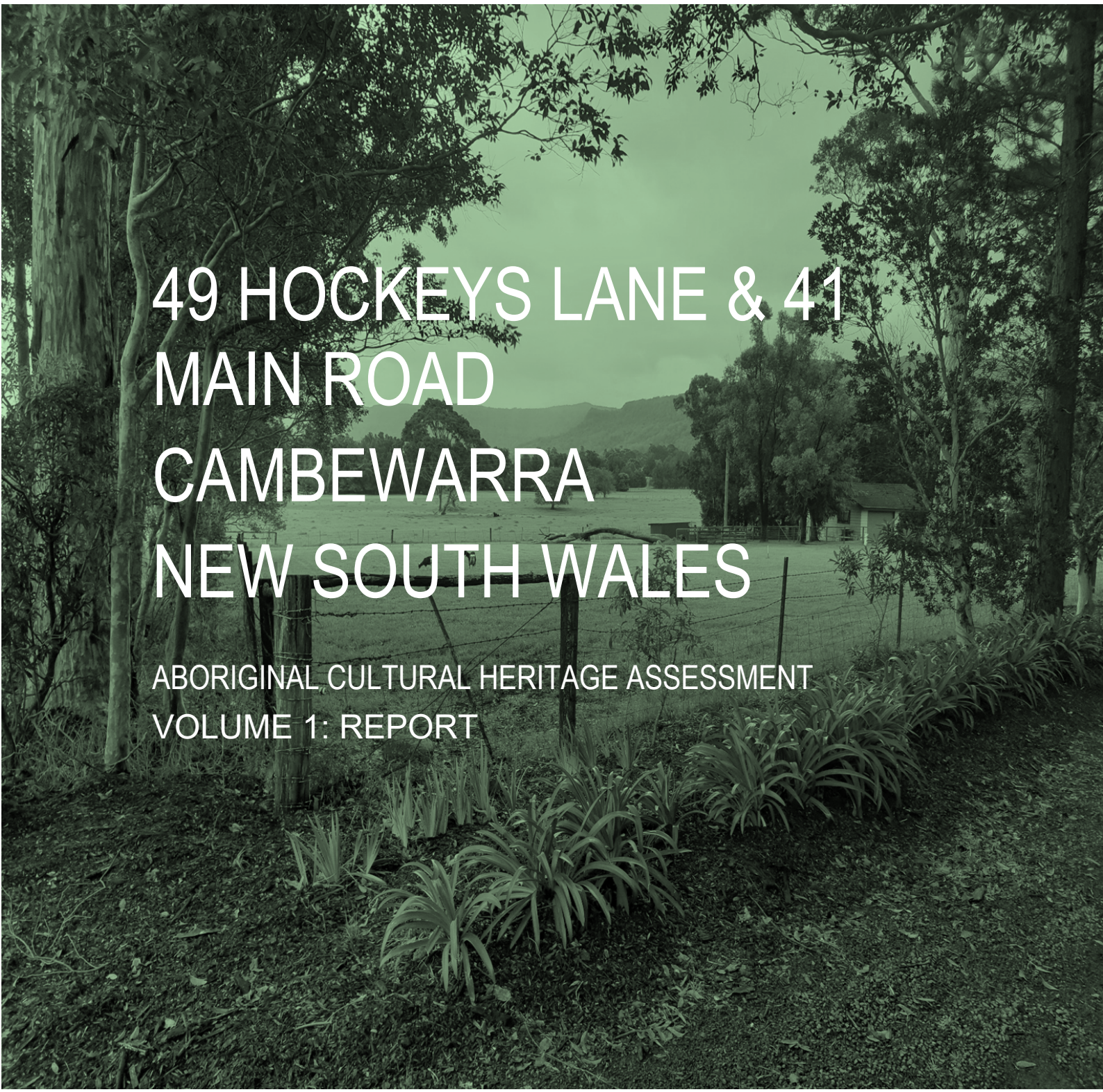
AUSTRAL ARCHAEOLOGY PTY LTD
ABN: 55 629 860 975
Info@australarch.com.au
www.australarchaeology.com.au



# 49 HOCKEYS LANE & 41 MAIN ROAD CAMBEWARRA NEW SOUTH WALES

## ABORIGINAL CULTURAL HERITAGE ASSESSMENT
## VOLUME 1: REPORT

**FINAL REPORT**

MAKER ENG

15 August 2022

## DOCUMENT INFORMATION

| | |
|---|---|
| **Project:** | 49 Hockeys Lane & 41 Main Road |
| **Services required:** | Aboriginal Cultural Heritage Assessment |
| **Client:** | Maker ENG |
| **Prepared by:** | Neil Fenley |
| **Project number:** | 21105 |

## DOCUMENT HISTORY AND APPROVAL STATUS

| Version No. | Version Type | Issue Date | Authored by | Approved by | Date Approved |
|---|---|---|---|---|---|
| 1 | Draft | 18-03-2022 | NF | AJB | 18-03-2022 |
| 2 | Final | 15-08-2022 | DC | AJB | 15-08-2022 |

## DISTRIBUTION OF COPIES

| Version No. | Quantity | Issue date | Issued to |
|---|---|---|---|
| 1 | 9 | 18-03-2022 | RAPs |
| 1 | 1 | 10-08-2022 | MAKER |
| 2 | 10 | 14-09-2021 | MAKER & RAPs |

# EXECUTIVE SUMMARY

This report has been prepared for Maker ENG and is an Aboriginal archaeological and cultural heritage assessment of land situated at 49 Hockeys Lane and 41 Main Road, Cambewarra, New South Wales (NSW) [the study area], within the Shoalhaven Local Government Areas (LGAs), and the parish of Illaroo in the county of Camden.

The study area is defined by the boundary of Lots 6 & 7, DP1256748, 49 Hockeys Lane and Lot 4 DP542936 41 Main Road, Cambewarra, 5.5 kilometres north-west of Nowra Central Business District.

This Aboriginal Cultural Heritage Assessment (ACHA) was undertaken to assess the significance of Aboriginal cultural material as part of a Development Application being prepared under Part 4 of the *Environmental Planning and Assessment Act 1979*, before the proposed residential subdivison of the study area. The ACHA has been undertaken in accordance with the *Code of Practice for Archaeological Investigation of Aboriginal Objects in NSW* (Department of Environment Climate Change and Water NSW 2010), the *Guide to investigating, assessing and reporting on Aboriginal Cultural Heritage in NSW* (Office of Environment and Heritage 2011) and the *Aboriginal Cultural Heritage Consultation Requirements for Proponents* (Department of Environment Climate Change and Water NSW 2010) [Consultation Requirements].

Background research uncovered no known sites within the study area, although, it did identify identified an alluvial flat within the study area that had the potential to contain Aboriginal artefacts.

The field survey recorded no surfacesurface finds in this area of potential. The the remainder of the study area to the south was a sloping landform which held little potential for Archaeological material to be present.

Test excavation was undertaken and consisted consist of 75 test pits, spread across the 3 areas of potential identified during the pedestrian survey of the site. Forty six artefacts were recovered with six new artefact scatters and five isolated artefacts recorded.

The Aboriginal sites identified during this ACHA report are described, along with their significance in the table below:

| Site name | Aboriginal cultural heritage values | Significance |
|---|---|---|
| **49 Hockeys Lane ISO 1**<br>**AHIMS #52-5-1041** | The site is indicative of a very low-density background scatter and holds limited research potential.<br>The site is representative of sites found along Taylors Lane and the wider Cambewarra area. The site is extremely common in the area.<br>The site holds limited education potential and its location is defined as having 1 artefact in Transect D TP 5. | Low |
| **49 Hockeys Lane ISO 2**<br>**AHIMS #52-5-1045** | The site is indicative of a very low-density background scatter and holds limited research potential.<br>The site is representative of sites found along Taylors Lane and the wider Cambewarra area. The site is extremely common in the area.<br>The site holds limited education potential. 1 Artefact in Transect D TP 6. | Low |
| **41 Main Road ISO 3**<br>**AHIMS #52-5-1036** | The site is indicative of a very low-density background scatter and holds limited research potential.<br>The site is representative of sites found along Taylors Lane and the wider Cambewarra area. The site is extremely common in the area.<br>The site holds limited education potential and is defined as a single artefact from Transect 3 TP V. | Low |
| **41 Main Road ISO 4**<br>**AHIMS #52-5-1042** | The site is indicative of a very low-density background scatter and holds limited research potential.<br>The site is representative of sites found along Taylors Lane and the wider Cambewarra area. The site is extremely common in the area.<br>The site holds limited education potential and is defined as a single artefact from Transect 1 TP D. | Low |

| Site name | Aboriginal cultural heritage values | Significance |
|---|---|---|
| **41 Main Road ISO 5**<br>**AHIMS #52-5-1043** | The site is indicative of a very low-density background scatter and holds limited research potential.<br>The site is representative of sites found along Taylors Lane and the wider Cambewarra area. The site is extremely common in the area.<br>The site holds limited education potential and is defined as a single artefact from Transect 1 TP H. | Low |
| **49 Hockeys Lane AS 1**<br>**AHIMS #52-5-1037** | There were 10 artefacts recovered across Test Pits 1, 2, 3 and 4 in Transect A, including 5 complete flakes. Although there is a relatively high number of artefacts present at this site compared with the remainder of the study area it is still considered as a low-density background scatter and holds limited research potential.<br>The site is representative of sites found along Taylors Lane and the wider Cambewarra area. The site is common in the area.<br>The site holds limited education potential. This is representative of a low density artefact scatter common to the general area | Low |
| **49 Hockeys Lane AS 2**<br>**AHIMS #52-5-1039** | There are 22 artefacts in this site spread across the entirety of Transect B, and Transect C TP 1. They comprise 10 complete flakes, 6 debitage, 2 distal flakes, 2 proximal flakes and 2 implements. The implements, a steep edge scraper and a geometric microlith are common in the region.<br>The site is indicative of a low density background scatter with areas of concentration. The expansion pits around TP 7 and the further 4 test pits excavated in a northerly direction from TP 7 support this conclusion. Although, further excavations may show a pattern of density distribution.<br>The site holds moderate education potential. | Moderate |
| **49 Hockeys Lane AS 3**<br>**AHIMS #52-5-1040** | There were 3 artefacts located across 2 test pits (TP 1 and TP 2) in Transect D.<br>The site is indicative of a very low-density background scatter and holds limited research potential.<br>The site is representative of sites found along Taylors Lane and the wider Cambewarra area. The site is extremely common in the area.<br>The site holds limited education potential. | Low |
| **49 Hockeys Lane AS 4**<br>**AHIMS #52-5-1046** | There were 2 artefacts recovered from a single test pit, TP 6 in Transect A.<br>The site is indicative of a very low-density background scatter and holds limited research potential.<br>The site is representative of sites found along Taylors Lane and the wider Cambewarra area. The site is extremely common in the area.<br>The site holds limited education potential. | Low |
| **41 Main Road AS 5 AHIMS #52-5-1044** | There were 2 artefacts recovered from a single test pit, TP Q in Transect 2.<br>The site is indicative of a very low-density background scatter and holds limited research potential.<br>The site is representative of sites found along Taylors Lane and the wider Cambewarra area. The site is extremely common in the area.<br>The site holds limited education potential. | Low |
| **41 Main Road AS 6 AHIMS #52-5-1038** | There were 2 artefacts recovered from a single test pit, TP S in Transect 3.<br>The site is indicative of a very low-density background scatter and holds limited research potential.<br>The site is representative of sites found along Taylors Lane and the wider Cambewarra area. The site is extremely common in the area.<br>The site holds limited education potential. | Low |

| Site name | Aboriginal cultural heritage values | Significance |
|---|---|---|
| **41 Main Road Surface Fine AHIMS #52-5-1050** | The site is indicative of a very low-density background scatter and holds limited research potential.<br>The site is representative of sites found along Taylors Lane and the wider Cambewarra area. The site is extremely common in the area.<br>The site holds limited education potential and is defined as a single artefact from Transect 1 TP D. | Low |

## ABORIGINAL COMMUNITY CONSULTATION

Consultation with Aboriginal stakeholders has been completed in accordance with the Consultation Requirements (DECCW 2010a). A summary of this process is included below.

| Stage | Component | Commenced | Completed |
|---|---|---|---|
| Stage 1 | Letters to agencies | 01/09/2021 | N/A |
| | Registration of stakeholders | 21/09/2021 | 06/10/2021 |
| Stage 2 | Project information | 07/10/2021 | N/A |
| Stage 3 | Review of project methodology | 07/10/2021 | 04/11/2021 |
| | Update to study areas | 11/11/2021 | 25/11/2021 |
| | Update to study areas | 17/03/2022 | N/A |
| Stage 4 | Review of ACHA by Aboriginal stakeholders | 18/03/2022 | 15/04/2022 |

Further information on the consultation completed for the project can be found in Section 2 and Appendix A of this report.

## RECOMMENDATIONS

The following recommendations are derived from the findings described in this ACHA. The recommendations have been developed after considering the archaeological context, environmental information, consultation with the local Aboriginal community, and the findings of the test excavation and the predicted impact of the planning proposal on archaeological resources.

It is recommended that:

1. Before any works occur, Maker ENG should apply to Heritage NSW for an Aboriginal Heritage Impact Permit (AHIP) to destroy 49 Hockeys Lane AS 1 (AHIMS #52-5-1037), 49 Hockeys Lane AS 2 (AHIMS #52-5-1039), 49 Hockeys Lane AS 3 (AHIMS #52-5-1040), 49 Hockeys Lane AS 4 (AHIMS #52-5-1046) , 49 Hockeys Lane ISO 1 (AHIMS #52-5-1041), 49 Hockeys Lane ISO 2 (AHIMS #52-5-1045), 41 Main Road AS 5 (AHIMS #52-5-1044), 41 Main Road AS 6 (AHIMS #52-5-1038), 41 Main Road ISO 3 (AHIMS #52-5-1036), 41 Main Road ISO 4 (AHIMS #52-5-1042), 41 Main Road ISO 5 (AHIMS #52-5-1043), and 41 Main Road Surface Fine (AHIMS #52-5-1050). These sites are protected under Section 90 of the *NSW National Parks and Wildlife Act 1974* (NPW Act). It is recommended that the following mitigation measures are implemented as part of the AHIP:
    1. Salvage excavations of 49 Hockeys Lane AS 1 and 49 Hockeys Lane AS 2
    2. All Aboriginal objects collected during the archaeological testing and anticipated salvage works (under the approved AHIP) will be reburied onsite at a nominated location.
2. In the event that unexpected finds occur during any activity within the study area, all works must in the vicinity must cease immediately. The find must be left in place and protected from any further harm. Depending on the nature of the find, the following processes must be followed:

1. If, human skeletal remains are encountered, all work must cease immediately and NSW Police must be contacted, they will then notify the Coroner's Office. Following this, if the remains are believed to be of Aboriginal origin, then the Aboriginal stakeholders and Heritage NSW must be notified.
2. All other Aboriginal cultural material will be covered by the AHIP and as such works do not need to stop if encountered.

3. It is recommended that Maker ENG continues to inform the Aboriginal stakeholders about the management of Aboriginal cultural heritage within the study area throughout the completion of the project. The consultation outlined as part of this ACHA is valid for six months and must be maintained by the proponent for it to remain continuous. If a gap of more than six months occurs, then the consultation will not be suitable to support an AHIP for the project.
4. A copy of this report should be forwarded to all Aboriginal stakeholder groups who have registered an interest in the project.

# CONTENTS

## FIGURES



## TABLES

# 1 INTRODUCTION

Austral Archaeology Pty Ltd (Austral) has been commissioned by Maker ENG (the proponent) to undertake an Aboriginal Cultural Heritage Assessment (ACHA) for the property at 49 Hockeys Lane (Lots 6 & 7, DP1256748) and 41 Main Road (Lot 4 DP542936), Cambewarra, New South Wales (NSW). These properties (the study area), are in the Shoalhaven Local Government Area (LGA), the parish of Illaroo, the county of Camden and within the boundaries of the Nowra Local Aboriginal Land Council (Nowra LALC).

## 1.1 PURPOSE OF THE ACHA

The ACHA was undertaken to assess the significance of any Aboriginal cultural heritage objects and values as part of a Development Application (DA) under Part 4 of the *Environmental Planning and Assessment Act 1979* (EP&A Act), for the residential development of the study area.

The project involves the removal of existing buildings from the property, removal of any existing vegetation, bulk earthworks to make the area suitable for construction, the excavation of trenches for underground services and the construction of infrastructure and houses within the study area.

The location of the study area is shown in Figure 1-1 and Figure 1-2. An outline of the proposed development in relation to the study area can be seen in Figure 1-3.

## 1.2 ASSESSMENT OBJECTIVES

The scope of this ACHA report is based on the legal requirements, guidelines and policies of the Heritage NSW, formerly the Office of Environment and Heritage (OEH), formerly, the Department of Environment, Climate Change and Water (DECCW), Department of Environment and Climate Change (DECC) and Department of Environment and Climate (DEC).

The guiding document for this assessment is the *Guide to Investigating, Assessing and Reporting on Aboriginal Cultural Heritage in NSW* (OEH 2011) [Guide], the *Code of Practice for the Investigation of Aboriginal objects in NSW* (DECCW 2010b) [Code of Practice] and the *Aboriginal Cultural Heritage Consultation Requirements for Proponents 2010* (DECCW 2010a) [Consultation Requirements].

Information provided in this assessment includes, but is not limited to:

- A description of the Aboriginal objects and/or places within the study area.
- A description of the Aboriginal cultural heritage values, including the significance of Aboriginal objects, places and values identified by the ACHA.
- Documentation of how the Consultation Requirements have been met (specifically 80C of the *National Parks and Wildlife Regulation 2009*) [NPW Regulation].
- The views of Aboriginal people regarding the likely impact of the proposed activity on their cultural heritage, including evidence of their submissions and how these have been addressed.
- An assessment of harm posed to Aboriginal objects, places or values as part of the project.
- A description of practical measures that have been used to protect, conserve, avoid or mitigate harm to Aboriginal objects, places and values.

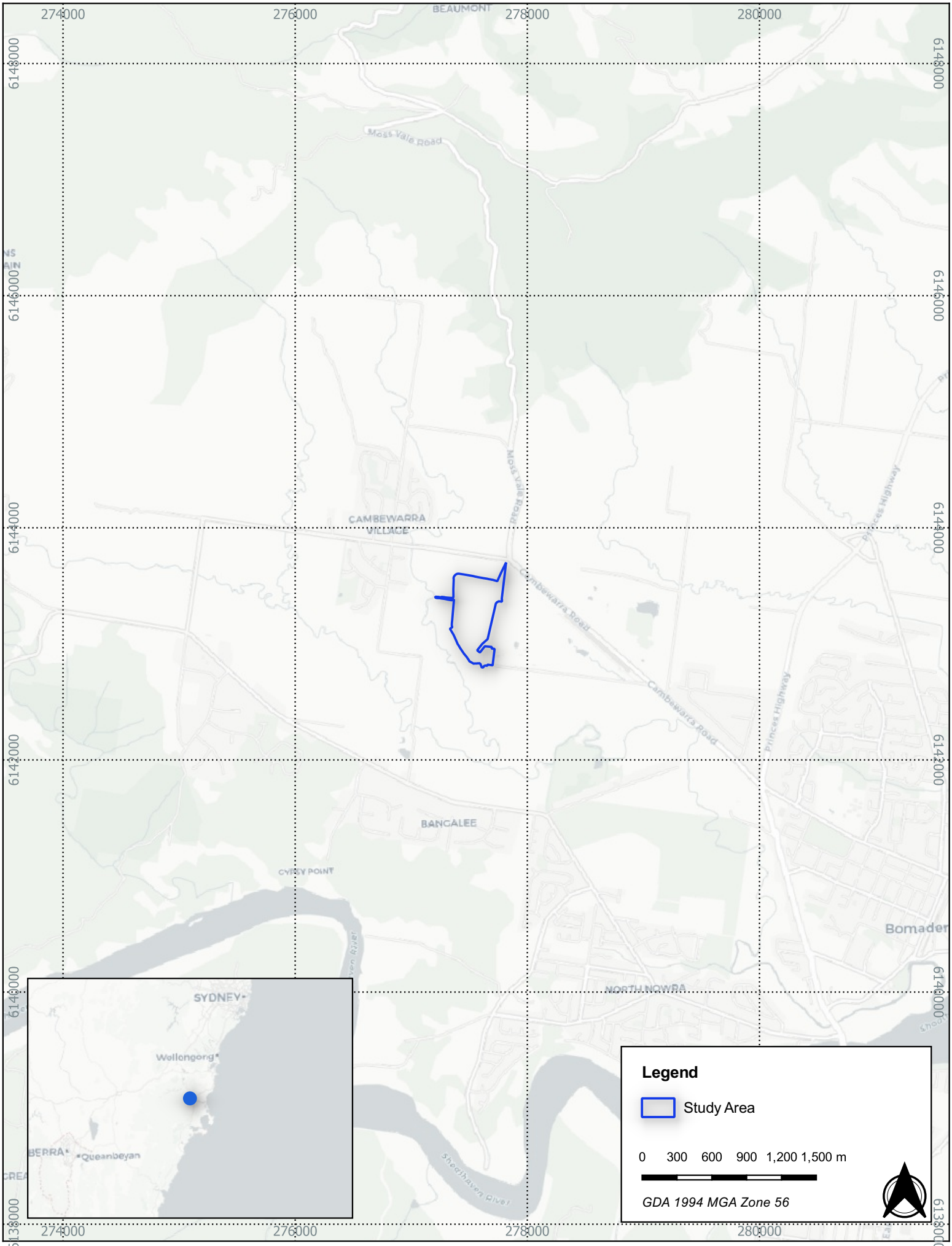



**Figure 1.1 - Location of the study area**

49 Hockeys Lane and 41 Main Road, Cambewarra

*Source: Nearmap*

*Drawn by: WA Date: 2022-03-01*

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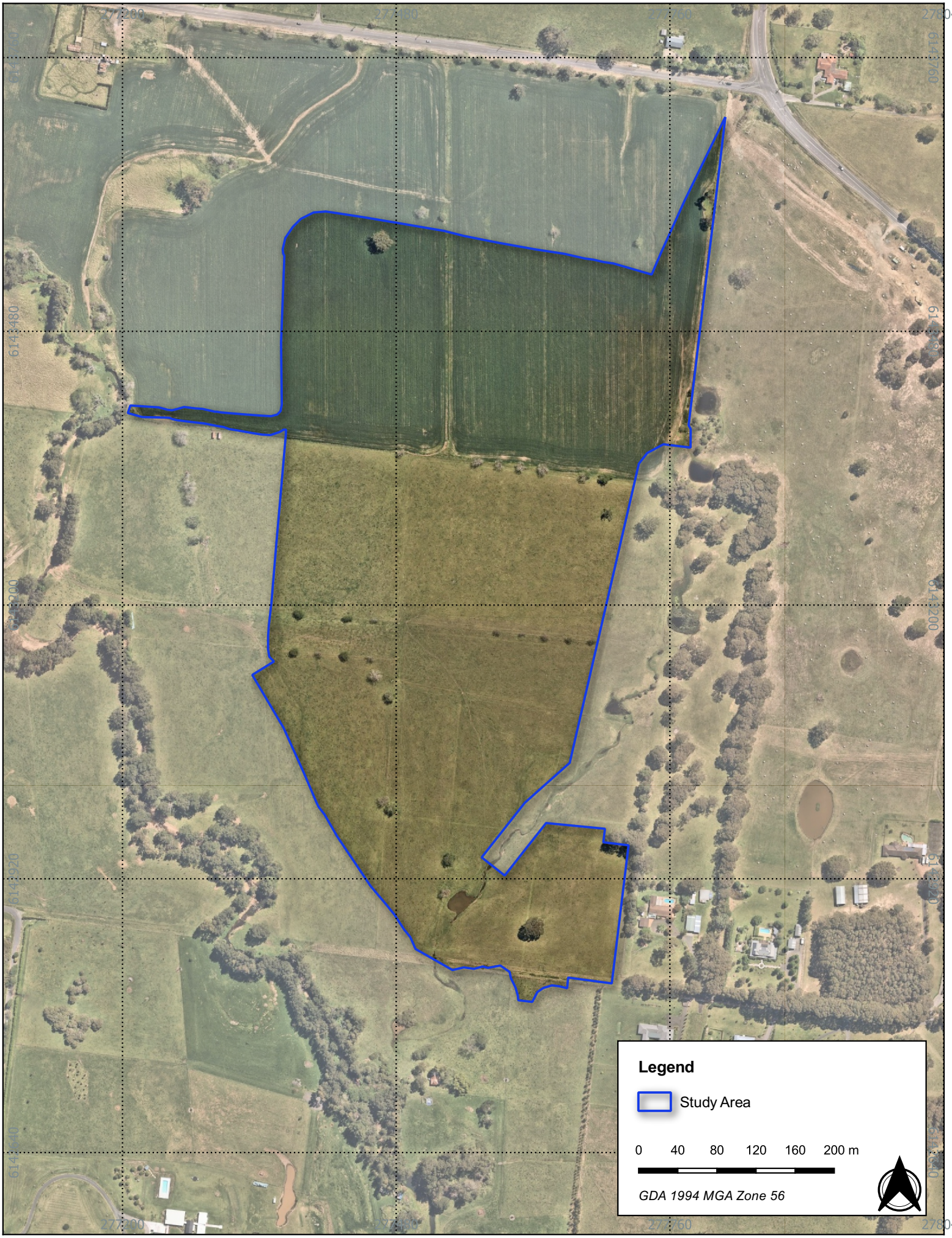


**Figure 1.2 - Detailed aerial of the study area**

49 Hockeys Lane and 41 Main Road, Cambewarra

*Source: Nearmap*

*Drawn by: WA Date: 2022-03-01*

AUSTRAL ARCHAEOLOGY

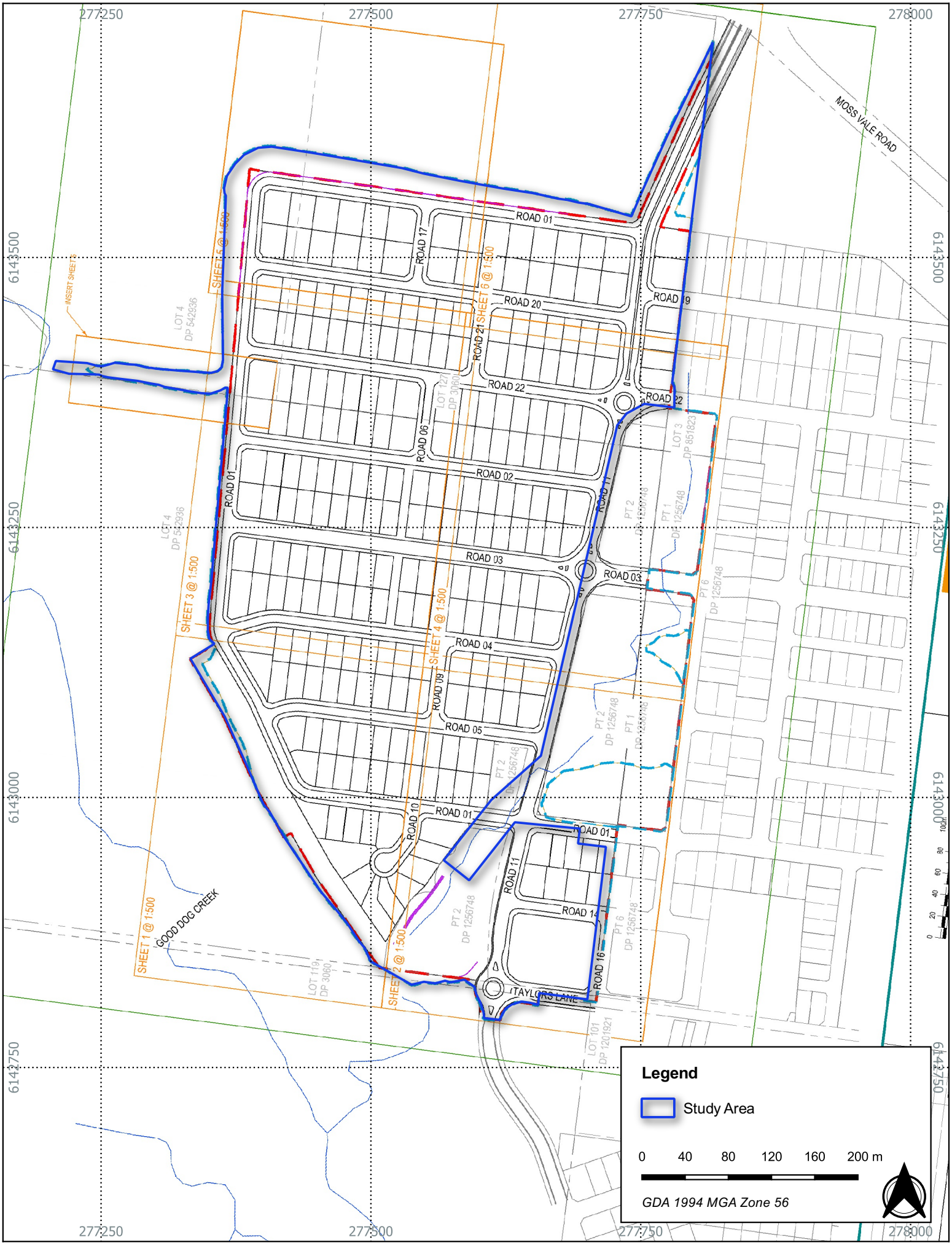


**Figure 1.3 - Proposed development within the study area**

49 Hockeys Lane and 41 Main Road, Cambewarra

*Source: Maker ENG*

*Drawn by: WA Date: 2022-03-01*

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## 1.3 SUMMARY OF LEGISLATIVE PROCESS

Aboriginal archaeological and cultural heritage assessments in NSW are carried out under the auspices of a range of State and Federal Acts, Regulations and Guidelines. The Acts and Regulations allow for the management and protection of Aboriginal places and objects, and the Guidelines set out best practice for community consultation in accordance with the requirements of the Acts.

This section outlines the Australian acts and guidelines that are applicable or have the potential to be triggered with regards to the proposed development are detailed in Table 1.1 to Table 1.4.

**Table 1.1 Federal acts**

| Federal Acts: | Applicability and implications |
|---|---|
| *Environment Protection and Biodiversity Conservation Act 1999* | This act has not been triggered and so does not apply, as:<br>• No sites listed on the National Heritage List (NHL) are present or in close proximity to the study area.<br>• No sites listed on the Commonwealth Heritage List (CHL) are present or in close proximity to the study area. |
| *Aboriginal and Torres Strait Islander Heritage Protection Amendment Act 1987* | Applies, due to:<br>This Act provides blanket protection for Aboriginal heritage in circumstances where such protection is not available at the state level. This Act may also override state and territory provisions. |

**Table 1.2 State acts**

| State Acts: | Applicability and implications |
|---|---|
| *National Parks and Wildlife Act 1974 (NPW Act 1974)* | Applies, due to:<br>• Section 86 – Prohibits both knowingly and unknowingly, causing harm or desecration to any Aboriginal object or place without either an AHIP or other suitable defence from the Act.<br>• Section 87 – Allows for activities carried out under an AHIP or following due diligence to be a defence against the harm of an Aboriginal object.<br>• Section 89A – Requires that the Heritage NSW must be notified of any Aboriginal objects discovered, within a reasonable time.<br>• Section 90 – Requires an application for an AHIP in the case of destruction of a site through development or relocation. |
| NPW Regulation 2009 | Applies, due to:<br>• Section 80A – States minimum standards of due diligence to have been carried out<br>• Section 80C – Requires Aboriginal community consultation process to be undertaken before applying for an AHIP.<br>• Section 80D – Requires production of a cultural heritage assessment report to accompany AHIP applications. |
| *The Environmental Planning and Assessment Act 1979 (EP&A Act 1979)* | Applies, due to:<br>• This project is being assessed under Part 4 of the EP&A Act 1979.<br>• Sections 86, 87, 89A and 90 of the NP&W Act 1974 will apply. |
| *NSW Heritage Act 1977* | There are no sites listed on the State Heritage Register associated with the study area, and therefore Section 57 of this act does not apply. |

**Table 1.3 State and local planning instruments**

| Planning Instruments | Applicability and implications |
|---|---|
| Local Environmental Plans (LEP) | The following LEP is applicable:<br>• Shoalhaven LEP 2014 |
| Development Control Plans (DCP) | The following DCP is applicable:<br>• Shoalhaven DCP 2014 |

**Table 1.4 Aboriginal community consultation guidelines**

| Guidelines | Applicability and implications |
|---|---|
| Consultation Requirements | The development is to be conducted in accordance with Part 4 of the EP&A Act.<br>As the project is to be assessed under Part 6 of the NP&W Act, approvals under Section 90 of the NP&W Act 1974 as amended 2010 will be required, S89A of the Act will apply, and the Part 4 Guidelines will apply. |

## 1.4 PROJECT TEAM AND QUALIFICATIONS

The following personnel have been involved in the preparation of this ACHA.

| Name | Qualifications | Title | Responsibilities |
|---|---|---|---|
| William Andrews | BA Archaeology<br>B. Eng. Hons (Surveying) | Archaeologist | Secondary Author, Mapping |
| Pauline Ramsey | BA Anthropology | Archaeologist | Primary Author, Fieldwork |
| Madelaine Firth | BA Hons Archaeology | Archaeologist | Secondary Author |
| Neil Fenley | BA Hons Archaeology | Senior Archaeologist | Project Management, Technical Lead, Fieldwork |

## 1.5 ABBREVIATIONS

The following are common abbreviations that are used within this report:

| | |
|---|---|
| ACHA | Aboriginal Cultural Heritage Assessment |
| AHIMS | Aboriginal Heritage Information Management System |
| AHIP | Aboriginal Heritage Impact Permit |
| Burra Charter | Burra Charter: Australia ICOMOS Charter for Places of Cultural Significance 2013 |
| CBD | Central Business District |
| CHL | Commonwealth Heritage List |
| CoP | Code of Practice |
| DEC | Department of Environment and Climate |
| DECC | Department of Environment and Climate Change |
| DECCW | Department of Environment, Climate Change and Water |
| DEWHA | Department of the Environment, Water, Heritage and the Arts |
| DCP | Development Control Plan |
| Heritage Act | NSW Heritage Act 1977 |
| ICOMOS | International Council on Monuments and Sites |
| LEP | Local Environmental Plan |
| LGA | Local Government Area |
| NHL | National Heritage List |
| NLALC | Nowra Local Aboriginal Land Council |
| NPW Act | National Parks and Wildlife Act 1974 |
| PAD | Potential Archaeological Deposit |
| The Proponent | Maker ENG |
| RAP | Registered Aboriginal Party |
| Study Area | 49 Hockeys Lane and 41 Main Road, Cambewarra (Lot 6, DP1256748) |
| Shoalhaven DCP | Shoalhaven Development Control Plan 2014 |
| Shoalhaven LEP | Shoalhaven Local Environmental Plan 2014 |

Refer also to the document Heritage Terms and Abbreviations, published by the Heritage Office and available on the website: http://www.environment.nsw.gov.au/heritage/index.htm.

