Compliance Report for State Significant Site and Director General's Requirements

The process which has been followed to meet the Director General's Requirement is provided as a checklist in the table below.

This table is also included in Section 10.1.1 of the Report.

Compliance Report Checklist

Director General's Requirement	**Response**
• The EA [Environmental Assessment] is to identify the nature and extent of impacts on any Aboriginal cultural heritage and address the requirements set out in the draft *"Guidelines for Aboriginal Cultural Heritage Impact Assessment and Community Consultation".*	• The Phase 1 Desktop Assessment and Phase 2 Field Assessment components will inform the EA required by the DGR. • The Phase 1 Desktop Assessment and Phase 2 Field Assessment have been undertaken as per the DECCW *Draft Guidelines for Aboriginal Cultural Heritage Impact Assessment and Community Consultation* 2005 (*the Part 3A Guidelines*) (DEC 2005b) and also take into consideration the *Part 5 Guidelines* (DEC 2005a), in the interest of completing full and comprehensive consultation (inclusive of Aboriginal stakeholders) for this project. • Both the Phase 1 Desktop Assessment and Phase 2 Field Assessment components have been undertaken as per the best practice heritage management requirements of the DECCW "Guidelines" and the ICOMOS Burra Charter.
Requirements of the *NP&W Act*	
• As the Calderwood Project is being assessed under *Part 3A of the EP&A Act*, AHIP consents from DECCW under Sections 87 and 90 of the *NP&W Act* are not required. Section 91 still applies and is triggered upon the discovery of any Aboriginal objects or places.	• Site cards have been prepared for all Aboriginal archaeological sites recorded during the Phase 2 Field Assessment component. • These site cards will be submitted to the DECCW AHIMS Registrar in accordance with the notification requirement of Section 91 of the *NP&W Act*.

Calderwood Urban Development Project
ABORIGINAL ARCHAEOLOGICAL AND CULTURAL HERITAGE ASSESSMENT

COMBINED DESKTOP ASSESSMENT & FIELD ASSESSMENT REPORT

Final Report – suitable for public display

Prepared by
Austral Archaeology Pty Ltd
Archaeological & Cultural Heritage Consultants

For

Eco Logical Australia Pty Ltd

On behalf of

Delfin Lend Lease

March 2010
Job No: 9030

EXECUTIVE SUMMARY

Austral Archaeology Pty Ltd has been commissioned by Eco Logical Australia Pty Ltd on behalf of Delfin Lend Lease Ltd to undertake the Aboriginal archaeological and cultural heritage assessment of the Calderwood Urban Development Project.

This full Aboriginal archaeological and cultural heritage assessment is to be undertaken in two stages: Phase 1, the Desktop Assessment, and Phase 2, the field assessment. The present document presents the desktop assessment, previously provided to the client as a standalone volume, as well as the results of the field assessment, and a discussion of the archaeological and Aboriginal cultural sensitivity of the Calderwood Project area.

The Calderwood Project area covers a 700 ha area within the Shellharbour and Wollongong LGAs, NSW. The development is currently in planning and is to be considered under Part 3A of the *Environmental Planning and Assessment Act 1979* (EP&A Act).

As Calderwood Urban Development Project is to be assessed under Part 3A, and the Department of Planning is the consent authority, the Department of Environment, Climate Change and Water's *Draft Guidelines for Aboriginal Cultural Heritage Impact Assessment and Community Consultation 2005* (the *Part 3A Guidelines*) are being applied. In practice, these guidelines direct the Applicant to the *Interim Community Consultation Requirements for Applicants* (the *Part 5 Guidelines*) (DEC 2005a). Therefore, the consultation for the Calderwood Urban Development Project is being undertaken as per the *Part 5 Guidelines* (DEC 2005a).

The Aboriginal archaeological and cultural heritage Phase 1 Desktop Assessment of the Calderwood Project area was undertaken in December 2009; the Phase 2 Field Assessment was undertaken over nine days in December 2009 and January 2010. Representatives from ILALC and WNDAC were registered as Aboriginal stakeholder groups and consulted with as per the Part 3a Guidelines (DEC 2005b). ILALC representatives participated in the Field Assessment; WNDAC was not able to provide representatives for the Field Assessment but was provided, with ILALC, the opportunity to review a draft of the current report and its recommendations.

34 new Aboriginal archaeological sites, containing at least 189 surface artefacts, were identified during field assessment. They consisted of 18 isolated finds (52.94%), 11 open artefact scatters (32.35%), four open artefact scatters with associated potential archaeological deposit (11.76%) and one potential archaeological deposit without surface material (2.94%). The dominant raw material was silcrete, followed by chert, mudstone, FGS, petrified wood, quartz, basalt and river cobble. Flakes or flake fragments were the most common artefact types, followed by cores, flaked pieces, and a single instance each of a hand axe, a milling stone or pestle, and a possible broken hammer stone.

As a result of the Phase 2 Field Assessment of the full Aboriginal archaeological and cultural heritage assessment of the Calderwood Project, the following recommendations are made:

1. No further archaeological investigation is deemed necessary for sites CP-IF-01, CP-IF-02, CP-S-01, CP-S-02, CP-IF-03, CP-S-03, CP-IF-04, CP-IF-05, CP-S-04, CP-IF-06, CP-IF-07, CP-IF-08, CP-S-05, CP-IF-09, CP-IF-10, CP-IF-11, CP-IF-12, CP-S-07, CP-IF-13, CP-S-08, CP-IF-14, CP-IF-15, CP-IF-16, CP-S-10, CP-S-12, CP-S-15, CP-IF-17 and CP-IF-18, or the area of low potential PAD CP-PAD-01.

2. Salvage through collection and relocation of surface artefacts is recommended for CP-IF-01, CP-IF-02, CP-S-01, CP-S-02, CP-IF-03, CP-S-03, CP-IF-04, CP-IF-05, CP-S-04, CP-IF-06, CP-IF-07, CP-IF-08, CP-S-05, CP-IF-09, CP-IF-10, CP-IF-11, CP-IF-12, CP-S-07, CP-IF-13, CP-S-08, CP-IF-14, CP-IF-15, CP-IF-16, CP-S-10, CP-S-12, CP-S-15, CP-IF-17 and CP-IF-18 if they are to be impacted by development for the Calderwood Project.

3. The development and implementation of a programme of test excavation and reporting is required to clarify the archaeological potential of CP-S-06/CP-PAD-02, CP-S-09/CP-PAD-03, CP-S-11/CP-PAD04 and CP-S-14/CP-PAD-05, if they are to be impacted by development for the Calderwood Project.

4. The development and implementation of a programme of salvage excavation and reporting is recommended for CP-S-06/CP-PAD-02, CP-S-09/CP-PAD-03, CP-S-11/CP-PAD04 and CP-S-14/CP-PAD-05, if it is warranted by the results of the test excavation programme.

5. The development and implementation of a Care and Control of artefacts strategy, devised through consultation with ILALC and WNDAC, is recommended for all collected and excavated archaeological material retrieved during the abovementioned surface collection, testing and/or salvage excavation works. . Such a strategy should be agreed and finalised with the Aboriginal stakeholders prior to any archaeological site works commencing.

6. Two properties, located at 269 North Macquarie Road and 342 Calderwood Road, were not accessible during the archaeological survey. If they are to be impacted by development for the Calderwood Project it is recommended that they be assessed for their archaeological potential.

7. If additional unrecorded Aboriginal archaeological material is encountered during development, works must cease immediately to allow an archaeologist to make an assessment of the finds, as all Aboriginal artefacts (known and unknown) are protected under Section 90 of the *NP&W Act*. The archaeologist may need to consult with NSW DECCW and registered stakeholder groups concerning the significance of any such material. DECCW must be notified of any such finds as per Section 91 of the *NP&W Act*.

8. As required by the *NSW Heritage Act 1977* (amended), in the event that historic relics are encountered, works must cease immediately to allow an archaeologist to make an assessment of the finds. The archaeologist may need to consult with the Heritage Branch Department of Planning concerning the significance of any historic cultural material encountered.

9. Restriction of access to Aboriginal archaeological information is recommended, in the event that this report is to go on public exhibition. Consultation with Austral Archaeology Pty Ltd, the registered Aboriginal stakeholders ILALC and WNDAC, DoP and DECCW will be necessary to determine the appropriate level of public release.

10. It is recommended that copies of the finalised report be provided to ILALC, WNDAC and NSW DECCW, and that the completed site cards (see Appendix D.3) be provided to the DECCW AHIMS Registrar as per Section 91 of the *NP&W Act*.

In accordance with Recommendation 7, this document is a sanitised version of the final report. After consultation with ILALC and WNDAC, all Aboriginal site location information and certain cultural information has been removed from the report. As a result this version of the document only is suitable for public display.

TABLE OF CONTENTS

1.0 INTRODUCTION

1.1 PROJECT DESCRIPTION

This report, which combines the Phase 1 Desktop Assessment and Phase 2 Field Assessment components of the full Aboriginal archaeological and cultural heritage assessment, has been prepared by Austral Archaeology Pty Ltd to accompany a Concept Plan Application under Part 3A of the *Environmental Planning & Assessment Act, 1979* (EP&A Act) and a proposal for State significant site listing under Schedule 3 of *State Environmental Planning Policy Major Development 2005* (SEPP Major Development) in relation to the Calderwood Urban Development Project.

The Calderwood Urban Development Project is a master planned community development by Delfin Lend Lease (DLL).

The Calderwood Urban Development Project proposes a mix of residential, employment, retail, education, conservation and open space uses. The development proposes approximately 4,800 dwellings and approximately 50 hectares of retail, education, community and mixed use / employment land. The overall development will accommodate approximately 12,400 people and will deliver an estimated $2.9 billion in development expenditure and create approximately 8,000 full time equivalent jobs by 2031.

The Calderwood Urban Development Project site is located within the Calderwood Valley in the Illawarra Region. It is approximately 706 hectares in area with approximately 600 hectares of land in the Shellharbour LGA and the balance located within the Wollongong LGA.

The Calderwood Valley is bounded to the north by Marshall Mount Creek (which forms the boundary between the Shellharbour and Wollongong LGAs), to the east by the Macquarie Rivulet, to the south by Johnstons Spur and to the west by the Illawarra Escarpment. Beyond Johnstons Spur to the south is the adjoining Macquarie Rivulet Valley within the suburb of North Macquarie. The Calderwood Urban Development Project land extends south from the Calderwood Valley to the Illawarra Highway. Refer to Location Plan at **Figure 1**.

The Calderwood Valley has long been recognised as a location for future urban development, firstly in the Illawarra Urban and Metropolitan Development Programmes and more recently in the Illawarra Regional Strategy (IRS).

The IRS nominates Calderwood as an alternate release area if demand for additional housing supply arises because of growth beyond projections of the Strategy, or if regional lot supply is lower than expected.

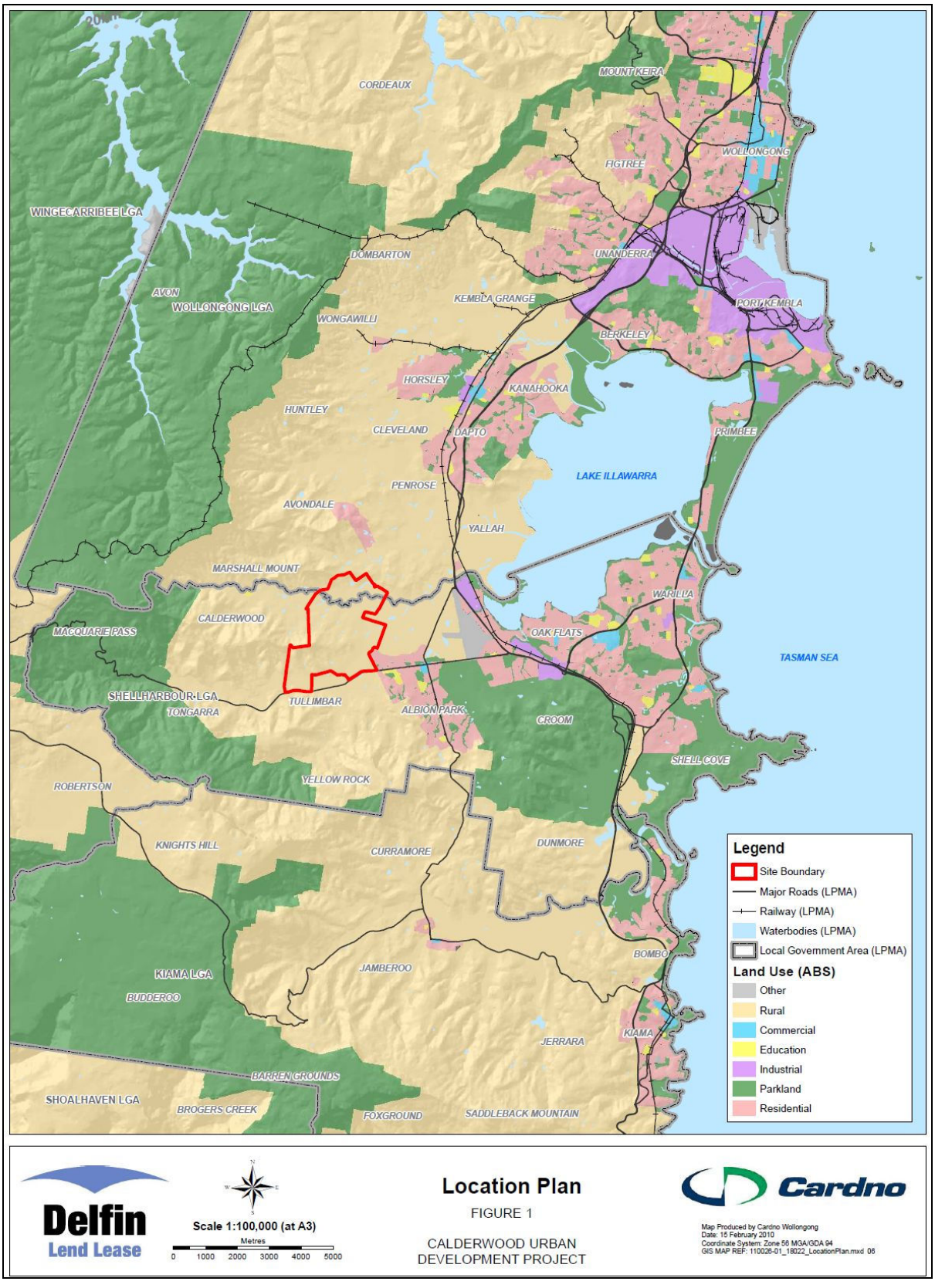
In 2008, the former Growth Centres Commission reviewed the proposed West Dapto Release Area (WDRA) draft planning documents. The GCC concluded that forecast housing land supply in the IRS cannot be delivered as expected due to implementation difficulties with the WDRA, and the significantly lower than anticipated supply of housing land to market in the Illawarra Region is now been recognised as a reality.

The GCC Review of the WDRA also recognised that there is merit in the early release of Calderwood in terms of creating a higher dwelling production rate and meeting State government policy to release as much land to the market as quickly as possible. Given the demonstrated shortfall in land supply in the Illawarra Region and the WDRA implementation difficulties highlighted in the GCC Report, the release of Calderwood for urban development now conforms to its strategic role under the IRS as a source of supply triggered by on-going delays in regional lot supply. The Calderwood Urban Development Project can deliver about 12% of the IRS' new dwelling target.

