in the area. Based on the location of the third site (AHIMS #45-5-3989), in the vicinity of a new road just north of the Edmondson Park Commuter Car Park, it is highly likely that this site has also been destroyed but not yet updated on AHIMS.

One site, EPCS 3 (#45-5-3909), is the site identified by ELA as being within the south eastern portion of the study area. The artefacts were originally recorded by AMBS in 2003 and were noted to be located within exposures associated with a dirt bike track. Overall, the site was considered by AMBS to have high potential for associated subsurface archaeological deposits, given the site's proximity to the confluence of two ephemeral creek lines which drain into Maxwells Creek to the east.



PO Box 236
NOWRA
NEW SOUTH WALES 2541

0 175 350

metres

Projection:
MGA Zone 56 (GDA 94)
Base Map:
NearMaps 2021
Image Date: 25/10/2021
Final - Version 1

Figure 8: AHIMS sites within a 200m radius of the study area.

N

4.5 Previous Archaeological Work

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

AMBS 2003

Australian Museum Business Services (AMBS) prepared an Aboriginal Heritage Management Plan (AHMP) for the Edmondson Park Composite Site (EPCS), in order to guide the future planning policies of both Campbelltown and Liverpool City Councils relating to future development of the EPCS through identification of any Aboriginal heritage constraints applicable to the site.

The dominant water sources within the area were identified as the Cabramatta and Maxwells Creek catchments, and a number of Aboriginal sites were previously recorded along these watercourses. Overall, much of the study area for the EPCS was identified as having been subject to some level of ground disturbance through past land use practices, and the current study area at 164=170 Croatia Avenue was considered to have been moderately disturbed by past land use actions.

A total of 18 Aboriginal sites had been previously registered within the EPCS study area, including 13 artefact scatters and five isolated finds, with a total of 276 artefacts. An additional 15 sites were recorded by AMBS as part of the assessment, which included EPCS3 which is located within the current study area. These artefacts were associated with a dirt bike track within the study area, and the site was considered to possess high potential for subsurface intact archaeological deposits to be present, particularly given the proximity of the confluence of two creek lines which drained into Maxwells Creek.

AMBS 2010

AMBS prepared an Aboriginal Heritage Assessment in advance of the proposed South West Rail Link (SWRL) Glenfield to Leppington Rail Line. Five previously recorded Aboriginal sites were identified within the study area, and an additional ten new sites were recorded as past of the assessment. Twelve areas of archaeological sensitivity were defined within the study area as well, and appropriate recommendations were made in order to manage the Aboriginal heritage resource within the study area.

The assessment included consideration of site EPCS, which had been recorded by AMBS in 2003 and was located just outside the SWRL study area, although was not considered likely to be impacted by the proposed development. it was noted that:

> *Current Masterplanning for the Edmondson Park Composite Site indicates that the extent of lands to be retained with minimal or no development as 'environmental protection/conservation' and 'public recreation' will be an appropriate offset for the destruction (following further archaeological investigation) of adjacent Aboriginla heritage sites, providing that appropriate care is taken to avoid any impact to these sensitive areas and sites* (AMBS 2010:iv).

AMBS 2012

AMBS prepared an Aboriginal heritage assessment for the Austral and Leppington North Precincts, as part of the South West Growth Centres and to inform the development of the project footprint. Survey of approximately 28% of the study area was completed, although it was noted that there was an extreme lack of visibility throughout the area due to high levels of vegetation. One previously recorded site was relocated, and six new sites were recorded. Thirty four previously recorded sites were not relocated during the survey. A number of areas of archaeological sensitivity were identified, primarily along creeklines and ridges, particularly where minimal disturbance had occurred. Recommendations for the conservation of areas with archaeological sensitivity were made, as well as for sites within the study area.

The assessment was located immediately east of the current study area, and while it did not cover the study area specifically, it established area of archaeological potential within the Austral and Leppington North precinct, as well as contributing to predictive modelling for the distribution of artefacts within the area. This modelling relied on proximity to watercourses as well as an assessment of ground disturbance present, and recommended mitigation measures depending on the level of disturbance present within the site.

GML 2012

Godden Mackay Logan (GML) undertook an Aboriginal Cultural Heritage Assessment for a residential development within the East Leppington Precinct of the South West Growth Centre. Survey identified sixty Aboriginal sites and test excavation was undertaken, identifying a distinct archaeological pattern across the site and assisting in refining predictive modelling for the region.

A total of 471 artefacts and 47 heat shatter and indeterminate lithic items were recovered during the test excavations, which assisted in making the following statements:

- Artefact sites are generally located within 100m of water sources

- Archaeological excavations in the region have had varied results, with few resulting in the identification of high density deposits and the majority yielding low density artefact deposits
- Artefacts are generally the only physical evidence of Aboriginal occupation of the region to remain in the archaeological record

ELA Australia 2019a

ELA Australia (ELA) prepared an ACHA for a proposed residential subdivision on Denham Court Road, Leppington. Two previously registered sites were located within the study area and varying levels of disturbance were identified within the properties, generally related to the construction of residential dwellings and associated infrastructure, as well as past agricultural practices.

Test excavation of three locations within the study area were undertaken, with a total of nineteen test pits excavated. A total of 35 lithic artefacts were recovered and confirmed low density subsurface assemblages associated with the previously registered sites within the study area.

It was noted that artefact density reduced considerably in association with distance to the second order watercourse (Bonds Creek) located to the north. The least disturbed area within the study area, close to Bonds Creek, yielded the highest number of subsurface artefacts. The results were considered to support the predictive modelling for the region, which posits that third order and above watercourses were more likely to be the location of repeated and sustained occupation sites, and lower density artefact assemblages located over 200m from higher order watercourses were more likely to represent brief or single occupation events.

ELA Australia 2019b

ELA prepared an Aboriginal due diligence assessment in advance of the proposed expansion of a mosque on Camden Valley Way. No previously recorded Aboriginal sites were located within the study area, and the area was considered to be highly disturbed by previous land use practices, and no further assessment was recommended.

4.5.1 Previous Assessment of the Study Area

A due diligence assessment of the area was undertaken by ELA in 2020, during which one new Aboriginal object comprising a mudstone flake was identified in association with an existing AHIMS site (#45-5-3909), and the site card was updated to include the new find. No new sites were identified and the study area was assessed as having disturbance across much of the ground surface, including waste dumped in the northern portion, along with machine excavation and introduced materials present within the soil profile. A tree with a scar visible was assessed as being a non-cultural modification and was not registered as an Aboriginal site.

Despite the disturbance present across much of the study area, ELA identified some subsurface archaeological potential within the site, along with the fact that the proposed development was likely to impact on AHIMS site #45-5-3909. Much of the southern portion of the study area was considered to have moderate archaeological potential (Figure 9). Further investigation of the PAD within the site was recommended.

ELA were initially engaged by Super Star Holding Group to prepare the required ACHA for the site, and had prepared a methodology and project information for the RAPs. As part of this methodology, an additional site inspection was undertaken in October 2021 and the area of PAD reassessed, with potential considered to be located around the watercourse only (Figure 10). An additional artefact associated with AHIMS site #45-5-3909 was identified during this additional survey.

Figure 9: Archaeological potential within the study area as identified by ELA 2020

Figure 10: Archaeological potential within the study area as identified by ELA 2021

Test excavation was proposed to "understand the presence, nature, extent and significance of the Aboriginal archaeological resource and how best to manage it" (ELA 2021:13).

4.6 Predictive Model

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

The landscape characteristics of the area influence the prediction of the nature of potential sites within the landscape itself. Disturbance is the predominant factor determining whether or not artefacts are likely to be identified within a landscape.

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

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

- Proximity to permanent water sources – generally permanent or areas of repeat habitation are located within approximately 200m of permanent water;
- Proximity to ephemeral water sources – generally sites near ephemeral water sources were utilised for one-off occupation;
- Ease of travel – ridgelines were often utilised for travel during subsistence activities; and
- The local relief – flatter, more level areas were more likely to be utilised for long term or repeat habitation sites than areas of greater relief, especially if the slopes are at a distance from water.

Stone Artefacts

Stone artefacts can be identified on the ground surface or within subsurface deposits. Generally, artefact concentrations are representative of debris from knapping activities, which includes flakes, flake fragments, cores, and pieces likely to have been knapped but with no or inconclusive diagnostic features, referred to as flaked pieces. Modified artefacts can also be identified, including backed artefacts, scrapers, or edge ground axes, although these are generally a smaller proportion of the artefact assemblage. During excavation, very small debris (~3-5mm) can be identified within sieved material, and is referred to as debitage. This is indicative of in situ knapping activities.

As the detection of stone artefacts relies on surface visibility, factors such as vegetation cover can prevent their identification. Conversely, areas of exposure can assist in their identification. Within the study area, artefacts have been identified on

the ground surface within areas of exposure, although vegetation cover and disturbance associated with past land use has reduced the archaeological visibility within much of the study area. It is possible additional artefacts, either in isolation or in concentrations, may be identified within the study area.