# 2 CONSULTATION PROCESS

This section outlines the consultation process that has been followed as part of the preparation of this ACHA.

## 2.1 INTRODUCTION

Stakeholder consultation for this project commenced in line with the Consultation Requirements (DECCW 2010a). Heritage NSW (2010a, p.iii) recognises that:

- Aboriginal people should have the right to maintain their culture.
- Aboriginal people should have the right to participate in matters that may affect their heritage directly.
- Aboriginal people are the primary determinants of the cultural significance of their heritage.

The Consultation Requirements outline a four-stage consultation process which includes:

- Stage 1 – Notification of the project proposal and registration of interest.
- Stage 2 – Presentation of information about the proposed project.
- Stage 3 – Gathering information about cultural significance.
- Stage 4 – Review of the draft cultural heritage assessment report.

Appendix A.1 contains a consultation log and evidence of all correspondences that were sent and received as part of the consultation process.

## 2.2 STAGE 1: NOTIFICATION AND REGISTRATION OF INTEREST

The following section outlines the tasks that were undertaken as part of Stage 1 of the Consultation Requirements.

### *2.2.1 IDENTIFICATION OF RELEVANT ABORIGINAL STAKEHOLDERS*

In accordance with the Consultation Requirements the following bodies were notified as part of the project proposal:

- A response was received from Heritage NSW with a list of stakeholders who may have an interest in the proposed development.
- The NLALC responded
- The South East Local Land Services replied that they had no list of stakeholders who may have an interest in the proposed development.
- The Shoalhaven City Council did not reply
- The National Native Tittle Tribunal replied with a list of stakeholders who may have an interest in the proposed development.

A search conducted by the Office of the Registrar; *Aboriginal Land Rights Act 1983* (NSW) listed that NTSCORP should be contacted for Aboriginal stakeholders for the land within the Study Area. A copy of these letters and searches are included in Appendix A.1 of this ACHA.

### *2.2.2 PUBLIC NOTICE*

An advert was placed in the South Coast Register, to run on 22 September 2021, requesting the registration of cultural knowledge holders relevant to the project area. A copy of this advert is included in Appendix A.1 of this report.

### *2.2.3 INVITATION TO REGISTER*

A total of 60 RAPs (Registered Aboriginal Parties) were contacted, with 50 being contacted by email and 10 by physical mail. A total of 8 parties replied asking to be registered as a stakeholder

to be consulted on the project, while 2 parties from NTSCORP were registered automatically as representatives of the South Coast Peoples native title claim.

As a result of the consultation procedure, the following groups shown in Table 2.1 registered as Aboriginal stakeholders with an interest in this project:

**Table 2.1 Registered Aboriginal stakeholders**

| Organisation | Contact person |
|---|---|
| Nowra Local Aboriginal Land Council | Nicole Moore |
| South Coast Peoples | Isobel Brinin, Sandy Chalmers |
| Goobah Development | Basil Smith |
| Three Ducks Dreaming Surveying and Consulting | Leonard Wright |
| Tungai Tonghi | Troy Tungai |
| JVD Corp | James Davis |
| Individual | Ronald Carberry |
| Individual | Clive Freeman |
| Individual | Graham Connolly |

## 2.3 STAGE 2: PRESENTATION OF INFORMATION

All registered Aboriginal stakeholders were provided with information outlining the proposed works, including information relating to proposed impacts as well as the project's methodology on 7 October 2021.

Copies of all correspondence relating to the provision of project information to registered Aboriginal stakeholders are included in Appendix A.3 of this report.

## 2.4 STAGE 3: GATHERING INFORMATION ABOUT CULTURAL SIGNIFICANCE

### *2.4.1 REVIEW OF DRAFT METHODOLOGY*

On 7 October 2021, Austral provided each Aboriginal stakeholder with a copy of the project methodology. The methodology outlined the proposed assessment process that would be used in the completion of the project. Aboriginal stakeholders were provided with 28 days to review and provide feedback on the methodology. The responses received are shown in Table 2.2.

**Table 2.2 Responses to methodology supplied in Stage 3 of consultation**

| Registered Aboriginal Party | Response |
|---|---|
| **Ronald Carberry** | *Ok thanks will I'll touch base after viewing the information package* |
| **Ronald Carberry** | *I would like to be included in consultation process as I have a tribal connection to that country my Elders have a input as well* |
| **Graham Connolly** | *I seen the report you have sent me the report can not be sign off with out the native owners input* |
| **Clive Freeman** | *The methodology looks great. The potential approach to test pits and the ratings and distributions of the pits work well. I agree with the methodology. One comment I would make is that i feel a few more pits could go into the slope area, just a few more pits than is listed. The ridge line is highly significant and material although not insitu in the slope would have high potential to move down to slope from the primary sites above.* |

Copies of all correspondence relating to the draft methodology from Aboriginal stakeholders are included in Appendix A.4 of this report.

### *2.4.2 INFORMATION GATHERED DURING FIELDWORK*

During fieldwork at 49 Hockeys Lane, Adrian Smith (Nowra LALC) said that Good Dog Creek was an area of particular interes and references to its sensitivity were mentioned on a few occasions during fieldwork.

## 2.5 STAGE 4: REVIEW OF DRAFT ACHA REPORT

A draft of the ACHA Report was sent on 18 March 2022 to the Aboriginal Stakeholders for review. Aboriginal stakeholders were given 28 days to review the ACHA, though no reply was received from the Aboriginal Stakeholders.

Copies of all correspondence relating to the draft ACHA Report from Aboriginal stakeholders are included in Appendix A.5 of this report.

# 3 LANDSCAPE CONTEXT

## 3.1 ENVIRONMENTAL CONTEXT

The following section discusses the study area in relation to its landscape, environmental and Aboriginal landscape resources. This environmental context has been prepared in accordance with Requirement 2 of The Code (DECCW 2010c, pp.8–9).

The study area is located within the Nowra-Durras Coastal Slopes, the area is made up of undulating slopes which overlie sandstone and siltstone. The flora of the area is predominately spotted gum (*Corymbia maculata*) forests, with an understorey of blady grass (*Imperata cylindrica*). The area also commonly includes swamps in valley floors and becomes less undulating to the south where it joins the Wandandian Coastal Plains (Mitchell 2002, p.114). The region surrounding the study area was recently farmland, with a small village of Cambewarra located nearby. It now falls within the rapid residential development that is occurring as part of the expansion of Nowra township.

### *3.1.1 TOPOGRAPHY AND HYDROLOGY*

The study area is located in a valley at the base of the Cambewarra Range. Much of the study area falls within a sloping landform that falls to the west, created by one of the ridgelines from the Cambewarra Range. The ridgeline runs parallel to the west of the study area in a north-south orientation. Test excavations have occurred along this ridgeline, with minimal artefactual material uncovered (Austral 2019, Biosis 2019).

49 Hockeys Lane consists of undulating topography. With the 4$^{th}$ order Good Dog Creek running through its centre from north to south, associated landforms include creek banks, elevated alluvial flats and floodplains. The Good Dog Creek also runs north to south across 41 Main Road, but within its western section. This property consists of similar landforms to that of 49 Hockeys Lane.

The topography of the study area is shown in Figure 3-1 and the landform units identified within the study area can be seen in Figure 3-2.

The study area is located within the Shoalhaven River Catchment area which at approximately 7,250 square kilometres is the sixth-largest coastal catchment in New South Wales.

Good Dog Creek, a 4$^{th}$ order stream cuts 49 Hockeys Lane from North to South. It flows in a southerly direction into the 5$^{th}$ order Bomaderry Creek which is approximately 1 kilometre to the south of the study area. Bomaderry Creek runs in an east-west alignment and has its confluence with the Shoalhaven River at Bomaderry.

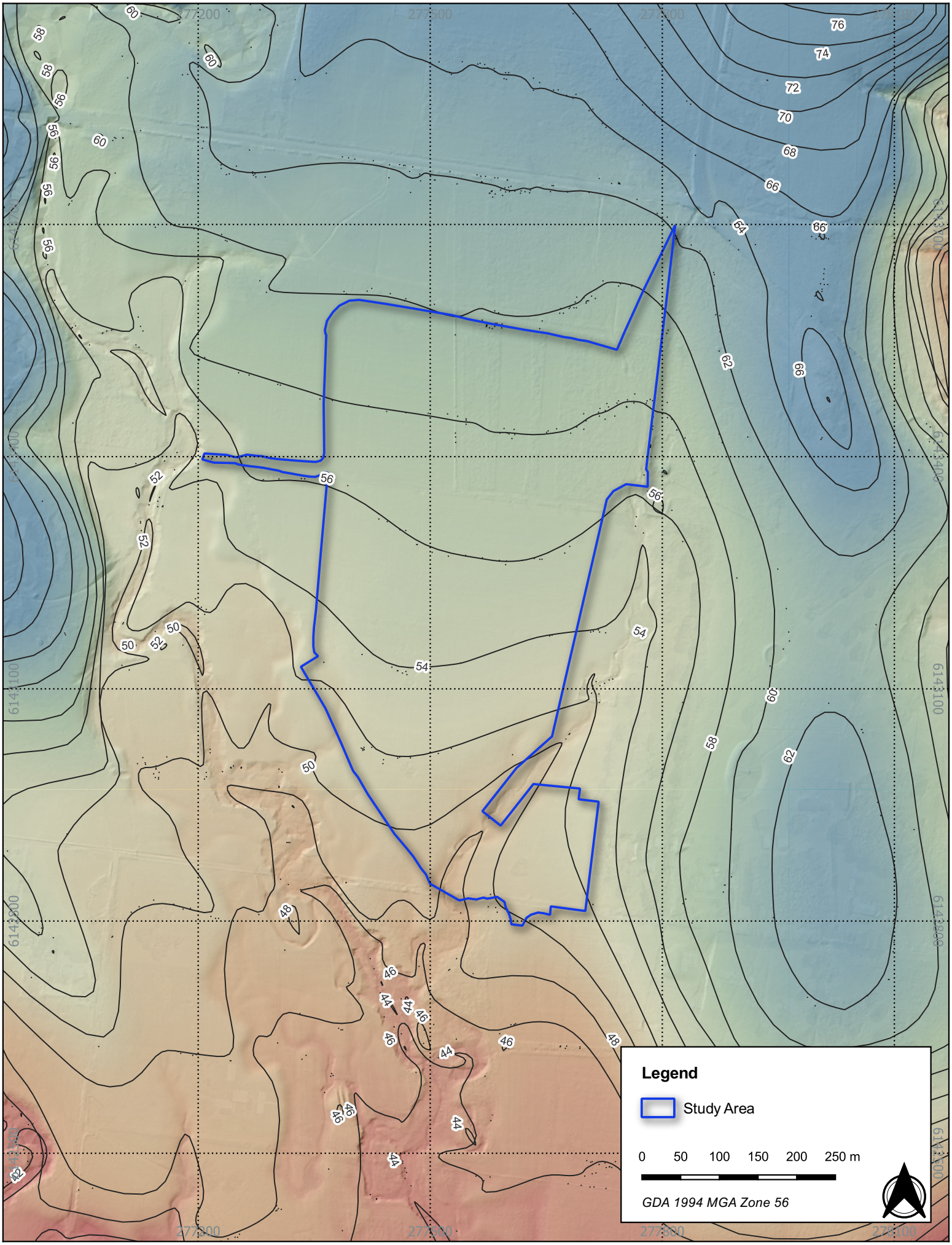



**Figure 3.1 - Topography of the study area**

49 Hockeys Lane and 41 Main Road, Cambewarra

*Source: Geoscience Australia*

*Drawn by: WA Date: 2022-03-01*

AUSTRAL ARCHAEOLOGY

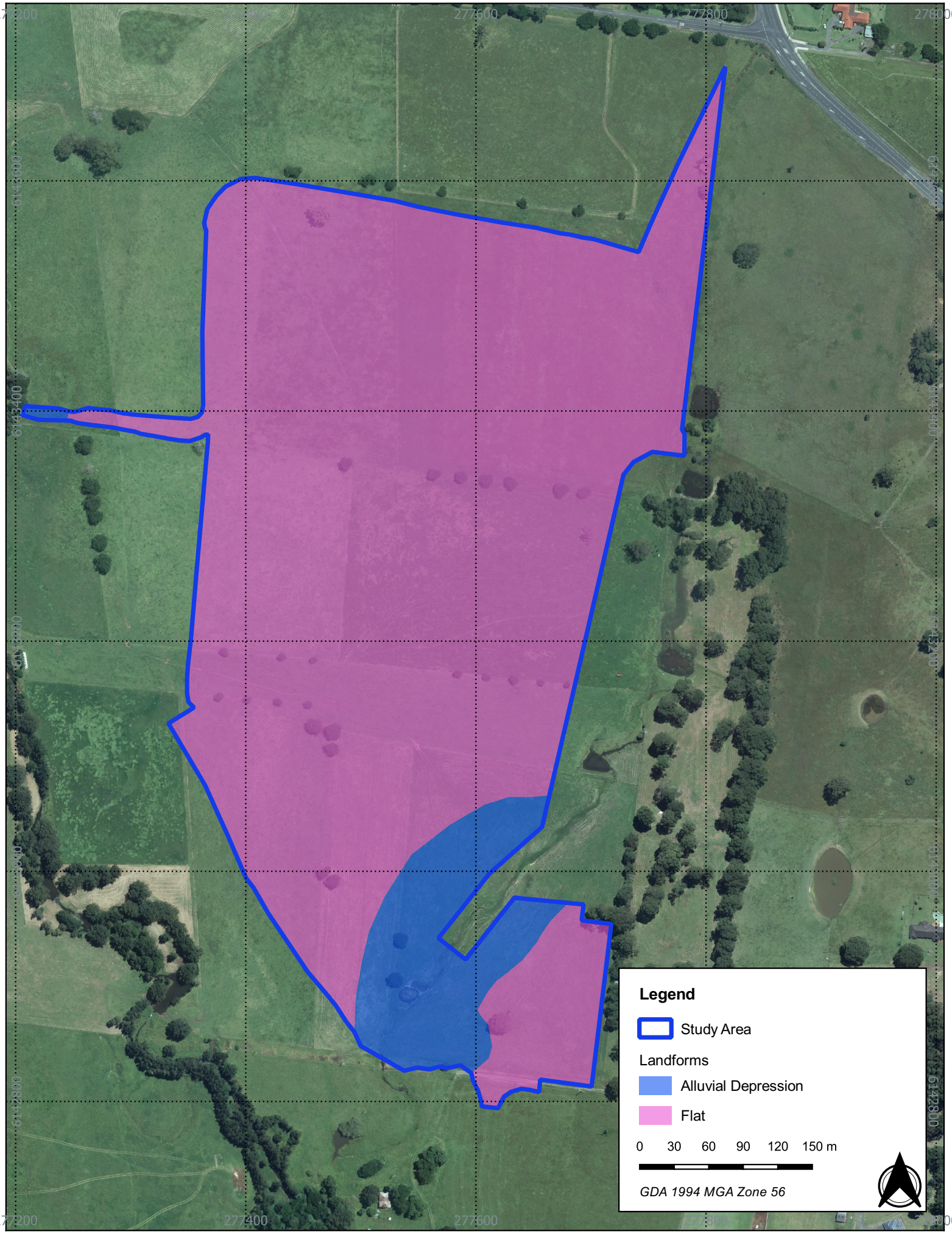



**Figure 3.2 - Landform units identified within the study area**

49 Hockeys Lane and 41 Main Road, Cambewarra

*Source: NSW LPI Aerial*

*Drawn by: ARH Date: 2022-09-13*

AUSTRAL ARCHAEOLOGY

The low lying alluvial flats adjacent to Bomaderry Creek are prone to flooding, although the alluvial flats of the study area are higher in elevation and are less flood prone. Studies have suggested that that parts of the alluvial flats immediately adjacent to Bomaderry Creek have the potential to experience flood events every five, 20 and 100 years (BMT WBM 2010, Cardno 2016). The areas that are susceptible to flooding are less likely to contain Aboriginal sites as these generally are not ideal habitation locations, whereas the elevated hill crests north of the creek lines are unaffected by flooding making them more suitable for habitation.

The hydrological systems identified within and in the locality of the study area are identified in Figure 3-3.

### *3.1.2 GEOLOGY AND SOILS*

The study area is located within two geological formations, of which the Berry Siltstone unit makes up the majority of the study area, alluvial fan deposits make up a small section along the western boundary. The Permian Berry Siltstone formation is aged between 264 and 265 million years and contains siltstones and shelf deposits of fluvial sands and gravel (Troedson & Hashimoto 2013). The quaternary alluvial fan deposits are a geological formation that is less than 2.5 million years old and contains current and recent mud, silt, sand and gravel deposited by the nearby river systems (Troedson & Hashimoto 2013).

Both geological formations within the study area lack rock types useful for stone tool manufacturing making it unlikely that quarry sites will be found in the study area.

The geological units identified within the study area are identified in Figure 3-4

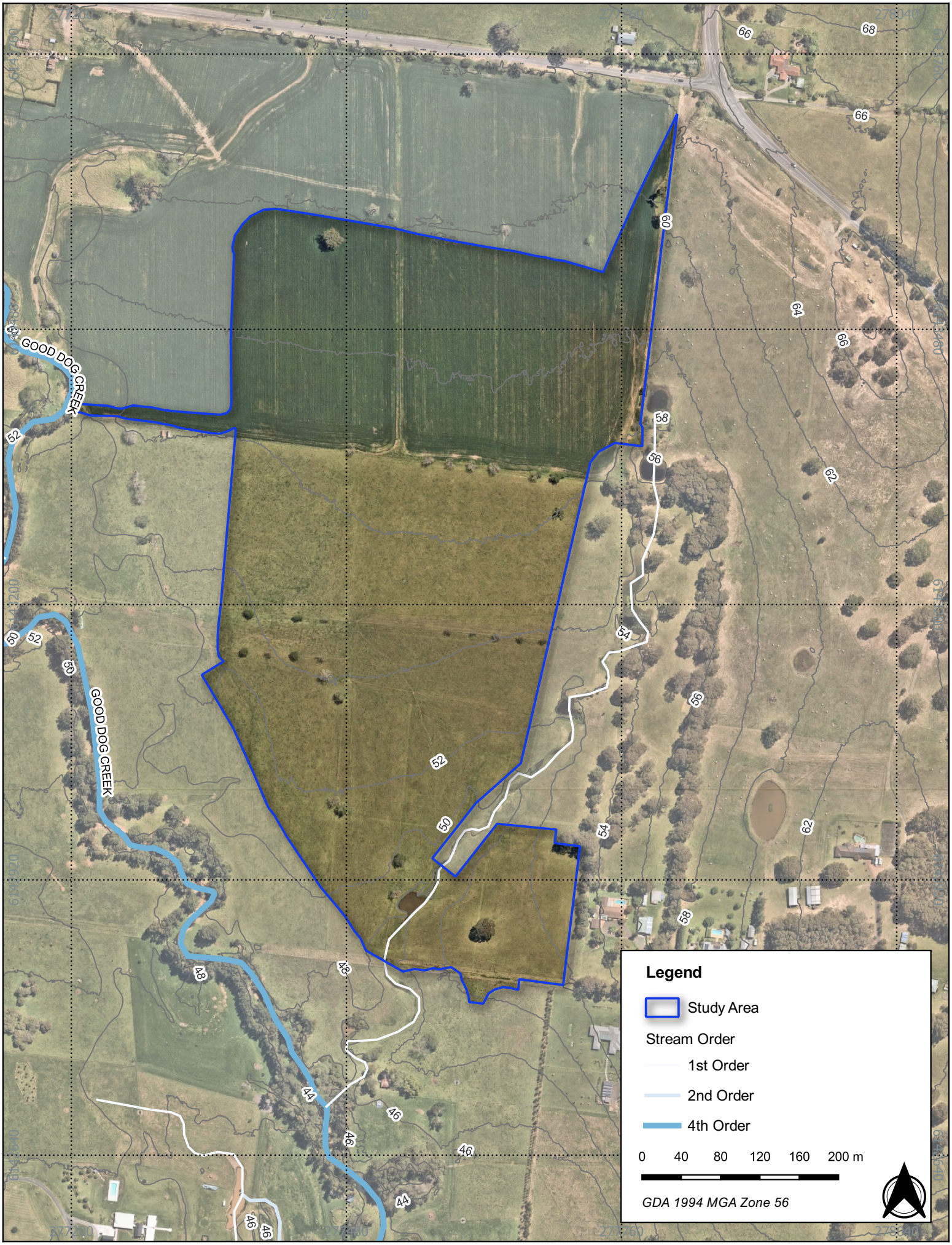



**Figure 3.3 - Hydrology of the study area**

49 Hockeys Lane and 41 Main Road, Cambewarra

*Source: Nearmap, Sixmaps*

*Drawn by: WA Date: 2022-03-01*

AUSTRAL ARCHAEOLOGY

The majority of the study area falls within the Coolongatta soil landscape with a long, narrow section along the western boundary falling within the Shoalhaven soil landscape.

The Coolongatta landscape has 4 dominant soil materials:

- **co1** – Hard setting dull brown loam, fine and sandy (topsoil)
- **co2** – Friable dark brown loam (topsoil)
- **co3** – Mottled dull reddish-brown weakly pedal sandy clay (subsoil)
- **co4** – Brown weakly pedal sandy clay loam (subsoil)

On midslopes, the Coolongatta soil landscapes are made up of 10 cm of **co1** which overlies less than 50 cm of **co4**. Total soil depth is 60 cm and boundaries are gradual between layers.

On lower slopes, the soil is made up of 10cm of **co1** overlying less than 15 cm of **co4** on top of less than 150 cm of **co3**. Boundaries are clear between layers (Hazelton et al. 1992, p.50).

The Shoalhaven landscape has 4 dominant soil materials.

- **sf1** – Hard setting brownish black fine sandy loam (topsoil)
- **sf2** – Brown weakly pedal light sandy clay loam (subsoil)
- **sf3** – Dull yellowish-brown massive sandy clay (subsoil)
- **sf4** – Dull reddish brown moderately pedal light-medium clay

On terraces, the soil is made up of 20 cm of **sf1** overlying less than 20 cm of **sf2**, which overlies 80 cm of **sf4**. Boundaries between layers are clear (Hazelton et al. 1992, p.69).

The soil landscapes identified within the study area are identified in Figure 3-5.

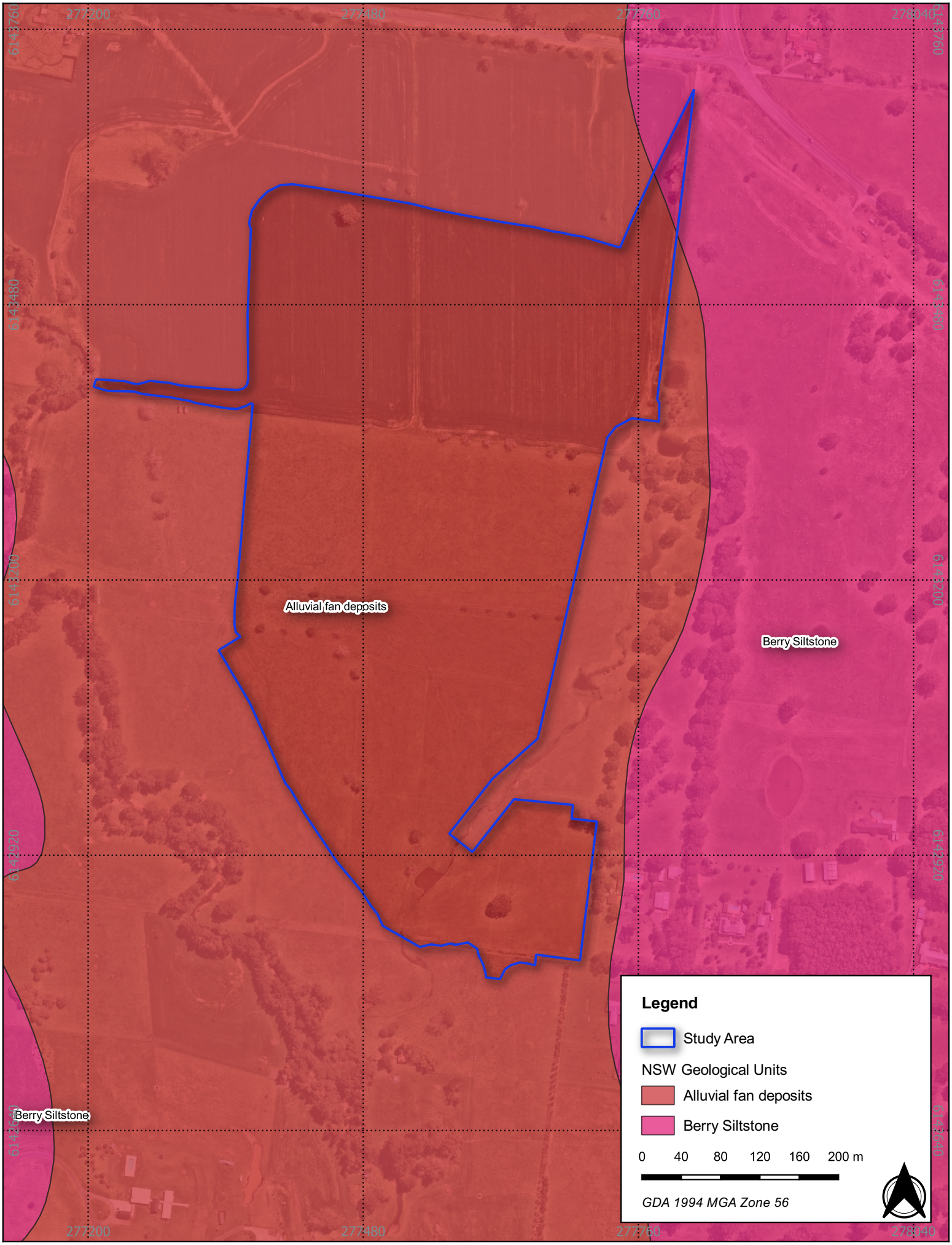



**Figure 3.4 - Geology of the study area**

49 Hockeys Lane and 41 Main Road, Cambewarra

*Source: Nearmap, NSW Seamless Geology*

*Drawn by: WA Date: 2022-03-01*

AUSTRAL ARCHAEOLOGY

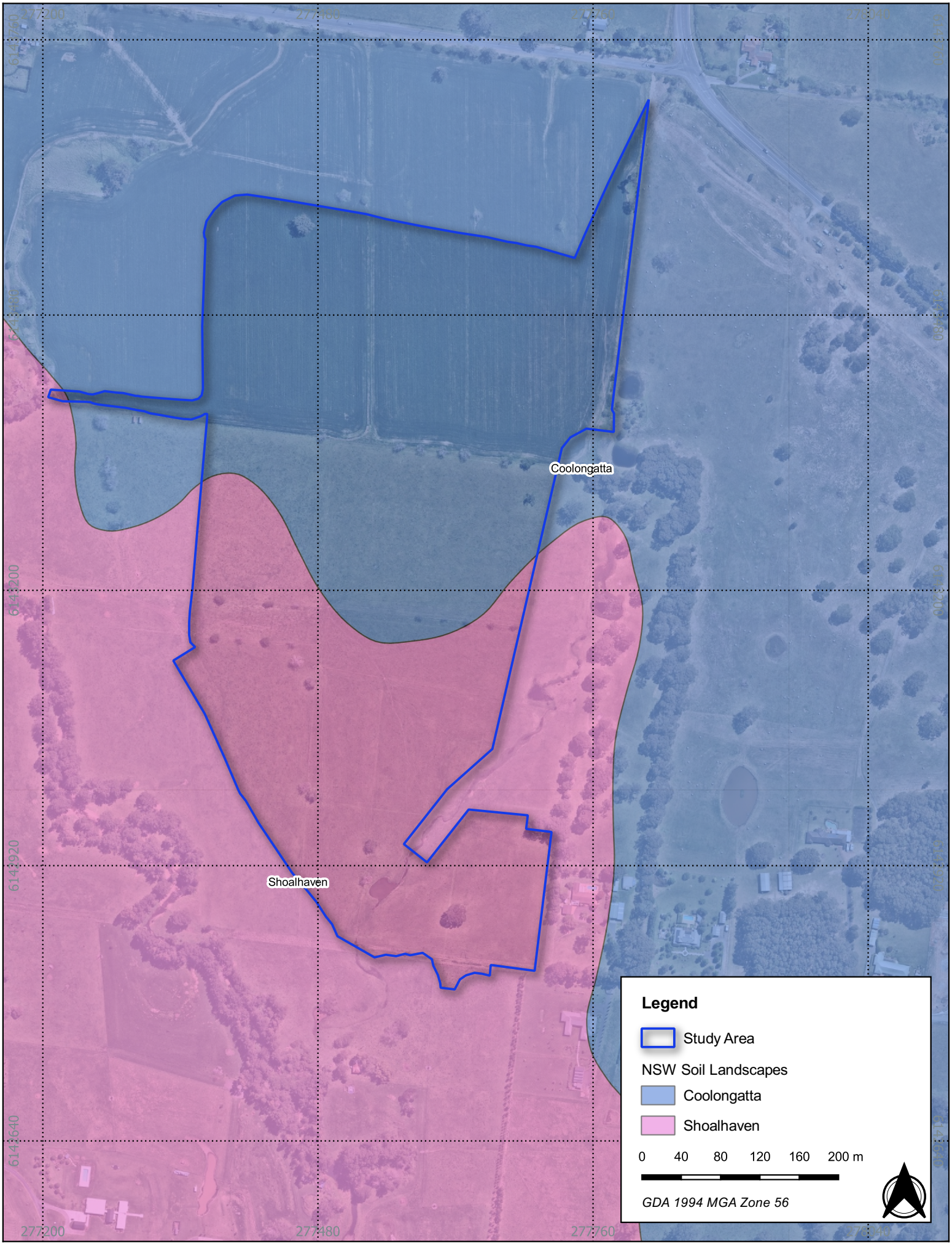



**Figure 3.5 - Soil landscapes within the study area**

49 Hockeys Lane and 41 Main Road, Cambewarra

*Source: Nearmap, NSW Soil Landscapes*

*Drawn by: WA Date: 2022-03-01*

AUSTRAL ARCHAEOLOGY

### *3.1.3 LANDSCAPE RESOURCES*

The climate of the Nowra region is warm-temperate, ranging from about $20^0$ to $26^0$ Celsius in the summer, and $10^0$ to $16^0$ degrees during winter. Rainfall totals are highest in the autumn and summer months, with annual averages of around 1,200 millimetres to 1,600 millimetres in areas near Nowra (Bureau of Meteorology 2020). This moderate climate and high rainfall would have allowed Aboriginal people to be wide spread and not tied to major or permanent water courses. It is likely the study area was used to move between the coastline and further inland through the Cambewarra range. The ridgeline to the east of the study area would have provided a relatively easy path up the to the range.

The Nowra landscape has been nearly completely cleared of native forest butwhere it remains it includes *Syncarpia glomulifera* (turpentine), *Eucalyptus punctata* (grey gum), *Corymbia maulata* (spotted gum), *Eucalyptus piperita* (Sydney peppermint), *Eucalyptus obliqua* (thin-leaved stringybark), *Corymbia gummifera* (red bloodwood), *Allocasuarina toruloa* (forest oak) and *Eucalyptus piluaris* (blackbutt) (Wesson 2005). The soft, spongy bark of the Illawarra flame tree was used to make nets and fishing lines, sap from the red bloodwood trees was utilised to tan fishing nets and stain wooden artefacts. Swamp oak bark provided material for canoe making and paperbark bark was used for bedding and blankets (Wesson 2009). Many of the vegetation species found within the vicinity of the study area were crucial for Aboriginal people and were used for numerous purposes as well providing habitat for faunal resources (Attenbrow 2010).

For a list of common resources which would have been available in the study area see Table 3.1.

**Table 3.1 Dharawal Names for common resources of the Illawarra Escarpment and their uses (DEC, 2005)**

| Common / Scientific Name | Dharawal Name | Uses |
|---|---|---|
| Lillypilly / Acmena smithii | Unknown | The bark, fruit, flower and fibre were used as food, to make rope, string, bags, eel traps, binding for shelter frames and canoes, as medicine for gastric problems and to indicate the arrival of certain animals and insects |
| Bangalow Palm / Archontophoenix cunninghamiana | Unknown | The leaves and seeds were used to make water carriers, baskets, thatching for shelters as food and to indicate the arrival of swamp wallabies, bushrats and bandicoots. |
| Lightwood / Acacia implexa | Unknown | The wood, bark and flower were used to make fish poison, weapons, implements, fibre, fire, shelter, as food and medicine. |
| Native Grape (also known as Water Vine and Kangaroo Vine) / Cissus antartica and hypoglauca | Unknown | The fruit and stem were used for making climbing hoops, medicine for stomach problems, as food and as an indicator for bandicoots, ground-feeding birds, black snakes and swamp wallaby. |
| King Orchid (also known as Rock Lily and Dagger Orchid) / Dendrobium speciosum and pugioforme | Unknown | The stem, sap and flower were used to prepare food, medicine and as an indicator for bearded dragons and blue-tongued lizards. |
| Bangalay / Eucalyptus botryoids | Bangalay | The bark, sap and flower were used to make fire, medicine, shelters, as a washing substance, painting surface and as an indicator for bees. |
| Sandpaper Fig / Ficus coronate | Murrulang, Ulowang | The fruit and leaves were used as food, to help in artefact production, as medicine and as an indicator for bats, possums and birds. |
| Lance Beard-heath / Leucopogon lanceolatus | Unknown | The berry and flower were used as medicine and as an indicator for bearded dragons and pythons. |

| | | |
|---|---|---|
| Turpentine / Syncarpia glomulifera subsp. Glomulifera | Booreeah | The flower, seed, wood, sap and resin were used to make weapons and as food. |
| Lyrebird / Menura novaehollandiae | Calboonya | Two traditional stories of the Dharawal people are associated with the Lyrebird. |
| Wonga pigeon / Leucosaraia melanoleuca | Wonga | The flesh was eaten, as well, one traditional story is associated with the Wonga pigeon. |

#### *3.1.3.1 PAST LAND-USE PRACTICES*

Modification of the natural landscape has been occurring in the Illawarra since the arrival of colonial settlers in the first half of the 19th century. Large scale modifications such as land clearing, earthworks, excavations, alterations of the hydrology of the Shoalhaven River and other creeks and streams as well as residential and industrial developments have all taken place within the region (AMBS 2006, 49). Vegetation clearance has occurred throughout most of the study area, which has resulted in erosion along the slopes and creek banks of Bomaderry Creek to the immediate east of the study area.