Changes in outlook arising from global, national and regional factors influencing investment and delivery certainty, housing supply and affordability and employment and economic development also add to the case for immediate commencement of the Calderwood Project.

In April 2008 the Minister for Planning issued terms of reference for the preparation of a Justification Report to address the implications of initiating the rezoning of Calderwood for urban development including associated staging, timing and infrastructure considerations.

In February 2009 the Minister for Planning considered a Preliminary Assessment Report for the Calderwood Urban Development Project that provided justification for the planning, assessment and delivery of the project to occur under Part 3A of the EP&A Act, having regard to the demonstrated contribution that the project will have to achieving State and regional planning objectives.



1.1 Calderwood study area.

Subsequently, on the 16 April 2009, pursuant to Clause 6 of SEPP Major Development, the Minister for Planning formed the opinion that the Calderwood Urban Development Project constitutes a Major Project to be assessed and determined under Part 3A of the EP&A Act, and also authorised the submission of a Concept Plan for the site. In doing so, the Minister also formed the opinion that a State significant site (SSS) study be undertaken to determine whether to list the site as a State Significant site in Schedule 3 of SEPP Major Development.

The Part 3A process under the EP&A Act allows for the Calderwood Urban Development Project to be planned, assessed and delivered in an holistic manner, with a uniform set of planning provisions and determination by a single consent authority. Given the scale of the proposal, the Concept Plan and SSS listing provide the opportunity to identify and resolve key issues such as land use and urban form, development staging, infrastructure delivery and environmental management in an integrated and timely manner.

The Phase 1 Desktop Assessment and Phase 2 Field Assessment components of the full Aboriginal archaeological and cultural heritage assessment have been prepared to fulfil the Environmental Assessment Requirements issued by the Director General for the inclusion of the Calderwood site as a State Significant Site under SEPP Major Development, and for a Concept Plan approval for the development. Specifically, the Stage 1 Desktop Assessment and Stage 2 Field Assessment components address the following requirements:

- The EA [Environmental Assessment] is to identify the nature and extent of impacts on any Aboriginal cultural heritage and address the requirements set out in the draft "Guidelines for Aboriginal Cultural Heritage Impact Assessment and Community Consultation".

This DGR has been interpreted and confirmed to require a full Aboriginal archaeological and cultural assessment of the Calderwood Project area.

In order to provide relevant Aboriginal heritage potential data to aid in phases of ongoing project planning and design the Aboriginal archaeological and cultural assessment of the Calderwood project area has been undertaken in two separate stages. The first phase comprises desktop research, Aboriginal stakeholder identification and consultation, plus an analysis taking into account archaeological, environmental and cultural variables to identify known Aboriginal heritage items and/or places. Such data was utilised to inform a landform predictive model and field assessment methodology. The results of these tasks and variables comprised the "Calderwood Urban Development Project Aboriginal Archaeological and Cultural Heritage Assessment Phase 1: Desktop Assessment" report provided to Eco Logical Australia Pty Ltd and Delfin Lend Lease Ltd in late 2009, and are incorporated into the current document to inform the discussion and analysis of the field assessment results.

The second phase aimed to take into account the data collated as part of Phase 1, implement the developed field survey methodology and report upon its results and actively seek Aboriginal stakeholder responses as to any identified sites or issues of Aboriginal cultural significance. The Phase 2 Field Assessment, as included in the current document, will conclude with an assessment of significance of the Aboriginal heritage items and values identified over both phases of the project as well as the development of appropriate professional management and/or mitigation strategies for dealing with the identified Aboriginal archaeological and cultural resource.

In accordance with the Director General's Requirements the full Aboriginal archaeological and cultural heritage assessment as included in this document has been prepared following consultation with the following agencies during the agency consultation meeting on 20th October 2009:

- The Department of Planning (DoP);
- The Department of Environment, Climate Change and Water (DECCW).

1.2 INTRODUCTION TO THE ABORIGINAL ARCHAEOLOGICAL AND CULTURAL HERITAGE ASSESSMENT

Eco Logical Australia Pty Ltd on behalf of Delfin Lend Lease Ltd (DLL) has commissioned Austral Archaeology Pty Ltd to undertake the Aboriginal archaeological and cultural heritage assessment of the Calderwood Urban Development Project.

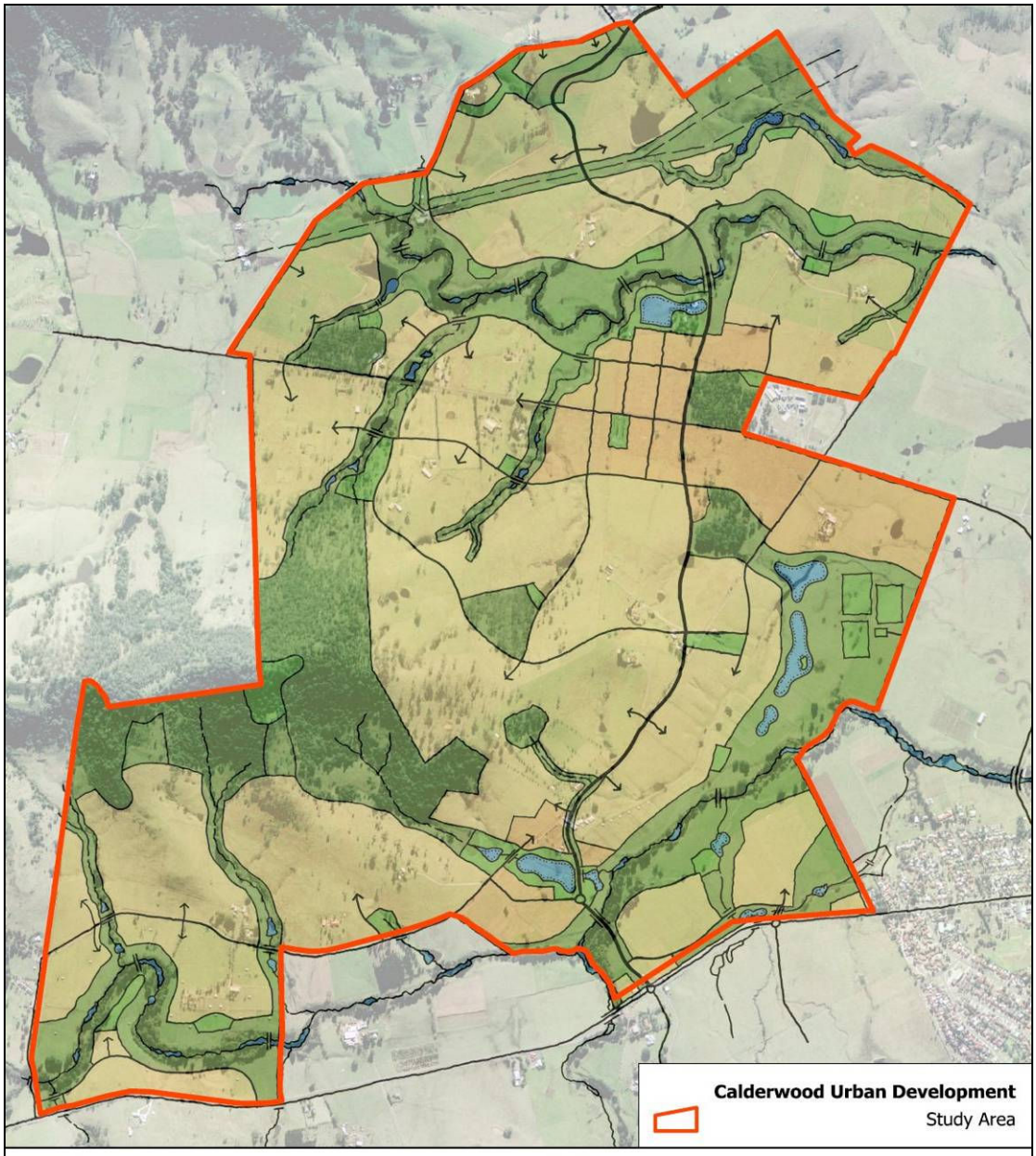


Figure 1.1

Calderwood Concept Plan
Delfin Lend Lease Ltd

0 500 m

N

1.3 BACKGROUND

The Director General's Requirement (DGR) with regards to Aboriginal heritage for the Calderwood Project is as follows:

- The EA [Environmental Assessment] is to identify the nature and extent of impacts on any Aboriginal cultural heritage and address the requirements set out in the draft *"Guidelines for Aboriginal Cultural Heritage Impact Assessment and Community Consultation".*

This DGR has been interpreted to require a full Aboriginal archaeological and cultural assessment of the Calderwood Project area. As previously stated this assessment has been conducted in two separate phases. The relevant aims, tasks and objectives for Phase 1 and 2 which comprise the current document are outlined in Section 1.4.

1.4 REPORT OBJECTIVES

The main objectives of the desktop assessment phase of the project as outlined in this report are to:

In Phase 1 –

- Identify, through established protocols (DECCW's *Draft Guidelines for Aboriginal Cultural Heritage Impact Statement & Community Consultation 2005* (DEC 2005b) – hereafter referred to as the *Part 3A Guidelines*) the appropriate Aboriginal stakeholders in the region of the proposed study;
- Identify and map known Aboriginal heritage sites through searches of heritage registers and databases;
- Identify the relevant legislation and the Client's obligation in regards to them;
- Undertake background archaeological, land-use and environment research and produce a précis of this information;
- Produce a predictive model and mapping of likely areas of Aboriginal archaeological sensitivity in relation to the study area;
- Consult with the relevant government authorities and agencies as required by DECCW's guidelines and direction by Client;
- Consult with identified Aboriginal stakeholders in order to elicit information as to any known Aboriginal cultural heritage values of the study area;
- Develop a field assessment methodology in consultation with the Aboriginal stakeholders taking into account the results of the background research, database/register searches and initial Aboriginal community consultation with respects to Aboriginal cultural heritage values of the study area;
- Produce a preliminary desktop report inclusive of the methodological points listed above.

In Phase 2 –

- Undertake a field assessment with the Aboriginal stakeholders to ground-truth the predictive model generated during Phase 1;
- To thereby identify Aboriginal archaeological and/or cultural sites and issues, areas of potential archaeological deposit, and/or culturally sensitive landscapes within the Calderwood Project area;
- To produce professional recommendations based on the results of the fieldwork and mapping to advise the Client on the Aboriginal archaeological and cultural values of the Calderwood Project area; and
- To do so in accordance with the established protocols (*the Part 3A Guidelines*) and the relevant DGR.

The results of this assessment will be used to inform the preparation of a Part 3A Application, which includes a public display component. In consideration of the sensitivity of site location

information to the Aboriginal community, maps of site location including site type and AHIMS number have been included in Appendix A: Confidential Section. Please note that this confidential section is not to be included in any material provided for public display. Consultation with Austral Archaeology Pty Ltd, the registered Aboriginal stakeholders, and the DECCW will be necessary to determine the appropriate level of public release.

1.5 SCOPE OF THE REPORT

Two main factors have influenced the scope of the Aboriginal archaeological and cultural heritage assessment undertaken for the Calderwood Project: inherent limitations of the AHIMS data; and limitations encountered during the field assessment such as poor ground surface visibility and limited property access.

Experience suggests that site location information received from the AHIMS database is also subject to some limitations. First, incorrect site location data may have been received. This may be due to inconsistencies in recording and data entry, failure to take into account the transition from using AMG84 coordinates to MGA94 coordinates during recording site location, and/or the age of the recording – older site coordinates may have been manually generated from 1:25 000 scale topographic maps and be less accurate than those generated by the hand-held GPS units that have come into common use in recent years. The inherent error range (of generally 4 – 8 m) in recordings made by non-differential GPS must also be taken into consideration. This limitation is not specific to the Calderwood Project area: it results from the amalgamation of a range of data formats within the AHIMS database and cannot be avoided.

However, best efforts have been made to confirm the projection of coordinates by reference to the original site cards and reports where available. Reports for sites surrounding the Calderwood Project area have been checked for discrepancies between the site location as mapped in the report, and the site location as provided in AHIMS. In cases where there is a discrepancy, the location as recorded in the original report and site cards is taken as the correct location. An example of this has been described in Section 5.1.1 of this report. Austral cannot confirm all AHIMS site locations without ground-truthing through relocating the sites, which is well beyond the scope of the current work. However, confirmation of site location through reference to the original reports and mapping has been undertaken for all sites in proximity to the Calderwood Project area.

Limitations encountered during the field assessment related to poor ground surface visibility and limited access to two properties. This has been described in more detail in Section 8.3.2 of this report, and has been summarised below.

Thick ground cover – usually either paddock grass or fallen leaves and undergrowth on the plains and heavily overgrown scrub and lantana along creek banks and Johnstons Spur – limited ground surface visibility to areas of exposure and/or physically prevented access to certain areas. The survey methodology aimed to compensate for poor ground surface visibility by walking transects across an area to ensure thorough coverage as well as concentrating on areas of exposure. In the case of heavily overgrown creek banks, best efforts were made to access the banks wherever possible.

Two properties – 342 Calderwood Road (Lot 21 DP 809156) and 269 North Macquarie Road (Lot 1 DP 558196) – could not be accessed during the field survey and therefore could not be assessed. These two properties are identified on Figure 8.2.

These limitations are considered acceptable and they should not detract from the results of this Field Assessment report. The implications of these limitations for determining the archaeological potential of the Calderwood Project area are discussed in Section 9.0 of this report.

1.6 STAKEHOLDER CONSULTATION

The Aboriginal community stakeholders to be consulted as part of the Aboriginal archaeological and cultural heritage assessment of the Calderwood Project are the Illawarra Local Aboriginal Land Council (ILALC) and the Wollongong Northern Districts Aboriginal Community (WNDAC).

Identification of Aboriginal community stakeholders was undertaken in accordance with the *DECCW Interim Community Consultation Requirements for Applicants 2005* (the *Part 5*

Guidelines) (DEC 2005a). These required notification of the relevant Local Aboriginal Land Council, the Registrar of Aboriginal Owners and Native Title Services (taken to mean the National Native Title Tribunal), as well as an invitation for Aboriginal stakeholders to register their interest in the project via public notices placed in the Illawarra Mercury and the Koori Mail. In addition, letters introducing the project were sent to the DECCW, Wollongong City Council and Shellharbour City Council.

Details of the consultation methodology are provided in Section 7.2. Responses to the advertisements seeking stakeholder consultation and to the proposed methodology as provided by the ILALC and WNDAC are included in Appendices B.1 and B.2. Cultural information obtained during fieldwork was to be included in Appendix B.3, however see below. Responses to the draft report are provided in Appendix B. 4 and details of consultation with ILALC and WNDAC are provided in Appendix B.7.

In brief, both the ILALC and WNDAC support the findings and recommendations of this report. With regards to Recommendation 7, ILALC recommends that an Aboriginal Site Officer should also attend should any unrecorded Aboriginal archaeological material be encountered. ILALC also recommends that an Aboriginal Site Officer be present to monitor excavation or construction works undertaken for the Calderwood project. In accordance with ILALC's wishes, the cultural information contained in Appendix B.3 has been removed from all versions of this report. However, the cultural information contained in Section 8.4 of this report has been deemed by ILALC as suitable for the wider community and therefore has been retained. WNDAC has also provided a number of historical references to guide any further research on the Aboriginal archaeology and culture of the Calderwood project area.