Quarry and Procurement

Exposures of stone which can be exploited for the production of lithics are referred to as quarries or procurement sites. Quarries generally have evidence of extraction visible, while procurement sites can be inferred through the presence of artefactual material made from raw material sources present within the area.

The geology of the study area does not suggest that quarry and procurement sites are likely to occur within the study area.

Middens

Middens are concentrations of shell, and may also contain stone artefacts, bone and sometimes human burials. These sites are generally recorded along coastal areas, or along higher order fresh watercourses. Middens are formed through the exploitation of locally available species by humans for resources, and accumulation of the shell material within a specific location. Middens can range in size from small, discrete deposits, to deposits covering a large area.

Generally, middens reflect the species available in the local area. In estuarine regions, estuarine species will dominate the composition of the midden, while around headlands, rock platform species tend to dominate. Given the distance of the study area from the coast or high order watercourses, middens are considered unlikely although not impossible to occur within the area.

Burials

Aboriginal people across Australia utilised a range of burial forms, which depended on the customs of the individual tribes. Common burial practices included inhumation, cremation, desiccation and exposure. Burials are known to occur within sandy contexts in the wider region. These are generally found within coastal Holocene sand bodies, and generally are not identified during field survey as there is usually minimal surface expression of this type of site.

To date, there are no records of Aboriginal burials being identified within the specific study area, but this does not preclude burials from occurring. However, the soil within the study area appears to be unlikely to have been utilised for burials, and based on the available information, burials are not expected to occur within the study area.

Rock Shelters

Rock shelters are formed by rock overhangs which would have provided shelter to Aboriginal people in the past. Often, evidence of this occupation can be found in the form of art and/or artefacts. Shell, midden material, grinding grooves, pictographs (rock engravings), artworks including stencils and paintings, and potential archaeological deposits (PAD) are common features of rock shelter sites.

There are no known rock overhangs within the study area likely to contain rock shelters, and thus this site type is considered unlikely to occur.

Grinding Grooves

Grinding grooves are formed on sandstone exposures through the creation and maintenance of ground edge tools, such as axes and spears. Usually, stone was ground to form a sharp edge, although bone and shell were also ground to create sharp points.

Generally, fine grained sandstone was favoured for these maintenance activities, and the presence of a water source nearby or overflowing the sandstone was also favoured. Grinding grooves range from individual examples through to hundreds of grooves within an area, sometimes arranged in a specific pattern. Horizontal sandstone was generally preferred, although there are examples of vertical grooves.

There are no known sandstone outcrops within the study area and thus this site type is considered unlikely to be present.

Scarred and Carved Trees

Scarred and carved trees are created during the removal of back from a tree for a range of reasons, both domestic and ceremonial. This type of site can be identified within areas containing trees of the correct species and appropriate age. Deliberately scarred trees can be difficult to differentiate from naturally occurring damage to trees, and specific criteria must be considered when assessing a scar for a cultural origin.

Given the level of historical clearance and bushfires that have impacted the area in the past, the likelihood of culturally scarred trees remaining within the study area is considered extremely low. It is understood a potential scarred tree within the site was previously identified but was considered to be non-cultural in origin.

Ceremonial Sites

Specific places were used for ritual and ceremonial purposes, including initiation and burial practices. Secret rituals were also undertaken at specific places by specific individuals, such as at water holes and by clever men.

The landscape itself was also considered to hold significance to Aboriginal people, and the understanding of this is referred to as a sacred geography. This includes natural features which were associated with spirits or creation beings. The meaning attributed to the landscape provided Aboriginal people with legitimacy regarding their role as guardians of the places which had been created by the spiritual ancestors (Boot 2002).

Many areas within NSW are considered to be sacred to the original inhabitants. There are no known recorded areas within the study area, although this does not preclude these values from existing within this location.

Contact Sites

Contact sites contain evidence of Aboriginal occupation concurrent with initial colonisers in an area. This could include evidence such as flaked artefacts formed on glass, or burials containing non-Aboriginal grave goods. Often Aboriginal camps would form around newly built towns, allowing for employment (or exploitation) of the Aboriginal people by the colonists, and also for trade to exist between the two communities. Contact sites can also occur around Aboriginal mission sites, where Aboriginal children were taken from their families to raise in the European manner. Families often camped around the mission boundaries to try to catch a glimpse of their children.

There is no known evidence of initial contact between Aboriginal people and colonists within the study area, although it may have been possible. The probability of evidence of contact sites occurring within the study area is considered low.

Summary

In terms of the study area, sites are considered more likely to comprise stone artefact concentrations or isolated finds, both surface or subsurface.

5.0 Field Work

5.1 Sampling Strategy

ELA (2021) prepared a detailed methodology for field survey, which was provided to the RAPs for their review and comment as discussed in Section 3.3 above. This methodology takes into account total survey coverage for the proposed impact areas and included a methodology for undertaking the additional test excavations. The methodology is attached as Appendix E of this report.

5.2 Site Inspection

A survey was undertaken on Monday 10 January 2022 by Apex Archaeology in conjunction with the RAPs for the study area.

Participants in the survey included:

- Leigh Bate, Apex Archaeology
- Bonnie Clark, Apex Archaeology
- Jamie Eastwood, Aragung
- Raymond Adams, Aragung

5.3 Survey Coverage

The study area was inspected for Aboriginal archaeological evidence. The study area was surveyed in one pedestrian transect (Table 4 &

Figure 11) across three landform elements (Table 5) by the four survey participants. Each participant was responsible for inspecting a 2m wide portion of the transect walked. This meant that on each pass an area covering 8m would be observed for archaeological material.

Table 4: Survey transects

Transect	Landform Element	Number of participants	Total Length
1	Flat/gentle simple slope	4	959m

Table 5: Survey Transect Waypoints

Waypoint	Easting	Northing	Zone	Datum
1	302371	6239234	56	GDA
2	302371	6239244	56	GDA
3	302504	6239289	56	GDA
4	302495	6239318	56	GDA
5	302489	6239330	56	GDA
6	302486	6239326	56	GDA
7	302501	6239290	56	GDA
8	302409	6239259	56	GDA
9	302403	6239327	56	GDA
10	302342	6239334	56	GDA
11	302356	6239400	56	GDA
12	302402	6239397	56	GDA
13	302434	6239384	56	GDA
14	302432	6239394	56	GDA
15	302358	6239403	56	GDA
16	302356	6239400	56	GDA
17	302359	6239428	56	GDA
18	302359	6239448	56	GDA
19	302373	6239459	56	GDA
20	302388	6239460	56	GDA
21	302439	6239427	56	GDA
22	302447	6239416	56	GDA
23	302456	6239414	56	GDA
24	302449	6239450	56	GDA
25	302438	6239480	56	GDA
26	302419	6239505	56	GDA

An assessment of landform element and slope was made for the study area, with the results presented in Table 6. The survey units are shown in

Figure 11.