The first European occupation within the study area was in the 1830s when 1,280 acres of land was granted to Alexander Berry throughout the Cambewarra and Nowra regions. The land associated with Berry's grant was known as 'Cumbewarra Farm'. Berry was one of the first landholders in the region, and gave his name to the modern town of Berry, approximately 15 kilometres northeast of the study area. Berry's grant formed a small part of his landholdings, which totalled to 57,000 acres (Biosis Pty Ltd 2018a, p.17). The location of the study area within the initial grant can be seen in Figure 3-6.

The village of Cambewarra was founded in 1859 as the district of Shoalhaven continued to develop around it. By 1880 the village had grown to encompass 2 stores, 2 hotels and a large tannery. In 1899, only 1 hotel and store remained but 2 butter factories and 1 cheese factory, a testament to the growing importance of the dairy industry within the region (Cousins 1948, p.268).


**Figure 3.6 - 1895 Parish map of 49 Hockeys Lane & 41 Main Road study area**

21105 - 49 Hockeys Lane & 41 Main Road, Cambewarra - ACHA

*Source: NSW HLRV*

*Drawn by: ARH Date: 2022-04-11*

AUSTRAL ARCHAEOLOGY

# 4 ARCHAEOLOGICAL CONTEXT

The pre-European social context of the Shoalhaven region is one of small bands of Aboriginal people living a mobile hunting and gathering lifestyle. Population estimates at the time of contact are difficult to determine. The social structure of pre-European groups was stratified with elders of clans holding decision-making capabilities. Subsistence activities were sexually dimorphic and the spirituality of groups is detailed and explained through an oral tradition of Dreamtime. Such tradition records that Cambewarra is Dharawal for “a mountain on fire” (Endacott 1955, p.17). Material culture was sourced from a variety of materials such as bark, resin, shell, bone, and reeds. The hard stone material that was made into stone tools is the main element of this tool kit to remain in the archaeological record as the organic element has mainly decomposed.

The pre-European environment of the Shoalhaven region provided an extensive resource base associated with a multitude of water sources. These water sources include rivers (Shoalhaven River), lakes (Lake Wollumbola), Saltwater Bays (Jarvis Bay) and freshwater creeks (including Good Dog Creek and Bomaderry Creek) Habitats associated with these water systems supported a wide range of fish, birds, reptiles, and mammals. The pre-European Shoalhaven landscape would have been the setting for a variety of human activities. This human activity would have included camping, hunting, gathering, cooking, ceremonies, and other cultural activities associated with short-term settlement sites in the region.

## 4.1 ETHNOHISTORY

Tindale identified the Dharawal-speaking Wodi group as the Aboriginal custodians of the Nowra area (Tindale 1974, p.156). The range of the Dharawal speakers is described as the country from Botany Bay in the north and Campbelltown in the west, south through the Nepean, Wollondilly, Georges and Cataract Rivers water catchments down to the Shoalhaven River and Jervis Bay. Alternatively, Dharawal land has also been described as spreading from Sydney in the north, the Blue Mountains and Goulburn in the west, and as far south as Bega (Department of Environment and Conservation 2005, p.6, Organ & Speechley 1997). Dharawal people are often sub-divided into several smaller categories referred to as fresh water, bitter water or salt water people depending on whether they occupied the coastal regions, the swamps or the plateaus and inland river valleys (Department of Environment and Conservation 2005b, p.6).

Neighbouring Aboriginal groups included the Gundungurra, Darug, Dhurga, Awabakal and Wiradjuri people, and movement in neighbouring territories was permissible under certain circumstances. A close connection existed between the Nowra Dharawal speakers and the Gameygal Dharawal speakers who traded together, shared ceremonies, and intermarried (Department of Environment and Conservation 2005b). During the 1800s, Aboriginal people, including Nowra Dharawal speakers, were known to have moved from the Shoalhaven River down to Jervis Bay, for both food gathering and inter-tribal activities (Organ 1990); (Sefton 1981, p.15).

The pre-contact population numbers for the Shoalhaven region are not known and, due to smallpox epidemics preceding European explorers to the region, it is unlikely that early European settlers were able to successfully grasp the traditional population size. The Shoalhaven region was a very densely populated area with between 2 to 4 people present per kilometre$^2$ (Organ & Speechley 1997, p.1). It has been estimated that in 1825 there were 1,800 Aboriginal people in the Shoalhaven area, spread as far south as Batemans Bay.

After land grants were issued to settlers in the Shoalhaven region in the early 1820s, Aboriginal food supplies were destroyed and land use was forever altered through the introduction of European livestock, exotic plants and crops, tree-felling, hunting, the fencing off of lands and the enforcement of European rules about “trespassing” (Organ & Speechley 1997, p.11). From the 1850s onwards, reports indicate that Aboriginal camping and hunting became concentrated along the coast as a result of being pushed to the fringes of their own country by European settlement and farming (Department of Environment and Conservation 2005b, p.25). There was no record of large-scale armed resistance from the Aboriginal people of the Nowra area against the European settlers, but small-scale resistance including homicide, intimidation and the sabotage of European farms took place in an attempt to drive off the Europeans. Further, thefts occurred in attempts to

obtain food once traditional hunting and plant collecting practices had been disrupted by farming (Department of Environment and Conservation 2005b, p.18).

Pressure from the environmental and social impacts of European settlement led to conflict between Aboriginal groups in the Shoalhaven region. Furthermore, as vacant land disappeared, forced interaction between European settlers and Aboriginal people become more frequent, resulting in campsites being established near established European settlements with a variety of responses from the residents. The Osborne family, who settled in Marshall Mount in 1831, showed kindness to the Aboriginal people who camped opposite the old village school and provided supplies of meat and fruit each Christmas (AMBS Consulting 2006b, p.38) Biosis Pty Ltd 2010, p.45, Kass 2010, p.13).

There is no record of large-scale armed resistance from the Aboriginal people of the Illawarra against the European settlers, but small-scale resistance including homicide, intimidation and the sabotage of European farms took place to drive off the Europeans. Further thefts occurred in attempts to obtain food once traditional hunting and plant collecting practices had been disrupted by farming (DEC 2005b:18).

The earliest recorded interaction between Europeans and Aboriginal people of the Shoalhaven occurred between local inhabitants and survivors of the “Sydney Cove” shipwreck of 1797. They had ventured from Gippsland, some 657 kilometres south of Gerringong. However, before being escorted to Port Jackson, the more exhausted survivors are thought to have perished at the hands of hostile local Aboriginal groups (Maunsell Australia & Navin Officer 2007, p.8).

The discovery of the region’s rich supply of soft woods, specifically cedar trees, encouraged the official and illegal settlement of the Illawarra. The Shoalhaven River, approximately 3.5 kilometres south of Cambewarra, was first sighted in 1797 by George Bass during his early navigations around the south-eastern coast of NSW. Exploration of the region followed shortly, in 1805 when government Surveyor James Meehan sailed the mouth of the Crookhaven and surveyed the Shoalhaven Valley (Peter Freeman Pty Ltd & JRC Planning Services 2003, p.17). During his travels, he noted the region’s rich soft wood resource, which started the cedar getter period (Maunsell Australia & Navin Officer 2007, p.8).

Of Aboriginal people living in Kiama in the 1840’s, William Burliss, wrote in 1840:

> “*It would appear that then dense scrub which existed between Kiama and Gerringong was a great resort to them, having all the natural facilities of a romantic and hunting character.”* (Organ 1993, p.268).

Continued expansion of European cedar cutters into the Shoalhaven, and increased settlement on the coast, resulted in pressures on the Aboriginal communities of the area. Occupation of the Illawarra by Aboriginal groups continued for the next two decades following the start of the Cedar getter period. Despite European appropriation of the land, some Aboriginal groups helped colonists explore the Illawarra to find good grazing or agricultural land (Peter Freeman Pty Ltd & JRC Planning Services 2003, p.16). Hostilities around the Shoalhaven River were not recorded more precisely at this time.

Passing indications of push back by Aboriginal communities are found in early ethnohistorical accounts. As the Shoalhaven remained mostly unmonitored for most of its early settlement. Accounts such as those kept by Lieutenant William Breton during his southward’s expeditions in 1834, which describe how three “natives persuaded a convict servant to accompany them in search of cedar…”. The tail ends with the convict pushed over a cliff and his tongue removed (Breton 1835). Furthermore, in 1815, three cedar cutters were also found to have been murdered by Aboriginal people shortly after arriving in the Shoalhaven (Maunsell Australia & Navin Officer 2007, p.8).

Depictions of this period are painted by Mickey of Ulladulla, an Aboriginal artist who was a member of the Dharug Group. He lived between 1825 and 1891, his drawings use European tools such as pen and paper, to depict the traditional lifestyle of Aboriginal peoples in the Shoalhaven during his time (Peter Freeman Pty Ltd & JRC Planning Services 2003, p.16). Figure 4-1 showcases one of Mickey’s pieces which illustrates kangaroos, an Echidna, Eucalyptus and a gathering of the Dharug groups among other things which made-up this local Aboriginal artist’s life. The combination of

traditional style drawings with the use of colonial instruments showcases the important cultural assimilation which was occurring during Mickey of Ulladulla's lifetime.

**Figure 4-1 "Corroboree with Na" by Mickey of Ulladulla, painted in ca. 1885**

The village of Cambewarra grew in the foothills between Bomaderry and Kangaroo Valley as colonial presence increased in the region. It was first settle in 1850 by Europeans as a farming settlement on the fringes of Berry and the fledging Shoalhaven municipality. By 1880 the village had grown to encompass 2 stores, 2 hotels and a large tannery. In 1899, only 1 hotel and store remained but 2 butter factories and 1 cheese factory, a testament to the importance of the dairy industry within the region (Cousins 1948, p.268).

## 4.2 PREVIOUS ARCHAEOLOGICAL WORK

The material evidence of Aboriginal land use has been compiled based upon a review of previous archaeological studies at a regional and local level, heritage database searches and field investigations.

An increase in archaeological studies focused on the Shoalhaven region over the last two decades has cast a new light on previously held views on Aboriginal population size and land use. The limited ethnographic accounts of early settlers were once considered the primary source for archaeological enquiry but with the recent spread of urban development within the Nowra environs, archaeological investigations have increased and contributed a more detailed understanding of land use patterns.

The major studies which have contributed to our understanding of the Shoalhaven area and those with direct relevance to the study area through their proximity are outlined below. Reference is made to the main trends borne of these investigations providing a broad framework in which to base the current study.

### *4.2.1 REGIONAL ARCHAEOLOGICAL CONTEXT*

Many of the earliest archaeological models were either developed for the entirety of the southern New South Wales coastline, stretching from Sydney south to Batemans Bay or concentrated on the Sydney region (Navin 1987). These settlement models focussed on seasonal mobility, with the

exploitation of inland resources in winter and coastal resources in the remainder of the year (Poiner 1971, Poiner 1976).

Whilst most academic studies in the region have focused on coastal and sandstone formations, the Shoalhaven has been subject to several regional assessments that have sought to combine the results of small consultancy-based assessments (plus additional research) into regional level assessments of the known archaeological resource and estimated archaeological potential for the Illawarra Region. Several recent development-driven excavations and council-driven heritage studies have been undertaken in the Illawarra and Shoalhaven regions, leading to an improvement in our knowledge of settlement patterns of the area. These include Sefton (1980), Boot (2002), Clarke and Huskie (Clarke & Huskie 2006), Navin Officer (2010) and (2012).

These reports, as relevant to the Study Area are summarised below.

### ABORIGINAL CULTURAL RESOURCES STUDY OF THE ILLAWARRA REGION

Sefton (1980) undertook an Aboriginal Cultural Resources Study of the Illawarra Region and identified the following categories of Aboriginal sites: archaeological deposits in caves, rock shelters and overhangs; midden deposits; open campsites; axe grinding grooves; water channels; canoe, shield or container trees; quarries; burials; paintings; rock engravings; carved trees; ceremonial grounds; stone arrangements; and natural sacred sites (Sefton 1980, pp.21–27).

Sefton (1980, pp.29–31) associated Aboriginal sites with the following environmental features:

- The zone from the coast to the upper reaches of estuaries was identified as having potential for middens, archaeological deposits, surface campsites and burials.
- Flat surfaces and overhangs where Hawkesbury sandstone and Shoalhaven group sandstone and conglomerates outcrop and/or overlay softer siltstones and shales were identified as having potential for engravings on Hawkesbury sandstone, axe grinding grooves, water channels, shelters with archaeological deposit, art sites, surface campsites and stone arrangements.
- Alluvial plains and the well-drained hill slopes alongside them had potential for scarred trees, open sites, shelter sites and shelters with art.
- Areas of stone outcrops or exposures suitable for use in making stone tools may contain quarries and other archaeological sites.
- Prominent natural features of the landscape such as high mountain peaks, rock outcrops and lakes may also be culturally significant as natural sacred sites; such areas may not necessarily have associated archaeological deposit.

Sefton's initial model formed the basis for the later regional models formulated by Mary Dallas Consulting Archaeologists (1995), AMBS (2006a, 2006b) and GML Heritage (2016).

## STREAM ORDER ST MARYS EXCAVATION

Another useful tool for predictive modelling is that based on stream orders. While developed by McDonald during her work on the Cumberland Plain, stream order modelling has been adapted and implemented as a modelling methodology for the entire eastern seaboard of Australia. The basis of stream order modelling is that it can be used to anticipate the potential for Aboriginal campsite locations to be present in the landscape based on the order of water permanence. McDonald (McDonald 1997a, McDonald 1997b, McDonald 1999, McDonald 2000) in particular has drawn on stream order modelling to forecast the potential nature and complexity of sites. These models can also be used to predict site distribution, the possible range of activities carried out at a particular site and the frequency and/or duration of occupation.

Analysing stream order can allow researchers to locate areas of past water permanence, which would have been vital for Aboriginal people. Abundant food and other resources are more likely to occur in areas of water permanence which would, in turn, attract Aboriginal occupation. McDonald's excavations of open artefact scatter sites at the ADI site in St Marys provided evidence of such a correlation (McDonald 1997a, p.13).

According to McDonald, the range of lithic activities and the complexity of the resulting stone assemblage observed at a location of permanent water differ depending on stream order. Overall, artefact scatters in the vicinity of a higher-order ranking stream reflect a greater range of activities (e.g. tool use, manufacture and maintenance, food processing and quarrying) than those located on lower-order streams. Temporary or casual occupations of a site, reflected by an isolated knapping floor or tool discard, are more likely to occur on smaller, more temporary watercourses (McDonald 1997a, pp.135–137).

It is, therefore, possible, McDonald concluded, that stream order modelling could be utilised to make general predictions about the location and nature of Aboriginal sites on the Cumberland Plain, while also providing general guidelines which can be transposed throughout New South Wales. Water permanence (i.e. stream order), landscape unit (i.e. hilltop, creek flat) as well as the proximity to artefact raw materials can result in variations in the density and complexity of an Aboriginal archaeological feature (McDonald 2000, p.19). Site location and duration of occupation predictions, therefore, relate to stream order in the following ways:

- In the headwaters of upper tributaries (i.e. first-order creeks) archaeological evidence will be sparse and represent little more than a background scatter.
- In the middle reaches of minor tributaries (second-order creeks) archaeological evidence will be sparse but indicate focussed activity (e.g. one-off camp locations, single episode knapping floors).
- In the lower reaches of tributary creeks (third-order creeks) will be archaeological evidence for more frequent occupation. This will include repeated occupation by small groups, knapping floors (perhaps used and re-used), and evidence of more concentrated activities.
- On major creek lines and rivers (fourth-order), archaeological evidence will indicate more permanent or repeated occupation. Sites will be complex, with a range of lithic activities represented, and may even be stratified.
- Creek junctions may provide foci for site activity; the size of the confluence (in terms of stream ranking nodes) could be expected to influence the size of the site.
- Ridgetop locations between drainage lines will usually contain limited archaeological evidence although isolated knapping floors or other forms of one-off occupation may be in evidence in such a location (McDonald 2000, p.19).

## LOWER SHOALHAVEN RIVER VALLEY ABORIGINAL HERITAGE & CULTURAL MAPPING

In 2006 Clarke and Kuskie (Clarke & Huskie 2006) developed a predictive model of the Shoalhaven region in general. They suggested that the region could be divided into two main resource zones, each supporting a different range of occupation types. These zones were called Primary and Secondary zones, and were defined by terrain units (landforms) as follows:

- Primary resource zones occur near the Shoalhaven and Crookhaven Rivers and have a higher probability of containing evidence for a wide range of occupation types including

congregations of large groups of people, community base camps, nuclear/extended family base camps, camping by small hunting and/or gathering (without camping) and transitory movement. Occupation is likely to have been regular and potentially longer in duration in the primary zones.

- Secondary resource zones are located near higher-order creeks and/or wetlands, including Bomaderry, Mundamia, Calymea, Flat Rock, Bengalee and Sandy Creeks and their associated flats, slopes and terraces. Occupation is likely to have been sporadic and relatively short in duration.

Areas outside the primary and secondary resource zones include landforms some distance from higher-order creeks and/or wetlands, such as lower-order drainage depressions and associated slopes and crests. Occupation in these areas is likely to have involved hunting and/or gathering (without camping) and transitory movement and is likely to have been sporadic and very short in duration (Clarke & Huskie 2006, p.2).

Clarke and Kuskie (Clarke & Huskie 2006) also found that artefact scatters are likely to be the most common site type in the area, with potential for stone artefact evidence to occur across virtually the entire region. Typically, artefacts would occur in low densities consistent with background discard, though occasional areas of high density would occur, characteristically at campsites within a primary resource zone.

Rock shelters and axe-grinding grooves occur with relative frequency in the search area. Rock shelters are more likely to be located in moderate to steep drainage depressions or spur crest units, although they can also occur in gently sloping terrain where suitable stone outcrops occur. It is possible that larger shelters situated close to a wide variety of resources may have been used as base camps, with smaller shelters utilised when needed. Art sites may occur in any area with a suitable surface. Likewise, grinding grooves may occur in any area with suitable stone outcrops (such as sandstone), generally immediately next to a water source (Clarke & Huskie 2006).

Although other consultants have undertaken more recent work around the Shoalhaven area, these reports either contain predictive models which are similar to those listed above or are too recent to be obtained from the AHIMS database.

### GERRINGONG TO BOMADERRY PRINCES HIGHWAY UPGRADE

A predictive model for the region was developed during a preliminary survey undertaken as part of the Gerringong to Bomaderry Princes Highway Upgrade (Navin Officer Pty Ltd 2007). This model was based on the results of previous studies completed in the development footprint as well as the broader region (Corkhill 1986, Donlan 1991, Kuskie & Navin Officer 1995, ERM Mitchell McCottery 1998, Paton 1992, Navin Officer 2000, Jo McDonald Cultural Heritage Management 1999, Navin Officer 2006).

According to the predictive model developed for this project, Aboriginal archaeological sites were considered likely to occur in varying densities and over a broad topographic range of landforms within the Illawarra Coastal Plains. Sites with longer-term occupational use or where food preparation and resource manufacture was undertaken were considered to likely result in higher densities of archaeological material at such sites. The likelihood of such sites occurring was considered dependent on certain topographic elements associated with a location, with the following predictions made:

- Preferred locations will be characterised by relatively level ground or areas with a low slope gradient (such as low-gradient basal slopes adjacent to the valley floor), lower valley elevation, terminal sections of major spurs and ridgelines, level ground on crests, spurs and ridgelines, foothills of alluvial terraces and sand dunes.
- Well drained and locally elevated landforms, such as elevated banks and margins of wetlands, rivers and creeks and low gradient crests and basal slopes within the coastal Plains represent additional landforms that were likely favoured for occupation due to their well-drained and elevated nature.
- Ridges and spurlines may contain sites associated with their use as travelling corridors, linking people to the resources of the coast, coastal plains and the Escarpment. Artefact

densities are expected to be clustered more densely in association with large and more prominent ridgelines, as well as those closer to freshwater resources.

- Crests in association with saddles may have provided a good vantage point and/or additional travelling corridors between steeper hills and may therefore additionally provide evidence transitory use.
- Sheltered landforms protected from harsh environmental conditions were likely favoured.
- Sites are more likely to occur in proximity to a permanent freshwater resource.
- Sites are more likely to occur in locations bordering several ecotones, where a range of resources could have been accessed.
- Older sites will likely be in the form of stone artefacts and middens sites. Such sites are likely to occur in remnant or aggrading dunes, fossil beach ridges and shoreline features, alluvial terraces and fans, colluvial slope deposits as well as source bordering zones. These deposits can date anywhere between 6,000 and 5,000 years ago.
- While meadows and pastoral fields are often overlooked as areas of potential due to their intermittent or permanent flooding, ethnographic accounts by Dicky Woods indicate that such areas may preserve evidence relating to tribal battles and burials (Navin Officer 2010, p.54).

Based on the results of the subsurface testing program completed at several Potential Archaeological Deposits (PADs) for the project, the following predictions were added to the predictive model (Navin Officer 2010):

- Valley floor contexts with alluvium soils in proximity to lower order streams are likely to be associated with low density archaeological material.
- Well drained, elevated and/or low gradient landforms located in the valley floor alluvium soils as well as in proximity to a known or predicted wetland basin, are considered as being of high archaeological potential.
- Riparian corridors associated with higher order streams are considered as being of high archaeological potential.
- Ridges and spurline crests and adjacent slopes may contain evidence relating to their transitional use as potential travel routes (Navin Officer 2010, p.44).

## PRINCES HIGHWAY UPGRADE FOXGROUND

Following the results of the Gerringong Upgrade testing program, a revised and more refined predictive model was developed for the proposed Princes Highway upgrades between Toolijoa Road, north of Foxground and Schofields Lane, south of Berry NSW (Navin Officer Heritage Consultants 2012) This model found that the most effective method for identifying and assessing the archaeological resource of the Illawarra Coastal Plains was to use a combination of archaeological testing and the continuous development of predictive modelling. The following conclusions were reached based on the results of this study:

- The relatively sparse number of recorded Aboriginal sites in the Illawarra Coastal Plains is a result of the overall low ground surface visibility within the region rather than the lack of Aboriginal activity.
- Spurs, crest ridgelines, spurlines and other elevated landforms found within 200 meters of wetland basins are more likely to contain archaeological material. Such basins would include the Omega Flat basin which has well defined boundaries, with clear elevated margins in certain areas.
- Based on ethnographic evidence gathered, meadows may have occupied valley floors with no prior estuarine origin, or sensitivity to flooding. These areas, hold high scientific research potential. Investigations into these areas would greatly increase the Aboriginal archaeological literature of the area (Navin Officer 2012, p.54).
- Alluvial flats are considered to hold low archaeological potential. Sites found in this landform tend to be low-density scatters most likely explained by cold air drainage, dense vegetation cover and poorly drained ground, which made these areas less suitable for occupation.
- Valley floors, found on alluvium and located at greater distances from higher order riparian zones are unlikely to hold dense and rich archaeological deposits.
- Although riparian corridors associated with higher order streams were previously predicted to have high archaeological sensitivity, the results of the Gerringong Upgrade testing program did not support this statement. The archaeological potential of such areas must be determined on a case-by-case basis involving physical assessment (Navin Officer 2012, p.55).
- Most sites have been found near ecotones, where greater access to varied resources was possible (Navin Officer 2012, p.56).
- Artefact sites (including isolated artefacts or artefact scatters of varying densities) are the most likely site type within the region.
- The average artefact density of sites investigated as part of the Princes Highway Upgrade in the Illawarra Coastal Plains ranges from 2.5 to 10 artefacts per square metre with artefacts typically found at a depth of 400 millimetres. These sites are more likely present within landforms which have relatively level and elevated ground and close to freshwater and/or resource zones (Navin Officer 2012, p.57).

Table 4.1 outlines micro-topographic variables found to hold higher archaeological sensitivity and the landforms associated with these variables based on the results of this assessment.

**Table 4.1 Summary of the micro-topographic traits with high archaeological potential (Navin Officer 2012, p.56)**

| Micro-topographic traits | Associated landform types |
|---|---|
| Low gradient slope, relatively level ground in proximity to a higher order stream (third order or above) | Low gradient basal slopes adjacent to the valley floor as well as the terminal section of a major spurs and ridgeline where they join or cross the valley floor. |
| Sheltered context. | Large mature fig trees. |
| Lack of surface rock exposure and gravel. | Banks of rivers and creeks. |

| Micro-topographic traits | Associated landform types |
|---|---|
| Short distance to a freshwater source. | Foothill of alluvial terraces. |
| Short distance from a resource area. | Elevated sand bodies outside of coastal barriers, dune systems, beach ridges, flats, infilled estuaries and source bordering zones. |
| Locally elevated area with well-draining surface. | Low gradient or level crests of spurs and ridgelines. |

A limitation of this model is of course the restrictions of the area surveyed and tested. Only a sample of the landforms representative of the Illawarra Coastal Plains were assessed as part of the previous investigations into the Princes Highway upgrade (Navin Officer 2012, p.54).

**Table 4.2 Summary of relevant regional reports.**

| Reference | Study area location/description | Results | Site distribution/Conclusions |
|---|---|---|---|
| Artefact Heritage Pty Ltd 2018 | ACHA for the proposed construction of a new bridge on the Princes Highway over the Shoalhaven River at Nowra. A test excavation program was conducted as part of the assessment.<br>Situated 4km southeast of the study area.<br>Entire study area was divided into 6 survey units.<br>Landforms identified included flat, slope, hilltop, cliff top, cliff face, embankment. | 5 sites identified, including Nowra Bridge 6 (# 52-5-0872), Nowra Bridge 7 (# 52-5-0875), Nowra Bridge 8 (# 52-5-0876), Nowra Bridge 9 (# 52-5-0874) and Nowra Bridge 10 (# 52-5-0873).<br>An archaeological survey was also conducted during the project due to changes in the development. One new Aboriginal site was identified (Nowra Bridge 11 (#52-5-0878). | 5 PADs were identified and test excavated. 2 PADs identified at flat and hill top each, 1 PAD within the slope landform and 2 PADs within the cliff face and cliff top landforms.<br>The test excavations identified 4 low density artefact scatters and one habitation site.<br>Nowra Bridge PAD 1 (AHIMS 52-5-0859) had human teeth from one of the test pits. |
| Navin Officer Heritage Consultants 2012 | Archaeological survey and test excavation for 11.6 kilometre upgrade to the Princes Highway between Toolijooa Road north of Foxground and Schofields Lane south of Berry in New South Wales (NSW).<br>Situated 13km northeast of the study area. | 29 Aboriginal heritage sites within the project area, including: two stone artefacts, 23 'potentially archaeological sensitive areas' (PADS) and four historical recordings of places of Aboriginal cultural significance.<br>21 PADs were selected for testing.<br>Test excavation resulted in 18 out of the 21 PADS yielding 236 stone artefacts. | 236 artefacts were obtained from 298 test pits excavated in 21 PADs.<br>7 stone materials were identified.<br>Assemblage was dominated by flakes (58%) and flaked pieces (19.1%).<br>Artefacts mostly found in locally elevated micro-topographies within a 200-metre margin around former wetland basins, such as low gradient basal slopes and the crests of low spurs.<br>Lower lying alluvial flats in valley floors have low archaeological sensitivity. |

| Reference | Study area location/description | Results | Site distribution/Conclusions |
|---|---|---|---|
| Navin Officer Heritage Consultants 2010 | Assessment of upgrade to the Princes Highway between Mount Pleasant and Toolijooa Road in NSW.<br>20km north east of the study area. | 2 Aboriginal Sites within or near the survey area with sub-surface and surface artefacts as well as PADS.<br>Low to very low artefact densities. In addition, five mature fig trees deemed to hold contemporary Aboriginal cultural significance.<br>The test excavation sites were located on elevated topographies adjacent to major creek lines, as well as in or near riparian corridors and major ridge crests. | 12 Aboriginal sites were found in or within the study area with low to very low artefact densities. |
| Kelleher Nightingale Consulting Pty Ltd 2010 | Archaeological assessment completed for the proposed North Nowra Link Road.<br>5km southeast of the study area. | 28 Aboriginal sites, which included four artefact scatters, two isolated finds, one midden site, one grinding groove site and 20 rock shelter sites along the Bomaderry Creek Regional Park. | It was concluded that the study area had a high density of Aboriginal material and that the surrounding area was occupied to a high degree by previous Aboriginal populations.<br>Most sites were in disturbed context and assessed to have low archaeological significance. |
| Kuskie 2008 | Aboriginal Heritage Impact Assessment for a proposed Ethanol Plant Upgrade at Shoalhaven Starches, NSW.<br>5.5km southeast of the study area. | The assessment found that there was low potential for Aboriginal heritage objects in due to the type of landform, i.e., low lying coastal plains. | No Aboriginal heritage evidence or cultural values were identified within the study or during the investigation. |

| Reference | Study area location/description | Results | Site distribution/Conclusions |
|---|---|---|---|
| Navin Officer Heritage Consultants 2006 | Test excavation program for the Gerroa Sand Mine extension.<br><br>25 km east of the study area. | The testing included using a mechanically driven auger and included 51 test pits<br><br>A total of 39 artefacts were recovered from five of the test pits, and shell midden material was recovered from 26 of the test pits.<br><br>The recovered assemblage was dominated by complete and broken flakes, with other artefact types being rare.<br><br>Raw material comprised mostly silcrete, quartz and chert, with sandstone, chalcedony and volcanic materials were also present.<br><br>Coastal Plains and sand dune landforms. | The artefacts were widely distributed across the site<br><br>It was concluded that the site represented low-density background scatters. |
| Silcox 1990 | Archaeological assessment of Aboriginal and Historic sites within the anticipated Pacific Highway upgrade between Dunmore and North Kiama NSW.<br><br>45km northeast of the study area. | Four Aboriginal sites featuring artefacts associated with shell middens were found and two potential camp sites.<br><br>These results highlight that middens in estuarine environments are usually located on elevated topographies around estuary margins or on the raised surfaces of older sediment deposition above their inundation zones. | Four Aboriginal sites were identified during the assessment. |

### *4.2.2 HERITAGE DATABASE SEARCH*

A search of the AHIMS database was undertaken on 10 November 2021 (Client Service ID 637590). The results of the AHIMS search identified 103 previously recorded sites within a three-kilometre radius of the study area. Identified sites within or adjacent to the study area are summarised in Table 4.4 and identified in Figure 4-2. The search indicates that artefact sites are the predominant site type with 61.17% of known sites belonging to this category, followed by Potential Archaeological Deposits (PADs) with 11.65% of known sites.

**Table 4.3 Summary of sites recorded within 3-kilometres of the Study Area**

| Site Type | Total | % |
|---|---|---|
| Art (Pigment of Engraved) | 3 | 2.91 |
| Art (Pigment or Engraved), Artefact | 2 | 1.94 |
| Art (Pigment or Engraved), Artefact, Potential Archaeological Deposit (PAD) | 2 | 1.94 |
| Artefact | 63 | 61.17 |
| Artefact, Grinding Groove | 1 | 0.97 |
| Artefact, Grinding Groove, Habitation Structure | 1 | 0.97 |
| Artefact, Habitation Structure | 1 | 0.97 |
| Artefact, Potential Archaeological Deposit (PAD) | 10 | 9.71 |
| Grinding Groove | 2 | 1.94 |
| Grinding Groove, Habitation Structure | 1 | 0.97 |
| Habitation Structure | 3 | 2.91 |
| Modified Tree (Carved or Scarred) | 2 | 1.94 |
| Potential Archaeological Deposit (PAD) | 12 | 11.65 |
| **Total** | **103** | **100.00** |

One site was identified within the study area in a previous assessment AHIMS pending. Another site, outside the study area to the northwest was identified and is AHIMS pending. No other recorded sites are identified within the study area.