1.7 PROJECT TEAM AND ACKNOWLEDGEMENTS

This project was overseen by Justin McCarthy (Managing Director, Austral Archaeology Pty Ltd) and Evan Raper (Senior Archaeologist). The Phase 1 Desktop Assessment was conducted and the report written, by Krissy Moore (Archaeologist). The Phase 2 Field Assessment was conducted by Krissy Moore and Leigh Bate (Archaeologist). The Final Report was written by Krissy Moore and Leigh Bate. Justin McCarthy reviewed the draft report.

Austral Archaeology would like to acknowledge the participation of the following people who have contributed to the preparation of this report:

Ed Beebe	Paul Davies Heritage Architects Pty Ltd
Robert Bennett	Delfin Lend Lease Ltd
Aaron Broad	Illawarra Local Aboriginal Land Council
Kashana Cohen-McMeekin	National Native Title Tribunal
Tracey Davidson	Delfin Lend Lease Ltd
Courtney Field	Office of the Registrar, *Aboriginal Land Rights Act* (1983)
Karen Gough	Wollongong Northern Districts Aboriginal Community
Steven House	Director, Eco Logical Australia Pty Ltd
Katherine Lang	Environmental Scientist, Eco Logical Australia Pty Ltd
Neville Maher	Illawarra Local Aboriginal Land Council
Jay Marsden	Illawarra Local Aboriginal Land Council
Margaret Mongta	Illawarra Local Aboriginal Land Council
John Pagett	Illawarra Local Aboriginal Land Council
Sharralyn Robinson	Illawarra Local Aboriginal Land Council
Roy Stewart	Illawarra Local Aboriginal Land Council
Joel Thompson	Wollongong City Council
Rebecca Ward	National Trust

The landowners within the Calderwood Project area

1.8 ABBREVIATIONS

AHD	Australian Height Datum
AHIP	Aboriginal Heritage Impact Permit
AHPI	Australian Heritage Places Inventory
Burra Charter, the	ICOMOS Australia Burra Charter 1999
DEC	Department of Environment and Conservation (now DECCW)
DECCW	Department of Environment, Climate Change and Water
DoP	Department of Planning
EA	Environmental Assessment
EIS	Environmental Impact Statement
EP&A Act	*Environmental Planning and Assessment Act 1979*
EPBC Act	*Environmental Planning and Biodiversity Conservation Act 1979*
AMG84	Australian Map Grid 1984
GDA94	Geocentric Datum of Australia 1994
ILALC	Illawarra Local Aboriginal Land Council
IREP	Illawarra Regional Environmental Plan No. 1
LGA	Local Government Area
LEP	Local Environmental Plan
NP&W Act	National Parks and Wildlife Act 1974, amended 2001
PAD	Potential Archaeological Deposit
Part 3A	Part 3A of the EP&A Act
Part 3A Guidelines	*Draft Guidelines for Aboriginal Cultural Heritage Impact Assessment and Community Consultation 2005* (DEC 2005b)
Part 5 Guidelines	*DECCW Interim Community Consultation Requirements for Applicants 2005* (DEC 2005a)
RNE	Register of the National Estate
SEPP	State Environmental Planning Policy
SHI	New South Wales Heritage Office State Heritage Inventory
SHR	New South Wales Heritage Office State Heritage Register
SLEP	Shellharbour Local Environmental Plan
SRLEP	Shellharbour Rural Local Environmental Plan
S87	Section 87 of the NP&W Act
S90	Section 90 of the NP&W Act
S91	Section 91 of the NP&W Act
WLEP	Wollongong Local Environmental Plan
WNDAC	Wollongong Northern Districts Aboriginal Community

2.0 LEGISLATIVE FRAMEWORK

2.1 ABORIGINAL HERITAGE LEGISLATIVE FRAMEWORK

Aboriginal archaeological and cultural heritage assessments in NSW are carried out under the auspices of a range of state and Federal Acts and Guidelines. The Acts 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.

The following legislation is relevant to the Calderwood Project:

2.1.1 Federal Acts

- The *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act), which places the protection of items listed on the National Heritage List (NHL) and Commonwealth Heritage List (CHL) as a new matter of National Environmental Significance.

The EPBC Act has not been triggered with regards to the Calderwood Project, as no Aboriginal archaeological items on the NHL or CHL are known within the study area.

- The *Aboriginal and Torres Strait Islander Heritage Protection Amendment Act 1987*, which provides blanket protection for Aboriginal heritage in circumstances where such protection is not available at a State level.

The Act applies with regards to the Calderwood Project, and may also override State and Territory provisions.

Principles for assessment and conservation management are provided by the non-statutory *ICOMOS Australia Burra Charter 1999* (the Burra Charter).

The Phase 1 Desktop Assessment and Phase 2 Field Assessment components of the Calderwood Project have been undertaken as per the best practice heritage management requirements of the Burra Charter.

2.1.2 State Acts

The following State Acts also apply in the case of the Calderwood Project:

- The *Environmental Planning and Assessment Act 1979* (EP&A Act).
    - The Act requires that impacts upon the environment and cultural heritage be considered prior to development approval being granted.
    - Under *Part 3A* of the Act, in the case of a Development Application constituting a 'State Significant Site' under the Act, the Proponent would not require the usual consents as per S87 and S90 of the NP&W Act. An Aboriginal archaeological and cultural assessment would still be required and appropriate levels of stakeholder consultation undertaken as per the *Part 3A Guidelines* (DEC 2005b) (see Section 2.1.4 below).

The Calderwood Project is to be assessed under Part 3A of the EP&A Act. The Phase 1 Desktop Assessment and the Phase 2 Field Assessment and recommendations will inform the Environmental Assessment (EA) required under the DGRs. Aboriginal archaeological and cultural assessment is being undertaken for the Calderwood Project and appropriate levels of Aboriginal community consultation being pursued as per the relevant DECCW Guidelines.

- The *National Parks and Wildlife Act 1974* amended 2001 (NP&W Act).
    - Part 6 (Approvals) of the Act lists the responsibilities and powers of the DECCW as the administrator of the Act.
    - Section 87 (S87) of the Act requires the application for an Aboriginal Heritage Impact Permit (AHIP) should the Proponent seek to disturb, move, and/or take possession of an Aboriginal object or disturb land for the purpose of discovering an Aboriginal object, as would occur during a programme of Aboriginal archaeological test excavation.

- Section 90 (S90) of the Act provides blanket protection to all Aboriginal objects and places, known and unknown, and requires an application for an AHIP should the Proponent seek to destroy, damage or deface an Aboriginal object or Aboriginal place, as would apply when no additional archaeological investigation beyond the initial assessment is deemed necessary, or where test excavation is considered to have sufficiently characterised a site, or where Aboriginal objects are to be moved (relocation).
- Section 91 (S91) requires that any person who locates an Aboriginal object or place must notify the DECCW within a reasonable time, as the DECCW also administers previously unknown or unrecorded objects and places as part of its Part 6 (Approvals) role.

As the Calderwood Project is being assessed under Part 3A of the EP&A Act, the DoP rather than DECCW is the consent body in this instance. Therefore, whilst Aboriginal archaeological and cultural assessment and appropriate levels of Aboriginal stakeholder consultation are still required, AHIP consents from DECCW under Sections 87 and 90 of the NP&W Act are not required. However, Section 91 still applies and would be triggered upon the discovery of any Aboriginal objects or places. It remains an offence under Section 91 not to notify the DECCW of such discoveries within a reasonable time.

2.1.3 Planning Instruments

The Calderwood Project also falls within the following planning instruments:

- *State Environmental Planning Policy (Major Development) 2005*

The Director General's Requirement (DGR) with regards to Aboriginal heritage is as follows:

"The EA [Environmental Assessment] is to identify the nature and extent of impacts on any Aboriginal cultural heritage and address the requirements set out in the draft "Guidelines for Aboriginal Cultural Heritage Impact Assessment and Community Consultation"."

This requirement is to be met through the production of the current combined report for Phases 1 and 2 of the Aboriginal archaeological and cultural assessment undertaken for the Calderwood Project.

- The *Illawarra Regional Strategy 2006-31*

This strategy applies to that part of the Calderwood Project which lies within the LGA of Wollongong. A stated aim of the Strategy is to "protect the cultural, European and Aboriginal heritage values and visual character of rural and coastal towns and villages, and surrounding landscapes" (NSW & DoP 2007: 9). Councils are required to consider Aboriginal cultural and community values in planning and management of the LGA, with reference to recent Aboriginal heritage studies and the Illawarra Aboriginal heritage study *Murni, Dhungang, Jirrar: Living in the Illawarra* (NSW & DoP 2007: 39).

This strategy has been incorporated into the assessment of Aboriginal heritage for the Calderwood Project.

- The *Illawarra Regional Environmental Plan No. 1*

The IREP applies to the LGAs Shoalhaven, Wollongong (excepting the area covered by the Wollongong City Centre LEP 2007), Kiama, Shellharbour and the Shire of Wingecaribee: therefore it applies to the Calderwood Project area. Regarding the environmental heritage of the area, the IREP requires the proponent to seek the appropriate consents prior to impacting on relics or places. It further requires that the consent authority and determining authorities take into account the findings and recommendations of the *Illawarra Region Aboriginal Resources Study* (Department of Environment and Planning 1980).

In the case of the Calderwood Project, consents from the DoP under Part 3A of the EP&A Act will satisfy the IREP requirements. The consent will also satisfy the recommendations of the Illawarra Region Aboriginal Resources Study (Department of Environment and Planning 1980: 10). See also Section 5.3 for discussion of the findings of the Study.

- The *Shellharbour Local Environmental Plan 2000 (SLEP)*
- The *Shellharbour Rural Local Environmental Plan 2004*
- The *Wollongong Local Environmental Plan 1990*

- The *Draft Wollongong Local Environmental Plan 2009 (awaiting gazettal)*
- The *Draft West Dapto Local Environmental Plan 2009 (awaiting gazettal)*

As the Calderwood Project is to be assessed under Part 3A of the EP&A Act, these planning instruments do not specifically apply, and the DoP remains the consent authority for this project. However it would be appropriate to notify the Shellharbour and Wollongong City Councils of the proposed development. As per the relevant community consultation guidelines followed by Austral in respects to the Calderwood Project and Aboriginal heritage the Shellharbour and Wollongong Local Councils have been contacted in writing.

2.1.4 Community Consultation Guidelines

- *DECCW Interim Community Consultation Requirements for Applicants (the Part 5 Guidelines)* (DEC 2005a)

Published in December 2004 and brought into action on 1 January 2005, these Interim Guidelines set out a code of practise regarding community consultation in respects to Aboriginal heritage, for projects to be assessed under Part 5 of the EP&A Act. They detail timeframes, procedures and processes regarding how to consult widely with the Aboriginal community and other interested stakeholder groups.

- DECCW *Draft Guidelines for Aboriginal Cultural Heritage Impact Assessment and Community Consultation 2005* (the *Part 3A Guidelines*) (DEC 2005b)

These Draft Guidelines set out a procedure for dealing with Aboriginal archaeological and cultural heritage and consulting with the Aboriginal community for projects to be assessed under Part 3A of the EP&A Act 1979.

In reference to the Calderwood Project the Draft Guidelines for Aboriginal Cultural Heritage Impact Assessment and Community Consultation 2005 (the Part 3A Guidelines) (DEC 2005b) apply in this instance as the project is being pursued under Part 3A of the EP&A Act. These guidelines are therefore being applied. In practice the community consultation guidelines for assessing projects under Part 3A of the EP&A Act refer the Applicant to the Interim Community Consultation Requirements for Applicants 2005 (the Part 5 Guidelines) (DEC 2005a) for consultation.

The details of the Aboriginal community consultation process are provided in Section 4.1.

2.2 SECTION SUMMARY

The Calderwood Urban Development Project (Calderwood Project) is currently in planning and is to be considered under *Part 3A of the EP&A Act*. As such Section 87 and 90 consents under the NP&W Act, as administered by the DECCW, are not required. Despite this Aboriginal archaeological and cultural assessment inclusive of appropriate levels of Aboriginal stakeholder consultation is a requirement for projects seeking planning approval under *Part 3A*.

All works fall under the protection of the *Aboriginal and Torres Strait Islander Heritage Protection Amendment Act* 1987. Searches of the Australian Heritage Places Inventory (AHPI), the Register of the National Estate (RNE), the National Heritage List and the NSW Heritage Office State Heritage Register (SHR) websites did not identify any recorded Aboriginal objects or places in or around the study area, and therefore the EPBC Act does not apply.

As the Calderwood Project is to be assessed under *Part 3A*, the DoP is the consent authority. The Wollongong and Shellharbour City Councils will be notified as part of the assessment process. Indeed the DECCW's *Draft Guidelines for Aboriginal Cultural Heritage Impact Assessment and Community Consultation 2005* (the *Part 3A Guidelines*) (DEC 2005b) also require consultation with local City Councils.

The environmental planning instrument that is to apply to the development in the case of a successful *Part 3A* determination is the SEPP (Major Development) 2005, which, in the event of an inconsistency between the SEPP 2005 and another environmental planning instrument, will prevail to the extent of the inconsistency.

The Calderwood Project is undertaken in accordance with the *Part 3A Guidelines* (DEC 2005b), while also taking into consideration the *Part 5 Guidelines* (DEC 2005a), in the

interest of completing full and comprehensive consultation (inclusive of Aboriginal stakeholders) for this project.

3.0 ENVIRONMENTAL BACKGROUND

3.1 CLIMATE

Located near Shellharbour, the Calderwood Project area has a mild to warm climate (17.9°C to 25.5°C in December and 8.2°C to 16.7°C in July); the nearby Plateau and Escarpment experience cooler conditions (21.5°C in January to 12.5°C in July) (Hazelton & Tille 1990: 4).

The Illawarra Escarpment provides an obstacle to the dominant southerly and coastal winds, resulting in an uplift which causes high levels of local rainfall (Navin Officer 2005; see also REINCO Consulting 2009: 5).

3.2 GEOLOGICAL CONTEXT AND SOIL LANDSCAPES

3.2.1 Physiographic Region

The Calderwood valley study area lies within the boundaries of the Illawarra Coastal Plain physiographic region, bounded to the west by the Woronora Plateau, to the west and south by the Illawarra Escarpment, and to the east by Lake Illawarra and then the South Pacific Ocean. The Coastal Plain consists of gentle rises of the Permian Illawarra Coal Measures, rolling to steep low hills of volcanic materials, moderate to steep slopes of Berry Siltstone, undulating Budgong Sandstone and Quaternary Alluvium (Hazelton 1992: 2). The Coastal Plain formed in the Holocene period, as a result of the westward recession of the Escarpment and rising sea levels (AMBS 2006: 19). The landscape of the Illawarra region has been described as six broad landscape zones: plateau, escarpment, coastal plain, estuarine, intertidal and marine (DEC 2005c: 10). The Calderwood Project study area lies within the Coastal Plain.