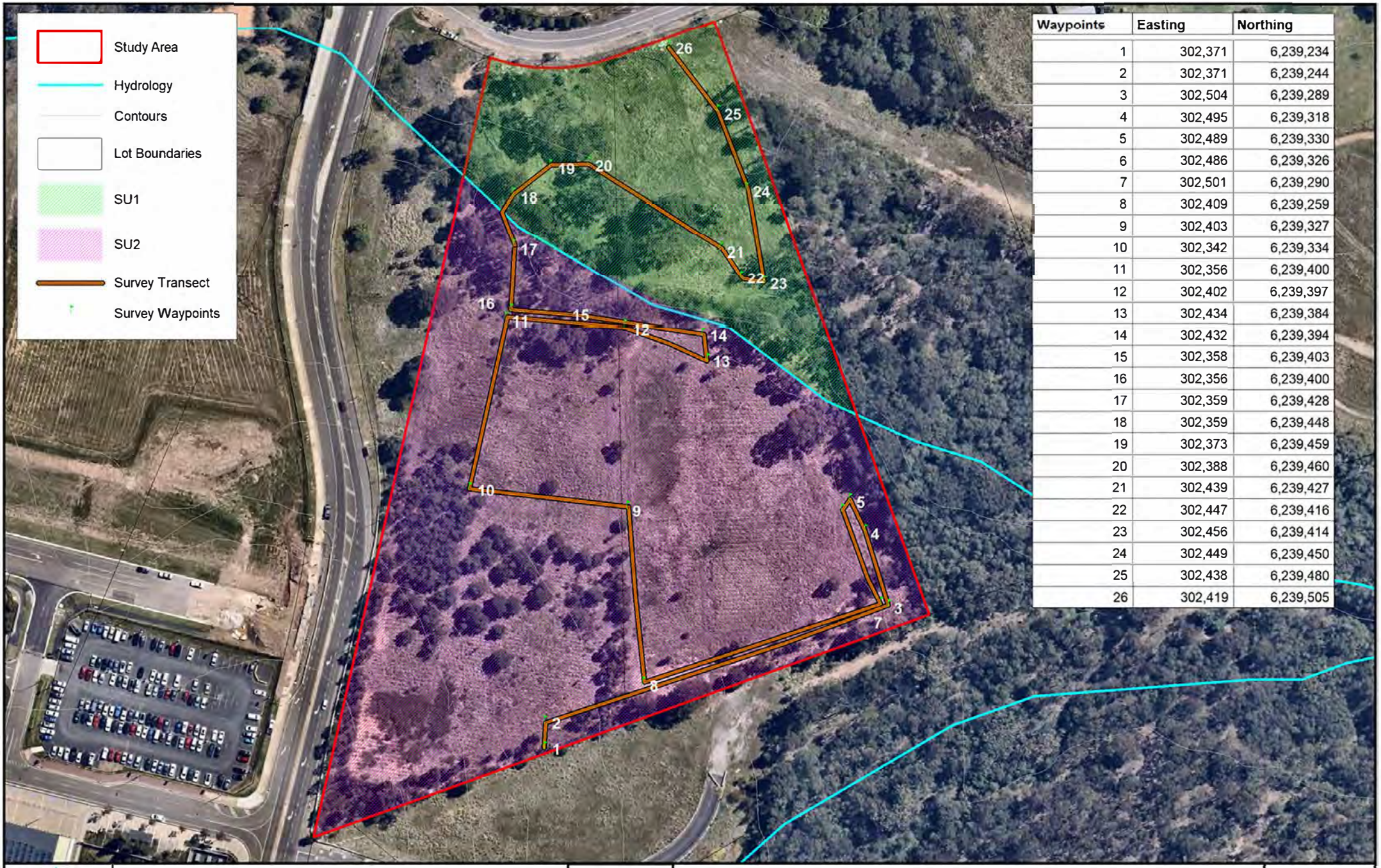
Table 6: Survey area results

Survey Area #	Landform Element	Slope	Vegetation	Detection Limiting Factors	Ground Disturbance
SU1	Flat/Simple Slope	Level-very Gentle (<1.45°	Cleared (weed/grass regrowth)	vegetation/leaf litter/grass/weeds	Moderate to high
SU2	Flat/Simple Slope	Level-very Gentle (<1.45°	Cleared (weed/grass regrowth)	vegetation/leaf litter/grass/weeds	Moderate to high

The total survey coverage (meaning the areas physically inspected for archaeological evidence) was approximately 7,672m^2. The total area of the development impact is approximately 42,530 m^2. A range of factors were considered and recorded during the survey, including the surface visibility (percentage of bare ground within a survey unit); archaeological visibility (amount of bare ground within an area in which artefacts could be expected to be identified if present); exposure type (A or B soil horizon) and calculations of how effective the survey coverage was. The results of the survey coverage are presented in Table 7.

Table 7: Survey coverage results

Survey Area #	Total Area Surveyed (m²)	Surface Visibility (%)	Arch Vis (%)	Exposure Type (A/B)	Effective Coverage (m²)	% Effective Survey Coverage of Context
SU1 & 2	7,672	<5%	<5	A	19.18	0.25



Waypoints	Easting	Northing
1	302,371	6,239,234
2	302,371	6,239,244
3	302,504	6,239,289
4	302,495	6,239,318
5	302,489	6,239,330
6	302,486	6,239,326
7	302,501	6,239,290
8	302,409	6,239,259
9	302,403	6,239,327
10	302,342	6,239,334
11	302,356	6,239,400
12	302,402	6,239,397
13	302,434	6,239,384
14	302,432	6,239,394
15	302,358	6,239,403
16	302,356	6,239,400
17	302,359	6,239,428
18	302,359	6,239,448
19	302,373	6,239,459
20	302,388	6,239,460
21	302,439	6,239,427
22	302,447	6,239,416
23	302,456	6,239,414
24	302,449	6,239,450
25	302,438	6,239,480
26	302,419	6,239,505

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Figure 11: Survey units and survey transect within the study area.

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Surface visibility across the study areas was limited due to surface vegetation such as exotic pasture grasses and weeds and leaf litter. Total effective survey coverage for the entire study area was 0.04% (Table 8).

Table 8: Total effective survey coverage results

Survey Area #	Total Area of Study Area (m²)	Total Area Surveyed (m²)	Surface Visibility (%)	Arch Vis (%)	Exposure Type (A/B)	Effective Coverage (m²)	% Effective Survey Coverage of Context (Total Area)
SU1 & 2	42,530	7672	<5	<5	A	19.18	0.04

5.4 Survey Results

The study area was identified by ELA (2020) as having moderate sub surface potential. Originally the due diligence assessment prepared by ELA focused on the southern portion of the study area as containing subsurface potential but after the second survey in 2021 with RAPs as a part of the ACHA process, the area of potential was revised to around the creek line within the northern portion of the study area.

The area has clearly been disturbed by farming machinery and clearing activities. Top soil has been stripped and extensive market gardening has occurred through the majority of the site.

Ground surface visibility (GSV) was extremely low throughout the study area. GSV was rated at <5% overall. No raw material sources were identified throughout the study area. The reduced visibility can be attributed to the site being vacant for more than a year and the extreme rainfall and vegetative regrowth within almost all portions of the study area.

One previously recorded artefact scatter was relocated within the southern portion of the site. The area of site #45-5-3909 was noted to be disturbed by past land use practices and subsequent erosion, and some soils were noted to be skeletal due to erosion. The area was considered unlikely to have sufficient deposit present to support subsurface deposits, and the artefacts visible were considered to represent a surface scatter only. No additional surface sites were identified during the initial site walk over.

Plate 3: General view looking west along the southern portion of the study area showing the erosion scour where AHIMS site 45-5-3909 is located.

Plate 4: General view looking west across the southern portion of the study area

Plate 5: General view looking north west towards the unnamed creekline.

Plate 6: General view west over the study area showing the skeletal soils present.

Plate 7: Looking north west through the central portion of the study area.

Plate 8: General view along the eastern boundary of the study area.

Plate 9: General view south from the central portion of the study area.

Plate 10: General view south east over the southern portion of the study area.

Plate 11: General view west along the unnamed creek line.

Plate 12: General view north over the unnamed creek line.

Plate 13: General view south from the northern study area boundary (recent site disturbance and dumping).

5.5 Test Excavation Results

Test excavations were undertaken over four days in January 2022. A total of 20 50 x 50cm test excavation units were excavated across the site which was logistically difficult given the extreme vegetative regrowth within the study area. A total of four items were confirmed to be artefactual, and three items of heat shatter were noted which were likely to comprise manuports. Further details of the lithic analysis can be found in Section 6.0. The test pit layout is shown in Figure 12.

Notification of the commencement of test excavations was provided by ELA to HNSW on 11 October 2021 for commencement on 25 October 2021, providing the required 14 days' notice prior to the commencement of works. This was in accordance with Requirement 15c of the Code of Practice. A subsequent email advising of the change in consultant and amended dates for test excavation was provided by Apex Archaeology to Heritage NSW on 17 November 2021, as well as to the RAPs.

Participants in the test excavation program included Leigh Bate and Bonnie Clark, both of Apex Archaeology, and Jamie Eastwood and Raymond Adams of Aragung.

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Figure 12: Test pit layout within study area

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Test excavations were placed in broad conformation to the transects proposed by ELA (2021), although significant ground disturbance reduced the area suitable for test excavation.

Soils generally conformed to the Blacktown soil landscape, although fill was noted within the upper spits many of the test pits. The A1 horizon generally comprised of loose brown silty loam with a high humic level. The A2 horizon is made up of a compact light brown silty loam. Some scattered charcoal flecks were noted from around 20cm depth in some pits. Ironstone and manganese inclusions were also noted close to the basal clay layer of pits. Basal clay depth ranged between 30 and 45cm.

Plate 14: Example of stratigraphy across site.

Artefacts were recovered from two of the test pits, namely TP1 and TP3, while TP3 and TP20 both contained heat shattered silcrete. The artefacts are discussed in greater detail in Section 6.0.

Known sites within the study area are shown on Figure 13.