**Table 4.4 Summary of sites recorded within the study area and adjacent**

| Name | AHIMS # | Type | Location Landform | Cadastral Boundary |
|---|---|---|---|---|
| 104 Taylors Lane IF1 | 52-5-0916 | Artefact | Ridgeline | Lot 3/DP851823 |
| 104 Taylors Lane AFT1 | 52-5-0915 | Artefact | Ridgeline | Lot 3/DP851823 |
| 104 Taylors Lane AFT2 | 52-5-0914 | Artefact | Ridgeline | Lot 3/DP851823 |
| Moss Vale Road AFT1 | 52-5-0880 | Artefact | Slope | Lot 1/DP949932 |
| Illaroo Road | 52-5-0923 | Artefact | Ridgeline | Lot 8/DP1256748 |
| Taylors Lane Artefact 1 | 52-5-0871 | Artefact | Ridgeline | Lot 10/DP1256748 |

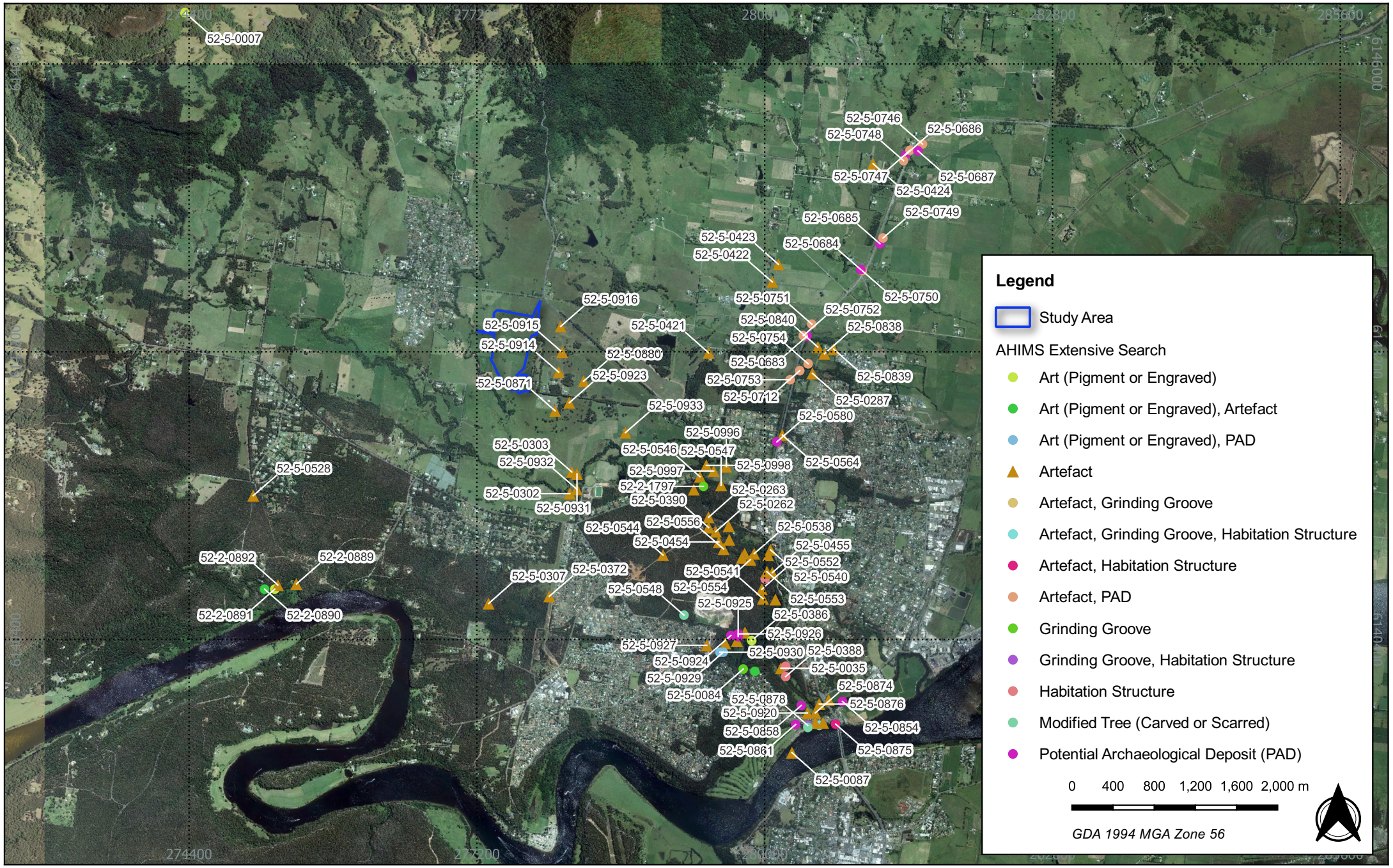



**Figure 4.2 - Identified AHIMS sites in relation to the study area**

21105 - 126 Taylors Lane, 49 Hockeys Lane and 41 Main Road, Cambewarra ACHA

*Source: OSM, NSW LPI Aerial, AHIMS* *Drawn by: WA Date: 2022-03-01*

AUSTRAL ARCHAEOLOGY

Most recorded sites within the vicinity of the study area are concentrated along the ridgeline to the east of the study area. It appears that this landform was a locus of travel through the area north and south, up or down the Cambewarra Range. The previously located artefacts that fall within the study area may have been washed down from the ridgeline above the study area as part of a natural process. As artefacts were found on the alluvial flat to the west of the study area, it is also possible that the artefacts are still in situ and the study area was occupied by Aboriginal people.

### *4.2.3 LOCAL ARCHAEOLOGICAL CONTEXT*

Although European observers recorded various aspects of the lifestyles of Aboriginal people in the Shoalhaven from the early years of European settlement of the area in the late 18th century, it was not until the 20th century that archaeological investigations of Aboriginal archaeological sites were undertaken.

Since then, archaeological sites have been frequently recorded across the region, and hundreds have been excavated. Most commonly, these contain open scatters of archaeological material such as stone artefacts, engraved or pigmented images or midden material.

Much of the archaeological work in the local area has been undertaken as a result of development-driven archaeological studies or surveys.

A review of the local Aboriginal archaeological studies completed either within or in the vicinity of the study area is outlined in Table 4.5 as well as the following section.

**Table 4.5 Summary of past reports in the vicinity of the study area**

| Reference | Relevance to the study area |
|---|---|
| Navin 1991 | An archaeological survey for a road development, linking North Nowra and Bomaderry Creek, commissioned by the Shoalhaven City Council. Situated between 1km to 400m south-east of the study area. |
| Lampert & Steele 1993 | 2 independent research excavations at Bomaderry Creek rock shelter. Located 1.5km southeast of the study area. |
| Kuskie 2008 | Aboriginal Heritage Impact Assessment for a proposed Ethanol Plant Upgrade at Shoalhaven Starches, NSW., involving an archaeological survey. 5.5km northeast of the study area. |
| Navin Officer Heritage Consultants 2010 | Archaeological subsurface testing for the Princes Highway upgrade at Gerringong. Located approximately 24 kilometres northeast of the study area. |
| Navin Officer 2010 | Princes Highway Gerringong Upgrade: Mount Pleasant to Toolijooa Road – Aboriginal Archaeological Subsurface Testing and Collection Program. The route runs approximately 12 kilometres north-east of the study area. |
| Navin Officer Heritage Consultants 2011 | Archaeological survey of the Foxground Princes Highway project. Located approximately 20 kilometres from the study area. |
| Navin Officer 2011 | Princes Highway Gerringong Upgrade: Mount Pleasant to Toolijooa Road: Aboriginal Archaeological Subsurface Testing Program - Addendum Report – PASA31 (Site G2B A12). The route runs approximately 12 kilometres north-east of the study area. |
| Navin Officer 2012 | Foxground and Berry bypass Princes Highway upgrade – Volume 2 – Appendix J, Technical Paper: Aboriginal Heritage. The route runs approximately 12 kilometres north-east of the study area. |

| Reference | Relevance to the study area |
|---|---|
| Navin Officer 2012 | Princes Highway Gerringong Upgrade: Additional Areas 1-19 and 49: Aboriginal Cultural Heritage Assessment. The route runs approximately 12 kilometres north-east of the study area. |
| Navin Officer Heritage Consultants 2013 | Completed a series of assessments for the Princes Highway Upgrade between Gerringong and Bomaderry between 2007 and 2013. |
| Artefact Heritage Services (Artefact Heritage) 2018 | Archaeological test excavations for the proposed construction of a new bridge on the Princes Highway over the Shoalhaven River at Nowra. The assessment was situated 4km southeast of the study area. |
| Dibden 2018 | Due Diligence Assessment of Moss Vale Road North Urban Release Area Master Plan and Development Control Plan for future residential development. 600m east of the study area. |
| Marry Dallas Consulting Archaeologists (MDCA) 2018 | Archaeological survey of land which is proposed for rezoning. 1 kilometre south-west from the study area, 759 metres from Bomaderry Creek. |
| Artefact Heritage Services (Artefact Heritage) 2018 | Archaeological test excavations for the proposed construction of a new bridge on the Princes Highway over the Shoalhaven River at Nowra. The assessment was situated 4km southeast of the study area. |
| (Biosis 2018) | Archaeological testing for a residential subdivision at 169 Taylors Lane, Cambewarra. 150 metres to the southeast of the study area. |
| Biosis Pty Ltd 2019 | Archaeological testing of a residential subdivision at Taylor's Lane (Lot 1 DP949932), Bomaderry. 400 metres east of the study area |
| Austral 2019 | Aboriginal Cultural Heritage Assessment, including test excavation, at 49 Taylors Lane, Cambewarra, NSW. 250 metres to the south-east of the study area |
| Austral 2019a | Archaeological testing of 371 Illaroo Road, Bangalee NSW (Lot 116 DP 3060). Located adjacent to the south of the study area. |

## NORTH NOWRA TO BOMADERRY CREEK LINK ROAD SURVEY

This survey was undertaken between Bomaderry Creek and the southern edge of the North Nowra suburb, between 1km to 400m south-east of the study area. The assessment area encompasses generally flat landforms, with area 1 including a drainage depression which forms a narrow gorge measuring roughly 120 metres wide (Navin 1991, p.4).

Two shelters with deposits were identified; Bomaderry Creek 4 (AHIMS # 52-5-0263) and Bomaderry Creek 5 (AHIMS # 52-5-0262). Bomaderry Creek 4 (AHIMS # 52-5-0263) was found on the southern side of Bomaderry Creek, in the top scarp above the creek and adjacent to a small drainage line. The shelter measured 20 metres in length, 4 metres in height and a maximum depth of 4 metres. The estimated depth of the deposits was 20 centimetres and consisted of a dark brown loam, with sandstone and quartzite (Navin 1991, p.10). Three artefacts were also found in this shelter - a fine-grained chert flaked piece, two fine-grained chert broken blades (Navin 1991, p.11).

The second shelter was also found on the southern bank of Bomaderry Creek. The site is around 5 to 6 metres in height, 60 metres long and 4 metres deep. The deposit is composed of light brown sandy alluvium, with a possible depth of up to 1 metre. 4 artefacts were recovered at this site

including 2 chert flakes, and 2 chert broken flakes. Mussel shell fragments were also noted on the shelter floor, in the dripline. (Navin 1991, p.11).

### NOWRA BRIDGE PROJECT TEST EXCAVATION

This study occurred within the proposed construction of a new bridge over the Shoalhaven River in Nowra, 4 kilometres south-east of the study area. This new bridge is found upstream from the current Nowra Bridge, 4 kilometres southeast of the study area.

The results of the test excavation program follow those of a preceding survey which identified 4 artefact sites, 1 modified tree and 5 PAD sites. Table 4.6 outlines the results of this previous survey.

**Table 4.6 Survey results (Artefact Heritage Pty Ltd 2018a, pp.35–42)**

| Site name / AHIMS # | Landform | Site Details |
|---|---|---|
| **Nowra Bridge 1 / 52-5-0852** | Isolated rise | 1 grey dolerite adze. |
| **Nowra Bridge 2 / 52-2-0853** | The localized eroded area is within a clifftop overlooking the Shoalhaven River. | 3 complete dolerite flakes, including a backed microlith. |
| **Nowra Bridge 3 / 52-5-0855** | Road reserve within a clifftop overlooking the Shoalhaven River. | 1 chalcedony flake |
| **Nowra Bridge 4 / 52-5-0857** | Access track along the base of a local cliff. | 1 elongated and approximately symmetrical scar on an *Allocasuarina* tree. The tree is in poor health, with observed fungal infections. It was concluded that the tree was likely old but its growth had stunted. Althoiugh, as Allocasurina trees do not generally live more than 100 years this site may have been incorrectly recorded |
| **Nowra Bridge 5 / 52-5-0856** | Rockshelter and surrounding it, overlooking Shoalhaven River. | Approximately 50 artefacts were found on the surface of the shelter. Materials identified included: dolerite, chalcedony, banded chert, silcrete, mudstone and quartz. 1 backed artefact was also identified, 1 worked chalcedony flake and 1 exhausted mudstone core. |
| **Nowra Bridge PAD 1 / 52-5-0859** | Top of an outlying sedimentary rise, overlooking the Shoalhaven River. | The rise is surrounded by lower-lying features and offers a good vantage point of the Shoalhaven River. Nowra Bridge 1 is located within this PAD. |
| **Nowra Bridge PAD 2 / 52-5-0860** | Level floodplain. | Relatively undisturbed, level floodplain, 200 metres from the Shoalhaven River. |
| **Nowra Bridge PAD 3 Cliff & Rockshelter Complex / 52-5-0861** | Clifftop and cliff, on the northern banks of the Shoalhaven River. | Contains Nowra Bridge 2, Nowra Bridge 3, Nowra Bridge 4 and Nowra Bridge 5. |
| **Nowra Bridge PAD 4 / 52-5-0858** | A section of ridgeline which cuts across a floodplain associated with Bomaderry Creek. | Previously recorded sites on the banks of the Bomaderry Creek, and lack of disturbance. |
| **Nowra Bridge PAD 5 / 52-5-0854** | The elevated natural levee along the banks of the Bomaderry Creek. | Predictive modelling assigned this landform's significance as moderate but is heavily disturbed. |

## ARCHAEOLOGICAL STUDIES AT BOMADERRY CREEK

This research paper outlines the results of two research projects completed at the Bomaderry Creek Rock Shelter (AHIMS # 52-5-0920). The site is a sandstone rock shelter located on the southern banks of a steep-walled gully. It overlooks the Bomaderry Creek. As part of an effort to better understand the prehistory of the South Coast, an initial study of the rock shelter was started in 1970 and then in 1987 (Lampert & Steele 1993, p.55). In these excavations, 6.5 metres$^2$ were excavated in 3 separate areas of the rock shelter. The deposit reached depths of up to 600 millimetres but cultural material was encountered only in the top 200 millimetres. Only the deposits excavated along the back wall of the shelter contained no disturbance. The upper occupation layer, encountered between 70 and 80 millimetres produced radio carbon dates of 1930± 60 years Before Present (BP). The main zone of occupation was encountered between 100 to 180 millimetres and

dated to 1410 ± 60 years BP. These discrete areas of shallow occupation indicate the cave's infrequent use (Lampert & Steele 1993, p.58).

The stone artefacts recovered were mostly made of chert and quartz, but also included a few silcrete fragments. The assemblage included 31 eloueras (a crescent shaped backed artefact), 56 'fabricators', 14 bipolar flakes, 8 scrapers, 9 backed artefacts, 1 cleaver, 2 hammerstones, 4 axes, 13 cores, 6 'trimming' flakes, 30 utilised flakes, and 2723 unmodified flakes. In addition 2 bone points, 328 *Macrozomia* seeds, 323 mollusc fragments and 334 individual mammal bones were revovered (Lampert & Steele 1993).

It was concluded that this rock shelter presented evidence for a temporary occupational activity, including the collection of nearby resources such as estuarine molluscs and mammals such as wombats and kangaroos. Most of the implements were made of chert, which can be found locally around 4 kilometres from the shelter. (Lampert & Steele 1993, p.65).

### ETHANOL PLANT UPGRADE AT SHOALHAVEN STARCHES

This study comprised an archaeological survey at a proposed ethanol plant located at the Shoalhaven Starches in Bomaderry, NSW. The survey encompassed land occupied by the existing Shoalhaven Starches Factory on the southern side of Bolong Road and adjacent to the Shoalhaven River. Before the construction of the factory, the study area encompassed extensive floodplains typical of the banks of the Shoalhaven River. This included level to very gently sloping levees and flats of the river. Soils are composed of deep, recent alluvium deposits with poor drainage as evidenced by frequent pooling. However, most of the studied area has now been impacted by the factory (Kuskie 2008, p.5). This affected the identification of archaeological potential greatly. The survey was thus focused on those areas not affected by development (Kuskie 2008, p.17).

A total area of 4160 metres$^2$ was surveyed encompassing the level to very gently sloping river levee on the western boundary of the factory as well as the levee on the eastern boundary. Due to the extensive impacts associated with these landforms, no archaeological potential remains in these areas. No cultural material was recovered during this survey (Kuskie 2008, p.19).

### GERRINGONG UPGRADE TEST EXCAVATION AND COLLECTION PROGRAM

This assessment is on the Princes Highway upgrade between Gerringong and Bomaderry, a study area 7.5 kilometres in length of varying widths. A portion of this assessment ran approximately 800 metres west of the current study area. Test excavations were undertaken between Mount Pleasant and Toolijooa Road Intersection, under the provisions outlined in the AHIP # 3233 (Navin Officer 2010, p.1).

Based on previously identified PASA's (Navin Officer 2010) a test excavation program was devised which included the mechanical excavation of 137 test pits within PASAs 32 to 39. This resulted in the recovery of 162 artefacts from 42 test pits and 5 PASAs. No artefacts were recovered from PASA 36, PASA 34 and PASA 35 (Navin Officer 2010, p.23).

PASA 32 (AHIMS # 52-5-0571) and PASA 33 (AHIMS # 52-5-0572) identified 14 artefacts from 11 test pits out of 36 excavated, and at an average depth of 200 to 500 millimetres. Artefact density was on average 0.76 artefacts per metre$^2$ (Navin Officer 2010, p.24). The assemblage at this combined site was composed of 6 flakes, 2 flaked pieces, 2 side and end scrapers, 2 bipolar flakes, 1 broken-backed artefact and 1 redirecting flake (Navin Officer 2010, p.25).

PASA 37 (AHIMS # 52-5-0575) recovered 42 artefacts from 8 test pits out of the 15 excavated, and at an average depth of 300-400 millimetres. Artefact density was on average 5.72 artefacts per metre$^2$ (Navin Officer 2010, p.26). The assemblage is composed of 21 flakes, 6 asymmetric backed artefacts, 6 microblade fragments, 4 flaked pieces, 2 heat fragments, 1 axe rejuvenation flake, 1 redirected flake from a microblade core, 1 shattered quartz crystal and 1 side retouched microblade fragment (Navin Officer 2010, p.29). The abundance of backing, microblades and axe flaking suggests this site is between 3000 and 5000 years old (Navin Officer 2010, p.27).

PASA 38 (AHIMS # 52-5-0576) found 76 artefacts from 18 test pits out of the 44 dug, and at a depth of 300 and 400 millimetres on average. Artefact density was on average 3.36 per metre$^2$ (Navin Officer 2010, p.29). The assemblage of this site is composed of 44 flakes, 10 flaked pieces, , 2 asymmetric backed artefacts, 2 heat fragments, 2 retouched flakes, 2 bipolar flakes, 2 microblades, 1 anvil fragment, 1 broken backed artefact, 1 hammerstone and anvil, 1 multiplatform

core, 1 NDF, 1 notch, 1 redirected flake, 1 semi-discoidal core and 1 side scraper (Navin Officer 2010, p.31).

PASA 39 (AHIMS # 52-5-0577) identified 14 artefacts out of five test pits from the 10 dug, and at a depth of 400 to 600 millimetres. The average artefact density for this site was 2.8 per metre$^2$. The assemblage consisted of 11 flakes, 2 flaked pieces and 1 symmetric backed artefact (Navin Officer 2010, p.33).

### FOXGROUND PRINCES HIGHWAY UPGRADE

This assessment was centred on 11.6 kilometres of the Princes Highway between Toolijoa Road, north of Foxground and Schofields Lane, south of Berry NSW. The studied area was the subject of both Aboriginal archaeological survey and testing within the framework of a proposed upgrade to the highway. The assessment follows the results of a Preliminary Aboriginal and non-Aboriginal Heritage Assessment (Maunsell Australia & Navin Officer 2007) as well as a preliminary landscape review (Navin Officer 2007) and outlines the results of a survey and testing program undertaken as part of this proposal (Maunsell Australia & Navin Officer 2007).

The field survey aimed to identify areas of potential archaeological deposits and sensitivity, as well as surface archaeology. The predictive model developed as part of the Review of Environmental Factors and the testing results of the Gerringong Upgrade (Navin Officer 2010, Navin Officer 2010) was utilised to identify Potential Archaeologically Sensitive Areas (PASA) within the Foxground upgrade. A total of 44 PASAs were identified using these reports, in consultation with registered Aboriginal parties (Navin Officer 2012, p.30). Out of these, 21 PASAs were selected for testing. This selection was based on the results of the Gerringong Upgrade testing, as well as overlaps with impacted areas. PASA 12 and PASA 13, PASA 21 to PASA 24 and PASA 25 to PASA 27 were grouped together due to their continuing landforms (Navin Officer 2012, p.31). From the 21 PASAs 18 recovered a subsurface deposit. The location of these PASAs and their results is outlined in Table 4.7.

**Table 4.7 Location and results of testing for all investigated PASAs (Navin Officer 2012, pp.63–65)**

| PASA | Landform | Testing Results |
|---|---|---|
| **PASA12** | Not Identified | 46 artefacts recovered, making it the densest site recorded. |
| **PASA13** | Not Identified | 2 artefacts recovered. |
| **PASA14** | Not Identified | 18 artefacts recovered. |
| **PASA15** | Not Identified | 4 artefacts recovered. |
| **PASA16** | Not Identified | 19 artefacts recovered. |
| **PASA18** | Not Identified | 2 artefacts recovered. |
| **PASA20** | Crest and basal slopes of an elevated spurline associated with 5$^{th}$ order stream Broughton Creek. | 40 artefacts recovered. |
| **PASA21** | Broughton Creek's alluvial flats, including terraces. | 1 artefact recovered. |
| **PASA22** | Broughton Creek's alluvial flats and valley floor. | No artefacts recovered. |
| **PASA23** | Broughton Creek's alluvial flats | 13 artefacts recovered. |
| **PASA24** | Broughton Creek's alluvial flats and valley floor. | 14 artefacts recovered. |
| **PASA25** | Crest and basal slope of a low spur adjacent to a valley floor and 5$^{th}$ order stream Broughton Creek. | 15 artefacts recovered. |
| **PASA26** | Broughton Creek's alluvial flats. | 7 artefacts recovered. |

| | | |
|---|---|---|
| **PASA27** | Broughton Creek's alluvial flats and valley floor. | 5 artefacts recovered. |
| **PASA28** | Crest and upper slope of Toolijooa Ridge line. | 8 artefacts recovered. |
| **PASA29** | Crest and upper slopes of a spurline. | 13 artefacts recovered. |
| **PASA40** | Low banks, adjacent flats and slopes associated with an unnamed, 2nd order stream. | 1 artefact recovered. |
| **PASA41** | Low banks, adjacent flats and slopes associated with an unnamed, 2nd order stream. | Out of the 14 artefacts recovered, one possible glass artefact among other glass fragments was also identified. The location of this area of potential is consistent with a possible fringe camp location. |
| **PASA42** | Crest and upper slopes of a spurline. | No artefacts recovered. |
| **PASA43** | Alluvial flats of Connollys Creek, and associated valley floor. | 10 artefacts recovered. |
| **PASA44** | Valley floor of Broughton Creek with adjacent alluvial flats. | 4 artefacts recovered. |

The survey further identified one artefact scatter G2B A3 (AHIMS # 52-5-0566), an isolated surface artefact G2B A 38 (AHIMS # 52-5-0656) associated with a PAD and finally four places of Aboriginal cultural heritage significance. Three of these related to historical events or occupation and included one cultural landscape known as the Toolijooa Ridge Aboriginal Cultural Landscape. In addition, Aboriginal cultural heritage values were identified during the consultation including 12 large old-growth fig trees as well as potential burials (Navin Officer 2012, p.60).

G2B A3 (AHIMS # 52-5-0566) consisted of four surface stone artefacts found in an exposed drainage ditch, on a low to moderately steep, north-facing slope which forms the foot slopes of a descending spur line off Toolijooa Ridge. The artefacts were exposed following mechanical ground disturbance (Navin Officer 2012, p.60). G2B A 38 (AHIMS # 52-5-0656) is an isolated find and PAD found on a crest of a minor spur. It overlooks an unnamed tributary of the Crooked River. The find consists of fine-grained quartzite retouched flake. The PAD was measured at 100 by 80 metres in area and thought to have moderate potential for archaeological sub-surface material, due to the moderate levels of disturbance found at the site (Navin Officer 2012, p.61).

Toolijoa Ridge, approximately 4.5 kilometres south-west of the study area, is a locally prominent ridgeline. In 1991, a local community survey undertaken by Donlan, found that an old cattle trail running along the ridge and connecting the coast follows an older Aboriginal trail which started in Foxground (Navin Officer 2012, p.44). This same questionnaire also identified a local artefact collection in association with a lost stone arrangement and bora ring on Toolijooa Hill, near the old trail. Contemporary Aboriginal groups recognised the cultural significance of the crest and prominent slope during the survey (Navin Officer 2012, p.45).

In the same 1991 survey by Donlan, a local tradition amongst the Broughton Village community found that Aboriginal people were known to have camped along the banks of Broughton Creek, approximately 10 kilometres south-west of the study area. This area known as Brookside, is locally notable for surface finds collected by the community. (Navin Officer 2012, p.37).

Little Mountain also known as Dicky Wood's Meadow battle ground, is associated with site G2B A13, and found near the current Broughton village, approximately 5 kilometres south-west of the study area. This battle ground was recorded based on the oral testimony of a Shoalhaven man known as Buthring, and transcribed by Archibald Campbell in 1900. The man describes the area beside the creek on the eastern side of Broughton Creek as the area used for battle by generations of Aboriginal people (Navin Officer 2012, p.37). The descriptions provided here in this account, suggest that the battle field would have been located within a natural clearing within the forest, most likely in a wetland of intermittent wetland basin. This site represents an area of high

archaeological significance, both for its intangible cultural values but also for its potential to find burials (Navin Officer 2012, p.39).

Finally, the Aboriginal encampment at Berry, is known from ethnographic and historical sources to have occurred in two phases: the Boongaree encampment located in a meadow at the junction of the Broughton and Broughton Mill Creeks, and the temporary, seasonal encampment by Aboriginal crop pickers on the Broughton Mill Creek Flats (Navin Officer 2012, p.42).

A total of 298 test pits were excavated across all PASAs, all but one utilised a mechanical excavator (Navin Officer 2012, p.14). An average of less than 40% variation in spit depth was encountered due to the use of a mechanical excavator. The final depth of test pits which were mechanically excavated were between one and three metres. An additional 200 millimetres was added to the width of the test pit to allow the bucket to reach these depths (Navin Officer 2012, p.15). Only one test pit was hand excavated: Pit #20 within PASA 20. The test pit measured 0.5 metres $^2$ (Navin Officer 2012, p.18).

The lithic assemblage recovered during this testing excavation resulted in 236 artefacts, found in 18 of the 21 PASA's investigated. Overall, 58.1% were flakes, and 19.1% were flaked pieces. The remaining artefacts are 5.9% heat fracture, 3% redirecting flakes, 2.1% have pot lids, 1.3% multiplatform cores, 1.3% retouched flake fragments, 0.8% cores, 0.8% hammerstones, and the remaining artefacts, asymmetric backed artefacts, possible bipolar cores,bipolar flakes,burin spalls, core fragment, end scraper, fire cracked rock, split cobble flake, hammerstone and anvil, microblade, notched double side and end scraper, retouched flakes, retouched flaked piece and ventral side scraper each made up 0.4% of the assemblage respectively . The assemblage was 71% chert, 27% quartz and less than 5% of volcanic, silcrete, chalcedony, mudstone, quartzite, sandstone, glass, ochre and an unidentified sedimentary stone (Navin Officer 2012, pp.73–74).

It was concluded that the higher density sites recovered during this assessment tended to be found on elevated terraces and creek banks. Furthermore, the location of these richer assemblages also coincided with the location of major spurlines and gentle basal slopes above valley floors. Lower-density sites were alternatively found within these valley floors and alluvial flats. The inspected ridgeline crests and saddles tended to hold sparse and low-density sites.

### PRINCES HIGHWAY GERRINGONG UPGRADE: MOUNT PLEASANT TO TOOLIJOOA ROAD – ABORIGINAL ARCHAEOLOGICAL SUBSURFACE TESTING AND COLLECTION PROGRAM (NAVIN OFFICER, 2010)

This assessment is on the Princes Highway upgrade between Gerringong and Bomaderry, encapsulating a study area of 7.5 kilometres. A portion of this assessment ran approximately 800 metres west of the current study area. Testing excavations were undertaken between Mount Pleasant and Toolijooa Road Intersection, under the provisions outlined in the AHIP #3233 (Navin Officer 2010, p.1).

Based on the identified Potential Archaeologically Sensitive Areas (PASA's) from the previously discussed survey (Navin Officer 2010), a testing program was devised which included the mechanical excavation of 137 test pits within PASAs 32 to 39. This resulted in the recovery of 162 artefacts from 42 test pits and 5 PASAs. No artefacts were recovered from PASA 34, PASA 35 and PASA 36 (Navin Officer 2010, p.23).

PASA 32 (AHIMS #52-5-0571) and PASA 33 (AHIMS #52-5-0572) contained 14 artefacts from 11 test pits out of 36 dug, and at an average depth of 200 to 500 millimetres. Artefact density was on average 0.76 artefacts per metre$^2$ (Navin Officer 2010, p.24). The assemblage at this combined site was composed of 6 flakes, 2 flaked pieces, 2 side and end scrapers, 2 bipolar flakes, 1 broken backed artefact and 1 redirecting flake (Navin Officer 2010, p.25).

PASA 37 (AHIMS #52-5-0575) recovered 42 artefacts from 8 test pits out of the 15 dug, and at an average depth of 300-400 millimetres. Artefact density was on average 5.72 artefacts per metre$^2$ (Navin Officer 2010, p.26). The assemblage is composed of 21 flakes, 6 asymmetric backed artefacts, 6 microblade fragments, 4 flaked pieces, 2 heat fragments, 1 axe rejuvenation flake, 1 redirected flake from microblade core, 1 shattered quartz crystal and 1 side retouched microblade fragment (Navin Officer 2010, p.29). The abundance of backing, microblades and axe flaking indicates this site is between 3,000 and 5,000 years old (Navin Officer 2010, p.27).

PASA 38 (AHIMS #52-5-0576) found 76 artefacts from 18 test pits out of the 44 dug, and at a depth of 300 and 400 millimetres on average. Artefact density was on average 3.36 per metre$^2$ (Navin Officer 2010, p.29). The assemblage of this site is composed of 44 flakes, 10 flaked pieces, 3 quartz crystals, 2 asymmetric backed artefacts, 2 heat fragments, 2 retouched flakes, 2 bipolar flakes, 2 microblades, 1 anvil fragment, 1 broken backed artefact, 1 hammerstone and anvil, 1 multiplatform core, 1 NDF, 1 notch, 1 redirected flake, 1 semi-discoidal core and 1 side scraper (Navin Officer 2010, p.31).

PASA 39 (AHIMS #52-5-0577) identified 14 artefacts out of five test pits from the 10 dug, and at a depth of 400 to 600 millimetres. The average artefact density for this site was 2.8 per metre$^2$. The assemblage consisted of 11 flakes, 2 flaked pieces and 1 symmetric backed artefact (Navin Officer 2010, p.33).

This report is of relevance to the current study as it contributes to the predictive model for the region.

### PRINCES HIGHWAY GERRINGONG UPGRADE: MOUNT PLEASANT TO TOOLIJOOA ROAD: ABORIGINAL ARCHAEOLOGICAL SUBSURFACE TESTING PROGRAM - ADDENDUM REPORT – PASA31 (SITE G2B A12) (NAVIN OFFICER 2011)

This addendum report presents the results of archaeological test excavations undertaken at testing location PASA 31 located at the southern end of the Gerringong Upgrade of the Princes Highway. A total of ten test pits were excavated resulting in the recovery of 16 artefacts from 5 test pits. The highest number of artefacts recovered from a single pit was 8. Artefact density ranged from 1 to 8 artefacts per square meter, with an average of 4 artefacts per square meter. The assemblage was dominated by complete and broken flakes (n=7, 44%). Two single platform cores were recovered as well as two retouched artefacts. Raw materials included chert (75%), quartzite (12.5%), chalcedony (6.2%) and silcrete (6.2%). The assemblage was subsequently recorded as site 'G2B A12'. The value of the site was assessed as being "limited by the remnant nature of the deposit, lack of vertical integrity and the low overall artefact incidence" (Navin Officer, 2011 p.1).

This report is of relevance to the current study as it contributes to the predictive model for the region.

### FOXGROUND AND BERRY BYPASS PRINCES HIGHWAY UPGRADE: ABORIGINAL HERITAGE (NAVIN OFFICER, 2012)

This assessment was centred on 11.6 kilometres of the Princes Highway between Toolijoa Road, north of Foxground and Schofields Lane, south of Berry NSW. The studied area was the subject of both Aboriginal archaeological survey and testing within the framework of a proposed upgrade to the highway. The assessment follows the results of a Preliminary Aboriginal and non-Aboriginal Heritage Assessment (Maunsell Australia & Navin Officer 2007) as well as a preliminary landscape review (Navin Officer 2007) and outlines the results of a survey and testing program undertaken as part of this proposal (Maunsell Australia & Navin Officer 2007).

The field survey aimed to identify areas of potential archaeological deposits and sensitivity and sites as revealed on the ground surface. The predictive model developed as part of the Review of Environmental Factors and the testing results of the Gerringong Upgrade (Navin Officer 2010, Navin Officer 2010) was utilised to identify Potential Archaeologically Sensitive Areas (PASAs) within the Foxground upgrade. A total of 44 PASAs were identified using these reports, in consultation with registered Aboriginal parties (Navin Officer 2012, p.30). Out of these, 21 PASAs were selected for testing. This selection was based on the results of the Gerringong Upgrade testing program, as well as overlaps with impacted areas. PASA 12 and PASA 13, PASA 21 to PASA 24 and PASA 25 to PASA 27 were grouped together due to their continuing landforms (Navin Officer 2012, p.31). 18 of the 21 PASAs investigated were found to contain a subsurface deposit. The location of these PASAs and their results is outlined in Table 4.7.

### PRINCES HIGHWAY GERRINGONG UPGRADE: ADDITIONAL AREAS 1-19 AND 49: ABORIGINAL CULTURAL HERITAGE ASSESSMENT (NAVIN OFFICER, 2012)

This report presents the results from an ACHA conducted for additional areas to be disturbed by the Princes Highway Gerringong Upgrade program. The ACHA was required as the existing AHIP area was too distant and/or based on an assessment that did not cover the landform type within the additional areas. The ACHA involved a desktop review and additional survey of the new areas.