3.2.2 Soil Landscapes

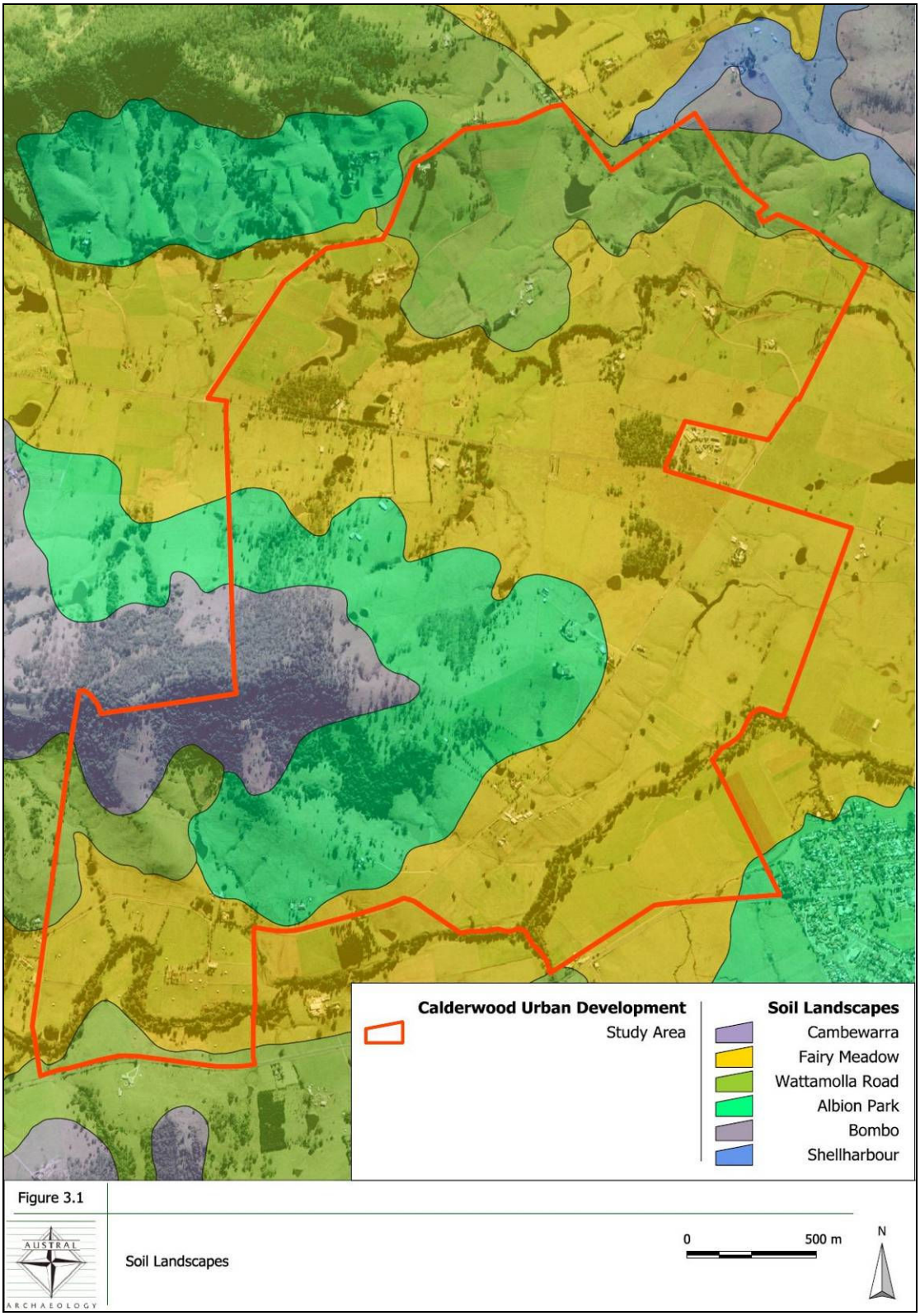
The underlying geology includes Berry Siltstone and Budgong sandstone, and conglomerate beds in this area provide rounded pebbles and cobbles of basic to intermediate volcanics and quartz (Sefton 1984 in Navin 1987: 6). The soil landscapes over which the study area runs include the Fairy Meadow (fa), Albion Park (ap), Cambewarra (ca), and Wattamolla Road (wt) landscapes.

The Fairy Meadow swamp landscape is characterised by gently undulating broad alluvial plains, floodplains, valley flats and terraces below the Illawarra Escarpment, with scattered swamps also present. The underlying geology is based on Quaternary sediments, and the landscape is associated with lowlands and floodplains near Solomon's Creek and Duck Creek, on the north edge of the Calderwood Valley, and the Macquarie Rivulet, on the south edge of the Valley. The area has minor sheet erosion, gully erosion, minor rill erosion on batters, and stream bank erosion (Hazelton 1992: 97).

The Albion Park erosional landscape occurs in smaller patches to the north of Duck Creek and on the valley floor between the arms of Marshall Mount Creek and the Macquarie Rivulet. It is situated on short steep upper slopes with long gentle foot slopes on the Berry Formation. The Berry formation is characterised by mid grey to dark grey siltstone, mudstone and fine sandstone with localised outcrops of Budgong Sandstone on mid to upper slopes in the area (Hazelton 1992: 40). Local relief on this landscape is from 60 – 100 m on the slopes.

The Cambewarra erosional landscape is bounded to the west by the Illawarra Escarpment, to the north and south by the arms of the Fairy Meadows soil landscape associated with Marshall Mount Creek and the Macquarie Rivulet, and also by the Albion Park and Wattamolla Road landscapes to the east. It extends into the western side of the Calderwood Project area along Johnstons Spur/Mount Johnston. It is characterised by steep to very steep hills (of 100 – 200 m) with broad colluvial benches. The soil landscape is characterised by minor gully erosion, as well as widespread rock falls and slumps along road batters, especially after heavy rain (Hazelton 1992: 46-47).

The Wattamolla Road depositional soil landscape consists of long gently to moderately inclined side slopes and undulating to rolling hills, with a relief of <200 m. It overlies the red brown and grey volcanic lithic sandstone of the Budgong Sandstone formation. Slumping, very small terraces, and minor gully erosion occur on steeper slopes (Hazelton 1992: 85-86).


Calderwood Urban Development
Study Area
Soil Landscapes
Cambewarra
Fairy Meadow
Wattamolla Road
Albion Park
Bombo
Shellharbour
Figure 3.1
Soil Landscapes
0
500 m
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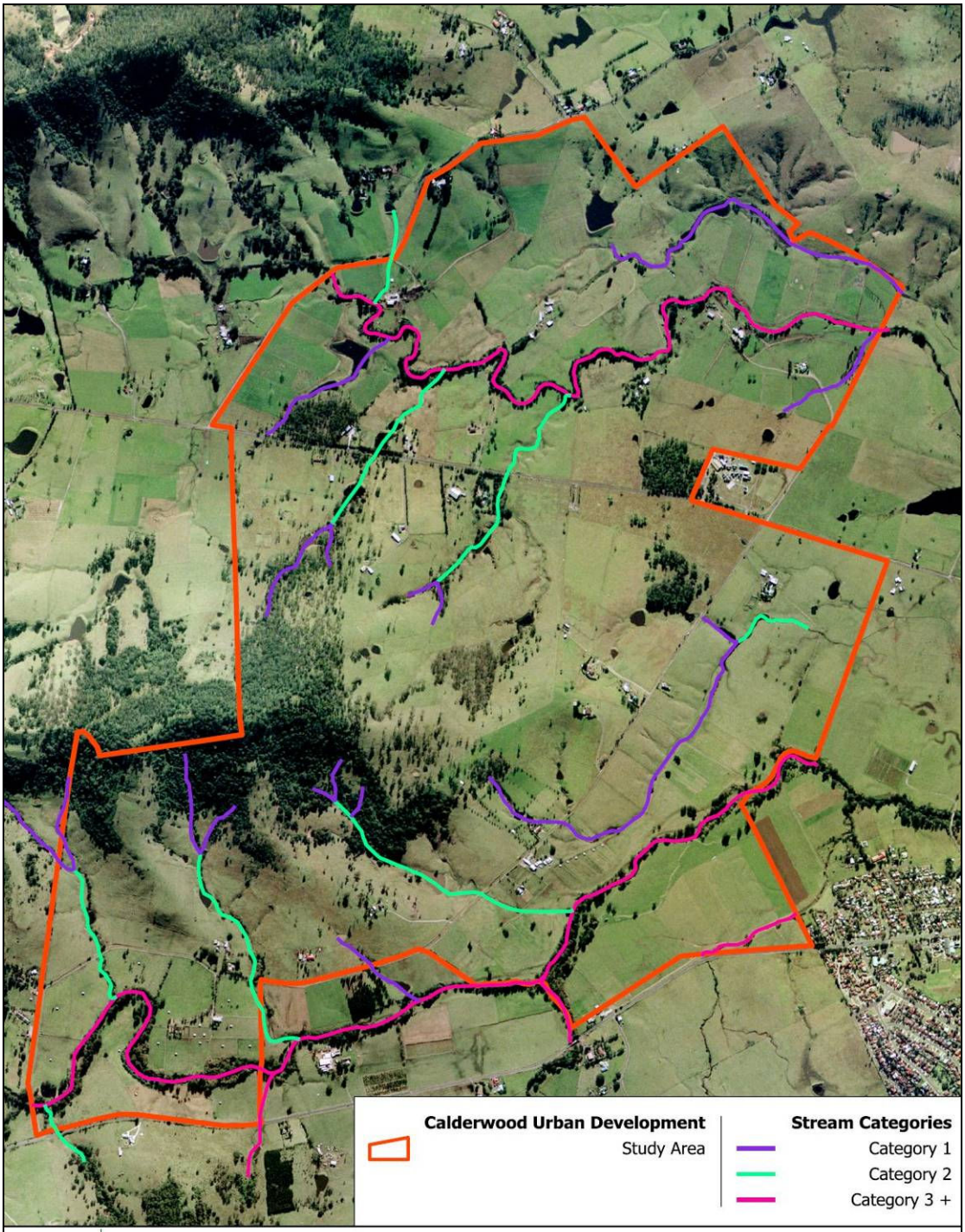
3.3 HYDROLOGY



The main watercourses of the study area are the large perennial streams of Marshall Mount Creek, to the north of Calderwood Road, and the Macquarie Rivulet, to the south. These are both fed by numerous often ephemeral and unnamed drainage lines which originate along Johnstons Spur (REINCO Consulting 2009: 11). A large part of the landform surrounding Marshall Mount Creek lies within the 100 year flood event extent (AMBS 2006: Figure 6).

Many of these streams have been modified through the construction of dams, creek bank modification, bridging and erosion as a result of land clearance.

Delfin's ground-truthed stream order classification (2010, after Strahler 1952: see Figure 3.2) identifies both the Macquarie Rivulet and Marshall Mount Creek as third-order or higher streams.

The Macquarie Rivulet has its headwaters on the escarpment near Robinson, flows east over the Illawarra Escarpment, and eventually discharges into Lake Illawarra. It represents a significant portion of the total catchment of Lake Illawarra. The three arms of the drainage network of the Macquarie Rivulet – being the Rivulet, Marshall Mount Creek, and Frazer's Creek to the south of the Calderwood Project area – combine to the east of the Calderwood Project area, on the flood plain above the Princes Highway and west of Albion Park airport (REINCO Consulting 2009: 4).

The Macquarie Rivulet and Marshall Mount Creek are fed by multiple first and second order streams or drainage lines which originate on Johnstons Spur. These smaller streams have been described as heavily modified from their natural condition due to historic land use (REINCO Consulting 2009: 12).

3.4 PLANT, ANIMAL AND LITHIC RESOURCES

The Illawarra Region is located within the Sydney Basin Bioregion, a highly bio-diverse area with over 1,360 plant species (NSW & DoP 2007: 27). This landscape would have provided a wide range of plant, animal and lithic resources for the use of past Aboriginal people.

Based on the soil landscapes underling sections of the Calderwood Project area, the following vegetation communities were present: low open-forest and woodland on the Fairy Meadow landscape, tall open-forest on the Albion Park and Wattamolla Road landscapes, closed-forest on the Cambewarra landscape, and tall open-forest and closed-forest on the Illawarra Escarpment landscape (Hazelton 1992). Located in the Coastal Plain environment identified by DEC (2005d: 5), the Calderwood Project study area would have contained a range of environments including grassy woodland, swamps, grasslands and scrub. Marshall Mount Creek and the Macquarie Rivulet have been described as supporting a distinctive riparian vegetation community consisting of Tall River Oak (*Casuarina cunninghamiana*) along drainage line banks, and *Casuarina glauca* and *Melaleuca spp.* closer to Lake Illawarra (AMBS 2006: 32). The nearby Illawarra Escarpment contains a large subtropical rainforest area (NSW & DoP 2007: 27).

Stone tool resources for the Illawarra area included volcanic rock, basalt and silcrete, which were mined, and shaped into tools for local use as well as trade with groups from the northwest (DEC 2005d: 13). However AMBS (2006: 18) stated that, while small quantities of stone may have been sourced from conglomerate exposures in underlying bedrock such as surface outcrops of quartz within the West Dapto Release Area (WDRA), which extends north and east from the north bank of Marshall Mount Creek, there is no known source of stone suitable for manufacture of Aboriginal tools in the WDRA or its immediate vicinity.

The potential for exploitation of volcanic material for the region, including basalt materials from the Dapto Latite Member, dependent on the accessibility of outcrops and the suitability of the stone for flaking and/or grinding, was noted (AMBS 2006).

Locations of suitable stone material, including metamorphosed basic igneous rocks, greywackes, hornfels, fine-textured siliceous material and acidic volcanics, outside of the Calderwood Project area include Red Point, Bass Point, Black Head, Five Islands, the upper reaches of the Minnamurra River, the upper reaches of the Shoalhaven River (for outcrops of quartz) and the Murramarang Aboriginal Area (Department of Environment and Planning 1980: 29-31).

An area of exposed stone platforms in the bed of Yellow Rock Creek where it crosses the Illawarra Highway to join the Macquarie Rivulet on the southern boundary of the study area was identified during the initial site visit by Austral staff (2009). Platforms such as these have potential for the identification of axe grinding grooves (see Figure 3.3). The Macquarie Rivulet and Marshall Mount Creek, however, have been described as having coarse bed sediments (sands and gravels) with very few exposures of bedrock (REINCO Consulting 2009: 12).

3.3: Stone platforms in the bed of Yellow Rock Creek where it crosses the Illawarra Highway and enters the Calderwood Project area, as observed by Austral during the initial site visit (2009). This type of platform has potential to contain grinding groove sites. Photograph © Austral Archaeology Pty Ltd 21/102/009.

Other uses of the natural stone resources of the area included making use of rock overhangs in the nearby Illawarra Escarpment, which are of Hawkesbury sandstone, for both shelter and use as art sites (DEC 2005d: 12), and the use of spurs as natural travel routes allowing travel from the Coastal Plain onto the Escarpment. Suitable flat surfaces and overhangs are present in the catchment of the Port Hacking River, the Northern Illawarra Escarpment, the catchments of the Woronora, O'Hares, Cataract, Cordeaux, Avon and Nepean Rivers, the lower reaches of Shoalhaven River, Morton National Park, Endrick State Forest, Quilty's Forest and Jervis Bay (Department of Environment and Planning 1980: 29-31). Ochres and stone artefact materials including basalt and silcrete were also mined and traded in the Illawarra Region (DEC 2005c: 11).