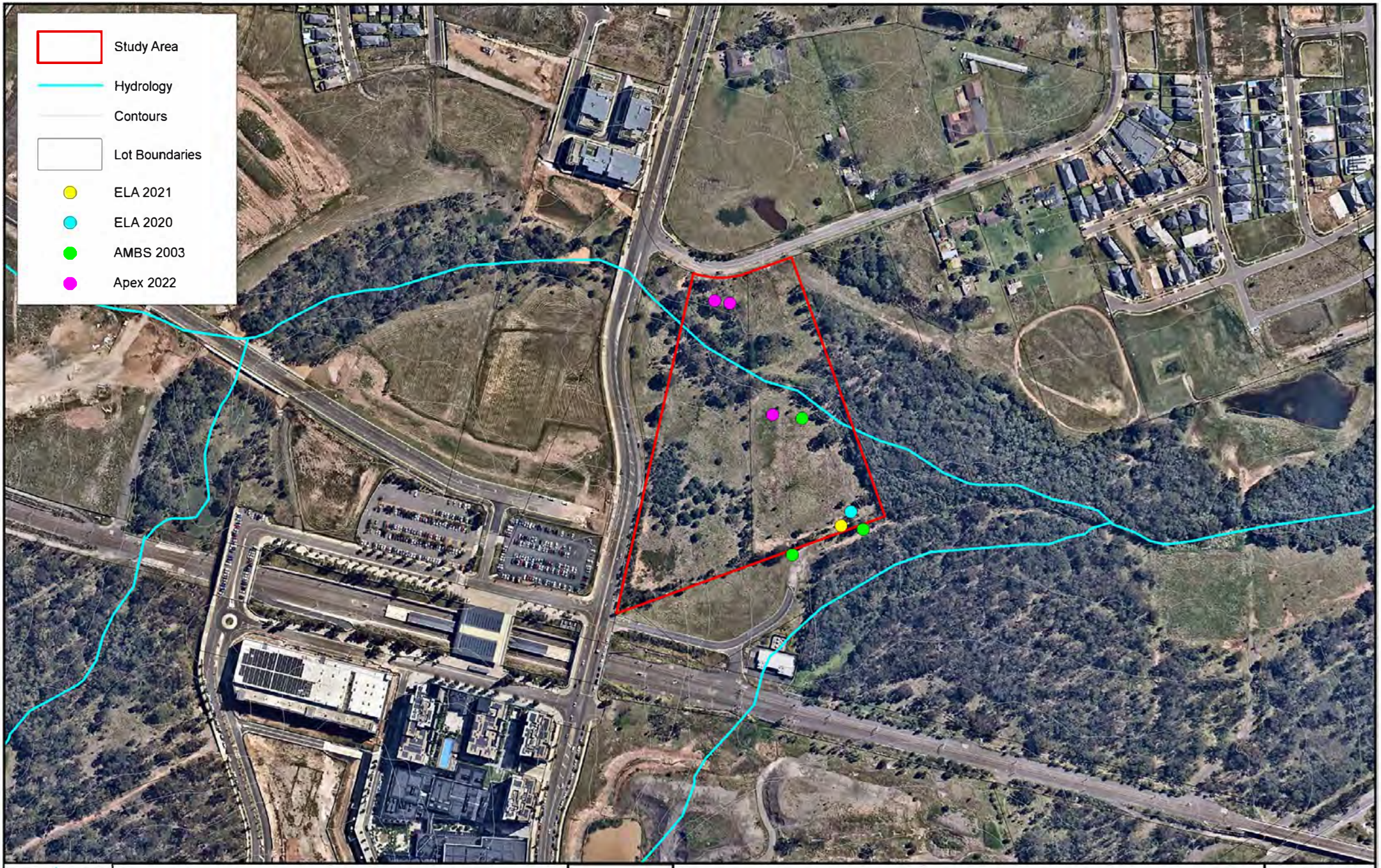

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Figure 13: Extent of identified archaeological sites within the study area.

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6.0 Lithic Analysis

This section outlines the results of the lithic analysis of Aboriginal objects recovered during test excavation within the study area at 164-170 Croatia Avenue, Edmondson Park. A total of seven lithic items were recovered.

6.1 Study brief and constraints

The test excavation was conducted under the *Code of Practice for Archaeological Investigation of Aboriginal Objects in New South Wales* (DECCW 2010). This Code sets out various requirements relating to stone artefacts of which requirements 18, 19 and part of 26 are most relevant to the current study:

- Requirement 18 includes identifying the types of activities which were conducted and evidence for technological change over time (see below sections 6.2 and 6.2.1),
- Requirement 19 states that artefact attributes to be recorded are those on the DECCW AHIMS artefact recording form. The methods used to record artefacts and meet this requirement are described in Appendix G.
- Requirement 26 states that a full catalogue of artefacts should be prepared, including photographic and drawn records for diagnostic stone artefacts if the artefacts are to be reburied. The catalogue is included in Appendix H. Photographs and drawings are included in the body of this report as relevant.

6.2 Defining activities – Requirement 18

Stone artefacts resulted from sequences of actions relating to the procurement, reduction and use of stone, from when a person first picked up a rock to its moment of discard, and perhaps subject to further actions after discard (e.g. trampling, burial). The nature of activities could have varied, potentially resulting in the discard of artefacts with different attributes (Vaquero et al. 2012; Way 2018; White 2012). Literature review has previously identified the following kinds of activities which involved and/or produced stone artefacts: procurement of stone at its source (e.g. a quarry), transport, heat treatment to improve flaking qualities of the stone, reduction of cores to produce flakes, production of shaped tools, hafting, tool use, maintenance (retouching) of tool edges, stockpiling, storage (or caching), recycling (reuse of previously discarded stone) and discard (White 2012). The nature of activities could be identified by technical attributes of artefacts and manuports, and by their context (where they occur and artefacts or items they are associated with). Small size (especially artefacts less than 10mm in maximum size) generally indicates on-site flaking while larger artefacts could have been produced by on-site flaking or carried (transported) around the landscape or to different sites (White 2012).

Lithic activities may be identified in various ways. Rock type is useful because artefacts of different rock types must have originated from different pieces of stone. Some rock types are heterogeneous, such that different pieces of the same rock type

have different grain size, inclusions, banding patterns (bedding planes) or flaws. Sometimes such rock types can be subdivided into separate analytical nodules which may indicate separate lithic activities (Andrefsky 2009; Larson and Ingbar 1992; White 2012).

Conjoining (refitting artefacts to other artefacts) is useful because it can demonstrate that some artefacts came from the same piece of stone (e.g. flakes conjoined to a core or tool) or that some artefacts could not join due to different size, shape or other attributes. Technical traits or observations may also indicate the nature of activities such as flaking stone in different stages of reduction, different core flaking patterns, or production of distinctive tool forms such as backed artefacts. Artefacts from individual activities can be varied in nature (e.g. technical attributes) and in number or density (Way 2018; White 2012).

Dispersed test pits can intercept artefacts from different activities conducted across a landscape. In this sense a test excavation can provide an indication of the range and nature of activities in a landscape. However, there is an element of chance in testing, as to whether any one test pit might encounter a high or low density activity, and whether a test pit is placed in the centre or the edge of an activity area. It is also possible that artefacts might be present but the location missed by small test pits.

6.2.1 Defining technological change – Requirement 18

Requirement 18 also stated that artefact recording should "...identify... significant changes in the technologies used to produce stone artefacts throughout time..." (DECCW 2010:28). Change through time occurred on the Cumberland Plain, with a three phase sequence which could potentially be divided into smaller units.

Phase 1 commenced with initial occupation at or before 35,000 cal.BP at Parramatta, Pitt Town and Cranebrook (GML Heritage in prep., JMcD CHM 2005a; Nanson et al. 1987; Stockton and Nanson 2004; Williams et al. 2014). Lithic assemblages were dominated by IMST and unifacial flaking was the predominant technique (McDonald 2008; White 2017).

Phase 2 commenced by c. 7,000 cal. BP with assemblages dominated by silcrete, especially glossy heat treated silcrete. Backed artefacts were made more frequently after c. 5,000 cal.BP (Kohen 1986; McDonald 2008; White 2018). Phase 2 assemblages occurred in most parts of the Cumberland Plain indicating widespread occupation of the region and use of all parts of the landscape during the Late Holocene. This contrasted with limited evidence of Phase 1 occupation, restricted to sandy deposits along the Hawkesbury-Nepean corridor (Williams et al. 2012, 2014, 2017), the north-east margin of the Cumberland Plain (Haglund 1993; JMcD CHM 2005b) and Parramatta (Comber 2018; GML Heritage 2019, in prep.; JMcD CHM 2005a; Williams et al. 2021). However, White (2017, 2021) argued that Phase 1 assemblages occurred more often on the Cumberland Plain than had previously

been identified, and that the currently known sites may have reflected long-term geomorphic processes which led to the survival of Phase 1 objects rather than directly reflecting Phase 1 land use strategies. White (2021) suggested that most Phase 1 objects may have been eroded from hilly landscapes during the last 7,000 years or so.

6.3 Analysis of lithics from the test excavation

Seven lithic objects were recovered from the test excavation. All were of silcrete and included a silcrete core. Four were identified as artefacts, while the remaining three were heat shatters, with at least one containing a remnant flaked surface, suggesting the heat shatters may have originally comprised artefacts which fragmented after discard. Given the level of disturbance across the site, it is difficult to suggest when this breakage may have occurred.

6.3.1 Test Pit 1 – 369E 477N

Two small flaked silcrete items were recovered from this test pit. Their small size suggests the items may have been produced on site rather than carried to the location, or the items could have been displaced by taphonomic processes on site.