A predictive model was developed based on the results of the Gerringong Upgrade and Foxground and Berry Bypass archaeological testing programs.

The additional survey resulted in the identification of three areas of PASA including:

- PASA 48: archaeologically sensitive due to the location of this basal slope at an intersection of a substantial drainage line and the margin of the former coastal plain wetlands, which are predicted to have been a focus of Aboriginal occupation.
- PASA 49: archaeologically sensitive due to the lack of comparative data for this landform (a locally elevated low rise situated between two drainage lines in a valley floor) combined with the areas expected archaeological potential based on the predictive model.
- PASA 50: archaeologically sensitive due to its association with an archaeologically sensitive landform type consisting of a locally elevated, low gradient slope adjacent to the floor of a coastal plain and margin of former wetlands, as suggested in the predictive modelling.

### MOSS VALE ROAD NORTH URBAN RELEASE AREA

An archaeological survey and assessment was completed as part of the Moss Vale Road North Urban Release Area Master Plan and its associated development control plan, located ~750 metres north-east of the study area. The area consists of 266.1 hectares of land, which includes multiple landforms which were surveyed on foot. Simple slopes, minor crests, drainage depressions, crests and undulating flats were considered to hold low archaeological potential, whereas the terrace flats, and those slopes and drainage depressions with low disturbance levels were found to hold moderate levels of archaeological potential (Dibden 2018, pp.19–21). The survey found no archaeological material but identified a number of areas of archaeological potential, notably areas immediately adjacent to Abernethy's Creek and a gently undulating flat to the south of Abernethy's Lane and Creek

### 2541 WARRAH ROAD

This assessment encompasses the result of an archaeological survey at 2541 Warrah Road (Lot 24 DP714096) and 12A-C Warrah Road (Lot 21-23 DP14096), in North Nowra, 1 kilometre south-west from the study area (MDCA 2018, p.1). This property comprises relatively flat landforms to the west, with portions to the east heavily disturbed through the development of bike trails and access tracks. Sandstone ledges above the tributaries are also present throughout (MDCA 2018, pp.30–33). Two previously recorded sites were in the study area:

- EGP-28 (AHIMS # 52-5-0307) scatter of 5 artefacts, located in a clearing adjacent to a gravel quarry, and
- Duke 7 (AHIMS # 52-5-0372). artefact scatter

It was concluded that due to the highly disturbed nature of both recorded sites, as well as their relatively low density, they have low archaeological potential and low overall significance (MDCA 2018, p.46).

### MOSS VALE SOUTH URBAN RELEASE AREA: TAYLORS LANE SUBDIVISION (169 HOCKEYS LANE, CAMBEWARRA)

An archaeological survey found three landforms in the study area - a hillcrest, hillslope and alluvial flat. Due to the heavy vegetation cover no Aboriginal objects were identified during the survey. The survey identified the hillcrest (Taylors Lane PAD 1) landform as having moderate potential for Aboriginal cultural material to be present, and a raised alluvial terrace (Taylors Lane PAD 2) nearby Good Dog Creek as having high potential. These were both assessed as having potential due to their proximity to the resource bases that the creeks provide, whilst also being elevated enough to be protected from floodwaters. As such, would be suitable areas for occupation (Biosis 2018, pp.40–43).

Ten test pits were excavated within Taylors Lane PAD 1, an area designated as having moderate potential. The test pits were shallow and showed minimal levels of disturbance. One chert geometric microlith was found in this area of PAD. The presence of a tool rather than the waste from the manufacture of tools, suggests that Aboriginal people were using the area but were not

knapping. As only a single tool was found, Biosis suggest that the tool was lost or discarded during travel or hunting activities (Biosis 2018, p.53).

Three test pits were excavated in Taylors Lane PAD 2, an area designated as having high potential. The tests pits were relatively shallow and appearance of bleached contexts and iron-manganese suggested that the area is frequently inundated. No artefacts were found. It was concluded that the elevated hills to the north of the study area were the more likely sites of occupation, as they were dry and safe from floods (Biosis 2018, p.53).

### TAYLORS LANE LOT 1 DP949932

Archaeological survey and test excavation assessments were completed at Taylors Lane, Lott 1 DP 949932, in Cambewarra, 400 metres east of the study area. The studied area encompasses hillslopes, which are dissected by 2 first-order, non-perennial drainage lines (Biosis Pty Ltd 2019, p.14). Similar to the current study area, 2 soil landscapes are present within the studied area: the erosional Shoalhaven and the alluvial Coolangatta landscapes (Biosis Pty Ltd 2019, p.16).

One site had been previously been recorded in the subject area, an isolated chert core Moss Vale Road AFT 1 (AHIMS # 52-5-0880). This artefacts was not able to be relocated and no other artefactual material was found during the study (Biosis Pty Ltd 2019, p.38).

The PAD associated with Moss Vale Road AFT 1 (AHIMS # 52-5-0880) was subject to test excavation. 14 test pits were excavated none of which yielded cultural material.

### 49 TAYLORS LANE

An Aboriginal archaeological assessment was conducted at 49 Taylors Lane, Cambewarra (Austral 2019b, p.1). Three landforms were identified: a hillcrest, hill slope and alluvial flat overlooking Bomaderry Creek (Austral 2019b, p.35). No surface archaeological material was identified but two areas of moderate to high archaeological potential were identified on the hillcrest and the alluvial flat landforms. The hillcrest overlooks the creek and is found close to a perennial water source.

### 371 ILLAROO ROAD BANGALEE NSW

This archaeological assessment was conducted at 371 Illaroo Road, Bangalee (Lot 116 DP3060), NSW. A prior ACHDDA was conducted at this site and found low and moderate levels of disturbance related to the past farming activities as well as 2 areas of moderate archaeological potential. These were limited to a hill crest in the northern section of the property above an alluvial floodplain and less than 500 metres from a perennial water source, and on a lower slope approximately 250 metres south from the hillcrest. This second area has good vistas of the Bomaderry Creek (Biosis Pty Ltd 2018c).

Following these survey results, a program of archaeological testing was undertaken to investigate the nature and extent of these areas of potential. Two artefacts were recovered, from two test pits out of the overall 35 excavated. Both were in the hill crest landform and found in the first spit. The first artefact was a silcrete distal flake and the second was a single platform, unidirectional silcrete core. Based on this assemblage, it was concluded that the hill crest represented a small background artefact scatter

# 5 PREDICTIVE MODEL

Austral has used the information produced as part of the archaeological and environmental context sections to formulate a broad predictive model that identifies the type and character of Aboriginal cultural heritage sites that may be present within the Study Area.

The predictive model is based upon the analysis of the following key variables:

- Relationship between site types and their spatial distribution within the landscape.
- Raw site types, raw material types and site densities and their relationship to salient environmental features.
- Information in ethnohistorical sources that may indicate important natural resources or landscape features that may have been exploited.
- Potential chronological and spatial relationships between sites

A predictive model has been developed based on the consideration of the variables outlined above that indicates the lively site types that will be encountered during the archaeological survey and archaeological testing.

## 5.1 ANALYSIS OF KEY VARIABLES

An AHIMS search indicates that artefact scatter sites are the predominant site type with 61.17% of known sites belonging to this category, followed by Potential Archaeological Deposits (PADs) with 11.65% of known sites.

It should be noted that any analysis using AHIMS data will be prone to biases as it relates to sites that have been recorded over the past 40 years. During this time, varying methodologies have been used to identify sites and a large portion of the surrounding landscape may have been subject to limited or no assessment. Therefore, site distribution is likely to be reflective of survey methods and patterns and should not be considered a comprehensive list of all Aboriginal sites within a given region.

### *5.1.1 SOIL LANDSCAPES*

The majority of the study area falls within the Coolongatta soil landscape, with a small portion of the remainder falling within the Shoalhaven soil landscape.

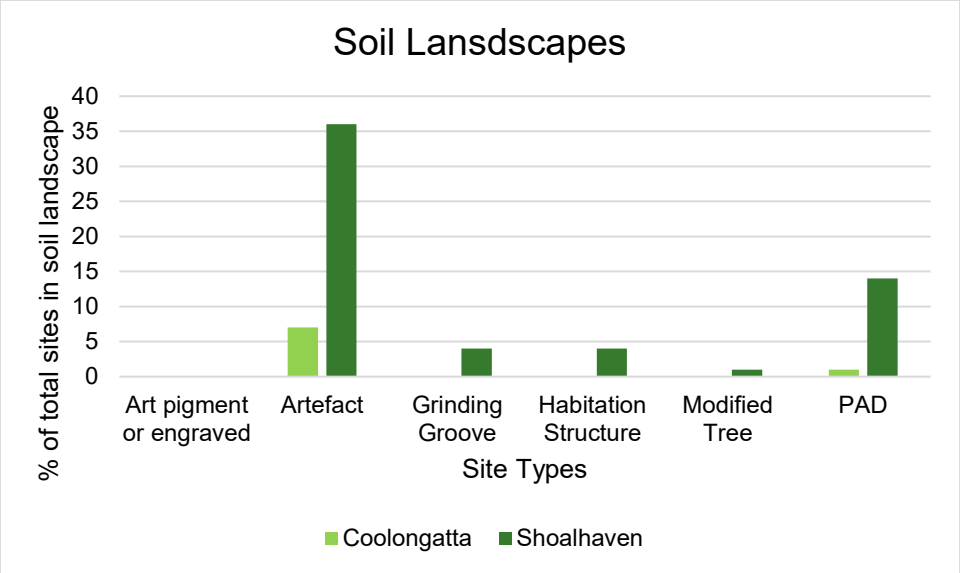



**Figure 5-1 Site types in relation to soil landscapes**

As can be seen from Figure 5-1 the majority of site, 92%, fall within the Shoalhaven soil landscape and 8% in the Collongatta soil landscape. The Shoalhaven and Nowra landscapes make up the

largest portion of the AHIMS search area. As such, it makes sense that these landscapes would have the most sites. It does not appear that any single site type is proportionally more likely to occur in any one soil landscape type.

The one exception to this is art sites, which are unlikely to occur in the Shoalhaven soil landscape.

### *5.1.2 GEOLOGICAL UNITS*

The majority of the study area falls within the Berry Siltstone geological unit, while a small section of the western portion of the study area falls within Alluvial fan deposits. The Nowra Sandstone geological unit contained 37.90% (n=47) of the sites, followed by 21.77% (n=27) in the Alluvial Floodplain deposits and 16.94% (n=21) in the Berry Siltstone geological unit with the remainder of sites occuring in lessening amounts across 7 other geological units. As sites fell within 10 separate geological units, just the units related to the study area will be considered in depth.

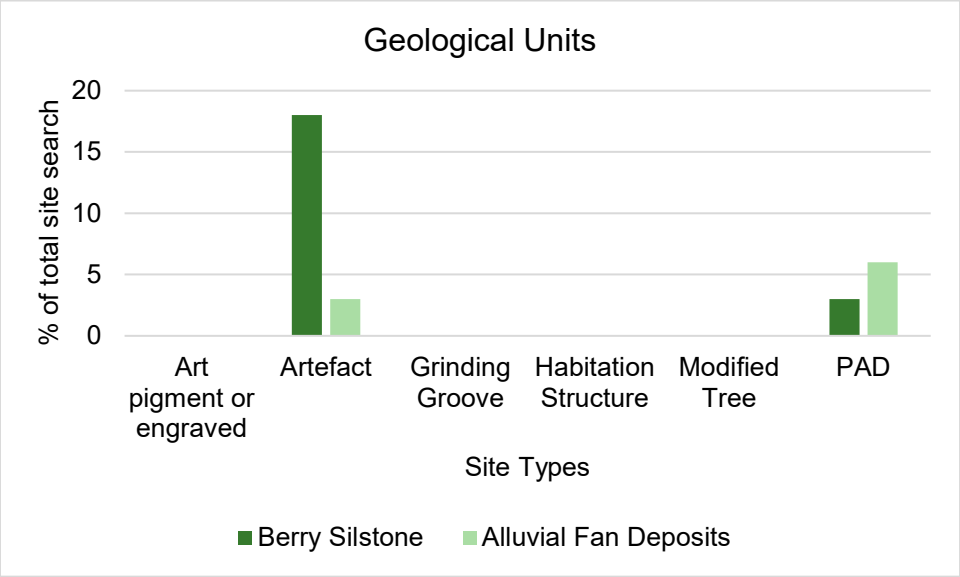



**Figure 5-2 Site types in relation to select geological units**

As can be seen above in Figure 5-2, it appears that artefacts are more likely to occur on the Berry Siltstone geological unit and PADs tend to be identified within Alluvial fan deposits. As such, artefacts are more likely to be found within the section of the study area related to the Berry Siltstone geological unit, and less likely to occur within Alluvial fan deposits.

### *5.1.3 HYDROLOGY*

There is a small non-perennial 1st order stream running through the study area as seen in Figure 3-3. But the main perennial water sources in the area are the 4th Order Good Dog Creek, which is located 350 metres to the west of the study area and 5th Order Bomaderry Creek 850 metres south of the study area.

Sites were predominantly located nearby 6th order streams with 44.35% (n=55) of sites along these streams. This was followed by 29.84% (n=37) nearby 1st order streams and 18.55% (n=23) closest to 4th order streams.

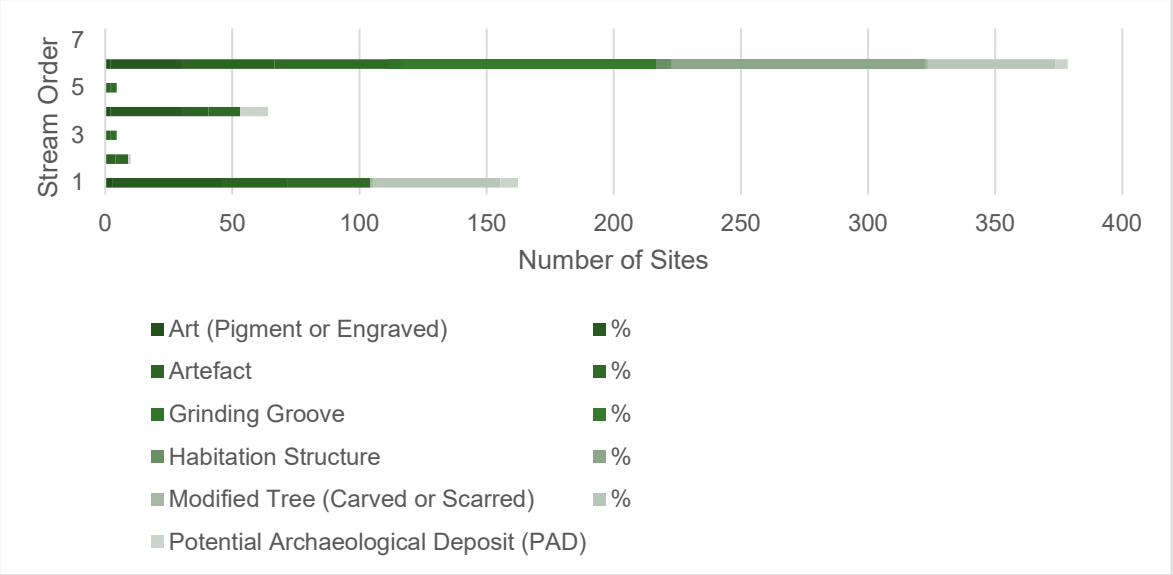



**Figure 5-3 AHIMS sites in relation to stream orders**

As can be seen above in Figure 5-3, sites in the area tend to be associated with higher-order streams (above 3rd order), with many sites located along Bomaderry Creek which is a 6th order stream. Whilst the majority of sites are located nearby higher order streams, a good proportion of sites are also located along 1st order drainage channels. As such, there is a potential for sites to be located along the small stream running through the study area.

### *5.1.4 TOPOGRAPHY*

An analysis of the distribution of local sites in comparison to terrain has been undertaken using a spatial tool that classifies landforms using a range of parameters including slope, elevation and form (Stepinski & Jasiewicz 2011, Jasiewicz & Stepinski 2013). An overview of the landform classifications used by the algorithm are detailed in Figure 5-4 and the landforms identified within the study area is shown in Figure 5-5.

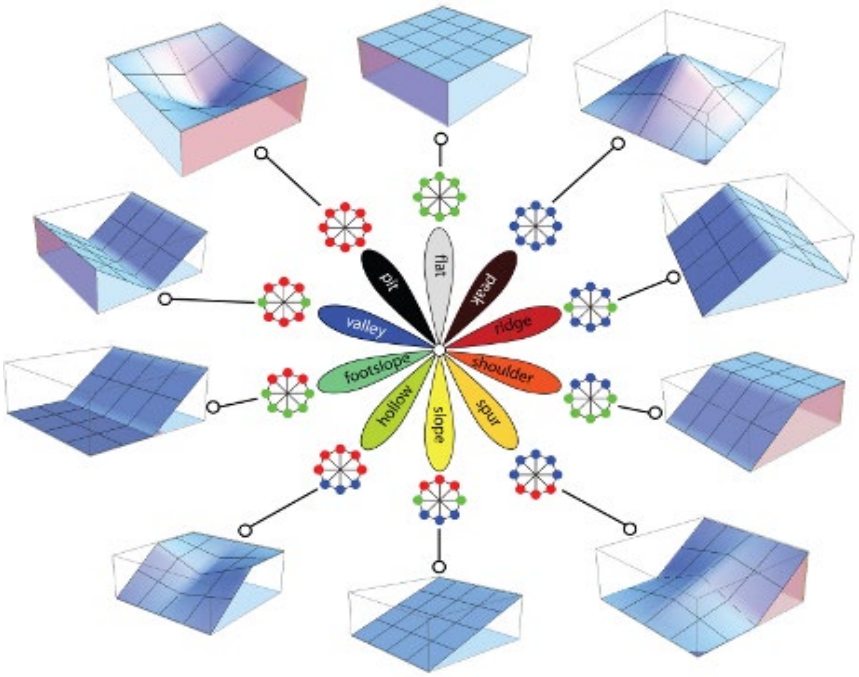



**Figure 5-4 Examples of landform definitions by geomorphons**

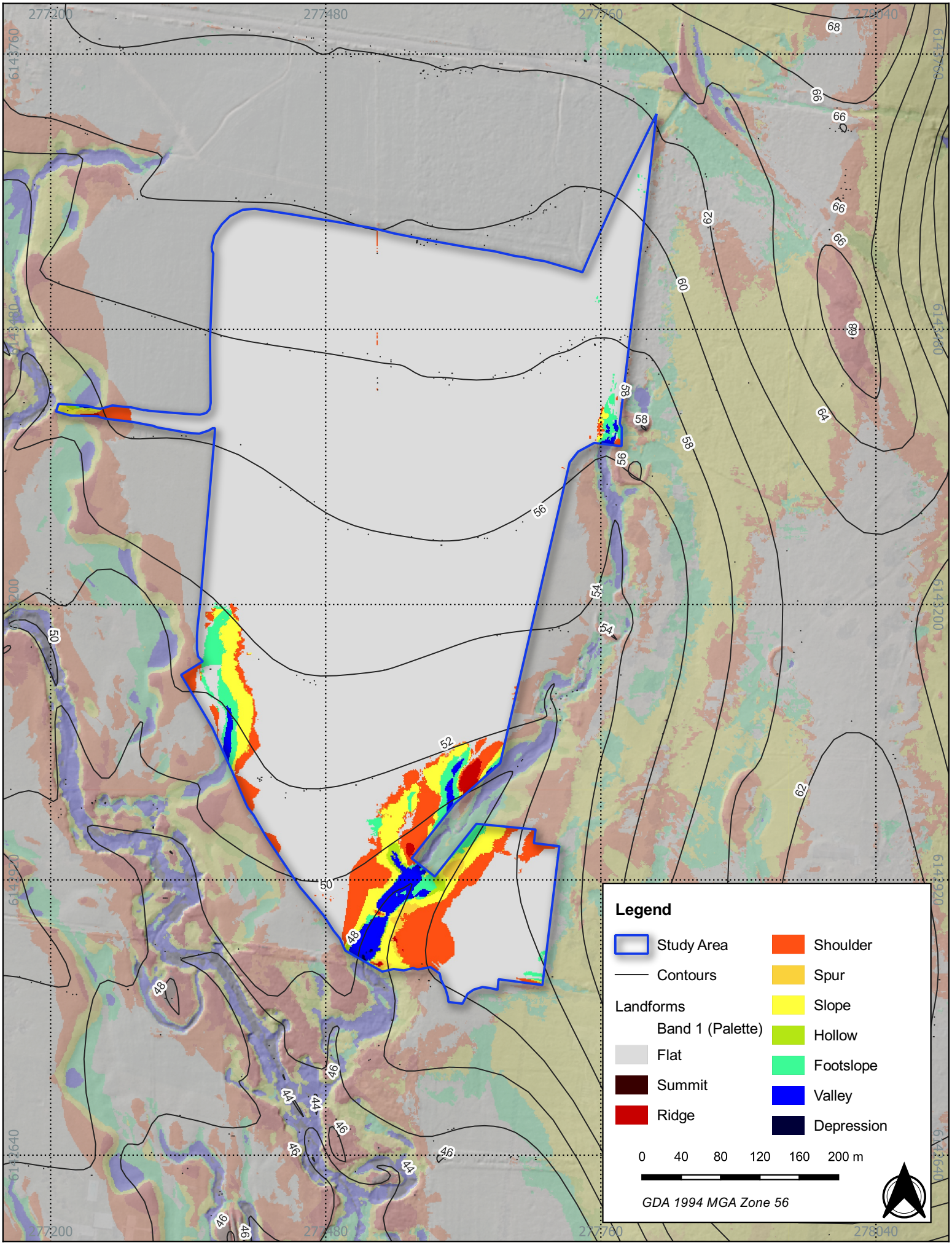



**Figure 5.5 - Geomorphons present within the study area**

49 Hockeys Lane and 41 Main Road, Cambewarra

*Source: Geoscience Australia*

*Drawn by: WA Date: 2022-03-01*

AUSTRAL ARCHAEOLOGY

The majority (27.42% [n=34]) of sites are located within slope landforms, with 15.32% (n=19) of sites located within hollows, 14.52% (n=18) of sites in valleys and 12.90% (n=16) on spurs. The results of the assessment in relation to the identified landforms within the study area are shown in Figure 5-6.

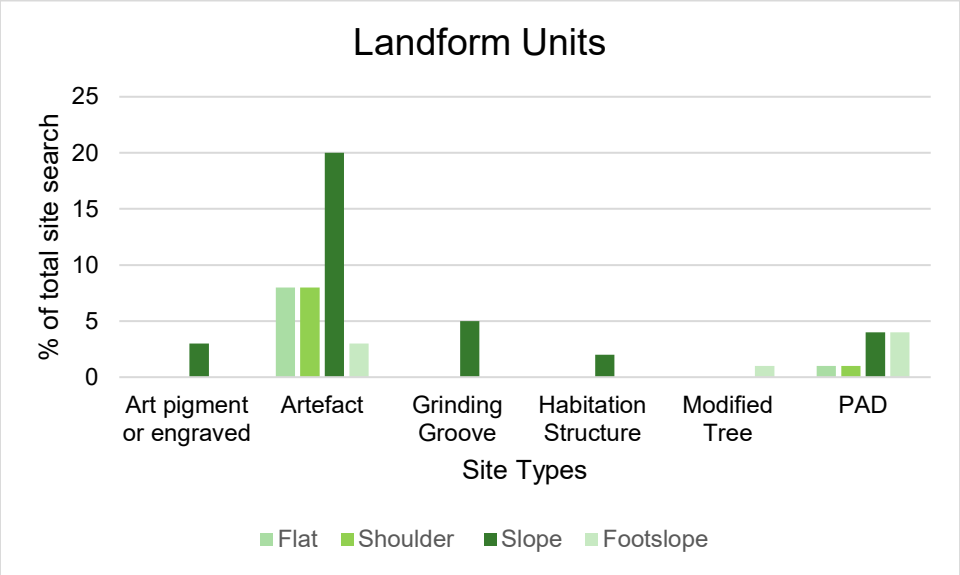



**Figure 5-6 Known Aboriginal sites in relation to geomorphons identified within the study area.**

The majority of the study area is a slope in the southern half of the study area and a flat and foot slope in the north of the study area. Artefacts and PAD sites are commonly identified within these landforms, as such, there is a potential for Aboriginal sites to occur across the study area.

### *5.1.5 ANALYSIS OF KNOWN SITES IN THE LOCALITY*

As most known sites within the locality are artefact scatter sites and PADs, Austral has undertaken an analysis of excavated sites associated with the Good Dog Creek and Bomaderry Creek catchment to provide a detailed breakdown of the anticipated density and composition of lithic assemblages in the locality. Sites from within approximately 500 metres of the Study Area have been subject to this analysis. This identified 6 sites that had been subject to archaeological test excavations. Details from these excavations are summarised in Table 5.1.

**Table 5.1 Composition and density of local lithic assemblages**

| Site name | No. test pits | Test pits w/ artefacts | Total ex. ($m^2$) | Total artefacts | Max artefact density/ $m^2$ | Average artefact density |
|---|---|---|---|---|---|---|
| 104 Taylors Lane IF1 (52-5-0916) | N/A | 1 | N/A | 1 | 1 | N/A |
| 104 Taylors Lane AFT1 (52-5-0915) | N/A | 2 | N/A | 2 | 1 | N/A |
| 104 Taylors Lane AFT2 (52-5-0914) | N/A | 3 | N/A | 3 | 1 | N/A |
| Moss Vale Road AFT1 (52-5-0880) | 14 | 0 | 3.5 | 0 | 0 | 0 |

| Site name | No. test pits | Test pits w/ artefacts | Total ex. (m²) | Total artefacts | Max artefact density/ m² | Average artefact density |
|---|---|---|---|---|---|---|
| Illaroo Road (52-5-0923) | 30 | 2 | 7.5 | 2 | 1 | 0.06 |
| Taylors Lane Artefact 1 (52-5-0871) | 13 | 1 | 3.25 | 1 | 1 | 0.08 |

## 5.2 PREDICTIVE STATEMENTS

Based on the analysis presented in Section 5.1 the following predictive statements can be made:

- The known sites within the region are dominated by artefact sites (64.52%) and PADs (19.35%), this is reflected in the following statements. This is most likely due to the soil and geological conditions that preclude other site types such as art sites (5.65%) and habitation structures (4.84%) which generally require stone outcrops or overhangs to be present.
- The low frequency of modified trees (1.61%) is most likely due to the extensive land clearance that has occurred post-contact. Where mature vegetation remains, there is the potential for modified trees to be present.
- Most sites are located on 6$^{th}$ order streams, such as Bomaderry Creek, which is located south of the Study Area, when considering perennial streams sites are likely to be within 500 metres, with 75% (n=113) of all sites being within this distance. The small creek that runs through the study area is a non-perennial stream, as such 60.48% (n=75) of sites are within 250 metres of the stream and 87.9% (n=109) are within 500 metres of a non-perennial stream.
- Sites occur across a range of landform contexts, with slopes, valleys, hollows and spurs.
- Maximum artefacts densities of up to 26 artefacts per metre² have been encountered within approximately 500 metres of the study area. In general, average densities have been between 0.48 and 5.09 artefacts per metre². The average artefact density across these sites is 2.39 artefacts per metre².
- Most lithics assemblages are likely to be dominated by petrified wood (30.14%) and chert (19.9%). Chert is the most common material as it is present in 6 of the 7 assemblages that have been reviewed as part of this assessment. Other raw material types likely to be present to varying degrees include silcrete, quartz, chalcedony, indurated mudstone/tuff, and jasper.

# 6 METHODOLOGY

## 6.1 SURVEY METHODS

An initial, preliminary pedestrian survey of 49 Hockeys Lane and 41 Main Road was undertaken on 18 March 2021, by William Andrews (archaeologist, Austral. A second survey was completed on 27 August 2021 by William Andrews with the assistance of Jesse Ferguson (Site officer, Nowra LALC).

### *6.1.1 SURVEY OBJECTIVES*

The objectives of the survey were to:

- Complete a systematic survey that targets areas that have been identified as having the potential to contain Aboriginal heritage values.
- Identify and record Aboriginal archaeological sites visible on the ground surface and areas of PAD.

### *6.1.2 SAMPLING STRATEGY*

The survey methodology was designed to optimise the investigation of areas where archaeological materials may be present and visible, as well as investigation of the broader archaeological potential of all landform elements present within the study area, which included:

- Slopes
- Low flat area
- Alluvial terrace
- Non-perennial creek banks
- Alluvial flat
- Drainage depression

The specific survey methodology developed for this assessment was guided by the survey requirements as set out in Requirement 5 to 10 of the Code of Practice (DECCW 2010c) and based upon consideration of the overall landform pattern within the study area, known landform elements (after Speight 2009) and the location of the previously identified sites. The survey targeted portions of the study area which contained higher archaeological potential. This included the surrounding landforms not associated with the widespread disturbance found on the central crest. Specifically, the alluvial terraces above the tributaries surrounding the study area. Any areas of exposure, such as the central road or the dirt track running along the mid-western slope were also targeted as areas more likely to reveal Aboriginal archaeological material.

### *6.1.3 SURVEY METHODS*

The archaeological survey consisted of pedestrian traverses completed by 3 team members. A key survey variable is ground visibility, which considers the amount of ground surface which is not covered by any vegetation; and exposure, which defines areas where dispersed surface soils and vegetative matter afford a clear assessment of the ground, were assessed across the study area and within each landform element. Overall survey coverage and calculated survey effectiveness was recorded. Note that the effectiveness of the field survey was largely dependent on the degree of ground surface visibility. Where surface visibility was restricted by dense vegetation cover, the potential for PADs was assessed, particularly in association with those landforms identified within the predictive model as more likely to contain Aboriginal archaeological sites. The potential of these areas and all landform elements within the study area was considered against available evidence of land disturbance.

Photographs were taken of all survey units and landforms as well as representative surface visibility, and where present, surface exposures, soil profiles and disturbances relevant to the interpretation of the stratigraphic conditions and archaeological potential within each survey unit.

## 6.2 TEST EXCAVATION METHODOLOGY

The test excavation was conducted on 30 November 2021 and between 6 and 8 December 2021 at 49 Hockeys Lane, and 10 to 12 January 2022 at 41 Main Road. Excavations Lane were over seen by Neil Fenley (archaeologist, Austral), and conducted by Pauline Ramsey (archaeologist, Austral), William Andrews (archaeologist, Austral), Isabelle Parnell (archaeologist, Austral), Emma Dougherty (archaeologist, Austral), Adrian Smith (site officer Nowra LALC), Chris Wellington site officer Jerrinja LALC), Gerald Carbery (site officer, Jerrinja LALC), Dean Scott (site officer, Nowra LALC), Seth Wellington (site officer, Nowra LALC), Gerald Carberry (site officer, Jerrinja LALC), Chris Wellington (site officer, Jerrinja LALC) and Willy Connolly (site officer, Jerrinja LALC).

The test excavation was completed in accordance with the notification and sampling strategy that was submitted to Heritage NSW on 7 October 2021. No response from Heritage NSW was received. A copy of this notification is included in Appendix A.

### *6.2.1 TEST EXCAVATION OBJECTIVES*

The objectives of the test excavation were to characterise the nature, extent and archaeological significance of Aboriginal objects associated with areas of previously recorded moderate potential. Another objective is to test the potential of all identified landforms within the study area. These were the initial research questions:

- Can we get a better understanding of the site formation processes?
- Can we add more information to the existing knowledge about the landform exploration by the traditional communities in the area? Enabling a comparative study between different landforms in the region
- Can we identify the various kind of cultural activities which occurred in the study area, thereby trying to establish activity zones in the area?
- Can we elucidate the different site formation processes in the study area and understand the context in which they are found?
- Is the nature of the subsurface archaeological deposit within the study area in line with the AHIMS search
- If Aboriginal heritage sites are found, what are the conservation or protective measures to be adopted
- Is there any spatial and stratigraphic extent and relationship between the Aboriginal heritage within the study area?
- Is there any relationship between the environmental factors and other natural processes impacting the deposition of Aboriginal heritage?

### *6.2.2 TEST EXCAVATION METHODOLOGY*

The test excavation programme was undertaken according to the prescribed methodology of Requirement 14 to 20 and 23 to 26 of the Code of Practice (DECCW 2010c). Specifically, in fulfilment of Requirement 15b of the Code of Practice (DECCW 2010c, p.25), a sampling strategy was developed for the test excavation prior to work commencing. Test pits were placed on a systematic grid designed to target both areas likely to contain PADs and the location of proposed impacts. Test pits were located 20 metres apart.

Each test pit was excavated following Requirement 16a of the Code of Practice using shovels and trowels (DECCW 2010c, p.26). Sample units measured 500 millimetres$^2$, with the first test pit excavated in 50-millimetre spits to act as a geomorphologic example and the remaining test pits were excavated in 100-millimetre spits. The excavations were undertaken until the B-horizon was reached and then continued for another 100 millimetres in the first test pit to confirm that the following spit was culturally sterile. In each differing soil landscape, a test pit was dug to 100millimetres below the B Horizon, to show that culturally sterile soils were present and in an attempt to reach the C Horizon.

The test excavations consisted of 75 test pits, spread across the 3 areas of potential identified during the pedestrian survey of the site. The location of the test pits can be seen in Figure 6-1, and

are grouped into 10 separate transects of varying length. All test pits were spaced 20 metres apart. The planned pit locations aimed to evenly cover the large areas of moderate potential and specifically target the area of higher potential and the alluvial terrace in the southeast corner of 49 Hockeys Lane.

Areas of moderate potential were systematically tested to ascertain if any areas of intense activity exist.

The test excavation conformed with Requirement 16 of the *CoP*. This included:

- The hand excavation of 500 x 500-millimetre test pits 20 metres apart on transects in areas considered to have high and moderate archaeological sensitivity.
- All excavation was conducted by hand, and the excavation of initial test pits proceeded in 50 millimetres spits. Subsequent test pits were excavated in 100-millimetre spits.
- Recording of each test pit was conducted during excavation using printed forms.
- 100% of excavated potential artefact bearing deposit was sieved using 5-millimetre screens.
- Artefacts were collected from the sieves and bagged according to excavation pit provenance. Each test pit was backfilled.

A description of each identified PAD is outlined in Table 6.1.