Past Aboriginal use of these resources is described in Section 4.2.

3.5 HISTORIC LAND USE

The Illawarra region has been subject to intensive land use since the early days of European settlement. Cedar getting was an early industry in the area – cedar getters learned of the presence of valuable red cedar in the area and were guided by local Aboriginal people (Lindsay *et. al.* 1994; DEC 2005d).

Cattle were moved into the area by 1815 via the Bulli Pass, with the first five land grants for the Illawarra issued in late December 1817 (DEC 2005d: 14). Prior to this time, almost all stock coming into Illawarra before 1815, and not much earlier than the opening of the 'Subscription Road' in 1821, were brought to the area by sea (Lindsay *et. al.* 1994: Ch 19).

In the 1820s McBrien surveyed a further 7,000 acres of grants from Bulli to the Minnamurra River, the townships of Wollongong and Kiama were planned, and Robert Jenkins extended his Illawarra holdings to 32,000 acres (DEC 2005d: 15).

By the 1830s, the first generation of white settlers referred to Illawarra as "the Garden of New South Wales" and to Wollongong as "the new Brighton", due to the widespread agricultural and pastoral use of the coastal plain (Organ & Speechley 1997: 2).

In recollections of his childhood, from his infancy in 1857-1858 to his departure from the Illawarra at age 19, Lindsay (Lindsay *et. al.* 1994: Epilogue) notes his great fascination for the beautiful rainforest vegetation and native birds, and that "settlers could not afford to have any sentimental regard for these beautiful natural growths, and the axe and the fire-stick were indiscriminately used, to make room for the growth of maize and wheat".

A shift from cedar getting, to pastoral and agricultural work, to an industrial and agricultural economy, occurred from the early 1800s, with a corresponding intensification of European settlement. A shell-lime industry also operated in the early years of settlement, using the 'large deposits of shell', most likely Aboriginal shell middens, found on the shoreline (Lindsay et. al. 1994: Ch 8). Coal mining has been of importance to the region since 1849 (Organ & Speechley 1997: 2). A further influx occurred in the 1920s, with people coming to work at the Port Kembla steelworks (NSW & DoP 2007: 38). Timber, wheat, corn, cattle and dairy products remain of importance (Organ & Speechley 1997: 2).

Agricultural impacts from European settlement and land use have included the clearance of massive areas of land, ploughing, and surface disturbance from horse and cattle tread. Estuaries and coastal wetlands have been heavily modified by infilling, drainage, altered river systems, artificial streams and diversions. Areas in the coastal plain have been modified first by agriculture and more recently for housing developments (DEC 2005d: 5).

The Calderwood Project study area has undergone impacts from agricultural and pastoral use and still retains a largely rural character. Over 85% of the study area, particularly the lower slopes and foot hills within the Calderwood Project area, has been cleared for grazing (Eco Logical Australia Pty Ltd 2010 *in draft*). Two main roads run east to west through the study area – Marshall Mount Road in the north and Calderwood Road through the centre, as well as North Marshall Mount Road and the Illawarra Highway on the periphery. The area may now be described as rural/residential, with land use including horse paddocks and training tracks, dairy cattle pasture and milking sheds, residential structures and associated road and farm infrastructure.

3.6 SECTION SUMMARY

The Calderwood Project area is located in a resource rich area between two major creek corridors (the Macquarie Rivulet and Marshall Mount Creek), and in close proximity to a range of environmental zones (the Escarpment, the coast, Lake Illawarra, and the coastal plain). Available plant and animal resources would have been sufficient for the needs of Aboriginal people and allowed for trade with neighbouring groups. The underlying geology of the study area: mudstone and siltstone may be present in the Albion Park soil landscape associated with the Macquarie Rivulet within the study area. Sandstone, a possible source of quartz and also an area of overhangs suitable for use as shelters and art sites, is present in the Escarpment to the west of the study area. Johnstons Spur, which extends into the study area from the west, would provide a route up into the Escarpment from the study area. Some of the same characteristics which made the area of use to past Aboriginal people also would have made it attractive to European settlers, leading to extensive clearing for agricultural, pastoral and rural residential use. The implications of these factors for the archaeological potential of the study area are discussed in the following sections.

4.0 ABORIGINAL BACKGROUND

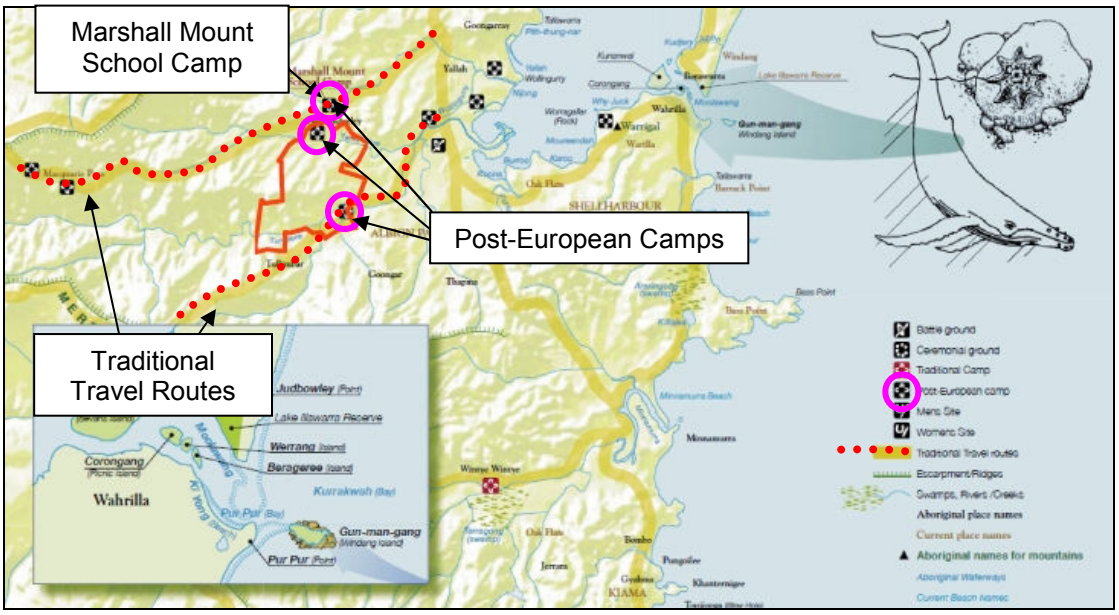
4.1 ABORIGINAL HISTORY OF THE ILLAWARRA REGION

The linguistic and social links between pre-contact populations and present Aboriginal groups are obscured by gaps in written and oral histories. The biases of European chroniclers must also be taken into account, alongside the devastating effects of newly introduced European diseases such as influenza and smallpox, social dislocation and the disruption of traditional land use and travel practices by the European settlers.

Organ & Speechley (1997: 1) consider it likely that Aboriginal groups have been present in the Illawarra region for at least 20,000 years. The Burrill Lake Shelter is dated to 20,000 years ago, and occupation at Bass Point is dated back to 18,000 years (Lampert 1971 and Bowdler 1976 in Kohen 1997: 7).

The population of the Illawarra region prior to 1788 is unknown, though the area was probably one of the most densely populated parts of Australia, with up to from 2 to 4 people per square kilometre (Organ & Speechley 1997: 1). It has been estimated that in 1820 there were 3,000 Aboriginal people in the Illawarra including the Shoalhaven. This number had reduced to 98 at Wollongong by 1846 (Organ & Speechley 1997: 10).

More detailed information on the post-contact period is available as the result of the Aboriginal Cultural Resources Study Illawarra Region (Department of Environment and Planning 1980), the historical research of Organ & Speechley (1997), the Illawarra Region Aboriginal Heritage Study (DEC 2005d), and the Illawarra Region Early Contact Map (DEC 2005e).



4.1: Approximate study area location (in red) in relation to "Post-European Camps" marked on the Illawarra Region Early Contact Map. Base image © DEC 2005e.

The Department of Environment and Conservation (now DECCW) Illawarra Region Aboriginal Heritage Study (IRAHS) identified the Dharawal-speaking Wodi Wodi group as the Aboriginal custodians of the Illawarra region (DEC 2005d: 6). The range of Dharawal speakers is described as the country from Botany Bay and Campbelltown in the north through the Nepean, Wollondilly, Georges and Cataract water catchments, west to Moss Vale and south to the Shoalhaven River and Jervis Bay, or from Sydney in the north, west towards the Blue Mountains and Goulburn, and as far south as Bega (DEC 2005d: 6; Organ & Speechley 1997: 1). Dharawal people are distinguished 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 (DEC 2005d: 6).

Neighbouring Aboriginal groups included the Gundungurra, Darug, Dhurga, Awabakal and Wiradjuri, and movement in neighbouring territories was permissible under certain

circumstances. Favoured north-south travel routes included the Princes Highway Route, Meryla Pass, and the Kangaroo River Route, while Bulli Pass, the Bong Bong Route and the Cordeaux River were used for travel east-west (DEC 2005d: 8). A close connection existed between the Illawarra Dharawal speakers and the Gameygal (Botany Bay) Dharawal speakers, who traded together, shared ceremonies, and intermarried (DEC 2005d: 27). During the 1800s, Aboriginal people, including Illawarra Dharawal speakers, are known to have also moved from the Tablelands and all parts of Illawarra to Lake Illawarra, for both food gathering and inter-tribal activities (Lindsay *et. al.* 1994: Chapter 2; also Department of Environment and Planning 1980 15). The Calderwood Project area is located between two known Aboriginal travelling routes (see Figure 4.1, above).

Aboriginal place names for some areas within the Illawarra region are known. Within the Calderwood Project area, Marshall Mount was originally known as *Murrindarry* or *Neurandurley* (AMBS 2006: 40).

After land grants were issued to settlers in Illawarra from 1816, Aboriginal land use and food supplies were destroyed through the introduction of livestock, exotic plants and crops, tree-felling and hunting, the fencing off of lands and the enforcement of European rules about "trespassing" (Organ & Speechley 1997: 11). All land grants fronted onto fresh water which would have had a huge impact on traditional land use (DEC 2005d: 15). From the 1850s onwards, reports indicate that Illawarra Aboriginal camping and hunting became concentrated along the coast, as a result of being pushed to the fringes of their country by European settlement and farming (DEC 2005d: 25). Other camps were known inland during the post-contact period, including three within or very near to the Calderwood Project area, including the Mount Marshall School Camp (DEC 2005e; see Figure 4.1 on the previous page). Henry Osborne and his family, who settled along Marshall Mount Creek in 1831, are said to have good relations with a local Aboriginal family that lived nearby "as it was their custom to camp opposite where the school now stands" (S. Thomas 1975: 13 referenced in Organ 1990: 171 in AMBS 2006: 38).

There was no record of large-scale armed resistance from the Illawarra Aboriginal people against Europeans, but small-scale resistance including homicide, theft, intimidation and the sabotage of European farming took place, in an attempt to drive off the Europeans and also to obtain food once traditional hunting and plant collecting practices had been disrupted by farming (DEC 2005d: 18). An example of this was recorded in the Sydney Gazette of 14 June 1822, regarding the taking of corn from fields in the Five Islands region (Lindsay et. al. 1994). An example of successful resistance and protection of a sacred site took place in 1835 or 1836, when the presence of Aboriginal people prevented a convict work team clearing land for the Princes Highway from cutting down the birthing tree for which the suburb of Figtree is now named (DEC 2005d: 20). Pressure from the environmental and social impacts of European settlement led to conflict between Aboriginal groups, such as between Illawarra and Bong Bong Dharawal speakers at the Battle of Fairy Meadow in 1830, and again between Illawarra Dharawal and "the Broughton Creek Tribe" in 1842 (DEC 2005d: 17). Late corroborees were recorded in Wollongong in the New Year of 1839-40 (Organ & Speechley 1997: 11) and in Unanderra in the 1870s (DEC 2005d: 31).

4.2 PAST RESOURCE USE AND MATERIAL CULTURE

The natural resources of the Calderwood Project area and surrounding landscape would have provided a range of resources for past Aboriginal people to use, as shown in Section 3.5. These descriptions are based in part on early European observations.

Hiscock (2008: 17) has recently argued that even very early historical accounts may not be a suitable basis for analogy: as Aboriginal groups in the historic period had to change their economic, cultural and political practices in order to cope with the social impacts of disease after the arrival of Europeans, he argues that it is likely that similar drastic changes happened in the past in response to "altered cultural and environmental circumstances". Social disruption in the Illawarra caused by European settlement pushing Aboriginal people to the fringes of their traditional lands would have caused such drastic changes.

Therefore, taking into account the limitations of analogy and the possibility of changes in resource and tool use over the long history of Aboriginal people in the Illawarra region, the following is proposed regarding past resource use and material culture.

Access to and use of resources was governed by a number of factors including gender, age, level of initiation, totem and tribal affiliation. Personal decoration was used to signify initiation status, through using bones or quills to pierce the septum, for men, plus the practice of tooth ablation, while women had a section of their little finger removed during their youth (Organ & Speechley 1997: 6).

Men hunted on land and fished with spears or line from canoes, while women gathered vegetable produces, shell fish, and fished with shell hook and line, nets or spear, as well as diving for lobsters off the entrance to the Shoalhaven River. Tools and knowledge relating to women specifically included childbirth, dilly bags, digging sticks, shell fishing hooks and stone implements, knowledge of bush foods; this knowledge included the duty of passing on the information to children. Men also had specific bush resources they used for weapons and tools (Organ & Speechley 1997: 5-7).

Sefton (Department of Environment and Planning 1980: 17) describes the tool kit of the Illawarra Aboriginal people as 'extractive' and 'maintenance' tools, as follows:

> *"The extractive group covers all those tools, weapons and containers used in obtaining food, while the maintenance tools include all tools used to make or maintain the extractives. Materials used were stone, shell, bone and a wide variety of vegetable materials such as wood, gum, vine, hair and bark. Extractive implements included ground edge hatches, shields, spear throwers, boomerangs, digging sticks, bark canoes, fishing lines, shell fish hooks, baskets and water containers together with several specialised types of spears used for fishing and hunting. There are many historical references to Aborigines using these extractive implements, but very little information on Aborigines manufacturing or using the maintenance groups of tools. These maintenance tools were used for chopping, slicing, sawing and smoothing implements of wood, stone, bone and shell, they included large pebble choppers, fish hook files, scrapers, adzes and chisels. Some tools, such as ground edges axes, were used for both gathering food and making other artefacts".*

Animal resources of the area include seafood (being fish, shellfish and marine mammals), birds, reptiles, kangaroo, wallaby and possum, and bush plants for food, medicine and decorative purposes (Organ & Speechley 1997: 5; Department of Environment and Planning 1980: 16). Reliance on particular resources would have varied depending on location and season, as part of a flexible and varied diet (Department of Environment and Planning 1980: 15). An additional use of plant material was in the construction of gunyahs, shelters made of bark as needed, and pieces of wood laid over a corpse during burial (Organ & Speechley 1997: 6; DEC 2005d: 33). Wild honey and small reptiles are also a known food source (DEC 2005d: 12).