6.3.2 Test Pit 3 – 389E 486N

Three small silcrete items were recovered from this test pit, including a broken backed flake, a small core, and a piece of heat shattered silcrete with a remnant flaked surface which may indicate the presence of an artefact that fragmented post discard.

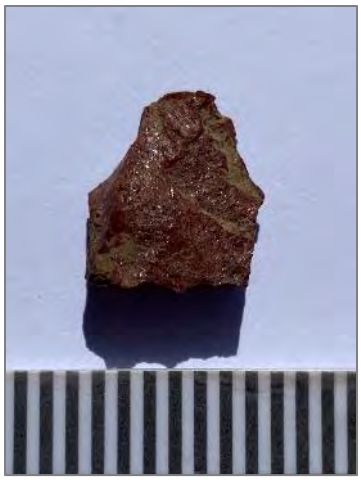


Plate 15: Silcrete broken backed flake
Scale in 1mm increments.

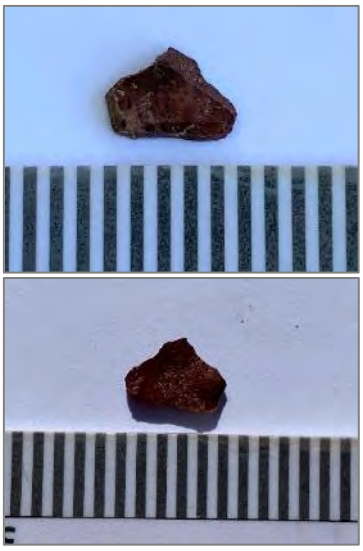


Plate 16: Silcrete flake.
Ventral and dorsal. Scale in 1mm increments.

6.3.3 Test Pit 20 – 388E 390N

Two small items of heat shatter were recovered from this test pit. One comprised a dark orange coarse grained silcrete and the other a red glossy fine grained silcrete, suggesting the two pieces originated from separate stone sources.

6.4 Discussion

The site exhibited varying levels of disturbance across the ground surface. The area that was subject to test excavation was considered to have been disturbed to a lesser extent than the remaining area, which was not subject to test excavation due to the disturbance present within the site.

The presence of silcrete cultural lithics within the site indicates Aboriginal occupation within the study area in the past. The presence of only a few lithic items fits with the predictive models for the area, stating that lower order watercourses were less likely to be the focus of long term habitation and instead were likely to have supported itinerant or opportunistic visitation by Aboriginal people in the past. Additionally, it supports GML's 2012 statement that most archaeological excavations in Leppington and surrounds yielded low density artefact deposits.

7.0 Aboriginal Cultural Heritage Significance Assessment

7.1 Introduction

The *Aboriginal cultural heritage consultation requirements for proponents 2010* acknowledge that:

- Aboriginal people have the right to maintain their culture, language, knowledge and identity
- Aboriginal people have the right to directly participate in matters that may affect their heritage
- Aboriginal people are the primary determinants of the cultural significance of their heritage

Undertaking consultation with Aboriginal people ensures that potential harm to Aboriginal objects and places from proposed developments is identified and mitigation measures developed early in the planning process.

7.2 Criteria

The Burra Charter is considered an appropriate framework for the assessment of cultural heritage, which can be made based on the following assessment criteria:

- **Social value:** Also referred to as cultural value, this criterion considers the spiritual, traditional, historical or contemporary associations an area or place has for Aboriginal people
- **Historic value:** the relationship between a place and people, events, phases or activities of importance to the Aboriginal community
- **Scientific value:** assessment under this criterion considered the ability of a landscape, place, area or object to inform scientific research and/or analysis and to assist in answering research questions
- **Aesthetic value:** the ability of a place, area, landscape or object to demonstrate aesthetic characteristics, or possess creative or technical values
- **Representativeness:** this criterion examines if the item is a representative example of that site type, and if it possesses the main characteristics of that site type
- **Rarity:** assesses whether the site is uncommon or endangered within a region and to what extent that site type is found elsewhere

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

- **Research potential:** Can the site contribute to an understanding of the area/region and/or the state's natural and cultural history? Is the site able to provide information that no other site or resource is able to do?

- **Representativeness:** is the site representative of this type of site? Is there variability both inside and outside the study area? Are similar site types conserved?
- **Rarity:** is the subject area a rare site type? Does it contain rare archaeological material or demonstrate cultural activities that no other site can demonstrate? Is this type of site in danger of being lost?
- **Integrity/Intactness:** Has the site been subject to significant disturbance? Is the site likely to contain deposits which may possess intact stratigraphy?

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

Table 9: Grading of significance, from Heritage Branch 2009

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

Whilst this was developed for the assessment of significance of historical items, the criteria are applicable to Aboriginal significance assessments as well. It is important to note that the below assessment is specific to Aboriginal cultural heritage and does not consider the non-Aboriginal significance of the site.

7.3 Significance Assessment

Social value

The Aboriginal community are best placed to make a determination of the social or cultural value of the study area. This assessment will be updated on receipt of comments from the RAPs regarding the social value of the study area.

To date, no comments specifically regarding the social value of the study area or the artefacts recovered during the test excavations have been received from the RAPs. In general, the Edmondson Park region is considered to be of importance to the local and wider Aboriginal community, and the potential of the area to contain archaeological evidence of previous Aboriginal occupation of the area provides a tangible link to their past.

The specific assessment of social significance will be updated on receipt of comments from the RAPs, but it is likely to have high social significance to Aboriginal people.

HISTORIC VALUE

The background research and consultation with the RAPs for this project has not identified any historical associations with Aboriginal use or occupation of the study area relating to specific historical events or people. At this stage, the study area does not meet this criterion.

SCIENTIFIC VALUE

The archaeological assessment and test excavation completed within 164-170 Croatia Avenue, Edmondson Park, identified a very low density artefact scatter within the study area. The investigations confirmed the presence of Aboriginal archaeological material both on the ground surface and within subsurface deposits. The scientific/archaeological assessment of the study area considered the following:

- The results show a low-density artefact scatter which is likely to demonstrate intermittent use of the area.
- The results of the test excavation support the general predictive models for the area based on information from similar archaeological excavations undertaken in similar landforms.
- This type of site is common within the local context and is considered to have limited research potential due to the limited range and type of artefacts identified.
- The artefacts themselves are of low research or educational value.

Therefore, the study area is assessed as being of low archaeological and scientific significance.

AESTHETIC VALUE

Generally, aesthetic value is determined by the response evoked by a setting. The study area is not considered to hold aesthetic significance with regards to Aboriginal heritage, based on its disturbed context and limited view lines. This criterion may be revisited if comments regarding the aesthetic value of the study area are provided by the RAPs.

REPRESENTATIVENESS

The archaeological material identified within the study area is representative of low density artefact scatters across the Cumberland Plain. The study area has been quite disturbed by previous land use activities and as such is not considered representative of the Cumberland Plain as it was prior to European settlement.

Overall the study area is not considered a good representative example of this site type due to its disturbance and limited range of artefacts present.

Rarity

Low density artefact scatters are a common site type within the Cumberland Plain. The study area and archaeological sites therein do not meet this criterion.

Research Potential

The study area is not considered to possess research potential, due to the limited likelihood of recovering a viable sample for statistical analysis, based on the results of the test excavations. Therefore, the research potential of the site is considered limited.

Integrity/Intactness

The site has been subject to quite intense disturbance in parts, and although some areas are relatively intact, overall the site is considered to have low integrity and intactness.

7.4 Cultural Significance Assessment

Generally, all Aboriginal sites are of high significance and importance to the Aboriginal community, both locally and more broadly. The Aboriginal social or cultural value of the study area can only be determined by the Aboriginal community and to date, no comments have been received regarding the specific social significance of the study area. No additional comments were received from the RAPs regarding the cultural significance of the area.

It is acknowledged that the overall significance of a site is determined by both the cultural and scientific values of the area; with cultural values potentially extending beyond a specific study area and incorporating cultural landscapes in many cases. The cultural significance of an area can only be determined by the Traditional Owners of that area.

7.5 Statement of Archaeological Significance

The study area for 164-170 Croatia Avenue, Edmondson Park, is considered to have low to moderate archaeological significance based on its research potential, representativeness, rarity and integrity. The range and number of artefacts recovered are considered consistent with similar sites in the region and the potential for the site to contribute a greater understanding of the archaeological record is limited.

The cultural significance of the site will be updated on receipt of comments from the RAPs for the project.

8.0 Impact Assessment

8.1 Proposed Development

It is proposed to subdivide the study area to create a number of residential lots with associated access roads and facilities within the southern portion of the study area. The northern portion and along the eastern boundary are proposed to be retained as open space. The proposed works would include cutting and filling to level the site. Infrastructure such as electricity and water supply would also be constructed. The sites would then be developed by individual owners.

8.2 Potential Impact

One previously registered Aboriginal site and one newly registered site are located within the study area. The proposed works within the study area would impact on both of these sites, comprising EPCS 3 and CA-AS-01.