**Table 6.1 Areas of PAD identified within the study area**

| PAD | Description | No. of test pits |
|---|---|---|
| PAD 2 – Moderate Potential – Alluvial Terrace | Area of moderate potential, on an alluvial terrace in the south-east corner of 49 Hockeys Lane | 6 |
| PAD 3 – Moderate Potential – Alluvial Flat | Area of moderate potential in the majority of the study area between Good Dog Creek and the smaller creek in the east. | 60 |

There were 4 additional test pits were added when a higher density of artefacts was encountered in test pit 7 within the alluvial landform. These were placed 10 metres apart in each cardinal direction (Figure 6-1).

On-site processing of excavated soils and artefact retrieval was undertaken via a combination of dry sieving through a 5-millimetre. Artefacts were collected from the sieves and placed in bags according to test pit provenance. Buckets containing material from the same spit were kept together and separate from other spits.

### RECORDING

Detailed recording of all test pits was undertaken, requiring the completion of an excavation recording form for each spit excavated. The form necessitated detailed descriptions of the soil profile, any evidence of disturbance and/or features, as well as depth of excavation and the number of artefacts and inclusions present. For each artefact a separate plastic bag was annotated with the project name, transect number, test pit number, spit number, date and recorder's initials.

The photographic recording occurred after each pit was completed. A photographic record was taken of at least one wall section in each test pit. Together with a section drawing and stratigraphic photogrammetry from each pit, the photographs allowed for a detailed record of the strata present at the site.

### ANALYSIS OF EXCAVATED MATERIAL

A lithic analysis was conducted that aimed to material, tool types and any indicators of *in situ* reductions that informs depositional integrity. All of the artefacts recovered were taken to a temporary storage location at the Austral office in Albion Park and are to be reburied within the study area upon the completion of the project.

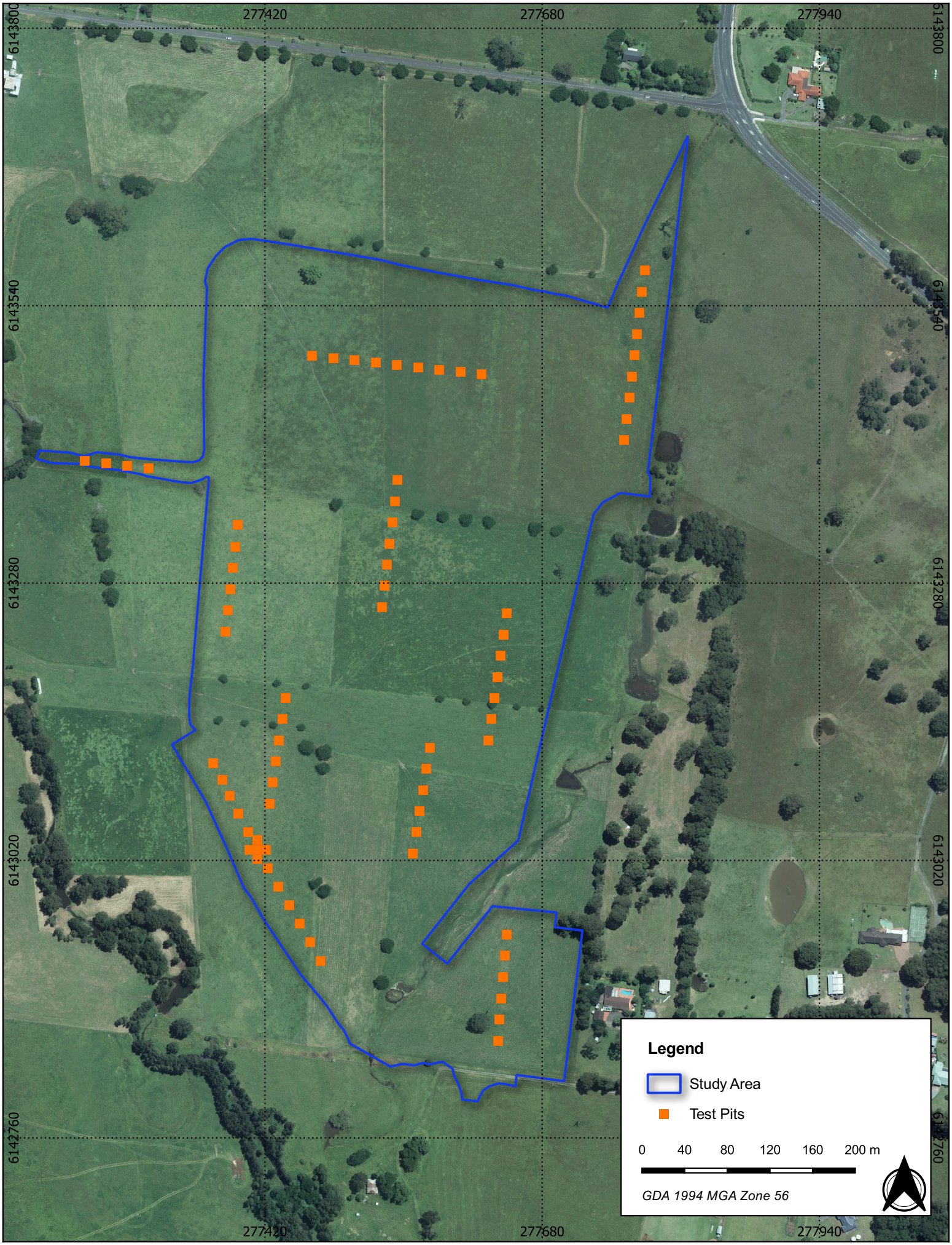



**Figure 6.1 - Location of test pits within the study area**

21105 - 49 Hockeys Lane & 41 Main Road, Cambewarra - ACHA

*Source: NSW LPI Aerial*

*Drawn by: ARH Date: 2022-03-17*

AUSTRAL ARCHAEOLOGY

# 7 RESULTS

The following section outlines the results of the archaeological investigations conducted within the study area.

## 7.1 ARCHAEOLOGICAL SURVEY RESULTS

In most archaeological reports and guidelines visibility refers to GSV, and refers to a percentage estimate of the ground surface that is visible and allows for the detection of cultural material present on the ground surface (DECCW 2010c). GSV within the proposed developed area was poor overall, with at times less than 1% visibility. The ground was covered in a thick grass cover, throughout the study area. As such, landform analysis will be more important than the presence of artefacts as they were not readily visible if present.

**Table 7.1 Survey coverage**

| Landform | Survey unit area (m²) | Visibility (%) | Exposure (%) | Effective coverage area (m²) | Effective coverage (%) |
|---|---|---|---|---|---|
| Alluvial Depression | **1,452** | **5** | **10** | **7.3** | **0.5** |
| Flat | **32,239** | **5** | **10** | **161.195** | **0.5** |

Most of the study area was located on a flat landform (Figure 7-1). This landform suggested low archaeological sensitivity in the study area. Mr Ferguson agreed with this assessment and believed the area was not suitable for any long-term occupation.

Mr Ferguson concluded that the existing areas of potential were likely to have had an Aboriginal presence in the past. The survey route and location of the artefact uncovered can be seen in Figure 7-1.

A site was recorded to the east of the study area, which consisted of only one Aboriginal stone artefact was identified in the centre of the northern portion of the study area (Figure 7-1). There is the possibility that the isolated artefact is part of a larger site. The landform of the site is a flat area that may have been suitable for camping in dry times. As artefacts have been found, this area is likely to have a moderate potential for further Aboriginal material.

No other artefacts were located, and the rest of the site consisted of a flat with alluvial depressions in the very western area of the site and cutting off the south-eastern corner of the study area.

A description of these results, as they relate to the survey units and observed landforms within the study area can be seen in Table 7.1 and Table 7.2.

**Table 7.2 Landform summary**

| Landform | Landform area (m²) | Area effectively surveyed (m²) | % of landforms effectively surveyed | No. sites | No. artefacts/features |
|---|---|---|---|---|---|
| Alluvial Depression | **1,452** | **7.3** | **0.5** | **0** | **0** |
| Flat | **32,239** | **161.195** | **0.5** | **1** | **1** |

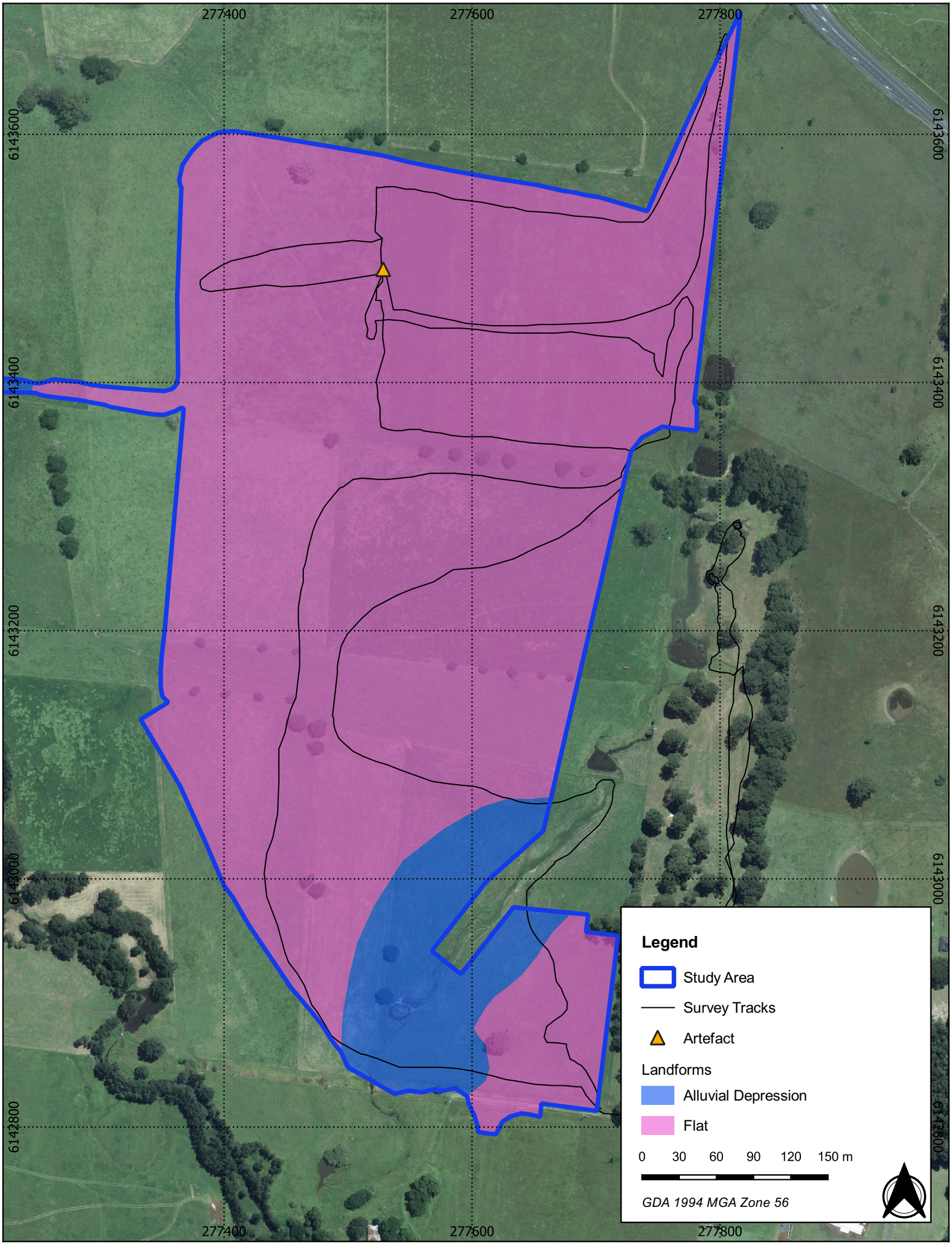



**Figure 7.1 - Survey Results**

21105 - 126 Taylors Lane, Cambewarra - ACHA

*Source: NSW LPI Aerial*

*Drawn by: ARH Date: 2022-09-13*

AUSTRAL ARCHAEOLOGY

## 7.2 TEST EXCAVATION RESULTS

Based on the results of the survey a test excavation was undertaken to investigate the identified sensitive landforms and areas of moderate archaeological potential. This consisted of 10 transects separated across the areas of potential. An outline of the distribution of test pits across the study area can be seen in Table 7.3.

**Table 7.3 Transect and test pit distribution across the study area**

| Address | Transect label | # of test pits | Landform |
|---|---|---|---|
| 49 Hockeys Lane | A | 5 | Creek bank |
| 49 Hockeys Lane | B | 7 | Alluvial flat |
| 49 Hockeys Lane | C | 6 | Creek bank |
| 49 Hockeys Lane | D | 6 | Alluvial flat |
| 49 Hockeys Lane | E | 5 | Alluvial flat |
| 49 Hockeys Lane | F | 7 | Alluvial flat |
| 49 Hockeys Lane and 41 Main Road | G | 7 | Alluvial flat |
| 41 Main Road | 1 | 4 | Alluvial flat |
| 41 Main Road | 2 | 9 | Alluvial flat |
| 41 Main Road | 3 | 9 | Alluvial flat |

#### *7.2.1.1 49 HOCKEYS LANE (TA1)*

Test Area 1 consisted of 34 test pis distributed across 7 transects. Test pits were placed 20 metres apart, covering the alluvial flats and creek banks east of Good Dog Creek.

#### SOILS, DISTURBANCE AND FEATURES

Soils across the entire testing area were generally consistent with small variations occurring with the depth of the horizons, Munsell colours and pH levels. The land has been ploughed numerous times for cropping purposes and this may have led to the homogenous soil profile across the entire study area. The test pits showed an A1 silty top soil, transitioning into an A2 silty loam, overlaying a mottled clayey silt which in turn overlay a mottled clay B Horizon. The water retention of this soil was very high, and due to the high levels of rain experienced during the weeks prior and while conducting the testing, water pooling at the surface and lower levels of the soil was widely encountered. This water retention was noted during both excavation periods in early December 2021and late January 2022. Disturbance in the form of various glass fragments and plastic pieces was encountered as deep as 200 mm. An outline of these soils can be seen in Table 7.4, Figure 7-2 and Table 7.3.

**Table 7.4 Summary of soil characteristics within the TA1**

| Soil Horizon | Soil Characteristics |
|---|---|
| A1 Horizon | **Depth:** 0-200 mm<br>**Munsell**: 5YR 2.5/2<br>**Ph:** 5.5<br>**Description:** Dark brown silty topsoil. Very humic. Gradual transition into underlying A2 horizon. Small grass roots present in upper 100 mm.<br>Modern disturbance is noted. Inclusions are fewer than 5%, sub-angular pebbles. |

| Soil Horizon | Soil Characteristics |
|---|---|
| A2 Horizon | **Depth:** 200-300 mm<br>**Munsell:** 5YR 2.5/2<br>**Ph**: 4<br>**Description:** mottled dark brown and yellowish silty clay transitioning layer. Inclusions are noted at 10% density a mix of river pebbles and sub-angular coarse material. |
| B Horizon | **Depth:** 300-400 mm<br>**Munsell:** 10YR 3/6<br>**Ph**: 4<br>**Description:** Mid-brown to yellow silty clay. Clay content increased with depth. No more inclusions. |

**Figure 7-2 View of northern soil profile of Transect B Test Pit 2**

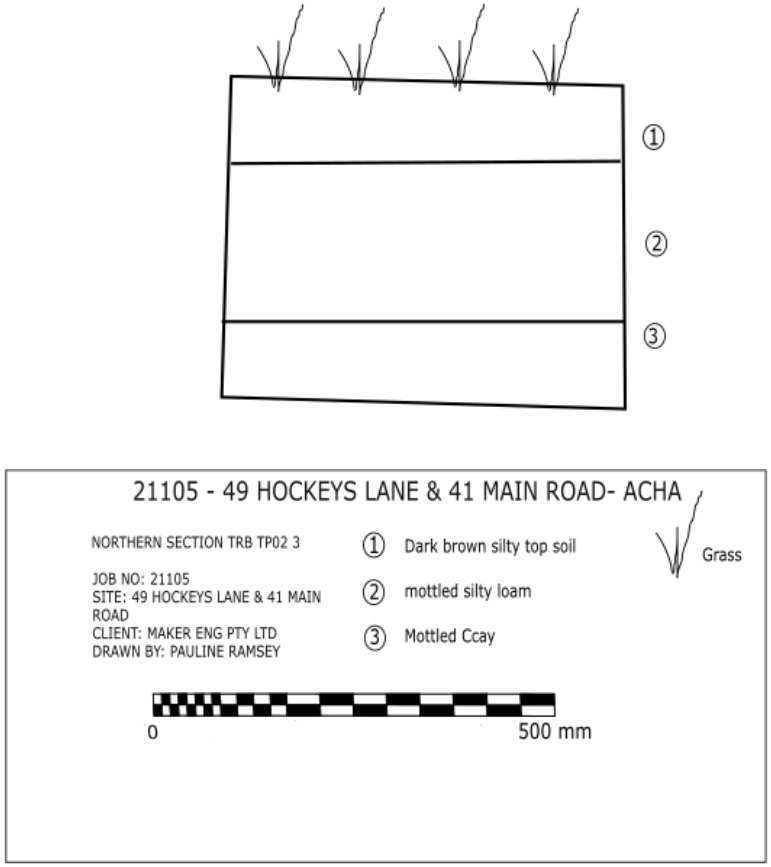



**Figure 7-3 North section soil profile of Transect B Test Pit 2**

*7.2.1.2 41 MAIN ROAD (TA2)*

The testing in this area consisted of 32 test pits spread over 4 transects. Test pits were placed 20 metres apart, covering the alluvial flat.

**SOILS, DISTURBANCE AND FEATURES**

Soils across 41 Main Road were fairly consistent. These comprised of an A1 silty topsoil, transitioning into a silty loam A2 Horizon. These, in turn, overlay a compact silty clay. Similar disturbance was encountered in the first 2 spits as in TA1, consisting of glass and plastic fragments. Bioturbation and long grass roots were present in the A1 Horizon, whereas the compactness of the soil was attributed to the soils poor water retention capabilities. Water pooling was similarly observed in all levels throughout the testing area. An outline of these soils can be seen in Table 7.5, Figure 7-5 and Figure 7-6.

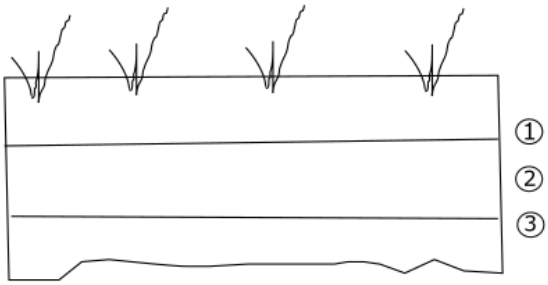

**Figure 7-4 Northern profile of Transect 3, TP R**

**Table 7.5 Summary of soil characteristics found in TA2**

| Soil Horizon | Soil Characteristics |
|---|---|
| A1 Horizon | **Depth:** 0-200 mm<br>**Munsell**: 5YR 2.5/2<br>**Ph:** 5.5<br>**Description:** Dark brown silty topsoil. Very humic. Gradual transition into underlying A2 horizon. Small grass roots present in upper 100 mm.<br>Modern disturbance is noted . Inclusions are fewer than 5%, sub-angular pebbles. |

| Soil Horizon | Soil Characteristics |
|---|---|
| A2 Horizon | **Depth:** 200-300 mm<br>**Munsell:** 5YR 2.5/2<br>**Ph**: 4<br>**Description:** mottled dark brown and yellowish silty clay transitioning layer. Inclusions are noted at 10% density a mix of river pebbles and sub-angular coarse material. |
| B Horizon | **Depth:** 300-400 mm<br>**Munsell:** 10YR 3/6<br>**Ph**: 4<br>**Description:** Mid-brown to yellow silty clay. Clay content increased with depth. No more inclusions. |

**Figure 7-5 View of northern soil profile of test pit R**



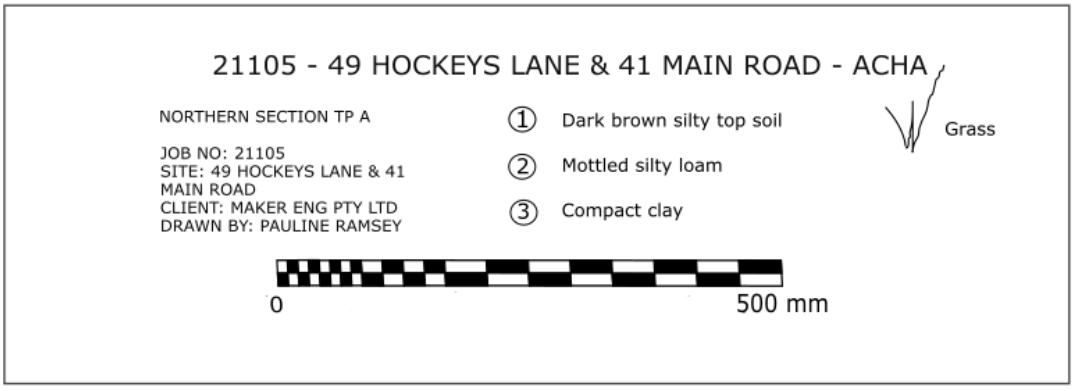




**Figure 7-6 Outline of soil profile of test pit R**

## 7.3 LITHIC ANALYSIS

This lithic analysis provides details of the stone material identified during the test excavation using standard terminology for artefact analysis taken from Holdaway & Stern (2013) and McCarthy (1976). Detailed artefact analysis entailed recording several characteristics for each artefact. Stone artefact raw materials were examined through a hand lens (x 10 magnification). Each artefact was recorded in database form, suitable for comparative analysis on a local and regional basis. The terminology used in the analysis is defined in Table 7.6.

**Table 7.6 Terminology used in the identification of stone tools**

| Analytical Terms | Definition |
|---|---|
| **Angular fragment / Debitage** | A piece of debris exhibiting evidence of knapping but lacking key diagnostic traits (e.g. platform, termination, bulb of percussion) |
| **Backing** | Abrupt retouch normally found on one lateral margin of a tool and opposite the working edge. |
| **Core** | A piece of stone from which flakes are struck (generally with a hammerstone). Exhibits only negative scars, no positive scars. Must have at least one complete flake scar |
| **Cortex** | The weathered outer layer of rock, differing in chemical and optical properties to the unweathered interior. |
| **Distal flake** | The termination end of a partial (broken) flake. |
| **Dorsal surface** | Outer surface of a flake (former surface of the core) characterised by cortex and/or negative flake scars and ridges denoting prior removal of flakes. |
| **Flake** | A sliver of stone struck from a core exhibiting characteristic positive traits of force fracture. |
| **Knapping** | The process of fracturing flakes of stone from a core |
| **Lateral margin** | Left and right edges of a flake (platform oriented upward when viewing the ventral surface and distal end oriented upward for the dorsal surface). |
| **Platform** | Planar surface marking the location from which the flake was struck from the core. |
| **Primary flake** | Initial flake struck from a weathered cobble with a dorsal surface covered in cortex and lacking prior flake scars. |
| **Proximal flake** | The platform end of a partial (broken) flake. |
| **Retouch** | Alteration of the cutting edges of a flake or tool to refine sharpness, shape, angle or strength. |
| **Termination** | End of a flake opposite the platform denoting the place the force applied by the hammerstone exited the core. |
| **Tertiary flake** | Flake lacking dorsal or platform cortex indicating a high degree of prior reduction of the core from which it was knapped. |
| **Ventral surface** | Inner surface of a flake originally attached to a core exhibiting one or more traits of conchoidal fracture including a bulb of percussion, bulbar scar and ripple marks. |

### *7.3.1 RESULTS OF THE ANALYSIS*

The artefacts recovered during the test excavation program underwent a detailed lithics analysis by Neil Fenley (Senior archaeologist, Austral). The distribution of artefacts is presented in Table 7.7.

**Table 7.7 Distribution of artefacts within test pits**

| Transect | Pit No. | Spit | | | | Total | |
|---|---|---|---|---|---|---|---|
| | | 1 | 2 | 3 | 4 | Count | % |
| Hockeys Lane A | TP1 | 4 | 1 | 0 | 0 | 5 | 10.86 |
| Hockeys Lane A | TP2 | 1 | 0 | 1 | 0 | 2 | 4.34 |

| Transect | Pit No. | Spit | | | | Total | |
|---|---|---|---|---|---|---|---|
| | | 1 | 2 | 3 | 4 | Count | % |
| Hockeys Lane A | TP3 | 0 | 2 | 0 | 0 | 2 | 4.34 |
| Hockeys Lane A | TP4 | 1 | 0 | 0 | 0 | 1 | 2.17 |
| Hockeys Lane A | TP6 | 0 | 2 | 0 | 0 | 2 | 4.34 |
| Hockeys Lane B | TP2 | 0 | 2 | 0 | 0 | 2 | 4.34 |
| Hockeys Lane B | TP3 | 1 | 0 | 0 | 0 | 1 | 2.17 |
| Hockeys Lane B | TP4 | 1 | 5 | 0 | 0 | 6 | 13.04 |
| Hockeys Lane B | TP6 | 1 | 0 | 0 | 0 | 1 | 2.17 |
| Hockeys Lane B | TP7 | 1 | 0 | 0 | 0 | 1 | 2.17 |
| Hockeys Lane B | TP7 EXP C | 0 | 1 | 1 | 2 | 4 | 8.69 |
| Hockeys Lane B | TP7 EXP D | 0 | 0 | 1 | 0 | 1 | 2.17 |
| Hockeys Lane B | TP9 | 0 | 3 | 1 | 0 | 4 | 8.69 |
| Hockeys Lane B | TP11 | 1 | 0 | 0 | 0 | 1 | 2.17 |
| Hockeys Lane C | TP1 | 1 | 0 | 0 | 0 | 1 | 2.17 |
| Hockeys Lane D | TP1 | 1 | 0 | 0 | 0 | 1 | 2.17 |
| Hockeys Lane D | TP2 | 0 | 2 | 0 | 0 | 2 | 4.34 |
| Hockeys Lane D | TP4 | 1 | 0 | 0 | 0 | 1 | 2.17 |
| Hockeys Lane D | TP6 | 1 | 0 | 0 | 0 | 1 | 2.17 |
| 41 Main Road 1 | TPD | 0 | 0 | 1 | 0 | 1 | 2.17 |
| 41 Main Road 1 | TPH | 0 | 1 | 0 | 0 | 1 | 2.17 |
| 41 Main Road 2 | TPQ | 2 | 0 | 0 | 0 | 2 | 4.34 |
| 41 Main Road 3 | TPS | 2 | 0 | 0 | 0 | 2 | 4.34 |
| 41 Main Road 3 | TPV | 1 | 0 | 0 | 0 | 1 | 2.17 |
| **Total** | | **20** | **19** | **5** | **2** | **46** | **100** |

A total of 46 flaked stone artefacts were recovered from 24 artefact-bearing test pits. Most artefacts were recovered spit 1 (n=20, 43/7%) and spit 2 (n=19, 41.3%) with the remaining artefact associated with spit 3 and 4. The artefacts were evenly distributed across the artefact bearing test pits with only very small variations in the numbers, this is typical of the low density widely dispersed background scatters in the general area. The artefact counts were higher the closer to water courses and this is clearly displayed with no artefacts recovered from the transects E, F and G. As such, the remainder of the analysis will explore technological pattering at an assemblage level only.

## ASSEMBLAGE CHARACTERISTICS – ARTEFACT CLASS, RAW MATERIAL, AND CORTEX

The assemblage is dominated by complete flakes and broken flakes (i.e., proximal, medial, or distal flakes) which account for a combined 54% of the assemblage. Debitage, lithic material with no diagnostic attributes, accounted for 28% of the assemblage, there were four retouched artefacts (8.6%) and a single multi-directional core.

The assemblage almost exclusively comprised the same red-brown chert raw material (82.6%). A single petrified wood flake and a single broken silcrete flake formed the remainder of the raw materials present (Table 7.8).

**Table 7.8 Assemblage composition based on artefact class and raw material type**

| Artefact class | Raw material | | | | | | | | Total | |
|---|---|---|---|---|---|---|---|---|---|---|
| | Chert | | Petrified Wood | | Silcrete | | Quartz | | | |
| | Count | % | Count | % | Count | % | Count | % | Count | % |
| Complete flake | 16 | 84.2 | 0 | 0 | 1 | 33.33 | 2 | 50 | 19 | 41.2 |
| Proximal flake | 3 | 7.9 | 1 | 100 | 0 | 0 | 0 | 0 | 4 | 8.7 |
| Distal flake | 2 | 5.2 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 4.4 |
| Core | 0 | 0 | 0 | 0 | 1 | 33.33 | 0 | 0 | 1 | 2.2 |
| Tool | 4 | 10.4 | 0 | 0 | 0 | 0 | 0 | 0 | 4 | 8.7 |
| Debitage | 13 | 34.2 | 0 | 0 | 1 | 33.34 | 2 | 50 | 16 | 34.8 |
| **Total** | **38** | **100** | **1** | **100** | **3** | **100** | **4** | **100** | **46** | **100.0** |

#### FLAKES AND CORES

Due to the low numbers of flaked artefacts (n=19) any further detailed analysis of the artefacts will not produce data that can be realistically used for an in depth analysis.

#### TOOLS

There were 4 tools recorded from the assemblage, a geometric microlith, a steep edge scraper and 2 blades. The geometric microlith is a backed tool, typical of the general region, the steep edge scraper is also relatively common among tools. The 2 blades present are indicative of predetermined lithic manufacture.

#### INTERPRETATIONS

The presence of the single backed artefact in the assemblage means that it can be typologically dated to the mid-to-late Holocene (<5,000 years ago).

The paucity of cores in the assemblage and the limited range of raw materials present indicates that the assemblage is likely the result of short-term use of the site where tool makers manufactured artefacts from cores that were then either discarded on-site when exhausted or transported off-site as part of a transportable tool kit.

## 7.4 IDENTIFIED ABORIGINAL SITES

As a result of this testing investigation, 11 Aboriginal archaeological sites have been identified: 5 artefact scatters, 49 Hockeys Lane AS1 through to AS4 and 41 Main Road AS5 and AS6, there are also 5 isolated artefacts present across the study area. A common theme throughout the recorded sites is the paucity of cores in the assemblage, the only core recorded was a single platform core, presenting as an isolated surface find adjacent to Transect 2, 41 Main Road.

### *7.4.1 ARTEFACT SCATTERS*

#### 49 HOCKEYS LANE AS1 (AHIMS #52-5-1037)

The artefact scatter, 49 Hockeys Lane AS1 (AHIMS #52-5-1037) comprises 9 artefacts recovered from Transect A, test pits 1 to 4 on an alluvial flat landform north of Good Dog Creek. Of the 9 artefacts found subsurface 8 were identified within the first spit and a single artefact from spit 3. The subsurface material was limited to 2 material types, chert and silcrete. Complete flakes make up the majority of the assemblage, followed by flaked pieces. Minor evidence of a disturbance was encountered, mostly the result of the farming activities taking place in the study area.

| Site type | Artefact |
|---|---|

| | |
|---|---|
| **Centroid** | GDA 94 Zone 56 277681 m E and 6142875 m N |
| **Site Extent** | 89 m X 41 m |

Figure 7-7, Figure 7-8, Figure 7-9 and Figure 7-10 contain representative images indicating the landscape context and cultural material identified in association with the artefact scatters.

### 49 HOCKEYS LANE AS2 (AHIMS #52-5-1039)

The artefact scatter, 49 Hockeys Lane AS2 (AHIMS #52-5-1039) comprised 17 artefacts recovered across Transect B, and a single artefact from Transect C. It is located on an alluvial flat east of Good Dog Creek. Of the 17 artefacts found subsurface 4 were identified within the first spit, 9 from spit 2, 2 from spit and a single artefact from spit 4. The assemblage for this site was made of flakes and flaked pieces with debitage. Minor evidence of a disturbance was encountered, mostly the result of the farming activities taking place in the study area.

The subsurface material was limited to 3 material types, chert, quartz and petrified wood. Complete flakes make up the majority of the assemblage, followed by flaked pieces and debitage. Similarly to Hockeys Lane AS1 the paucity of cores in the assemblage indicates that the assemblage is likely the result of short-term use of the site for an isolated manufacturing episode where tool makers manufactured artefacts from cores that were then either discarded on-site when exhausted or transported off-site as part of a transportable tool kit

| | |
|---|---|
| **Site type** | Artefact |
| **Centroid** | GDA 94 Zone 56 277423 m E and 6143016 m N |
| **Site Extent** | 252 m X 64 m |

### 49 HOCKEYS LANE AS3 (AHIMS #52-5-1040)

The artefact scatter, 49 Hockeys Lane AS3 (AHIMS #52-5-1040) comprised 3 artefacts recovered across Transect D, TP 1 and TP 2. It is located on an alluvial flat east of Good Dog Creek. Of the 3 artefacts found subsurface, there was a singe artefact identified from spits 2, 3 and 4. The assemblage for this site was made up of 2 pieces debitage and 1 complete flake. Minor evidence of a disturbance was encountered, mostly the result of the farming activities taking place in the study area. The subsurface material was limited to 2 material types, chert and quartz. Little other information can be deduced from this site due to the low number of artefacts

| | |
|---|---|
| **Site type** | Artefact |
| **Centroid** | GDA 94 Zone 56 277385 m E and 6143239 m N |
| **Site Extent** | 53 m X 34m |

### 49 HOCKEYS LANE AS4 (AHIMS #52-5-1046)

The artefact scatter, 49 Hockeys Lane AS4 (AHIMS #52-5-1046) comprised 2 artefacts recovered from Transect A TP 6. It is located on an alluvial flat north of 49 Hockeys Lane AS1. It consists of a quartz proximal flake from spit 2 and a single piece of chert debitage from spit 3. Minor evidence of a disturbance was encountered, mostly the result of the farming activities taking place in the study area.

| | |
|---|---|
| **Site type** | Artefact |
| **Centroid** | GDA 94 Zone 56 277311 m E and 6143388 m N |
| **Site Extent** | 10 m X 10 m |

### 41 MAIN ROAD AS5 (AHIMS #52-5-1044)

The artefact scatter, 41 Main Road AS5 (AHIMS #52-5-1044) comprised 2 artefacts recovered from Transect 2 TP Q. It is located on an alluvial flat east of Good Dog Creek. It consists of a chert blade and a piece of chert debitage both recovered from spit 1. Minor evidence of a disturbance was encountered, mostly the result of the farming activities taking place in the study area.

| | |
|---|---|
| **Site type** | Artefact |

| | |
|---|---|
| **Centroid** | GDA 94 Zone 56 277758 m E and 6143432 m N |
| **Site Extent** | 10 m X 10 m |

### 41 MAIN ROAD AS6 (AHIMS #52-5-1038)

The artefact scatter, 41 Main Road AS (AHIMS #52-5-1038) is comprised of 2 artefacts recovered from Transect 3 TP S. It is located on an alluvial flat in the northeast. It consists of two pieces of debitage both recovered from spit 1. Minor evidence of a disturbance was encountered, mostly the result of the farming activities taking place in the study area.

| | |
|---|---|
| **Site type** | Artefact |
| **Centroid** | GDA 94 Zone 56 277646 m E and 6142950 m N |
| **Site Extent** | 10m X 10m |

#### *7.4.2 ISOLATED ARTEFACTS*

There were 5 isolated artefacts (ISO) recorded during the test excavations, these were located at least 40 metres from the nearest artefact bearing test pit. All the ISOs are likely to be part of the overall low density background scatters common in the general area.