The permanent streams in the study area would have provided fish and eels, as well as water plants and reeds for food and use as tools. Lake Illawarra, to the east of the Calderwood Project study area, is a source of crustaceans, fish, roots, tortoise and water birds (DEC 2005d: 10). Aboriginal groups of the Illawarra Region were also observed digging drainage trenches in the sand dunes at the mouth of Lake Illawarra, which may have helped them to manage the water levels in the Lake (DEC 2005d: 13).

Historic references of plant use have been collated by AMBS (2006: Table 6) and reproduced below.

Table 4.1 Known uses of native plants by Aboriginal people in the Illawarra (after AMBS 2006)

Common name	Scientific name	Use
Bats-wing Coral tree	*Erythrina vespertilio*	Necklaces manufactured from bright orange-red seed. Wood used for shields and coolamons.
Grass Tree	*Xanthorrhoea resinosa*	Resin used for hafting spears and axe heads. Woody stalks used as spear shafts, sometimes a number of stalks joined together with resin.
Gymea Lily	*Doryanthes excelsa*	Long flower spike was eaten, roots were collected and roasted and made into cakes
Blackbutt Eucalypt and White Stringybark	*Eucalyptus pilularis* and *Eucalyptus globoidea*	Provide a number of raw materials. Bark for manufacture of a number of items, including coolamons and canoes. The seeds were ground to make cakes, root bark was roasted,

Common name	Scientific name	Use
Eucalypt		pounded and chewed and the leaves were used for medicinal purposes.
Mat-rush	*Lomandra longifolia*	Leaves woven into mats and baskets. Also used to make tight-fitting bands to put around the body for medicinal purposes.
Sticky Hop bush	*Dodonaea viscose*	Leaves chewed to ease toothache.
Paperbark	*Melaleuca styphelioides*	Used for a variety of purposes, including carrying containers and medicinal purposes.
Cabbage Tree Palm	*Livistona australis*	Tip of the palm, 'the cabbage' was eaten either raw or roasted. Leaves could also be used for baskets.
Black Wattle	*Acacia mearnsii*	The high-protein seeds were eaten.

Lithic resources would have been used as tools and weapons, for local use or trade. As mentioned in Section 3.4, stone suitable for tool construction may not have been readily available within the Calderwood Project area, which would increase the importance of trade to obtain suitable raw materials. Sandstone overhangs as are found in the Illawarra Escarpment to the west of the Calderwood Project area provided suitable locations for shelter, as well as the canvas for paintings. Made with charcoal and red and white ochre, the paintings served as a means of communication on local resources between travellers and groups who shared overlapping territories (Organ & Speechley 1997: 7).

4.3 SECTION SUMMARY

Although the language and tribal affiliations of prehistoric Aboriginal populations in the area of the Calderwood Project area cannot be determined, the Aboriginal people known from the region at the time of contact are the Illawarra Dharawal speaking people. The study area and the surrounding ecosystems would have provided a wide range of plant and animal resources for use, and the terrain – particularly Johnstons Spur and the two major creeks of Marshall Mount Creek and the Macquarie Rivulet – would have provided routes for travel to and from other areas. The environmental features of the area, as discussed in Section 3, when considered in light of the current section on Aboriginal culture and resource use, will provide a backdrop for consideration of the archaeological record in Section 5, and the predictive statement in Section 6.

5.0 ARCHAEOLOGICAL BACKGROUND

5.1 HERITAGE DATABASE SEARCH RESULTS

A search of National, State and local heritage databases was undertaken to establish the archaeological context of the study area. A summary of these results is presented below.

5.1.1 Aboriginal Heritage Information Management System Search Results

A search of the NSW DECCW's Aboriginal Heritage Information Management System (AHIMS) was conducted covering an area of approximately 10 km². A total of 66 Aboriginal objects and places have been recorded within this area (Figure 5.1 and Table 5.1). Of these, none are present within the bounds of the Calderwood Project area.

Table 5.1 Summary of sites recorded within 10km² of the study area

Site Features	Total	%
Art Site	2	3
Art Site & Potential Archaeological Deposit	1	2
Artefact	46	70
Artefact & Modified Tree	1	2
Artefact & Shell	2	3
Grinding Groove	1	2
Modified Tree	2	3
Potential Archaeological Deposit	5	8
Shell	5	8
Stone Arrangement	1	2
Total	**66**	**100%**

Definitions of these site types are provided in Appendix C.

Figure 5.1 provides the indicative locations of these sites. All site location information, including the AHIMS results in Appendices A.1 and A.2, is unsuitable for public display and therefore has been removed from this version of the report.

A sample of the sites recorded in the vicinity of the Calderwood Project area is discussed in Sections 5.2 and 5.3 on the following pages.

The AHIMS coordinates placed the open artefact scatter Macquarie Rivulet 2 (AHIMS 52-5-0288) within the study area just north of Marshall Mount Creek, as shown in Figure 5.1.

However, investigation of the site cards and original report has indicated that the site is actually located outside the study area. Rather, Macquarie Rivulet 2 is most likely one of the sites highlighted in blue in Figure 5.2. According to the site description on the AHIMS site card, Macquarie Rivulet 2 may be reached by entering the paddocks on the western boundary of Darcy Dunster Reserve, located on the west side of the intersection of the Illawarra Highway and the Princes Highway, and following the Macquarie Rivulet as it flows to the west and south west.

This site is located outside of the Calderwood Project area and therefore does not represent a heritage constraint.

This information is not suitable for public display.

Figure 5.1

Locality Map and AHIMS Site Search Results

0 1 km

N

5.1.2 Other Heritage Register Search Results

Searches of the Australian Heritage Places Inventory (AHPI), the Register of the National Estate (RNE), the National Heritage List and the State Heritage Register (SHR) on the Heritage Branch website did not identify any recorded Aboriginal objects or places in or around the Calderwood Project area.

12 Indigenous Places are listed on the RNE for the LGAs of Wollongong and Shellharbour but they do not lie within the Calderwood Project area.

5.2 ARCHAEOLOGICAL MODELS FOR THE ILLAWARRA REGION

As of 2007, limited excavation-based research has been undertaken in the foothills and escarpment region of the Illawarra (Biosis 2007: 19). A number of regional-level studies of the Aboriginal archaeological record of the Wollongong and/or Shellharbour regions of the Illawarra however have been undertaken, including Department of Environment and Planning (1980), Mary Dallas Consulting Archaeologists (1995) and AMBS (2006).

Each of the regional scale assessments listed above, although they have spanned a period of 26 years, has mentioned the development-driven nature of most Aboriginal archaeological assessments in the area. However, each has also attempted 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.

The regional studies presented below relate to the Illawarra region in general, and include the Illawarra Coastal Plain on which the Calderwood Project area is located.

5.2.1 Aboriginal Cultural Resources of the Illawarra Region (Department of Environment and Planning 1980)

Sefton (Department of Environment and Planning 1980) undertook an Aboriginal Cultural Resources Study of the Illawarra Region and identified the following categories of relics: 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 (Department of Environment and Planning 1980: 21-27).

This Study identified “environments suited to Aboriginal relics”. 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 (Department of Environment and Planning 1980: 29-31).

5.2.2 Aboriginal heritage planning study for Wollongong City Council (Mary Dallas Consulting Archaeologists 1995)

Mary Dallas Consulting Archaeologists (1995) undertook an Aboriginal heritage planning study for Wollongong City Council. The study area included the Wollongong LGA areas of the Illawarra Coastal Plain (which includes that part of the Calderwood Project area north of Marshall Mount Creek, an area of 107 ha) as well as the Woronora Plateau.

This study found that the most common site types, in order of frequency, are: shelters with art; axe grinding grooves; shelters with deposit; open camp sites; rock engravings; middens; shelters with midden; abraded grooves; scarred trees; burials; stone arrangements; water holes/wells; quarries; and isolated finds.

Site types found on the Coastal Plain include middens, burials, open artefact scatters and scarred trees, with middens and burials being the main site types on shorelines, and open artefact scatters, middens and scarred trees on the alluvial plain. Middens on the alluvial plain are usually associated with estuarine and marine conditions.

The predictive statement takes into account a wider range of landforms (coast, coastal plain, Escarpment, Woronora Plateau) than are present in the Calderwood Project area (see Table 5.3, below).

It was also noted that sites of Aboriginal occupation in the historic/post-contact period could survive. Examples of post-contact sites may include Missions, regular seasonal or "Christmas" camps, and/or places which were consistently occupied over long periods (Mary Dallas Consulting Archaeologists 1995: 39).

Table 5.3 Wollongong LGA Predictive Statement (after Mary Dallas Consulting Archaeologists 1995 in AMBS 2006)

Site Type	Location Predictions
Shelter Sites with Engraving, Painting or Drawing	Site distribution is related to the occurrence of suitable rock outcrops and surfaces common to the Hawkesbury Sandstone formation (potential also noted for Narrabeen sandstone formation, but less likely).
Shelter Sites with Occupation Deposit	Likely to occur only in sandstone locations where weathering has resulted in suitable overhangs or recesses in boulder outcrops or cliff lines. As above, these landscapes are common to the Hawkesbury sandstone formation (potential also noted for Narrabeen sandstone formation, but less likely).
Axe Grinding Grooves	May be found where suitable sandstone is exposed in or adjacent to creek lines. Sites are often associated with rock pools in creek beds and on platforms to enable the wet-grinding technique.
Rock Engravings	Often located on high vantage points along ridge lines at the headwaters of creeks, but can be located on any suitable fine grained sandstone surface.
Open Camp Sites	Likely to occur on dry, relatively flat landforms along or adjacent to creek lines. Sites containing deposit from repeated or continued occupation are more likely to occur on elevated ground, such as around Lake Illawarra or along its feeder creeks on terraces and benches. Single occurrences might be related to tool loss, abandonment or maintenance. Rarely documented in sandstone country due to difficulty of detection. Likely to be concentrated in the alluvial plains and foothills, and in these areas, are likely to be subsurface.
Quarries	Only found where raw materials (stone or ochre) occur within the landscape, and where have been exploited in the past. Loose or surface exposures of stone or cobbles maybe coarsely flaked for removal of portable cores. Raw materials can be sourced to these sites and provide evidence for Aboriginal movement and/or exchange. This research on quarry sites has not been conducted in the Wollongong area.
Stone Arrangements	Expected to occur in areas close to stone outcrops, consisting of geometric arrangements of portable stone on prominent rock outcrops. Sites are relatively rare, and may be difficult to detect.
Scarred or Carved Trees	Scarred trees are known on the Plateau and Coastal Plain, but distribution patterns are likely to reflect historical clearance of vegetation rather than actual pattern of scarred trees. Carved tree sites are unknown in the region. A few scarred trees have survived on the Plateau and Coastal Plain. Unless the tree is over 150 years old, scarring is not likely to be of cultural origin.
Burial Sites	Generally located in elevated, dry, soft sediments such as sand and alluvial silts. Usually only visible through disturbance of subsurface sediments or where exposed by erosion. Most commonly identified in coastal dunes and lake foreshore contexts. May also be found within rock shelter formations.
Middens	Usually located on elevated dry ground close to the aquatic environment from which the shellfish has been exploited and where fresh water resources are available. Deeper, more compacted midden sites are often found in areas containing the greatest diversity of resources, such as river estuaries and coastal lagoons. In the Wollongong LGA, midden sites are expected to occur along the immediate coast line, beach dunes and rocky headlands. The Windang Peninsula and the Lake Illawarra foreshores are also known to contain midden sites.
Mythological Sites	Identified by the local Aboriginal community as locations of cultural significance. Do not necessarily contain material evidence of Aboriginal associations with the place.
Contact/Historical Sites	Most likely to occur in locations of Aboriginal and settler interaction, such as on the edge of pastoral properties. May involve use of introduced materials (i.e. glass,

Site Type	Location Predictions
	ceramics) by Aboriginal people, or be sites of Aboriginal occupation in the historical period.

5.2.3 West Dapto Release Area Aboriginal Archaeological and Cultural Heritage Assessment (AMBS 2006)

Most recently, Australian Museum Business Services (AMBS) undertook a large-scale Aboriginal archaeological and cultural heritage assessment of the West Dapto Release Area (WDRA). The WDRA covers a large area spreading from the north bank of Marshall Mount Creek towards the north and east. The area of the Calderwood Project area on the north bank of Marshall Mount Creek therefore falls within the WDRA, and both the WDRA and the Calderwood Project area lie on the same Illawarra Coastal Plain physiographic region.

A four-week archaeological survey of a sample of each landform type within the WDRA was undertaken in 2004, followed by a four-week program of archaeological excavation. Surveys were conducted within the Calderwood Project study area: ten survey transects were walked within the Marshall Mount Creek system, the major hydrological feature in the northern half of the Calderwood Project area. Including those areas outside of the Calderwood Project, the survey of the WDRA identified 24 archaeological sites, including 13 open camp sites, 6 isolated finds and five scarred tree locations (with eight scarred trees in total). Sites were positioned on all landforms – six on creek lines, three on alluvial flats, three spanning creeks *and* alluvial flats, eight on hill slopes and four on spur crests. A total of 198 artefacts were recorded.

The subsequent three-stage subsurface testing program showed that all landforms of the WDRA contained potentially artefact-bearing deposits. The shallowest potentially artefact-bearing sediments (30 – 500 mm) were noted on ridges and hill slopes; the deepest (1,000 mm) were noted on some Holocene terraces. Foot slopes contained deposits of intermediate depth (150 – 550 mm).

Based on the results of the landform survey and subsurface testing program, AMBS provided a synthesis of Aboriginal heritage values for the WDRA (as summarised in Table 5.3). This also included mapping of areas of archaeological potential, in ranges of very low to low, low to moderate, and high. Areas of high archaeological potential include all major creek lines of the WDRA and adjacent alluvial flats and foot slopes, plus the pre-contact wetland areas of Mullet, Duck and Marshall Mount Creeks. For the part of the Calderwood Project area which falls within the bounds of the WDRA, the northern bank of Marshall Mount Creek has been identified as having high archaeological potential, the built up areas have been identified as having very low to low potential, and the remainder of the landform has been ascribed low to moderate potential.

No WDRA test pits were dug within the Calderwood Project area; however, as both the WDRA and the Calderwood Project area lie within the same Illawarra Coastal Plain physiographic region, and the two areas overlap at the Marshall Mount Creek catchment, the synthesis of Aboriginal heritage values of the WDRA (as provided below in Table 5.3) is considered relevant to the archaeological background of the Calderwood Project. AMBS' investigations within the Marshall Mount Creek catchment are described in more detail in Section 5.3.4 of this report.

Table 5.3 Synthesis of Aboriginal Heritage Values of the WDRA, summarised from AMBS (2006: VII-VIII)

Conclusions of the WDRA:
• Sites may be located on all landforms, although at varying levels of site density, artefact density and archaeological and cultural significance.
• Sites may be found in contexts that cross landform boundaries (most commonly extending away from the banks of creeks, across terraces and in some cases onto adjoining foot slopes).
• The majority of the artefacts occurred as subsurface deposits (480 artefacts from 52 site locations, as opposed to 189 artefacts from 20 surface site locations).
• Highest archaeological potential is accorded to landforms that provided camping sites or function as travel routes and that are associated with a range of resources. These include lower tributaries of major creeks, spur crests extending from the Escarpment, and benched foot slopes in the Escarpment foothills. These areas are likely to have a higher frequency of sites,

and sites are likely to have higher artefact numbers/densities.