The proposed development has the potential to impact on these artefact concentrations during any earthworks on the site. However, both sites are located within lands zoned RE1, which are to be retained as public recreation or environmental conservation and as such, will be subject to lesser overall impact than the rest of the site which is intended to be subdivision.

Although works within these areas will be less intensive than works associated with the subdivision, there will still be ground disturbing works required to make the area safe for public recreation, particularly in areas with significant vegetation cover and rubbish dumping. These works would impact on the locations of the Aboriginal sites and thus mitigation measures are necessary.

8.3 Ecologically Sustainable Development (ESD)

It is a requirement of Section 2A(2) of the NPW Act to apply the principles of Ecologically Sustainable Development (ESD) when considering any impact to Aboriginal objects and places. ESD integrates economic and environmental considerations, which includes cultural heritage, into decision-making processes. In general, ESD can be achieved through consideration and implementation of two key principles, being intergenerational equity and the precautionary principle.

Intergenerational equity refers to the present generation having consideration for the health, diversity and productivity of the environment for those generations to come. In terms of Aboriginal cultural heritage, this relates to cumulative impacts to Aboriginal objects and places within a region. Intergenerational equity therefore relies on the understanding that a reduction in the number of Aboriginal objects and places within a region results in fewer opportunities for Aboriginal people to access their cultural heritage in the future. Thus, it is essential to understand what comprises the Aboriginal heritage resource, both known and potential, when assessing intergenerational equity within a region.

Figure 14: Proposed development within study area

The precautionary principle relates to threats of serious or irreversible environmental damage, and that lack of scientific certainty regarding the degree of potential damage should not be a reason to postpone adequate reasonable measures to prevent harm to the environment. Regarding Aboriginal cultural heritage, the precautionary principle relates to where a proposed development may seriously or irreversibly impact Aboriginal objects or places, or their significance; and where there may be uncertainty relating to the integrity, rarity or representativeness of Aboriginal cultural values. The Code of Practice outlines that a precautionary approach should be taken to avoid or reduce damage to Aboriginal objects or places, with cost-effective measures implemented wherever possible. Additionally, a cumulative impact assessment should be completed to determine how the proposed development would impact the cultural resource in the wider region.

8.3.1 Intergenerational Equity

The cumulative impact of the project on the Aboriginal cultural resource can be assessed in two ways, these being:

1. Utilising AHIMS data to compare the identified cultural heritage resource within the study area to that of the wider region; and
2. Utilising aerial photographs, topographic maps and data drawn from GIS databases to identify the potential regional Aboriginal heritage resource.

As discussed in Section 4.4, numerous searches of the AHIMS database over the study area have been undertaken. A total of four previously registered sites were identified. One of these was identified as being located within the study area. An additional site was identified following completion of test excavations within the study area.

The potential of the study area was assessed during the site inspection, and was also informed by the results of surrounding archaeological assessments. The study area was considered to have some potential for subsurface deposits, and visible surface archaeological material present. Test excavations confirmed that there are low density subsurface artefacts present.

In terms of cumulative impact, the site contains evidence of Aboriginal occupation. A number of other registered sites in the vicinity have been destroyed by nearby development and are no longer listed as valid sites on AHIMS. However, both sites within the current study area are located within land zoned for public recreation or environmental conservation, and as such would be subject to lesser disturbance than if they were within areas proposed for subdivision. This offers an opportunity to minimise disturbance to any additional low density deposits which may be present in this area through providing mitigation measures to be followed as part of the development of this area. These mitigation measures have been proposed in Section 9.0.

Overall, it is considered that the proposal has an acceptable impact on the Aboriginal cultural heritage of the region, particularly if the proposed mitigation measures are enacted.

9.0 Management, Mitigation and Recommendations

9.1 Guiding Principles

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

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

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

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

9.2 Harm Avoidance or Mitigation

The study area contains one previously registered Aboriginal site. A further site was identified during the current assessment, resulting in a total of two sites within the study area. These sites cannot be avoided by the proposed works, which has an approved Masterplan in place to develop the area in order to provide urgently required housing stock and services for south western Sydney. As such, mitigation measures for these two sites are necessary.

9.3 Mitigation Measures

Surface collection of the artefacts associated with site EPCS 3 (#45-5-3909) is recommended, with the collected items reburied within an area that would not be impacted in future. Given the retention of the northern and eastern portion of the study area as public recreation or environmental conservation zones, an appropriate area on site should be identifiable. This enables the artefacts from the site, including those recovered during the test excavation program, to remain on Country.

If reburied on site, the location should be identified on the title for the lot as a "no harm" zone and registered as a new site on AHIMS to ensure the location is protected.

Consultation with the Aboriginal community has been undertaken for this project in accordance with the *Aboriginal cultural heritage consultation requirements for proponents 2010*.

10.0 Permit Requirements

10.1 Permit Area

An application for an AHIP under Part 6 of the *National Parks and Wildlife Act 1974* is required for the site at 48-54 Boundary Road, Oakville, NSW, prior to the commencement of subdivision works. The study area is further defined as 25 and 26 of DP 228850., and the proposed impact area is contained within these cadastral boundaries. Figure 15 shows the proposed AHIP boundary, and Table 10 lists the grid references for the proposed AHIP boundaries in GDA/MGA 94, Zone 56. These grid references are also provided on Figure 15.

Table 10: Grid references for study area boundary

Point	Easting	Northing
1	303,323.29	6,275,204.79
2	303,372.07	6,275,420.75
3	303,580.43	303,580.43
4	303,542.93	6,275,143.05

The proposed AHIP boundary includes the proposed development and impact area within the overall study area.

10.2 Permit Type

It is recommended that the AHIP permit surface salvage of site EPCS 3 (#45-5-3909) prior to impact, as well as unmitigated impact to site CA-AS-01 (AHIMS # pending).

10.3 AHIMS Numbers

A total of two AHIMS sites falls within the study area, as follows:

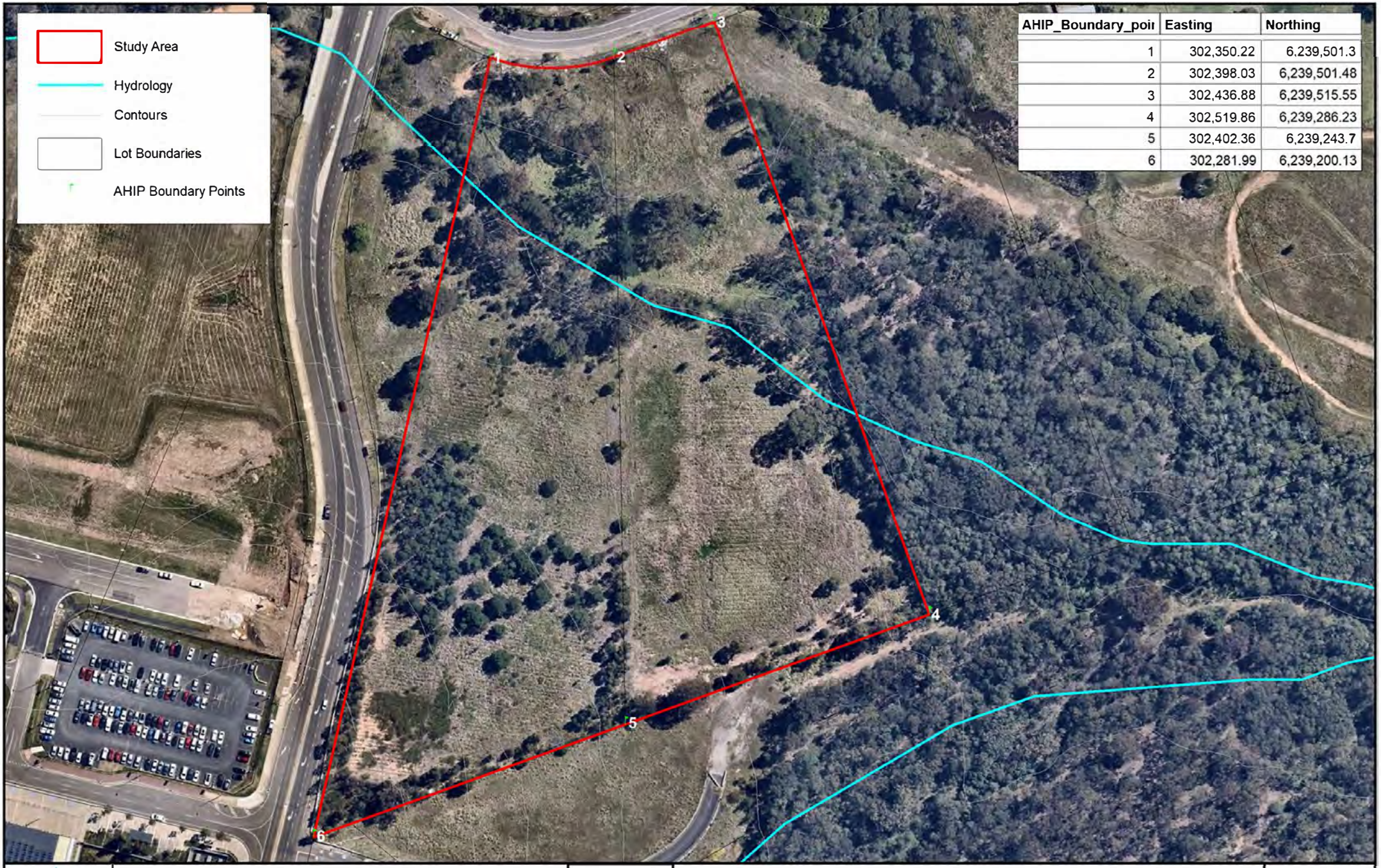
- 45-5-3909 EPCS 3
- CA-AS-01 (AHIMS # pending)

10.4 Previous AHIPs

No AHIPs have been issued or refused previously for the study area to the best of our knowledge.