### 49 HOCKEYS LANE ISO 1 (AHIMS #52-5-1041)

49 Hockeys Lane ISO 1 (AHIMS #52-5-1041) constitutes a single artefact found on the flat landform in the north of 49 Hockeys Lane AS 3 (AHIMS #52-5-1040). The isolated nature of this find makes it hard to draw any solid conclusions about the nature of the site. However, its location in proximity to the artefact scatter Hockeys Lane AS3 makes it likely to be part of a related background scatter.

| | |
|---|---|
| **Site type** | Artefact |
| **Centroid** | GDA 94 Zone 56 277393 m E and 6143290 m N |
| **Site Extent** | 10 m radius |

### 49 HOCKEYS LANE ISO 2 (AHIMS #52-5-1045)

49 Hockeys Lane ISO 2 (AHIMS #52-5-1045) constitute a single artefact found on the flat landform to the north of 49 Hockeys Lane AS 3 (AHIMS #52-5-1040). The isolated nature of this find makes it hard to draw any solid conclusions about the nature of the site. However, its location in proximity to the artefact scatter Hockeys Lane AS3 makes it likely to be part of a related background scatter.

| | |
|---|---|
| **Site type** | Artefact |
| **Centroid** | GDA 94 Zone 56 277396 m E and 6143327 m N |
| **Site Extent** | 10 m radius |

### 41 MAIN ROAD ISO 3 (AHIMS #52-5-1036)

41 Main Road ISO 3 (AHIMS #52-5-1036) constitutes a single artefact found on the flat landform to the east of Good Dog Creek and the west of 41 Main Road AS5 (AHIMS #52-5-1044). The isolated nature of this find makes it hard to draw any solid conclusions about the nature of the site. However, its location in proximity to the artefact scatter 41 Main Road AS5 makes it likely to be part of this background scatter.

| | |
|---|---|
| **Site type** | Artefact |
| **Centroid** | GDA 94 Zone 56 277254 m E and 6143395 m N |
| **Site Extent** | 10 m radius |

### 41 MAIN ROAD ISO 4 (AHIMS #52-5-1042)

41 Main Road ISO 4 (AHIMS #52-5-1042) constitutes a single artefact found on the flat landform centrally located in the north of the study area. The isolated nature of this find makes it hard to draw any solid conclusions about the nature of the site.

| | |
|---|---|
| **Site type** | Artefact |
| **Centroid** | GDA 94 Zone 56 277528m E and 6143487m N |
| **Site Extent** | 10 m radius |

### 41 MAIN ROAD ISO 5 (AHIMS #52-5-1043)

41 Main Road ISO 5 (AHIMS #52-5-1043) constitutes a single artefact found on the flat landform centrally located in the north of the study area, 80 metres east of 41 Main Road ISO 4 . The isolated nature of this find makes it hard to draw any solid conclusions about the nature of the site.

| | |
|---|---|
| **Site type** | Artefact |
| **Centroid** | GDA 94 Zone 56 277606 m E and 6143473 m N |
| **Site Extent** | 10 m radius |

### 41 MAIN ROAD SURFACE FINED (AHIMS #52-5-1050)

41 Main Road Surface Fine (AHIMS #52-5-1050) constitutes a single artefact found on the flat landform centrally located in the north of the study area. The isolated nature of this find makes it hard to draw any solid conclusions about the nature of the site.

| | |
|---|---|
| **Site type** | Artefact |
| **Centroid** | GDA 94 Zone 56 277528m E and 6143488m N |
| **Site Extent** | 10 m radius |

**Figure 7-7 Typical flat landform within the study area, adjacent to 49 Hockeys Lane AS2**

**Figure 7-8 Typical of the flat landform associated with 41 Main Road AS5**

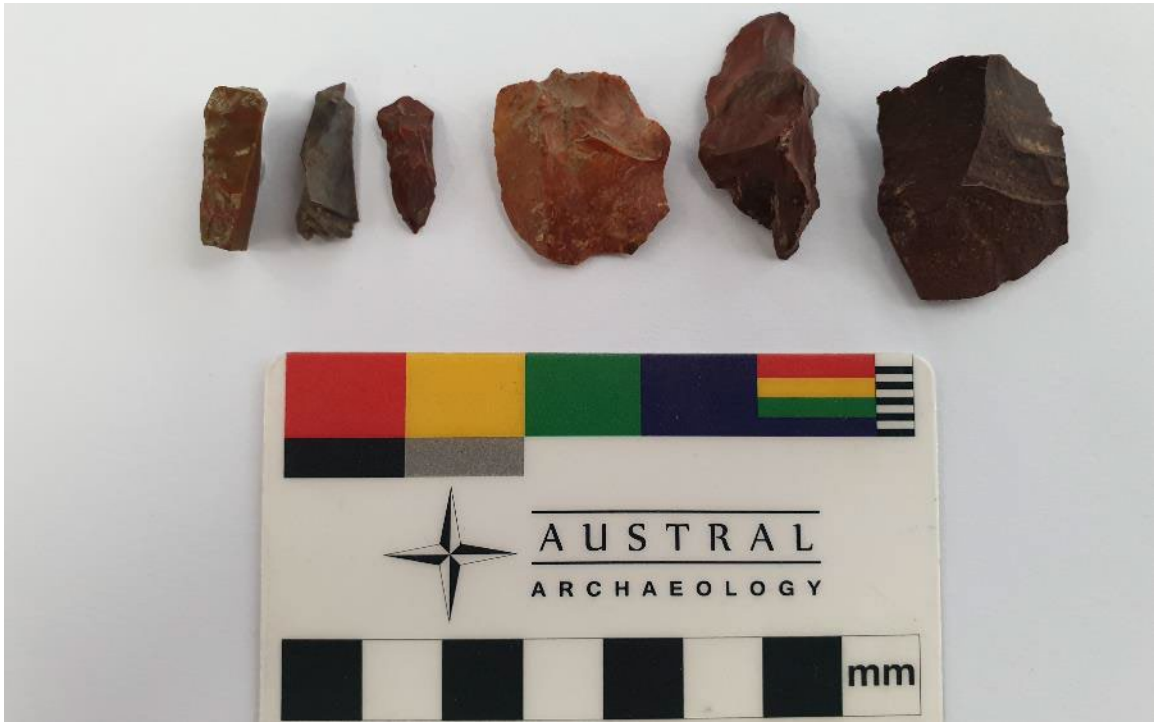



**Figure 7-9 Dorsal surface of flakes and broken flakes from 49 Hockeys Lane AS2**

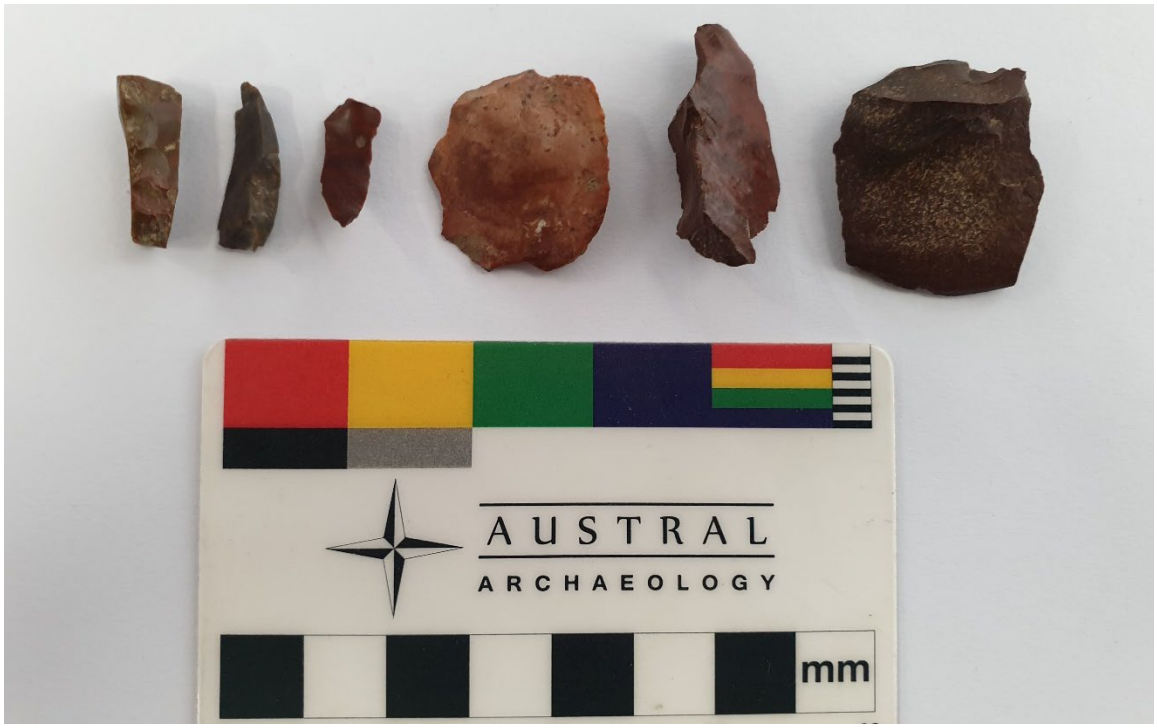



**Figure 7-10 Ventral surface of the artefacts from 49 Hockeys Lane AS 2**

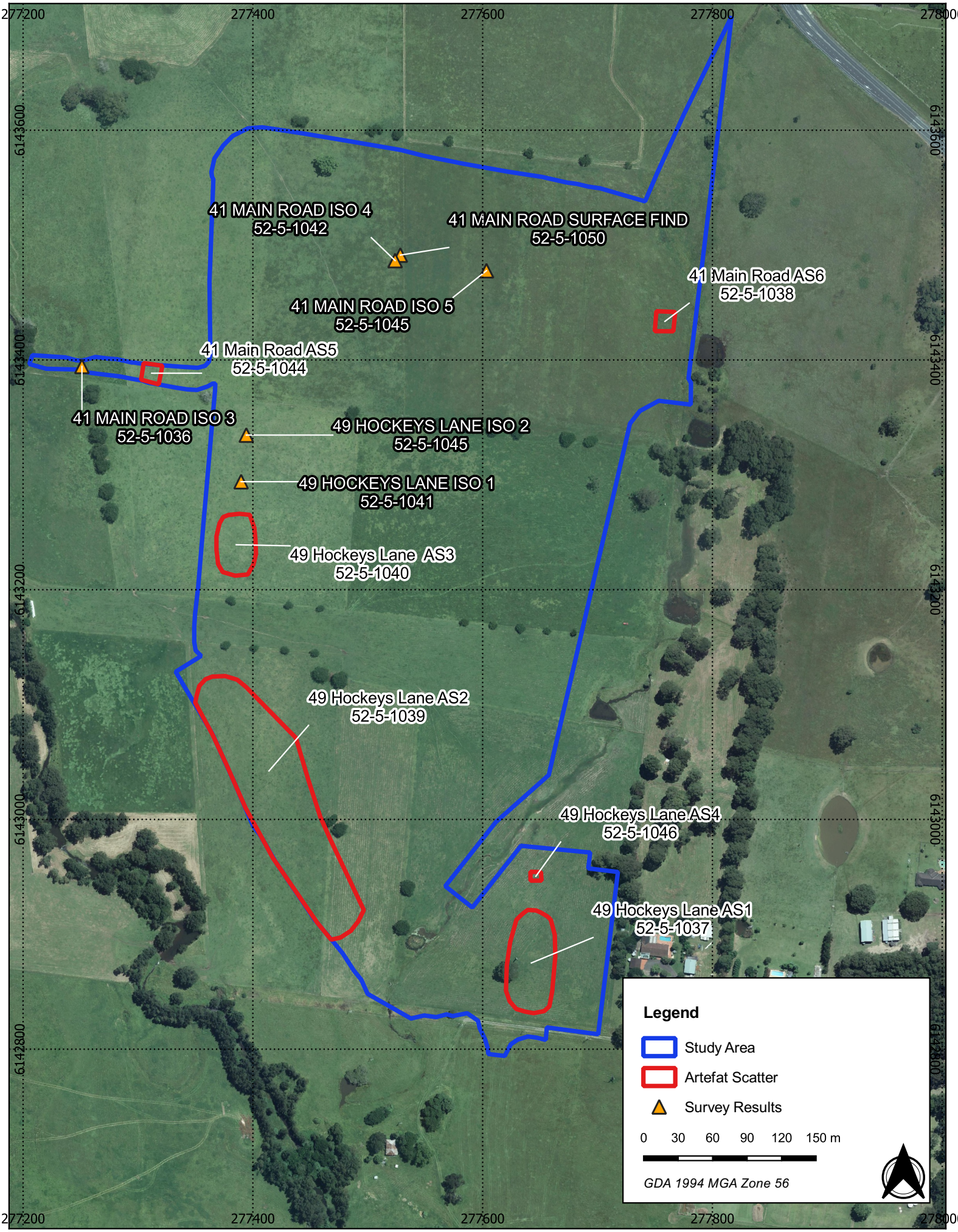



**Figure 7-11 - Archaeological results within the study area**

21105 - 49 Hockeys Lane & 41 Main Road, Cambewarra - ACHA

*Source: NSW LPI Aerial*

*Drawn by: ARH Date: 2022-09-16*

AUSTRAL ARCHAEOLOGY

# 8 CULTURAL HERITAGE VALUES

An assessment of significance seeks to determine and establish the importance or value that a place, site or item may have to the community at large. The concept of cultural significance is intrinsically connected to the physical fabric of the item or place, its location, setting and relationship with other items in its surrounds. The assessment of cultural significance is ideally a holistic approach that draws upon the response these factors evoke from the community.

## 8.1 BASIS FOR THE ASSESSMENT

The significance values provided in the Australia ICOMOS *Charter for the Conservation of Places of Cultural Significance* (the Burra Charter) are considered to be the best practice heritage management guidelines in Australia (Australia ICOMOS 2013a). The Burra Charter defines cultural significance as:

> *"…aesthetic, historic, scientific, social or spiritual value for past, present or future generations. Cultural significance is embodied in the place itself, its fabric, setting, use, associations, meanings, records, related places and related objects. Places may have a range of values for different individuals or groups." (Australia ICOMOS 2013a, p.2)*

The Burra Charter significance values outlined in Table 8.1; these are frequently adopted by cultural heritage managers and government agencies as a framework for a more holistic assessment of significance.

**Table 8.1 Definitions of Burra Charter significance values (Australia ICOMOS 2013b)**

| Value | Definition |
|---|---|
| **Aesthetic** | Refers to the sensory and perceptual experience of a place. That is how a person responds to visual and non-visual aspects such as sounds, smells and other factors having a strong impact on human thoughts, feelings and attitudes. Aesthetic qualities may include the concept of beauty and formal aesthetic ideals. Expressions of aesthetics are culturally influenced. |
| **Historic** | Refers to all aspects of history. For example, the history of aesthetics, art and architecture, science, spirituality and society. It therefore often underlies other values. A place may have historic value because it has influenced, or has been influenced by, an historic event, phase, movement or activity, person or group of people. It may be the site of an important event. For any place the significance will be greater where the evidence of the association or event survives at the place, or where the setting is substantially intact, than where it has been changed or evidence does not survive. However, some events or associations may be so important that the place retains significance regardless of such change or absence of evidence. |
| **Scientific** | Refers to the information content of a place and its ability to reveal more about an aspect of the past through examination or investigation of the place, including the use of archaeological techniques. The relative scientific value of a place is likely to depend on the importance of the information or data involved, on its rarity, quality or representativeness, and its potential to contribute further important information about the place itself or a type or class of place or to address important research questions. |
| **Social** | Refers to the associations that a place has for a particular community or cultural group and the social or cultural meanings that it holds for them. |

| Value | Definition |
|---|---|
| **Spiritual** | Refers to the intangible values and meanings embodied in or evoked by a place which give it importance in the spiritual identity, or the traditional knowledge, art and practices of a cultural group. Spiritual value may also be reflected in the intensity of aesthetic and emotional responses or community associations, and be expressed through cultural practices and related places.<br>The qualities of the place may inspire a strong and/or spontaneous emotional or metaphysical response in people, expanding their understanding of their place, purpose and obligations in the world, particularly in relation to the spiritual realm.<br>The term spiritual value was recognised as a separate value in the Burra Charter, 1999. It is still included in the definition of social value in the Commonwealth and most state jurisdictions. Spiritual values may be interdependent on the social values and physical properties of a place. |

In addition to the Burra Charter significance values, other criteria's and guidelines have been formulated by other government agencies and bodies in NSW to assess the significance of heritage places in NSW. Of particular relevance to this assessment are the guidelines prepared by the Australian Heritage Council and the Department of the Environment, Water, Heritage and the Arts (DEWHA), and Heritage NSW (Australian Heritage Council & DEWHA 2009, DECCW 2010c, OEH 2011, NSW Heritage Office 2001).

The Guide (OEH 2011, p.10) states that the following criteria from the NSW Heritage Office (2001, p.9) should be considered:

- **Social value:** Does the subject area have a strong or special association with a particular community or cultural group for social, cultural or spiritual reasons?
- **Historic value:** Is the subject area important to the cultural or natural history of the local area and/or region and/or state?
- **Scientific value:** Does the subject area have potential to yield information that will contribute to an understanding of the cultural or natural history of the local area and/or region and/or state?
- **Aesthetic value:** Is the subject area important in demonstrating aesthetic characteristics in the local area and/or region and/or state?

OEH (2011, p.10) states that when considering the Burra Charter criteria, a grading system must be employed. Austral will use the following grading system to assess the cultural values of the study area and its constituent features. These are outlined in Table 8.2.

**Table 8.2 Gradings used to assess the cultural values of the study area**

| Grading | Definition |
|---|---|
| **Exceptional** | The study area is considered to have rare or outstanding significance values against this criterion. The significance values are likely to be relevant at a state or national level. |
| **High** | The study area is considered to possess considerable significant values against this criterion. The significance values are likely to be very important at a local or state level. |
| **Moderate** | The study area is considered to have significance values against this criterion; these are likely to have limited heritage value but may contribute to broader significance values at a local or State level. |
| **Little** | The study area is considered to have little or no significance values against this criterion. |

## 8.2 ASSESSMENT OF SIGNIFICANCE

The following section addresses the Burra Charter significance values with reference to the overall study area.

### *8.2.1 AESTHETIC SIGNIFICANCE VALUES*

Aesthetic values refer to the sensory, scenic, architectural and creative aspects of the place. These values may be related to the landscape and are often closely associated with social and cultural values.

The slopes and flats present within the study area are common in the surrounding area and it is unlikely the Aboriginal heritage of study area is considered to have **low** aesthetic significance values within the meaning of the criterion for heritage assessment purposes.

values.

### *8.2.2 HISTORIC SIGNIFICANCE VALUES*

The assessment of historic values refers to associations with particular places associated with Aboriginal history. Historic values may not be limited to physical values but may relate to intangible elements that relate to memories, stories or experiences.

No distinct historic events occurred within the study area and it is not associated with any significant historical figures. It is considered to have **low** historic significance values.

### *8.2.3 SCIENTIFIC SIGNIFICANCE VALUES*

Scientific significance generally relates to the ability of archaeological objects or sites to answer research questions that are important to the understanding of the past life-ways of Aboriginal people. Australia ICOMOS (2013b, p.5) suggests that to appreciate scientific value, that the following question is asked: "*Would further investigation of the place have the potential to reveal substantial new information and new understandings about people, places, processes or practices which are not available from other sources?*".

In addition to the above criteria, The Guide (OEH 2011, p.10) also suggests that consideration is given to the Australian Heritage Council and DEWHA (2009) criteria, which are particularly useful when considering scientific potential:

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

An assessment of the scientific significance of the Aboriginal sites located within the study area is outlined in Table 8.3

**Table 8.3 Scientific significance of Aboriginal sites in the study area**

| Site name | AHIMS No. | Assessment of significance | Grading |
|---|---|---|---|
| **49 Hockeys Lane ISO 1** | 52-5-1041 | The site is indicative of a very low-density background scatter and holds limited research potential.<br>The site is representative of sites found along Taylors Lane and the wider Cambewarra area.<br>The site is extremely common in the area and has been found in all previous excavations.<br>The site holds limited education potential and is defined as a single artefact from Transect D TP 5. | Low |
| **49 Hockeys Lane ISO 2** | 52-5-1045 | The single artefact, chert debitage, is indicative of a very low-density background scatter and holds limited research potential.<br>The site is representative of sites found along Taylors Lane and the wider Cambewarra area.<br>The site is extremely common in the area and has been found in all previous excavations.<br>The site holds limited education potential. 1 Artefact in Transect 5 TP 6. | Low |

| Site name | AHIMS No. | Assessment of significance | Grading |
|---|---|---|---|
| **41 Main Road ISO 3** | 52-5-1036 | The site is indicative of a very low-density background scatter and holds limited research potential.<br>The site is representative of sites found along Taylors Lane and the wider Cambewarra area.<br>The site is extremely common in the area and has been found in all previous excavations.<br>The site holds limited education potential and is defined as a single artefact from Transect 3 TP V. | Low |
| **41 Main Road ISO 4** | 52-5-1042 | The site is indicative of a very low-density background scatter and holds limited research potential.<br>The site is representative of sites found along Taylors Lane and the wider Cambewarra area.<br>The site is extremely common in the area and has been found in all previous excavations.<br>The site holds limited education potential and is defined as a single artefact from Transect 1 TP D. | Low |
| **41 Main Road ISO 5** | 52-5-1043 | The site is indicative of a very low-density background scatter and holds limited research potential.<br>The site is representative of sites found along Taylors Lane and the wider Cambewarra area.<br>The site is extremely common in the area and has been found in all previous excavations.<br>The site holds limited education potential and is defined as a single artefact from Transect H | Low |
| **49 Hockeys Lane AS 1** | 52-5-1037 | There were 10 artefacts recovered across TP 1, 2, 3 and 4 in transect A, these includes 5 complete flakes. Although there is a relatively high number of artefacts present at this site compared with the remainder of the study area it is still considered as a low-density background scatter and holds limited research potential.<br>The site is representative of sites found along Taylors Lane and the wider Cambewarra area.<br>The site is extremely common in the area and has been found in all previous excavations.<br>The site holds limited education potential. This is representative of a low density artefact scatter common to the general area | Low |
| **49 Hockeys Lane AS 2** | 52-5-1039 | There are 22 artefacts in this site spread across the entirety of Transect B, and Transect C TP1. They comprise of 10 complete flakes, 6 debitage, 2 distal flakes, 2 proximal flakes and 2 tools. The tools, a steep edge scraper and a geometric microlith are a common tool type in the region.<br>The site is indicative of a low density background scatter with areas of concentration. The expansion pits around TP 7 and the further 4 test pits excavated in a northerly direction from TP 7 corroborated this hypothesis.<br>The site is indicative of a low-density background scatter and holds limited research potential.<br>The site is representative of sites found along Taylors Lane and the wider Cambewarra area.<br>The site is extremely common in the area and has been found in all previous excavations.<br>The site holds limited education potential. | Moderate |

| Site name | AHIMS No. | Assessment of significance | Grading |
|---|---|---|---|
| **49 Hockeys Lane AS 3** | 52-5-1040 | There were 3 artefacts located across 2 test pits (TP 1 and TP 2) in Transect D.<br>The site is indicative of a very low-density background scatter and holds limited research potential.<br>The site is representative of sites found along Taylors Lane and the wider Cambewarra area. The site is extremely common in the area.<br>The site holds limited education potential. | Low |
| **49 Hockeys Lane AS 4** | 52-5-1046 | There were 2 artefacts recovered from a single test pit, TP 6 in Transect A.<br>The site is indicative of a very low-density background scatter and holds limited research potential.<br>The site is representative of sites found along Taylors Lane and the wider Cambewarra area. The site is extremely common in the area.<br>The site holds limited education potential. | Low |
| **41 Main Road AS 5** | 52-5-1044 | The site is indicative of a very low-density background scatter and holds limited research potential.<br>The site is representative of sites found along Taylors Lane and the wider Cambewarra area.<br>The site is extremely common in the area and has been found in all previous excavations.<br>The site holds limited education potential although there is a chert blade along with a single piece of chert debitage from Transect 2 TP Q. | Low |
| **41 Main Road AS 6** | 52-5-1038 | There were 2 artefacts recovered from a single test pit, TP S in Transect 3.<br>The site is indicative of a very low-density background scatter and holds limited research potential.<br>The site is representative of sites found along Taylors Lane and the wider Cambewarra area. The site is extremely common in the area.<br>The site holds limited education potential. | Low |
| **41 Main Road Surface find** | 52-5-1050 | The site is indicative of a very low-density background scatter and holds limited research potential.<br>The site is representative of sites found along Taylors Lane and the wider Cambewarra area.<br>The site is extremely common in the area and has been found in all previous excavations.<br>The site holds limited education potential and is defined as a single artefact located on the ground surface of Transect 1 TP D. | Low |

### *8.2.4 SOCIAL AND SPIRITUAL SIGNIFICANCE VALUES*

As social and spiritual significance are interdependent, Austral has undertaken a combined assessment of these values. The Consultation Requirements specify that the social or cultural values of a place can only be identified through consultation with Aboriginal people.

The following submissions were received from RAPs during the completion of the project:

Adrian Smith (NLALC) thought the area away from the creek lines had limited potential and the most likely area for artefacts was close to Good Dog Creek.

Based on this assessment, the study area is considered to have **low** social and spiritual significance values.

## 8.3 STATEMENT OF SIGNIFICANCE

Statements of significance for identified Aboriginal sites within the study area are presented in Table 8.4. The statements of significance have been formulated using the Burra Charter significance values and relevant NSW guidelines (DECCW 2010c, OEH 2011, Australia ICOMOS 2013a).

**Table 8.4 Statements of significance for Aboriginal sites in the study area**

| Site name | Aboriginal cultural heritage values | Significance |
|---|---|---|
| **49 Hockeys Lane ISO 1**<br>**AHIMS #52-5-1041** | The site is indicative of a very low-density background scatter and holds limited research potential.<br>The site is representative of sites found along Taylors Lane and the wider Cambewarra area. The site is extremely common in the area.<br>The site holds limited education potential and its location is defined as having 1 artefact in Transect D TP 5. | Low |
| **49 Hockeys Lane ISO 2**<br>**AHIMS #52-5-1045** | The site is indicative of a very low-density background scatter and holds limited research potential.<br>The site is representative of sites found along Taylors Lane and the wider Cambewarra area. The site is extremely common in the area.<br>The site holds limited education potential. 1 Artefact in Transect D TP 6. | Low |
| **41 Main Road ISO 3**<br>**AHIMS #52-5-1036** | The site is indicative of a very low-density background scatter and holds limited research potential.<br>The site is representative of sites found along Taylors Lane and the wider Cambewarra area. The site is extremely common in the area.<br>The site holds limited education potential and is defined as a single artefact from Transect 3 TP V. | Low |
| **41 Main Road ISO 4**<br>**AHIMS #52-5-1042** | The site is indicative of a very low-density background scatter and holds limited research potential.<br>The site is representative of sites found along Taylors Lane and the wider Cambewarra area. The site is extremely common in the area.<br>The site holds limited education potential and is defined as a single artefact from Transect 1 TP D. | Low |
| **41 Main Road ISO 5**<br>**AHIMS #52-5-1043** | The site is indicative of a very low-density background scatter and holds limited research potential.<br>The site is representative of sites found along Taylors Lane and the wider Cambewarra area. The site is extremely common in the area.<br>The site holds limited education potential and is defined as a single artefact from Transect 1 TP H. | Low |
| **49 Hockeys Lane AS 1**<br>**AHIMS #52-5-1037** | There were 10 artefacts recovered across TP 1, 2, 3 and 4 in Transect A, these includes 5 complete flakes. Although there is a relative number of artefacts present at this site compared with the remainder of the study area it is still considered as a low-density background scatter and holds limited research potential.<br>The site is representative of sites found along Taylors Lane and the wider Cambewarra area. The site is common in the area.<br>The site holds limited education potential. This is representative of a low density artefact scatter common to the general area | Low |
| **49 Hockeys Lane AS 2**<br>**AHIMS #52-5-1039** | There are 22 artefacts in this site spread across the entirety of Transect B, and Transect C TP 1. They comprise of 10 complete flakes, 6 debitage, 2 distal flakes, 2 proximal flake and 2 tools. The tools, a steep edge scraper and a geometric microlith are a common tool type in the region.<br>The site is indicative of a low density background scatter with areas of concentration. The expansion pits around TP 7 and the further 4 test pits excavated in a northerly direction from TP 7 corroborated this hypothesis. | Moderate |

| Site name | Aboriginal cultural heritage values | Significance |
|---|---|---|
| | The site is indicative of a low-density background scatter and holds limited research potential. Although, further excavations may show a pattern of density distribution.<br>The site holds moderate education potential. | |
| **49 Hockeys Lane AS 3**<br>**AHIMS #52-5-1040** | There were 3 artefacts located across 2 test pits (TP 1 and TP 2) in Transect D.<br>The site is indicative of a very low-density background scatter and holds limited research potential.<br>The site is representative of sites found along Taylors Lane and the wider Cambewarra area. The site is extremely common in the area.<br>The site holds limited education potential. | Low |
| **49 Hockeys Lane AS 4**<br>**AHIMS #52-5-1046** | There were 2 artefacts recovered from a single test pit, TP 6, in Transect A.<br>The site is indicative of a very low-density background scatter and holds limited research potential.<br>The site is representative of sites found along Taylors Lane and the wider Cambewarra area. The site is extremely common in the area.<br>The site holds limited education potential. | Low |
| **41 Main Road AS 5 AHIMS #52-5-1044** | There were 2 artefacts recovered from a single test pit, TP Q, in Transect 2.<br>The site is indicative of a very low-density background scatter and holds limited research potential.<br>The site is representative of sites found along Taylors Lane and the wider Cambewarra area. The site is extremely common in the area.<br>The site holds limited education potential. | Low |
| **41 Main Road AS 6 AHIMS #52-5-1038** | There were 2 artefacts recovered from a single test pit, TP S, in Transect 3.<br>The site is indicative of a very low-density background scatter and holds limited research potential.<br>The site is representative of sites found along Taylors Lane and the wider Cambewarra area. The site is extremely common in the area.<br>The site holds limited education potential. | Low |
| **41 Main Road Surface Fine AHIMS #52-5-1050** | The site is indicative of a very low-density background scatter and holds limited research potential.<br>The site is representative of sites found along Taylors Lane and the wider Cambewarra area. The site is extremely common in the area.<br>The site holds limited education potential and is defined as a single artefact from Transect 1 TP D. | Low |

| Site name | Statement of significance |
|---|---|
| **49 Hockeys Lane ISO 1** | This site is located to the north of 49 Hockeys AS 1 and is comprised of a single isolated artefact which is very common in the surrounding area. It is located on a flat landform. This landform type is suitable for camping, however, the paucity of artefacts recovered from the general area suggest this area was sparsely habitated. As such, the site is deemed to have **low** significance. |
| **49 Hockeys Lane ISO 2** | This site is located to the north of 49 Hockeys AS 2 and comprised of a single isolated artefact which is very common in the surrounding area. It is located on a flat landform and further inland from Good Dog Creek. As such, this site is deemed to have **low** significance. |

| Site name | Statement of significance |
|---|---|
| **49 Hockeys Lane AS 1** | This site is made up of 10 artefacts located in the south of the study area on a sloping landform which is generally unsuitable for even short-term settlements. It is therefore likely that the artefacts have been washed down by natural processes. As such, the site is deemed to have **low** significance |
| **49 Hockeys Lane AS 2** | This large low density site of 21 artefacts is located on flat ground elevated from the alluvial flat that abuts Good Dog Creek in the west. This location would have been an ideal habitation location. The areas of higher density at this location are likely to occur sporadically throughout the site. There is the possibility that some patterning of these densities exist and as such, the site is deemed to have **moderate** significance. |
| **49 Hockeys Lane AS 3** | This site is comprised of 3 artefacts, which is very common in the surrounding area. It is located on a flat landform. This landform type is suitable for camping, however, the paucity of artefacts recovered from the general area suggest this area was sparsely habituated. As such, the site is deemed to have **low** significance |
| **49 Hockeys Lane AS 4** | This site is made up of 2 artefacts located in the south of the study area on a sloping landform which is generally unsuitable for even short-term settlements. It is therefore likely that the artefacts have been washed down by natural processes. As such, the site is deemed to have **low** significance |
| **41 Main Road AS 5** | This site is comprised of two artefacts, which is very common in the surrounding area. It is located on a flat landform. This landform type is suitable for camping, however, the paucity of artefacts recovered from the general area suggest this area was sparsely habituated. As such, the site is deemed to have **low** significance |
| **41 Main Road AS 6** | This site is comprised of two artefacts, which is very common in the surrounding area. It is located on a flat landform. This landform type is suitable for camping, however, the paucity of artefacts recovered from the general area suggest this area was sparsely habituated. As such, the site is deemed to have **low** significance |
| **41 Main Road ISO 3** | This is an isolated artefact site, which is very common in the surrounding area. It is located on a flat landform. This landform type is suitable for camping, however, the paucity of artefacts recovered from the general area suggest this area was sparsely habituated. As such, the site is deemed to have **low** significance. |
| **41 Main Road ISO 4** | This is an isolated artefact site, which is very common in the surrounding area. It is located on a flat landform. This landform type is suitable for camping, however, the paucity of artefacts recovered from the general area suggest this area was sparsely habituated. As such, the site is deemed to have **low** significance. |
| **41 Main Road ISO 5** | This is an isolated artefact site, which is very common in the surrounding area. It is located on a flat landform. This landform type is suitable for camping, however, the paucity of artefacts recovered from the general area suggest this area was sparsely habituated. As such, the site is deemed to have **low** significance. |
| **41 Main Road ISO 6** | This is an isolated artefact site, which is very common in the surrounding area. It is located on a flat landform. This landform type is suitable for camping, however, the paucity of artefacts recovered from the general area suggest this area was sparsely habituated. As such, the site is deemed to have **low** significance. |
| **41 Main Road Surface Find** | This is an isolated artefact site, which is very common in the surrounding area. It is located on a flat landform. This landform type is suitable for camping, however, the paucity of artefacts recovered from the general area suggest this area was sparsely habituated. As such, the site is deemed to have **low** significance. |

Heritage NSW specifies the importance of considering cultural landscapes when determining and assessing Aboriginal cultural values. The principle behind this is that '*For Aboriginal people, the significance of individual features is derived from their inter-relatedness within the cultural landscape. This means features cannot be assessed in isolation and any assessment must consider the feature and its associations in a holistic manner"* (DECCW 2010d).