- Other landforms throughout the WDRA are also likely to contain archaeological sites, but frequency of sites (and artefact numbers/densities) is likely to be lower.
- Stands of mature vegetation on hill slopes may contain scarred trees. Scarred trees may be considered to be of higher archaeological significance due to their rarity at both regional and local levels.
- Large open camp sites are also considered to be of higher archaeological potential due to the rarity of large open camp sites on landforms of the Illawarra Coastal Plain.
- The conservation value of small low density artefact scatters is recognised, as their numbers have been reduced due to extensive development of the Illawarra Coastal Plain.
- Small, low density artefact scatters (being less than 5 artefacts per square metre) dominate the WDRA archaeological resource.

5.3 ARCHAEOLOGICAL INVESTIGATIONS SURROUNDING THE CALDERWOOD PROJECT AREA

Smaller-scale studies undertaken in the general vicinity of the Calderwood Project area provide support for these large-scale predictive models. The studies below have been selected due to their location on the Illawarra Coastal Plain, proximity to the Calderwood Project area and representative sample of site types. McIntyre (1984) surveyed on the Coastal Plain; Navin Officer Pty Ltd (2002c. 2005) surveyed and test excavated an area directly to the south of the study area on Hazelton Creek, part of the Macquarie Rivulet catchment; and Biosis (2006, 2007) surveyed and test excavated on Johnstons Spur, just outside the bounds of the Calderwood Project area.

5.3.1 Proposed coal transport route from Huntley Colliery to Tallawarra Power Station (McIntyre 1984)

To the north of the Calderwood Project area, an archaeological survey of a proposed coal transport route from Huntley Colliery on the foothills of the Illawarra Range to Tallawarra Power Station on Lake Illawarra was undertaken (McIntyre 1984). This study area ran over Quaternary alluvial deposits, and the bulk of the land had been cleared for pastoral use. McIntyre (1984: 4) identified that the areas most likely to contain sites are those which retain the most natural features, specifically, undisturbed vegetation and deposit. Disturbances to the area are similar to those encountered within the Calderwood Project area, including land clearance, pasturing, dam construction and creek widening for farming purposes; and the construction of infrastructure including road works, transmission lines and easements, and housing. Therefore this area may be considered broadly comparable to the Calderwood Project study area in terms of physiographic region, landform and types of disturbance. However it should also be noted additional disturbances related to coal mining and power station construction had also occurred in the coal transport route study area

A group of at least five scarred trees was identified outside of the coal transport route study area; these had been previously recorded by Sefton (referenced in McIntyre 1984). Some of the scars show metal axe marks, which may be taken as a sign of European origin (McIntyre 1984: 6); however, McIntyre argues that they are as likely to be of recent Aboriginal origin as in many places Aboriginal people quickly incorporated metal axes into their way of life. The scars are generally oval and small, more consistent with scars made from removing bark for coolamons and shields, rather than for roofing in European contexts.

As a result, five isolated finds and three open sites (Duck Creek 1 AHIMS 52-2-0147, Duck Creek 2 AHIMS 52-5-0001, and Duck Creek 3 AHIMS 52-5-0056) were located near Duck Creek and its tributaries. Duck Creek 3 (AHIMS 52-5-0056), a sparse open artefact scatter, was recorded as part of a small complex including two scarred trees. One tree showed signs of bark removal, and toe holes for climbing had been cut into the trunk of the other. Four of the five isolated finds were located along creeks, with the remaining site located embedded in a road cutting. These finds were not mapped in AHIMS or provided with site numbers; no further descriptive information was available.

The raw materials used in these three sites were quartz, silcrete and chert, none of which are naturally occurring in the immediate vicinity of the study area.

5.3.2 Tullimbar Village Development (Navin Officer Pty Ltd 2002c, 2005).

More recently, Navin Officer Pty Ltd (2002c) undertook an archaeological assessment for the 85 ha area of the Tullimbar Village Development. This area is located on the south side of the Illawarra Highway, on both banks of Hazelton Creek, directly east of the south eastern corner of the Calderwood Project area and directly west of the suburb of Albion Park (see Figure A.1). In terms of landscape unit, this is the Macquarie Rivulet floodplain at the base of the Illawarra Escarpment, over the Berry formation and low relief topography of quaternary fluvial sediments. Two low-density surface exposures of artefacts – HC 1 (AHIMS 52-5-0522) and HC 2 (AHIMS 52-5-0441) – were identified. The majority of the Tullimbar study area was located on creek flats, which were considered to have low archaeological potential. However, locally elevated areas on the valley floor and on terraces associated with Hazelton Creek were identified as having potential to contain low to moderate densities of Aboriginal artefacts. Four areas of PAD – namely, PAD 1 (AHIMS 52-5-0434), associated with HC1; PAD 2 (AHIMS 52-5-0439) on the eastern side of Hazelton Creek; PAD 3 (AHIMS 52-5-0431), in the same area, and associated with HC2; and PAD 4 (AHIMS 52-5-0440), on the western side of Hazelton Creek.

Part of PAD 3 (AHIMS 52-5-0431) was later subjected to subsurface testing (Navin Officer Pty Ltd 2005). The entire PAD consists of two discontinuous areas of archaeological potential on the margins of Hazelton Creek, including the terrace feature upslope of the confluence of Hazelton Creek and an unnamed tributary, and the elevated creek bank/terrace location between the southern boundary of Tullimbar to a pair of dams upslope of the intersection of the powerlines and Hazelton Creek. A total of twelve artefacts were recovered from five of the fourteen test pits scattered across the northern section of PAD 3. Raw materials were volcanics, chert, silcrete and tuff, all identified as being relatively common within the region and more broadly within south eastern Australia. The artefact types were flakes, flake pieces, broken flakes and a chip, with flakes being generally elongated suggesting that flakes were long and narrow or blade like. The artefacts were identified as the result of general flaking activities and could be described as background scatter. All artefacts were located in spits 1 and 2, indicating that there is little potential for artefacts within deeper deposits, and that the artefacts may be more recent in age as they have not been moved through the soil profile by taphonomic processes such as bioturbation (Navin Officer Pty Ltd 2005: 9).

5.3.3 Calderwood Telecommunications Compound (Biosis 2006, 2007).

Biosis (2006) undertook an archaeological assessment of the proposed Calderwood Telecommunications Compound, along a stretch of Johnstons Spur immediately to the west of the Calderwood Project area. As a result of the assessment, one flaked artefact (Calderwood 1 AHIMS 52-5-0529) was located, in a raised exposed area situated between two dry creek beds. Based on a consideration of landform unit and proximity to ephemeral water sources, the area around Calderwood 1 was attributed a moderate archaeological sensitivity, as predictive modelling suggested that the area may contain a dispersed low density artefact scatter (Biosis 2006: 1). In addition, the crest of Johnstons Spur was identified as an area of moderate PAD (Calderwood PAD 1 AHIMS 52-5-0515). This was based on the level natural topography of the ridge crest, its access to the escarpment in the west, and its usefulness as a vantage point over the surrounding area. (Biosis 2006: 43).

Calderwood PAD 1 (AHIMS 52-5-0515) extended for 60 m in a predominantly north west – south east alignment and encompasses the width of the level section of the ridge crest. Biosis (2007: 15, 29) noted that the unassessed areas of the flat part of the ridge crest – specifically where it extends towards the Escarpment in the west and also towards Mount Johnston in the east – may also contain archaeological potential, but that the assessment of these areas was beyond the scope of Biosis' project. These unassessed areas could extend into the Calderwood Project area.

A program of sub-surface testing identified seven stone artefacts from three out of the six test pits, being six broken flakes, one with retouch, and one complete flake. Five of the artefacts were made of the same grey brown volcanic material, with the remainder being one flake of grey silcrete and one of chalcedony (Biosis 2007: 27). The low artefact density and the characteristics of the artefact assemblage suggest the low intensity of site use regarding stone tools. It was suggested that grey brown volcanic flakes may have been created during a single manufacturing event. Uses of the Spur unrelated to stone tool production, such as a travel route or a vantage point, could not be confirmed from the material recovered during the excavation. It was suggested that the presence of a backed retouch artefact could indicate

tool maintenance, as such tool types are thought to be parts of composite tools such as spears (Biosis 2007: 28). As this artefact was located in the upper soil profile (5 – 10 cm depth), a possible mid-Holocene date was suggested for the site. Calderwood PAD 1 was then renamed Calderwood 2 (artefact site & PAD), and identified as being of low scientific significance (Biosis 2007: 1).

5.3.4 Marshall Mount Creek Catchment Test Pitting – West Dapto Release Area Aboriginal Archaeological and Cultural Heritage Assessment (AMBS 2006)

As part of the Stage 2 and 3 test pitting process for the West Dapto Release Area (WDRA) assessment described in Section 5.2.3, 12 test pits were excavated in the Marshall Mount Creek catchment area (AMBS 2006).

None of these were located within the Calderwood Project area, but test pits MMC_10, MMC_11 and MMC_12 are located directly outside the study area, to the west of the point where Marshall Mount Creek crosses Marshall Mount Road. MMC_05 was located directly to the east of the study area along the banks of Marshall Mount Creek, and MMC_09 was located directly to the north of the study area, in the Iowna Property, south of Marshall Mount Road and directly north of the two 330kV transmission lines which enter the Calderwood Project area from the northeast.

Table 5.4 Marshall Mount Creek Catchment Test Pits (modified from AMBS 2006: Table 42) (AMG Site location coordinates removed as site location information is not suitable for public display).

Test Pit #	AMG E	AMG N	ZONE	Landform	Depth (cm)	# of finds
MMC_01			56	Spur Crest	10	0
MMC_02			56	Alluvial Flat	33	0
MMC_03			56	Stream (3)	46	2
MMC_04			56	Stream (3)	50	0
MMC_05			56	Stream (3)	40	0
MMC_06			56	Alluvial Flat	70	0
MMC_07			56	Hill slope (mid)	33	1
MMC_08			56	Spur Crest	20	3
MMC_09			56	Spur Crest	50	0
MMC_10			56	Stream (3)	32	2
MMC_11			56	Hill slope (lower)	30	1
MMC_12			56	Hill slope (lower)	31	1

As a result of the test excavation program, artefacts were recovered from six of the 12 test pits in the Marshall Mount Creek Catchment (AMBS 2006: 244), as described in Table 5.4.

The Marshall Mount Creek catchment was found to average 0.8 artefacts/m²; lower than the Duck Creek Catchment (2.8.m²) and then Mullet Creek Catchment (4.7/m², or 2.5/m² if one very large site is excluded). The raw materials found in these test pits included chert, quartzite and silcrete (AMBS 2006: 196).

Figure 5.3

WDRA Test Pit Locations (AMBS 2006) in relation to Calderwood Project Area

0 500 m

N

5.4 SECTION SUMMARY

The Illawarra region, including the Illawarra Coastal Plain wherein the Calderwood Project area is located, has a rich Aboriginal archaeological background. This is evident despite the relatively small number of large-scale regional studies of the archaeological resource. A search of the AHIMS register revealed 66 sites located within 10 km² of the Calderwood Project area.

Comparison of the AHIMS mapping with the relevant site cards has revealed that no previously recorded Aboriginal archaeological sites are located within the study area, and that the location of the open artefact scatter (Macquarie Rivulet 2 AHIMS 52-5-0288) plotted in the northern half of the study area is incorrect. This site most likely lies outside the Calderwood Project area and therefore would not present a specific development constraint.

However, Biosis (2006) identified an area of moderate archaeological potential, Calderwood PAD 1 (AHIMS 52-5-0515), on Johnstons Spur to the west of the study area, which has potential to extend into the Calderwood Project area along the crest of the Spur leading toward Mount Johnston. This area may represent a development constraint as the area of PAD test excavated by Biosis (2007) contained artefacts (designated as site Calderwood 2). It will be necessary to ground-truth whether the Calderwood PAD 1 extends into the Calderwood Project area.

In addition, test pitting undertaken on a range of landforms in the Marshall Mount Creek catchment area (although outside of the Calderwood Project area) has shown that there is potential for subsurface archaeological deposit independent of surface artefact scatters.

Archaeological models for the Aboriginal occupation of the Illawarra region have been investigated as they pertain to the Illawarra Coastal Plain, and a sample of small-scale consultancy-driven assessments has also been investigated. The results of this investigation shall inform the predictive statement for the Calderwood Project area provided in Section 6.0 on the following page.

6.0 PREDICTIVE STATEMENT

6.1 SCOPE OF THE PREDICTIVE STATEMENT

Please note that the mapping in this section represents a predictive model. The accuracy of this model was ground-truthed during the field assessment phase. The results of the field assessment phase are discussed in Section 9.0 of this report.

Site location is described using landform unit terminology from the DECCW AHIMS Site Recording Form – the landform units most relevant to the Calderwood Project area are cliff, crest, flat, lower slope, mid slope, upper slope, plain, ridge, tor, valley flat, levee, stream bank, stream channel, terrace and terrace flat. For brevity, the landform units stream bank, stream channel, terrace and terrace flat shall be grouped under the heading 'creek bank'. These areas have been mapped as a 100 m buffer around the water course line. The landform units lower slope, mid slope and upper slope shall be grouped under the heading 'hill slopes'.

6.2 DEGREE OF DISTURBANCE

Historic land use and natural taphonomic processes have impacted on the surface and subsurface archaeological potential of the Calderwood Project area. In general, lower levels of ground surface disturbance correlate to higher potential for Aboriginal archaeological resources, once patterns of past Aboriginal landscape use have been taken into consideration. Predictive models based on patterns of past Aboriginal movement within the landscape are discussed in Section 5.2 of this report.