10.5 Restricted Information and Confidentiality

Aboriginal stakeholders for the project have not identified any restricted, confidential or culturally sensitive information related to the project and this AHIP application.



AHIP_Boundary_poi	Easting	Northing
1	302,350.22	6,239,501.3
2	302,398.03	6,239,501.48
3	302,436.88	6,239,515.55
4	302,519.86	6,239,286.23
5	302,402.36	6,239,243.7
6	302,281.99	6,239,200.13

PO Box 236
NOWRA
NEW SOUTH WALES 2541

0 75 150
metres

Projection:
MGA Zone 56 (GDA 94)
Base Map:
NearMaps 2021
Image Date: 25/10/2021
Final - Version 1

Figure 15: AHIP boundary.

N

10.6 Copyright

Apex Archaeology asserts its Moral Rights in this work, unless otherwise indicated, in accordance with the Commonwealth *Copyright (Moral Rights) Amendment Act 2000*. Apex Archaeology vests copyright in all material produced in this report by Apex Archaeology (excluding pre-existing material) in the Bathla Group, and retains the right to use all the material produced by Apex Archaeology for our ongoing business and professional activities (including but not limited to professional presentations, academic papers and/or publications).

10.7 Artefact Management

The artefacts recovered during the test excavation and proposed surface collection should be reburied on site within an appropriate location that will not be further impacted. The location of these items would be registered with AHIMS. An appropriate location would be determined in consultation with the Aboriginal community and the proponent to ensure an area unlikely to be impacted in future is selected. It is likely that this location would be within the RE1 zone in the north and east of the study area, in an area that does not contain archaeological sites.

Artefacts should be reburied in accordance with Requirement 26 of the *Code of Practice for Archaeological Management of Aboriginal Objects in NSW*, at an appropriate depth of approximately 30-50cm, with a robust plaque placed on the ground surface noting “Environmentally sensitive area, no digging” or similar wording. The requirement not to impact this area should be included on any management plan prepared for the RE1 zone lands, and all personnel working on the lands should be aware of the requirement not to disturb that location. The coordinate location should also be recorded and submitted to the AHIMS registrar as a new site, and a new AHIP would be required to impact that location in future.

11.0 RECOMMENDATIONS

The following recommendations are made on the basis of:

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

It was found that:

- There was one previously registered Aboriginal site within the study area.
- One additional site was identified during the test excavation undertaken for the project.
- Test excavations identified a very low density subsurface deposit associated with CA-AS-01.
- The artefacts identified during test excavations were formed from silcrete, and several pieces of heat shatter were also identified.
- The sites would be impacted by the proposed works and mitigation measures have been proposed.

Therefore, the following recommendations have been made.

RECOMMENDATION 1: AHIP APPLICATION REQUIRED

Aboriginal cultural material is present within the study area and thus an application for an Aboriginal Heritage Impact Permit (AHIP) is required to permit harm to these items, namely:

- EPCS 3 (AHIMS #45-5-3909)
- CA-AS-01 (AHIMS # pending)

It is recommended that this AHIP permit surface collection of artefacts associated with EPCS 3 and unmitigated impact to CA-AS-01.

RECOMMENDATION 2: MAINTAIN ABORIGINAL COMMUNITY CONSULTATION

Consultation with the RAPs regarding the project should continue, in order to keep the RAPs informed about the management of Aboriginal cultural heritage within the study area. This includes notifying the RAPs when an AHIP application is lodged, and also in the event an AHIP is issued.

RECOMMENDATION 3: DEVELOPMENT BOUNDARIES

The proposed development works must be contained within the assessed boundaries for this project. If there is any alteration to the boundaries of the proposed development to include areas not assessed as part of this archaeological

investigation, further investigation of those areas may be necessary to assist in appropriately managing Aboriginal objects and places which may be present.

RECOMMENDATION 4: STOP WORK PROVISION

Should unanticipated Aboriginal archaeological material be encountered during site works after the recommended mitigation measures have been completed in accordance with an approved AHIP, all work must cease in the vicinity of the find and an archaeologist contacted to make an assessment of the find and to advise on the course of action to be taken. Further archaeological assessment and Aboriginal community consultation may be required prior to the recommencement of works. Any objects confirmed to be Aboriginal in origin must be reported to Heritage NSW.

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

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

RECOMMENDATION 5: REPORTING

One digital copy of this report should be forwarded to Heritage NSW to support the required AHIP application for the project, along with required supporting documentation.

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

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

12.0 BIBLIOGRAPHY

Allen, H. and Holdaway, S. 2009 The Archaeology of Mungo and the Willandra Lakes: Looking Back, Looking Forward. *Archaeology in Oceania*, 44(2):96-106.

Andrefsky, W., Jr. 2009, The analysis of stone tool procurement, production, and maintenance. *Journal of Archaeological Research*, 17:65-103.

Attenbrow, V. 1976, *Aboriginal Subsistence Economy on the Far South Coast of New South Wales, Australia.* Unpublished BA (Hons) thesis, University of Sydney, Sydney.

Attenbrow, V. 2004 *What's Changing: Population Size or Land-use Patterns? The Archaeology of Upper Mangrove Creek, Sydney Basin*. Published updated PhD Thesis. Terra Australis 21. Australian National University, Canberra: Pandanus Books.

Attenbrow, V. 2010, *Sydney's Aboriginal Past: Investigating the archaeological and historical records*. UNSW Press, Sydney (Second Edition).

Apex Archaeology. 2018, *Vermont Estate Central Precinct Stage 3: Archaeological Technical Report.* Report to Johnson Property Group.

Australian Museum Business Services. 2003, *Edmondson Park Composite Site Master Plan – Aboriginal Heritage Management Plan.* Prepared for Liverpool City Council and Campbelltown City Council.

Australian Museum Business Services. 2010, *South West Rail Link – Glenfield to Leppington Rail Line: Aboriginal Heritage Assessment.* Report to Parson Brinkerhoff Australia Pty Ltd.

Australian Museum Business Services. 2012, *Indigenous Heritage Assessment Project: Austral and Leppington North Precincts, South West growth Centres.* Report to NSW Department of Planning and Infrastructure.

Barz, K. 1977, *Some theoretical and practical aspects of midden sampling as applied to a site at St Georges Basin, Jervis Bay, ACT.* Unpublished BA(hons) thesis, Australian National University.

Baker, N.B. 1992 *Evidence from the analysis of backed blades, pp.43-76. In N.B. Baker and A.C. Gorman Narama salvage project, lower Bayswater Creek, Hunter Valley, NSW*. Unpublished report by Brayshaw McDonald for Enviroscicences and Narama Joint Venture.

Boot, P. 1994, Recent research into the prehistory of the hinterland of the South Coast of New South Wales, pp.319-340. In M. Sullivan, S. Brockwell and A. Webb (eds) *Archaeology in the North: Proceedings of the 1993 Australian Archaeological Association Conference*. Darwin: North Australia Research Unit, Australian National University.

Boot, P. 2002, *Didthul, Bhundoo, Gulaga and Wadbilliga: An Archaeological Study of the Aboriginals of the New South Wales South Coast Hinterland.* Thesis submitted for the degree of Doctor of Philosophy of the Australian National University.

Bowdler, S. 1970, *Bass Point: The Excavation of a South East Australian Shell Midden Showing Cultural and Economic Change.* Unpublished BA (Hons) Thesis, University of Sydney, Sydney.

Bowdler, S. 1976, Hook, line and dilly bag: An interpretation of an Australian coastal shell midden. *Mankind* 10:248-258.

Bowdler, JM., Johnston, H., Olley JM., Prescott, JR., Roberts, RG., Shawcross, W and Spooner, N. 2003, 'New ages for human occupation and climactic change at Lake Mungo, Australia.' *Nature* Vol 421:30, pp.837-840.