The study area is generally made up of suitable landforms for camping, which would have seen Aboriginal people use them for short-term stays in periods of low rainfall while passing through the

area. The flat area closer to Good Dog Creek would have been an ideal camping location, with easy access to water and food resources.

The site 49 Hockeys AS 2, supports this theory, the widely dispersed low density site is interesting as it provides a direct connection with the people of the past to a specific location and may provide information regarding patterning in low density artefact scatters. However, much of the information that can be obtained from the lithic analysis has already been obtained and a salvage excavation will be required to ascertain the true nature and extent of the site.

As such, the study area is generally quite low in significance and representative of the many surrounding sites that have been tested. However, the presence of slightly higher densities throughout the site provides a higher significance than the surrounding isolated artefacts and artefact scatters.

# 9 PROPOSED ACTIVITY

This section outlines, according to Heritage NSW guidelines, the potential harm that the proposed activity may have on identified Aboriginal objects and places within the study area (OEH 2011, DECCW 2010c).

## 1. LAND-USE HISTORY

The study area has been previously cleared of vegetation, likely during the days of early European settlement when logging and clearance for agricultural activities were undertaken. Vegetation clearance has occurred throughout most of the study area, which has resulted in erosion along the slopes and creek banks within the study area.

The main impacts relate to past agricultural practices, extensive land clearance, animal grazing, the construction of buildings, fences and vehicle tracks, tree harvesting and ongoing encroachment of residential development surrounding the study area. These activities would have contributed to the removal of the original native vegetation as the study area is now covered in dense native and introduced grasses with regrowth of native vegetation and intrusive weeds along the creeks and gullies.

Land clearance would have resulted in soil disturbance and topsoil movement and loss that, coupled with erosion on slopes across the majority of the study area, accounts for widespread artefact displacement rather than the complete destruction of Aboriginal sites and the limited archaeological potential across this disturbance zone is more likely to reflect the inherent unsuitability of much of the terrain than the prior loss of the potential resource.

The majority of the study area remained intact until the 1980s when the study area was de-forested. Since then there has been a cattle run on the property along with other livestock. There have been agricultural crops grown in the past within the study area. Ploughing for the crops would have caused upper level soil disturbance and led to local artefact displacement. This displacement, however, does not generally destroy sites and the artefact concentrations at Hockeys Lane AS 1 and AS 2 are evidence of this.

**Table 9.1 Summary of past land uses within the study area, and the potential impacts on archaeological resources**

| Past land uses | Potential impacts on archaeological resources |
|---|---|
| De-forestation | Removal of cultural trees, removal or relocation of subsurface artefacts |
| Cattle grazing | Relocation or damage to surface artefactual material, damage to cultural trees |
| Agricultural practices | Re-location of cultural material within its footprint with some destruction possible |

This long-lasting disturbance has impacted the study area in various ways as seen within the results of this recent testing investigation. However, these disturbances remained in the higher horizons of the soil profile, and only minor impacts were seen in lower deposits.

## 2. PROPOSED ACTIVITY

The proposed activity at this stage consists of the construction of 254 residential lots, which will require the removal of existing vegetation, bulk earthworks to level the land, the installation of underground services, construction of roadways and finally the construction of the houses within the lots.

## 3. ASSESSING HARM

This section outlines the assessment process for addressing potential harm to Aboriginal objects and/or places within the study area, as outlined by Heritage NSW (OEH 2011, p.12).

### *9.1.1 ECOLOGICALLY SUSTAINABLE DEVELOPMENT*

An objective of the NPW Act, under Section 2A(1)(b)(i) is to conserve "*places, objects and features of significance to Aboriginal people*" through applying the principles of ecologically sustainable development (ESD) (Section 2A(2)). ESD is defined in Section 6(2) of the *Protection of the Environment Administration Act 1991* (NSW) as "…*the effective integration of social, economic and environmental considerations in decision-making processes".* ESD can be achieved with regards to Aboriginal cultural heritage, by applying the principle of inter-generational equity, and the precautionary principle to the nature of the proposed activity, with the aim of achieving beneficial outcomes for both the development, and Aboriginal cultural heritage.

#### INTERGENERATIONAL EQUITY

The principle of intergenerational equity is where the present generation ensure the health, diversity and productivity of the environment for the benefit of future generations. The Department of Environment and Climate Change (DECC), now Heritage NSW, states that in terms of Aboriginal cultural heritage "*intergenerational equity can be considered in terms of the cumulative impacts to Aboriginal objects and places in a region. If few Aboriginal objects and places remain in a region (for example, because of impacts under previous AHIPs), fewer opportunities remain for future generations of Aboriginal people to enjoy the cultural benefits of those Aboriginal objects and places.*" (DECC 2009, p.26).

The assessment of intergenerational equity and understanding of cumulative impacts should consider information about the integrity, rarity or representativeness of the Aboriginal objects and/or places that may be harmed and how they illustrate the occupation and use of the land by Aboriginal people across the locality (DECC 2009, p.26).

Where there is uncertainty over whether the principle of intergenerational equity can be followed, the precautionary principle should be applied.

#### PRECAUTIONARY PRINCIPLE

Heritage NSW defines the Precautionary Principle as "*if there are threats of serious or irreversible environmental damage, lack of full scientific certainty should not be used as a reason for postponing cost-effective measures to prevent environmental degradation*" (DECC 2009, p.26).

The application of the precautionary principle should be guided through:

- A careful evaluation to avoid, wherever practicable, serious or irreversible damage to the environment.
- An assessment of the risk—weighted consequences of various options.

DECC (2009, p.26) states that the precautionary principle is relevant to the consideration of potential impacts to Aboriginal cultural heritage, where:

- The proposal involves a risk of serious or irreversible damage to Aboriginal objects and/or places or to the value of those objects and/or places.
- There is uncertainty about the Aboriginal cultural heritage values, scientific, or archaeological values, including in relation to the integrity, rarity or representativeness of the Aboriginal objects or places proposed to be impacted.

Where either of the above is likely, a precautionary approach should be taken and all effective measures implemented to prevent or reduce harm to Aboriginal cultural heritage values.

### *9.1.2 TYPES OF HARM*

When considering the nature of harm to Aboriginal objects and/or places, it is necessary to quantify direct and indirect harm. The types of harm, as defined in the Guide (OEH 2011, p.12), and are summarised in Table 9.2. These definitions will be used to quantify the nature of harm to identified Aboriginal objects and/or places that have been identified as part of this assessment. The Code states that the degree of harm can be either total or partial (DECCW 2010b, p.21).

**Table 9.2 Definition of types of harm**

| Type of harm | Definition |
|---|---|
| **Direct harm** | May occur as the result of any activity which disturbs the ground including, but not limited to, site preparation activities, installation of services and infrastructure, roadworks, excavating detention ponds and other drainage or flood mitigation measures, and changes in water flows affecting the value of a cultural site. |
| **Indirect harm** | May affect sites or features located immediately beyond, or within, the area of the proposed activity. Examples of indirect impacts include, but are not limited to, increased impact on art in a shelter site from increased visitation, destruction from increased erosion and changes in access to wild food resources. |

## 9.2 IMPACT ASSESSMENT

This ACHA has included a programme of investigations that have characterised the nature, extent and significance of Aboriginal sites within the study area.

The construction of this residential development will cause direct harm to the identified sites within the study area. Earthworks and the installation of underground services are likely to remove or destroy all Aboriginal material in their way. As most of the cultural material was found in the first 200 mm of the soil, disturbances will likely occur to most Aboriginal artefacts within the study area.

An evaluation of harm to the Aboriginal sites identified as part of the ACHA is summarised in Table 9.3. Details of the proposed activity and their relationship to identified Aboriginal sites is outlined in

**Table 9.3 Assessment of harm to identified Aboriginal sites**

| Site name / AHIMS No. | Type of harm | Degree of harm | Consequence of harm |
|---|---|---|---|
| **49 Hockeys Lane ISO 1 AHIMS #52-5-1041** | Direct | Total | Total loss of value |
| **49 Hockeys Lane ISO 2 AHIMS #52-5-1045** | Direct | Total | Total loss of value |
| **41 Main Road ISO 3 AHIMS #52-5-1036** | Direct | Total | Total loss of value |
| **41 Main Road ISO 4 AHIMS #52-5-1042** | Direct | Total | Total loss of value |
| **41 Main Road ISO 5 AHIMS #52-5-1043** | Direct | Total | Total loss of value |
| **49 Hockeys Lane AS 1 AHIMS #52-5-1037** | Direct | Total | Total loss of value |
| **49 Hockeys Lane AS 2 AHIMS #52-5-1039** | Direct | Total | Total loss of value |
| **49 Hockeys Lane AS 3 AHIMS #52-5-1040** | Direct | Total | Total loss of value |
| **49 Hockeys Lane AS 4 AHIMS #52-5-1046** | Direct | Total | Total loss of value |
| **41 Main Road AS 5 AHIMS #52-5-1044** | Direct | Total | Total loss of value |
| **41 Main Road AS 6 AHIMS #52-5-1038** | Direct | Total | Total loss of value |
| **41 Main Road Surface Find AHIMS #52-5-1050** | Direct | Total | Total loss of value |

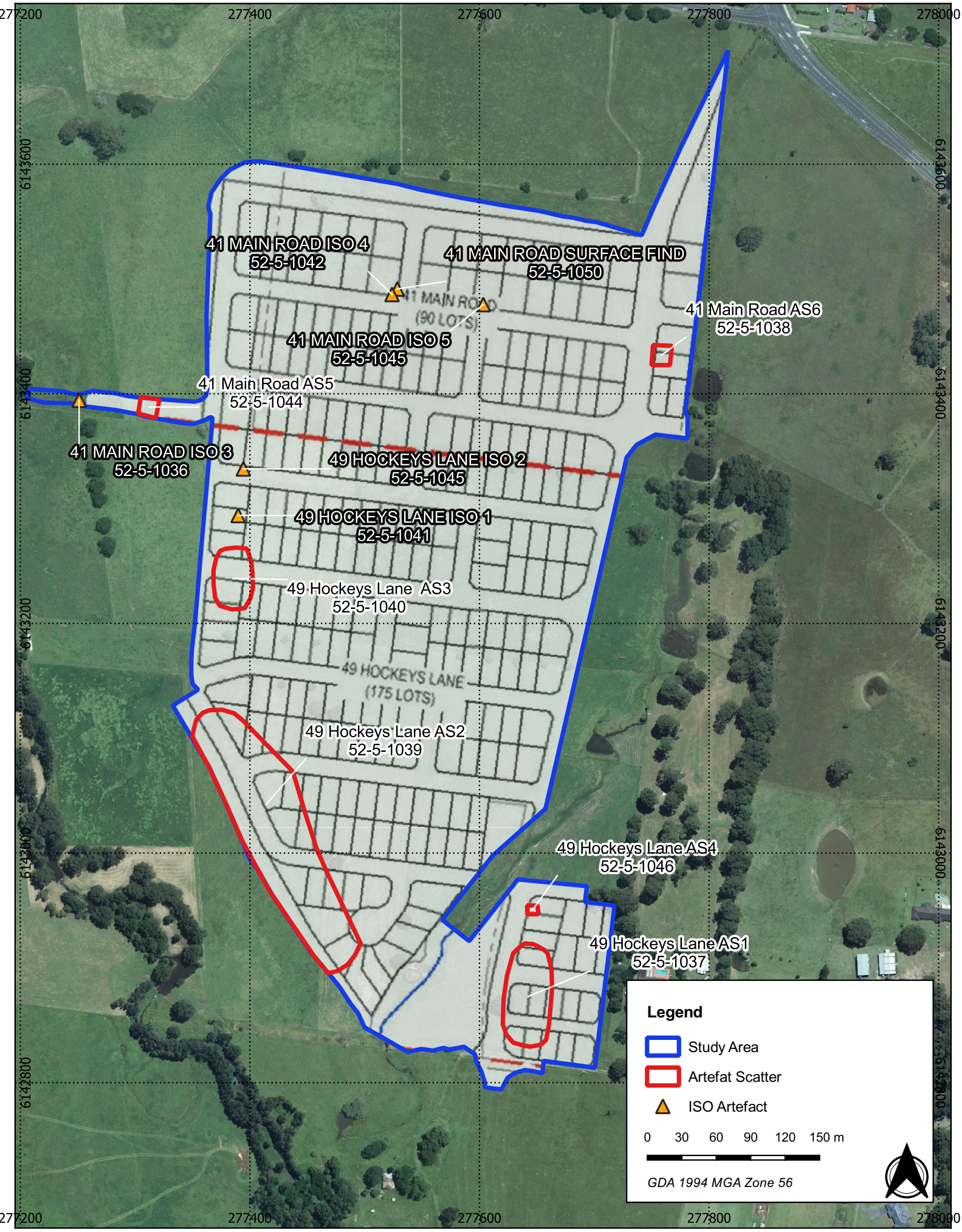



**Figure 9.1 - Details of the proposed activity in relation to identified Aboriginal sites**

21105 - 126 Taylors Lane, Cambewarra - ACHA

*Source: NSW LPI Aerial, Maker ENG*

*Drawn by: ARH Date: 2022-09-16*

AUSTRAL ARCHAEOLOGY

# 10 AVOIDING AND MINIMISING HARM

The Burra Charter, advocates a cautious approach to change: "*do as much as necessary to care for the place and to make it useable, but otherwise change it as little as possible so that its cultural significance is retained*" (Australia ICOMOS 2013a, p.1). Based on this principle, this section identifies the measures that have been taken to avoid harm and what conservation outcomes have been achieved through the preparation of this ACHA.

## 10.1 DEVELOPMENT OF PRACTICAL MEASURES TO AVOID HARM

All the identified sites will be directly impacted due to the development of the study area. The sites that are located across the study area are:

- 41 Main Road ISO 4, 41 Main Road ISO 5 and 41 Main Road Surface Fine are centrally located in the northern portion of the study area, with 41 Main Road ISO 4 and 41 Main Road ISO 5 located in test pits 60 meters apart, and 41 Main Road Surface Fine on the ground surface within 2 meters of the 41 Main Road ISO 4's test pit
- 41 Main Road AS 6 is located in the northern portion of the study area, close to the eastern boundary.
- 41 Main Road ISO 3 and 41 Main Road AS 5 are locate in the piece of the study are that extends to the west of the central portion.
- 49 Hockeys Lane AS 3, 49 Hockeys Lane ISO 1 and 49 Hockeys Lane ISO2 are located along the western boundary of the of the central section of the study area. Each site is spaced 40 meters apart.
- 49 Hockeys Lane AS 2 is located along the south western boundary of the southern portion of the study area.
- 49 Hockeys Lane AS 1 and 49 Hockeys Lane AS 4 are located in the southern most portion of the study areas and are 20 meters apart.

49 Hockeys AS 1 and site 49 Hockeys AS 2 are sites with higher artefact counts within a broader area of a low density background scatter of artefacts. The southern portion of the study area is an area that has a high potential of containing more cultural material within the location of the sites.

The sites 49 Hockeys AS 3, 49 Hockeys AS 4, and 41 Main Road AS 6 will be impacted by the development residential blocks and roads. The density of these sites are not as extensive as 49 Hockeys AS 1 and site 49 Hockeys AS 2, with finds located only with in one test pit in the transect. 41 Main Road AS 5 is located in an area that is reserved for a proposed drainage line. This area is considered to be of low potential along with most of the northern and central portion of the study area. These artefact scatters are located in areas that are closest to water.

Isolated artefacts have been located on the surface and within individual pits. Most are located close to identified artefact scatters, apart from 41 Main Road ISO 4, 41 Main Road ISO 5 and 41 Main Road Surface Find. These isolated artefacts are all located within the same transect. The isolated artefacts throughout the study area are also considered to be in areas of low potential. As such, harm need not be avoided as most of the site is on a similar landform that is not likely to contain significant sites.

As such, the impact on the significance of the sites in these areas is likely to be minimal; however, the material will be destroyed during the development if harm minimisation strategies are not in place.

## 10.2 APPLICATION OF PRINCIPLES OF ESD AND CUMULATIVE IMPACTS

The majority of the study area is located in an area of low significance that is similar to sites nearby which have been approved for development. Artefacts are located in many of the recorded sites within 3 kilometres of the study area, with sites that only have artefacts making up the 61.17% of the archaeological record. Archaeological investigations within the area have found these sites consist of low-density background scatters. The artefacts within study area are of relatively low significance in the wider archaeological context and similar sites are present with in the region. The variation of the artefact material and typology which were excavated during testing is found in similar ratios to similar sites within the area. The reduction in number is unlikely to largely affect the cumulative impact of development within the area and there will be still examples of these site types regardless of if the development goes ahead. The sites located within the study area reflect these background scatters, therefore are not significant to the wider understanding of the region around the study area.

## 10.3 STRATEGIES TO MINIMISE HARM

Harm is unavoidable to all sites, with the extent of works covering all identified scatters and isolated artefacts. Since the sites contain low significance within the region it is recommended that salvage of all sites be conducted. A salvage excavation program will remove as many of the remaining artefacts that are left within the study area as possible, thus preventing them from being destroyed by the development. A salvage excavation will enable the true extent and of the artefact scatters to be assessed, which cannot always be achieved during test excavation. As a part of the salvage process, when the development has been completed, a location that has not been over developed and is unlikely to be developed in the future will be chosen for the reburial of the artefacts that were excavated during the test and salvage excavations. The reburial will ensure that the artefacts will be remain in their environmental context even if they are not *in situ*.

# 11 RECOMMENDATIONS

The following recommendations are derived from the findings described in this ACHA. The recommendations have been developed after considering the archaeological context, environmental information, consultation with the local Aboriginal community, and the findings of the test excavations and the predicted impact of the planning proposal on archaeological resources.

It is recommended that:

1. Before any works occur, Maker ENG should apply to Heritage NSW for an Aboriginal Heritage Impact Permit (AHIP) to destroy 49 Hockeys Lane AS 1 (AHIMS #52-5-1037), 49 Hockeys Lane AS 2 (AHIMS #52-5-1039), 49 Hockeys Lane AS 3 (AHIMS #52-5-1040), 49 Hockeys Lane AS 4 (AHIMS #52-5-1046) , 49 Hockeys Lane ISO 1 (AHIMS #52-5-1041), 49 Hockeys Lane ISO 2 (AHIMS #52-5-1045), 41 Main Road AS 5 (AHIMS #52-5-1044), 41 Main Road AS 6 (AHIMS #52-5-1038), 41 Main Road ISO 3 (AHIMS #52-5-1036), 41 Main Road ISO 4 (AHIMS #52-5-1042), 41 Main Road ISO 5 (AHIMS #52-5-1043), and 41 Main Road Surface Fine (AHIMS #52-5-1050). These sites are protected under Section 90 of the *NSW National Parks and Wildlife Act 1974* (NPW Act). It is recommended that the following mitigation measures are implemented as part of the AHIP:
    1. Salvage excavations of 49 Hockeys Lane AS 1 and 49 Hockeys Lane AS 2
    2. All Aboriginal objects collected during the archaeological testing and anticipated salvage works (under the approved AHIP) will be reburied onsite at a nominated location.
2. In the event that unexpected finds occur during any activity within the study area, all works must in the vicinity must cease immediately. The find must be left in place and protected from any further harm. Depending on the nature of the find, the following processes must be followed:
    1. If, human skeletal remains are encountered, all work must cease immediately and NSW Police must be contacted, they will then notify the Coroner's Office. Following this, if the remains are believed to be of Aboriginal origin, then the Aboriginal stakeholders and Heritage NSW must be notified.
    2. All other Aboriginal cultural material will be covered by the AHIP and as such works do not need to stop if encountered.
3. It is recommended that Maker ENG continues to inform the Aboriginal stakeholders about the management of Aboriginal cultural heritage within the study area throughout the completion of the project. The consultation outlined as part of this ACHA is valid for six months and must be maintained by the proponent for it to remain continuous. If a gap of more than six months occurs, then the consultation will not be suitable to support an AHIP for the project.
4. A copy of this report should be forwarded to all Aboriginal stakeholder groups who have registered an interest in the project.

# 12 REFERENCES

AMBS Consulting 2006a, *West Dapto Release Area. Report to Wollongong City Council*.

AMBS Consulting 2006b, 'Aboriginal Heritage Management Plan: West Dapto Release Area Final Report.'

Artefact Heritage Pty Ltd 2018a, *Nowra Bridge Project Aboriginal Cultural Heritage Assessment Report*, Shoalhaven City Council.

Artefact Heritage Pty Ltd 2018b, *Nowra Bridge Project*, Pymont, NSW.

Artefact Heritage Services 2018, *Nowra Bridge Project Aboriginal Cultural Heritage Assessment Report (PACHCI Stage 3)*.

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

Austral Archaeology Pty Ltd 2019, *371 Illaroo Road, Bangalee, NSW: Aboriginal Cultural Heritage Assessment*.

Austral Archaeology Pty Ltd 2022, *49 Taylors Lane, Cambewarra, NSW; Aboriginal Archaeological Survey Report*.

Australia ICOMOS 2013a, *The Burra Charter: the Australia ICOMOS Charter for Places of Cultural Significance*, Australia ICOMOS, Burwood, VIC.

Australia ICOMOS 2013b, 'Practice Note: Understanding and assessing cultural significance'.

Australian Heritage Council & DEWHA 2009, 'Guidelines for the assessment of places for the National Heritage List'.

Biosis 2018, *Moss Vale South Urban Release Area: Taylors Lane Subdivision (169 Hockeys Lane, Cambewarra). Archaeological Report. Report to Cardno.*

Biosis Pty Ltd 2010, *Tallawarra Lands: Part 3A Concept Plan Aboriginal Archaeological Assessment*.

Biosis Pty Ltd 2018a, 'Taylors Lane, Lot 116 DP 3060 Aboriginal Cultural Heritage Due Diligence Assessment'.

Biosis Pty Ltd 2018b, '70 Paynes Road (Halifax Park), Kembla Grange: Aboriginal Due Diligence Assessment. Report prepared for Cardno.'

Biosis Pty Ltd 2018c, 'Taylors Lane, Lot 116 DP 3060 Aboriginal Cultural Heritage Due Diligence Assessment'.

Biosis Pty Ltd 2019, *Taylors Lane (Lot 1 DP949932) Archaeological Report*, Prepared for Cardno.

Boot, P 2002, *Didthul, Gulaga and Wadbilliga: An archaeological study of the Aboriginals of the New South Wales South Coast hinterland.*Unpublished PhD thesis, Australian National University, Canberra.

Breton, WH 1835, 'Excursions in New South Wales, Western Australia and Van Dieman's Land, During the Years 1830, 1831, 1832 and 1833'.

Bureau of Meteorology 2020, *Bomaderry Weather*, <http://www.bom.gov.au/places/nsw/bomaderry/>.

Cardno 2016, 'Bomaderry floodplain risk management study'.

Clarke & Huskie 2006, 'Aboriginal Heritage and Cultural Mapping Project: Lower Shoalhaven River Valley – Stage 4A: Archaeological Predictive Modeling and Aboriginal Community Consultation'.

Corkhill, T 1986, *Gaining Ground: Apredictive Model for Holocene Infill Areas on the South Coas of New South Wales*.

Cousins, A 1948, *The Garden of New South Wales: A History of the Illawarra & Shoalhaven Districts 1770-1900*, Illawarra Historical Society, Wollongong.

DECC 2009, 'Operational Policy: Protecting Aboriginal Cultural Heritage', <https://www.environment.nsw.gov.au/resources/cultureheritage/09122ACHOpPolicy.pdf>.

DECCW 2010a, 'Aboriginal Cultural Heritage Consultation Requirements for Proponents 2010'.

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

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

DECCW 2010d, 'Fact Sheet 2: What is an Aboriginal cultural landscape?'

Department of Environment and Conservation 2005a, *Murni Dhungang Jirrar - Living in the Illawarra*.

Department of Environment and Conservation 2005b, *Early Contact Map*, Department of Environment and Conservation, Sydney.

Dibden, j 2018, *Aboriginal Archaeological Study for Moss Vale Road North (MVRN) Urban Release Area*.

Donlan, D 1991, *A Preliminary Archaeological Survey of Proposed Roadworks Programme Between Gerringong and Berry NSW*.

Endacott, SJ 1955, *Australian Aboriginal Words and Plce Names and their Meanings*, Georgian House Melbourne.

ERM Mitchell McCottery Pty Ltd 1998, *Berry Bypass Environmental Impact Statement*.

GML Heritage 2016, 'Dapto Land Review, NSW, Aboriginal Heritage Assessment. Prepared for Stockland.'

Hazelton, PA, Conservation, NSWD of, & Management, L 1992, *Soil landscapes of the Kiama 1:100 000 sheet*, Sydney : Dept. of Conservation and Land Management, viewed 5 December 2019, <https://trove.nla.gov.au/version/24715460>.

Holdaway, S & Stern, N 2013, *A Record in Stone: The Study of Australia's Flaked Stone Artefacts.*, Aboriginal Studies Press, Melbourne.

Jasiewicz, J & Stepinski, T 2013, 'Geomorphons - a pattern recognition approach to classification and mapping of landforms', *Geomorphology*, vol. 182, pp. 147–157.

Jo McDonald Cultural Heritage Management Pty Ltd 1999, *Aboriginal and European Heritage Assessment: the Proposed Gerringong-Gerroa Sewage Treatment Plant ans Associated Sewage Pumping Stations and Pipeline Routes Gerringong & Gerroa, NSW*.

Kass, T 2010, *A Thematic History of the City of Wollongong*, Wollongong City Council, Wollongong.

Kelleher Nightingale Consulting Pty Ltd 2010, *North Nowra Link Road*.

Kuskie, P 2008, *An Aboriginal Heritage Impact Assessment of a Proposed Ethanol Plant Upgrade at Shoalhaven Starched, Bomaderry, South Coast of New South Wales*, Manildra Group.

Kuskie, P & Navin Officer Heritage Consultants 1995, *An Aboriginal Archaeological and Anthropological Assessment of the Proposed Eastern Gas Pipeline Between Longford, Victoria and Wilton, NSW*.

Lampert, RJ & Steele, DH 1993,'Archaeological studies at Bomaderry Creek, New South Wales', in J Specht (ed.), *Commemorative Papers (Archaeology, Anthropology, Rock Art)*, The Australian Museum, Sydney, N.S.W., pp.55–75.

Marry Dallas Consulting Archaeologists 2018, *Aboriginal Cultural Heritage Assessment Report 2541 Warrah Road (Lot 24 in DP714096), and 12A-C Warrah Road (Lots 21-23 INDP14096) North Nowra NSW*.

Mary Dallas Consulting Archaeologist 1995, *Wollongong City Aboriginal Heritage Planning Study*.

Maunsell Australia Pty Ltd & Navin Officer Pty Ltd 2007, *Gerringong to Bomaderry Princes Highway Upgrade Route Options Development Appendix I - Preliminary Indigenous and Non-Indigenous Heritage Assessment*.

McCarthy, FD 1976, *Australian Aboriginal Stone Implements*, The Australian Museum Trust, Sydney.

McDonald, J 1997a, 'Interim heritage report: ADI Site, St Marys; Test Excavation Report to Lend Lease - ADI Joint Venture in response to the Section 22 Committee Interim Report'.

McDonald, J 1997b, 'Interim heritage management report: ADI Site, St Marys; Volume 1: Test excavation report to Lend Lease - ADI Joint Venture in response to the Section 22 Committee Interim Report'.

McDonald, J 1999, 'Test Excavation of PAD5 (RH/SP9) and PAD31 (RH/cc2) for the Rouse Hill (Stage 2) Infrastructure Project at Rouse Hill and Kellyville, NSW'.

McDonald, J 2000, 'Archaeological Survey for Aboriginal Sites: Proposed Light Industrial Subdivision " Austral Site" – Mamre Road, Erskine Park, NSW''.

Mitchell, P 2002,'Descriptions for NSW (Mitchell) Landscapes Version 2 (2002)', in, Department of Environment and Climate Change.

Navin, K 1987, 'What hasn't happened to Lake Illawarra'.

Navin, K 1991, *Archaeological Survey of North Nowra-Bomaderry Creek Link Road (Option 2) and Three Alignment Options*, Report to Mitchell McCotter & Associated Pty Ltd.

Navin Officer Heritage Consultants 2000, *Elambra Estate Gerringong NSW Archaeological Survey for Aboriginal Sites*.

Navin Officer Heritage Consultants 2006, *Gerroa Sand Mine Extension: Archaeological Subsurface Testing Program*, Report for Perram and Partners on behalf of Cleary Bros (Bombo).

Navin Officer Heritage Consultants 2007, *Princes Highway Upgrade Gerringong to Bomaderry Cultural Heritage Assessment Preliminary Report*.

Navin Officer Heritage Consultants 2010, *Gerringong upgrade Princes Highway: Review of Environmental Factors Appendix G – Cultural Heritage Assessment*, Report for The Roads and Traffic Authority NSW.

Navin Officer Heritage Consultants 2012, *Foxground and Berry bypass Princes Highway upgrade Volume 2 – Appendix J Technical paper: Aboriginal heritage*, Roads and Maritime Services NSW on behalf of AECOM Australia Pty Ltd.

Navin Officer Heritage Consultants 2013, *'Berry to Bomaderry upgrade Technical paper: Aboriginal cultural heritage assessment report*, Report for the Roads and Maritime Services NSW on behalf of AECOM Australia Pty Ltd.

Navin Officer Heritage Consultants Pty Ltd 2006, *Gerroa Sand Mine Extension Archaeological Suburface Testing Program*.

Navin Officer Heritage Consultants Pty Ltd 2010, *Princes Highway Gerringong Upgrade - Mount Pleasant to Toolijooa Road: Aboriginal Archaeological Subsurface Testing and Collection Program*.

Navin Officer Heritage Consultants Pty Ltd 2011a, *Princes Highway Berry and Foxground bypass, Cultural Heritage Assessment. Archaeological Survey and Initial Analysis*.

Navin Officer Heritage Consultants Pty Ltd 2011b, *Princes Highway Gerringong Upgrade Mount Pleasant to Toolijooa Road. Aboriginal Archaeological Subsurface Testing Program, Addendum Report – PASA31 (Site G2B A12)*.

NSW Heritage Office 2001, 'Assessing heritage significance', viewed 1 May 2016, <http://www.environment.nsw.gov.au/resources/heritagebranch/heritage/listings/assessingheritagesignificance.pdf>.

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

Organ, M (ed.) 1990, *A documentary history of the Illawarra & South Coast Aborigines, 1770-1850: including a chronological bibliography 1770-1990*, Aboriginal Education Unit, Wollongong University, Wollongong.

Organ, M & Speechley, C 1997, *Illawarra Aborigines - An Introductory History*, University of Wollongong, Wollongong, NSW.

Organ, MK 1993, *Illawarra South Coast Aborigines 1770-1900*, Report to the Australian Institute of Aboriginal and Torres Strait Islander Affairs, Canberra.

Paton, R 1992, *An Interim Report of an Archaeoloigcal Investigation of the Cleary Bros Southern Sand Extraction Area, Gerroa, New South Wales*.

Peter Freeman Pty Ltd & JRC Planning Services 2003, *Shoalhaven City Council Heritage Study 1995-1998*.

Poiner, G 1971, 'The Process of the Year'.

Poiner, G 1976, 'The Process of the year among Aborigines of the Central and South Coast of New South Wales'.

Sefton, C 1980, *Aboriginal Cultural Resources Study Illawarra Region*, Report for Illawarra Regional Planning Committee.

Sefton, C 1981, *Aboriginal Cultural Resources Study Illawarra Region*, Report for National Parks and Wildlife Services.

Silcox, R 1990, *Archaeological assessment of Aboriginal and Historic sites on the proposed North Kiama by pass between Dunmore and Bombo, Kiama, NSW*, Report for Connell Wagner Pty Ltd.

Speight, JG 2009, *Landform in Australian Soil and Land Survey Field Handbook*, National Committee on Soil and Terrain, CSIRO, Collingwood.

Stepinski, T & Jasiewicz, J 2011,'Geomorphons - a new approach to classification of landform', in, *Proceedings of Geomorphometry 2011*, Redlands, pp.109–112.

Tindale, N 1974, *Aboriginal Tribes of Australia*, Australian National University, Canberra.

Troedson & Hashimoto 2013, 'Shoalhaven Area Coastal Quartenary Geology Map'.

Wesson, S 2005, 'A History of Aboriginal People of the Illawarra 1770 - 1970'.

Wesson, S 2009, 'Murni Dhungang Jirrar: Living in the Illawarra'.

# 13 APPENDICES

**Continued in Volume 2**