Clarkson, C., Smith, M., Marwick, B., Fullagar, R., Wallis, L., Faulkner, P., Manne, T., Hayes, E., Roberts, R., Jacobs, Z., Carah, X., Lowe, K., Matthews, J and Florin, S. 2015, The archaeology, chronology and stratigraphy of Madjedbebe (Malakunanja II): A site in northern Australia with early occupation. *Journal of Human Evolution.* 83:46-64

Corkill 1997, Red, yellow and black: Colour and heat in archaeological stone. *Australian Archaeology,* 45:54-55.

Dean-Jones, P. and Mitchell, P.B. 1993, *Hunter Valley Aboriginal sites assessment project: Environmental modelling for archaeological site potential in the Central Lowlands of the Hunter Valley*. Unpublished report to the NSW National Parks and Wildlife Service.

DECCW 2010. *Code of Practice for Archaeological Investigation of Aboriginal Objects in New South Wales.* DECCW, Sydney South.

DECCW 2010. *Due Diligence Code of Practice for the Protection of Aboriginal Objects in New South Wales*. DECCW, Sydney South.

DECCW 2010. *Aboriginal cultural heritage consultation requirements for proponents 2010*. DECCW, Sydney South.

Domanski, M. and Webb. J.A. 1992, Effect of Heat Treatment on Siliceous Rocks Used in Prehistoric Lithic Technology. *Journal of Archaeological Science*, 19:601-614.

ELA Australia. 2019a, *365-405 Denham Court Road, Leppington: Aboriginal Cultural Heritage Assessment.* Unpublished report to Stockland.

ELA Australia. 2019b, *1492 Camden Valley Way, Leppington – Aboriginal Heritage Due Diligence Assessment.* Unpublished report for the Al-Saeed Educational & Welfare Trust.

ELA Australia. 2020, *164-170 Croatia Avenue, Edmondson Park: Aboriginal Due Diligence Assessment.* Unpublished report to Super Star Holding Group Pty Ltd.

ELA Australia. 2021, 164-170 Croatia Avenue, Edmondson Park – Aboriginal Cultural Heritage Assessment and Sampling Strategy for Archaeological Test Excavation

Fitzhardinge, L. F. 1979, *Sydney's First Four Years, A Narrative of the Expedition to Botany Bay and a Complete Account of the settlement of Port Jackson 1788 – 1791 by Captain Watkin Tench of the Marines*. Library of Australian History: Sydney.

Godden Mackay Logan. 2012, *East Leppington – Aboriginal Cultural Heritage Assessment Report.* Unpublished report to Stockland.

Heritage Branch Department of Planning. 2009, *Assessing Significance for Historical Archaeological Sites and 'Relics'.* Heritage Council of NSW, Sydney.

Hewitt, G. and Allen, J. 2010, Site Disturbance and Archaeological Integrity: The Case of Bend Road, an Open Site in Melbourne Spanning Pre-LGM Pleistocene to Late Holocene Periods. *Australian Archaeology*, 70:1-16.

Hiscock, P. 1993, Bondaian Technology in the Hunter Valley, New South Wales. *Archaeology in Oceania*, 28(2):65-76.

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

Hughes, P.J., M.E. Sullivan and R.J. Lampert. 1973, The use of silcrete by Aborigines in southern coastal NSW. *Archaeology and Physical Anthropology in Oceania* 8(3):220-225.

Hughes, P & R Lampert. 1982, Prehistorical population changes in southern coastal New South Wales. In S. Bowdler (ed) *Coastal Archaeology in Eastern Australia: Proceedings of the 1980 Valla Conference on Australian Prehistory.* Pp 16-28. Occasional Papers in Prehistory 11. Department of Prehistory Research School of Pacific Studies, Australian National University, Canberra.

Hughes, P., Spooner, N. and Questiaux, D. 2014, The Central Lowlands of the Hunter Valley, NSW: Why So Few Early Sites Have Been Found in this Archaeologically-Rich Landscape. *Australian Archaeology,* 79:34-44.

JMcD CHM 2005 *Archaeological salvage excavation of site RTA-G1 109-113 George Street Parramatta*. Unpublished report to Landcom Pty Ltd.

Kohen, JL., Stockton, ED., and Williams, MAJ. 1984, 'Shaws Creek KII rockshelter: a prehistoric occupation site in the Blue Mountains piedmont, eastern New South Wales'. *Archaeology in Oceania* 19(2):57-73.

Lampert, RJ. 1971a, *Burrill Lake and Currarong: Coastal sites in southern New South Wales.* Canberra Publishing & Printing Co.

Lampert, RJ. 1971b, Coastal Aborigines of Southeastern Australia. In DJ Mulvaney and J Golson (Eds), *Aboriginal Man and Environment in Australia.* Pp 114-132. Australian National University Press, Canberra.

Lampert, RJ. & Steele, D. 1993, 'Archaeological Studies at Bomaderry Creek, New South Wales', *Records of the Australian Museum,* Supplement 17: 55-75.

Larson, M.L. and E.E. Ingbar. 1992, Perspectives on refitting: Critique and a complementary approach, pp.151-162. In Hofman, J.L. and Enloe, J.G. (eds) *Piecing together the past: Applications of refitting studies in archaeology*. Oxford: BAR International Series 578.

Leonard, R.D. and Jones, G.T. (eds). 1989, *Quantifying Diversity in Archaeology.* Cambridge: Cambridge University Press.

Mackay, A. 2005, *Informal movements: Changing mobility patterns at Ngarrabullgan, Cape York, Australia, pp.95-107. In Clarkson, C. and Lamb, L. (eds) Lithics 'down under': Australian perspectives on lithic reduction, use and classification.* BAR International Series 1408. Oxford: Archaeopress.

McDonald J. 2005, *Archaeological Salvage Excavation of Eight Archaeological Landscapes in the Second Ponds Creek Valley Rouse Hill Development Area, NSW*. Unpublished report to Rouse Hill Infrastructure Pty Ltd and Landcom.

McDonald, J. 2008, *Dreamtime superhighway: An analysis of Sydney Basin rock art and prehistoric information exchange. Terra Australis.* Australian National University E Press, Canberra.

Mercieca, A. and Hiscock, P. 2008, Experimental Insights Into Alternative Strategies of Lithic Heat Treatment. *Journal of Archaeological Science*, 35:2634-2639.

Mulvaney, J & Kamminga, J. 1999, *Prehistory of Australia.* Allen & Unwin, Crows Nest.

Nicol, G & Sewell, J. 1793, *A Complete Account of the Settlement at Port Jackson in New South Wales, Including An Accurate Description of the Situation of the Colony; of the Natives; and Of Its Natural Productions.* London.

O'Connell, J.F and Allen, J. 2004, Dating the colonization of Sahul (Pleistocene Australia-New Guinea): a review of recent research. *Journal of Archaeological Science* 31:835-853.

OEH. 2011, *Guide to investigating, assessing and reporting on Aboriginal cultural heritage in NSW.* OEH, Sydney South.

Rich, E. 1993, *Archaeological investigation of sites RC-PAD and MF2 at Mt Flora near Mittagong, NSW*. Unpublished report to Mitchell McCotter Pty Ltd and CSR Readymix.

Rowney, M. 1994, Palaeomagnetic tests of heat-treated silcrete artefacts. *Australian Aboriginal Studies Research Reports* 1:39-43.

Rowney, M. and White, J.P. 1997, Detecting Heat Treatment on Silcrete: Experiments and Methods. *Journal of Archaeological Science*, 24:649-657.

Schmidt, P. and P. Hiscock. 2019, Evolution of silcrete heat treatment in Australia – a regional pattern on the South-East Coast and its evolution over the last 25 ka. *Journal of Paleolithic Archaeology*, 2(1):74-97.

Smith, MA. 2013, *The Archaeology of Australia's Deserts.* Cambridge University Press, New York.

Stockton, ED. 1973, 'Shaws Creek Shelter: Human Displacement of Artefacts and its significance.' *Mankind* 9: 112-117

Stockton, ED. & Holland, WN. 1974, 'Cultural sites and their environment in the Blue Mountains.' *Archaeology and Physical Anthropology in Oceania.* 9:36-65

Tindale, N.B. 1974, *Aboriginal Tribes of Australia – Their Terrain, Environmental Controls, Distribution, Limits and Proper Names.* Online resource, accessed from http://archives.samuseum.sa.gov.au/tribalmap/index.html

Vaquero, M., M.G. Chacon, M.D. Garcia-Anton, B.G. de Soler, K. Martinez and F. Cuartero. 2012, Time and space in the formation of lithic assemblages: The example of Abric Romani Level J. *Quaternary International*, 247:162-181.

Way, A.M. 2018, *Event-based analysis: Identifying and sequencing prehistoric activities in buried palimpsests: An example from Lake George, Australia.* Unpublished PhD Thesis, Department of Archaeology, The University of Sydney.

White, B. 2012, Minimum Analytical Nodules and Lithic Activities at Site W2, Hunter Valley, New South Wales. *Australian Archaeology*, 75:25-36.

White, E. 2018, *Time matters on shallow open sites: An example from Western Sydney, Australia*. Unpublished PhD thesis, University of Sydney.