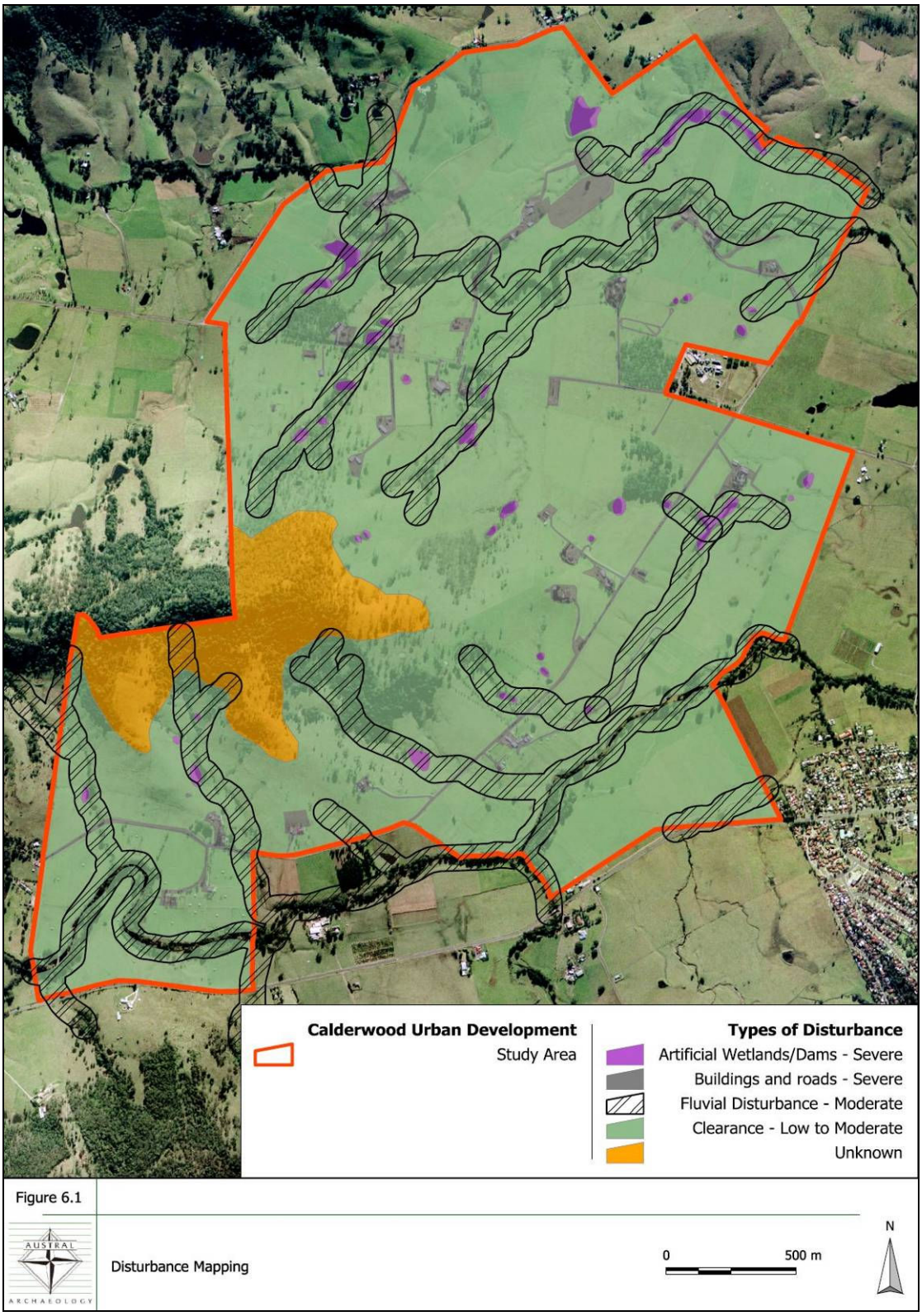
The main processes leading to ground surface disturbance in the Calderwood Project area are the historic land-use effects of vegetation clearance; ploughing and agriculture; grazing of hoofed animals; construction of roads and service infrastructure; construction of dwellings and farm infrastructure; and the natural taphonomic processes of hill slope and ridge erosion from rain; creek bank erosion from river flows; and the deposition and removal of sediment as a result of flooding. It must also be noted that past land use practices such as extensive vegetation clearance will have intensified the effects of natural processes such as erosion.

Categories of ground disturbance and their potential impact on surface and subsurface archaeological resources are described in Table 6.1 below.

Table 6.1 Categories of Ground Disturbance

Degree of Disturbance	Impact Description	Impact on Archaeological Resource
Undisturbed	No apparent disturbance to original land surface.	*In situ* archaeological deposits may be present.
Low	Non-mechanical vegetation clearance and stock grazing.	Archaeological material will retain some spatial integrity although localised displacement is expected. Removal of tree stumps has subsurface impact.
Moderate	Mechanical vegetation clearance and cultivation (ploughing) sheet/gully erosion, fluvial disturbance.	Archaeological materials may be present, although localised spatial displacement and artefact damage is likely; *in situ* deposits may remain beyond plough zone (usually between 100 – 150 mm).
Severe	Removal of topsoil via excavation for residential development, road and infrastructure construction, landscaped gardens, sheer erosion through natural causes and development, earthworks for dam construction (when topsoil has been moved to create earthworks).	While archaeological sites may be destroyed, remnant dispersed archaeological material may survive. The context of such material may be unknown.

Based on the above mapping, preliminary levels of disturbance for the Calderwood Project area are as follows:



- An area of fairly undisturbed ground surface may be present on top of Johnstons Spur. The extent of disturbance in this area is unclear and could not be determined from aerial photographs prior to undertaking fieldwork. (Additional aerial photographs were obtained after the completion of fieldwork. The influence of this additional information on the predictive model shall be discussed in Section 9.0 of this report).
- The majority of the study area has undergone low to moderate impact, in the form of clearance and pastoral use and differing levels of fluvial disturbance. The dashed areas in Figure 6.1 represent a 50 m buffer on either side of all first, second and third order and higher streams identified in Delfin's ground-truthed Strahler classification.

This is an approximate indication of the zone which may have been impacted by fluvial disturbance such as flooding, erosion or wash.

- A small percentage of the study area has undergone severe disturbance in the form of the construction of roads, dwellings, farm buildings and other infrastructure, and dams. The extent of this disturbance was calculated based on aerial photographs and land use mapping provided by DLL.

6.3 PREDICTIVE STATEMENT

Taking into consideration the archaeological context, local Aboriginal history, and past land disturbances in the study area, a predictive statement has been generated for the Calderwood Project area.

The predictive statement suggests likely site locations, site types, and degree of site preservation.

A buffer of 100 m has been generated around all streams in the study area. This area has been arbitrarily defined as the creek bank zone and may include the landform units stream bank, stream channel, levee, terrace and terrace flat.

- Site Location
    - Sites may be found on all landforms within the Calderwood Project area.
    - Landforms with high archaeological potential are crests, ridges and possibly upper slopes of Johnstons Spur and Mount Johnston within the Calderwood Project area, and stream banks, stream channels, terraces and terrace flats around waterways.
        - Second-order and higher streams are given a rating of high archaeological potential; first order streams are given a rating of moderate potential. This distinction attempts to represent the possibility that first order streams may have been visited less frequently or for shorter periods of time than higher order (and presumably more reliable) water sources.
        - Artificial wetlands – dams – have also been mapped as areas of high potential. Site preservation in such contexts is described later on in this Section.
    - Landforms with low to moderate archaeological potential are the cleared plains, valley flats, flats and hill slopes of the Calderwood Project area.
    - Landforms with very low to low archaeological potential are those landforms impacted by the development of dwellings, farm buildings, infrastructure and other works.
- Site Types
    - Site types are likely to consist of open artefact scatters, and possibly grinding grooves where suitable geology is present (such as in Yellow Rock Creek, as observed by Austral during the initial site visit). There is no geology suitable for quarry sites or stone shelters with deposit or art within the Calderwood Project area.
    - Ridge crests may contain low density artefact scatters associated with repeat use over a long period of time related to use of the ridges as access tracks and vantage points. Repeat use of ridge lines may be reflected by increased artefact density.
    - Scarred trees would be unlikely except in areas where trees of at least 150 + years of age have survived. Scarred trees with steel axe marks may still be Aboriginal in origin – the age of the tree, and the size, shape and placing of the scar must also be taken into account.
    - Mythological sites may be identified by the local Aboriginal community during consultation. These may or may not contain Aboriginal archaeological artefacts.

- Contact period sites may also survive. These could be any of the site types predicted for this area (open artefact scatters, grinding grooves and scarred trees) and be distinguished from pre-contact sites by the presence of European material (such as modified glass or ceramics) or signs of the use of European tools (such as the use of metal axes to remove bark from trees). Contact period sites may also leave no archaeological trace but could be recorded in Aboriginal and European local histories.
- Potential archaeological deposits (PADs) may be identified in areas with suitable landform feature but no surface artefacts, if there is considered to be undisturbed deposit and a chance of finding subsurface archaeological material. PADs may also be identified when it is considered likely that surface archaeological material (such as an open artefact scatter or isolated find) is likely to also continue below the surface.

- Site Preservation
  - In cleared pastures, archaeological material may have undergone localised displacement but may still maintain some spatial integrity. More intact sites may also be found along the ridge of Johnstons Spur (dependent on the effects of animal traffic, clearing and erosion, which will require ground-truthing during field assessment).
  - In ploughed paddocks, areas of sheet or gully erosion, and areas which have undergone fluvial disturbance such as the banks of Marshall Mount Creek and the Macquarie Rivulet, archaeological materials may be present, but damage and displacement is likely and spatial and/or stratigraphic integrity is likely to be low (unless possibly below the plough zone).
  - In areas impacted by construction of dwellings, farm buildings, roads and other infrastructure, archaeological sites will likely be destroyed, though dispersed archaeological material may survive out of context.
  - Artefacts may also be located on dams, levees or other earthworks as the disturbance of the deposit through earthmoving works and subsequent erosion of the earthen walls increases visibility. However the spatial integrity and/or stratigraphic integrity of any artefacts found such contexts would most likely be low.
  - Site preservation may also have been impacted along creek banks due to erosion from fluvial action, bank modification and animal traffic along the banks.

Figure 6.2 endeavours to visually represent zones of archaeological potential based on landform unit and the level of ground surface disturbance estimated to be present based on the results of the desktop assessment.

Three levels of potential for finding archaeological sites have been ascribed. These levels are indicative of the potential for finding intact Aboriginal archaeological material while taking into account the impacts of past land use and other taphonomic processes as described in Table 6.1.

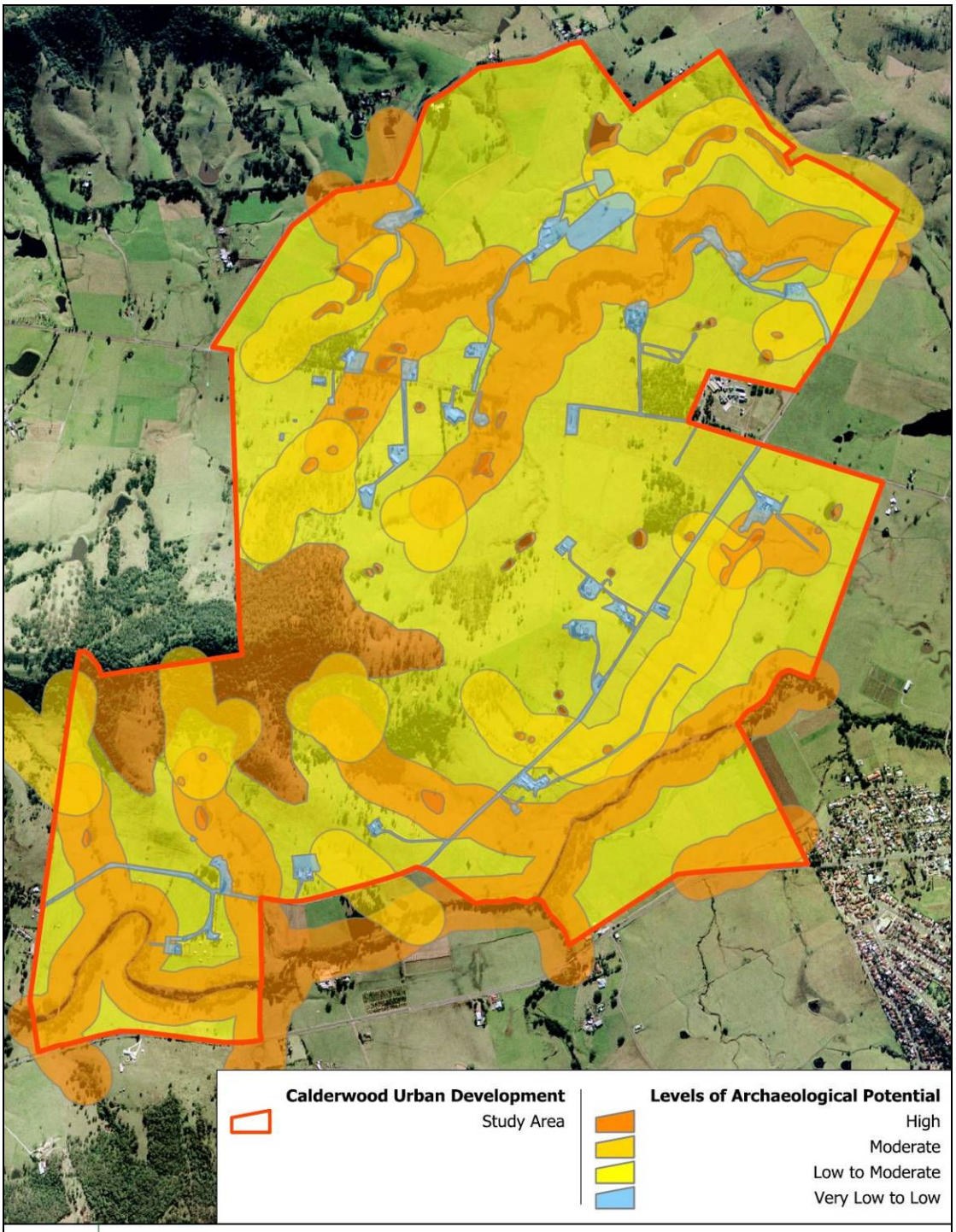
It is important to note that Aboriginal archaeological material may be found on all landforms within the Calderwood Project area. These levels of potential attempt to represent the likelihood of finding intact or less-disturbed archaeological material in the Calderwood Project area.

The levels of potential have been described as Very Low to Low, Low to Moderate and High.

- Very Low to Low: refers to the pale blue shaded areas that – based on aerial photography and topographic maps available during the desktop assessment – are known to have been impacted by the construction of roads, houses and farm infrastructure. These areas may be located on any landform unit.
- Low to Moderate: refers to those areas which appear to have been impacted by vegetation clearance, possibly ploughing, cattle/horse tread and other rural activities, but which still have potential for archaeological material to be present based on

models of past landscape use, and for that material to have survived in a modified form.

- High: refers to those areas identified as having high potential for archaeological material to be present based on models of past landscape use and potential for intact material to survive.



6.4 SECTION SUMMARY

It is estimated that the majority of the Calderwood Project study area has undergone low to moderate impact from clearance, pastoral activities and fluvial action, while a small percentage has undergone severe impacts from infrastructure and dwelling construction. An area of undisturbed ground surface may be present on top of Johnstons Spur. It is predicted that sites may be found on all landforms within the Calderwood Project area, with ridge crests and creek banks having the highest archaeological potential, followed by the cleared alluvial flats and hill slopes, and then by areas impacted by infrastructure construction. Open artefact scatters are considered to be the most likely site type, followed by grinding grooves in areas with appropriate stone outcrops, and scarred trees in areas with trees of suitable age. Site preservation is tied in with levels of ground surface disturbance, but it is estimated that sites with some spatial integrity may be present in areas of low to moderate impact such as cleared paddocks and potentially along Johnstons Spur. All predictions made in this section will require ground-truthing during the field assessment. The field assessment methodology is provided in Section 7.0.

7.0 PROPOSED ASSESSMENT METHODOLOGIES

7.1 PROPOSED ABORIGINAL ARCHAEOLOGICAL ASSESSMENT METHODOLOGY

This survey methodology has been developed to meet the requirements of the *NSW National Parks & Wildlife Service Aboriginal Cultural Heritage Standards & Guidelines Kit* (NSW NPWS 1997).

7.1.1 Survey Units

The Calderwood Project area was divided into Survey Units based on landmarks, landform units and property boundaries within the study area. The Survey Units are shown in Figure 7.1 and their characteristics are described in Table 7.1.

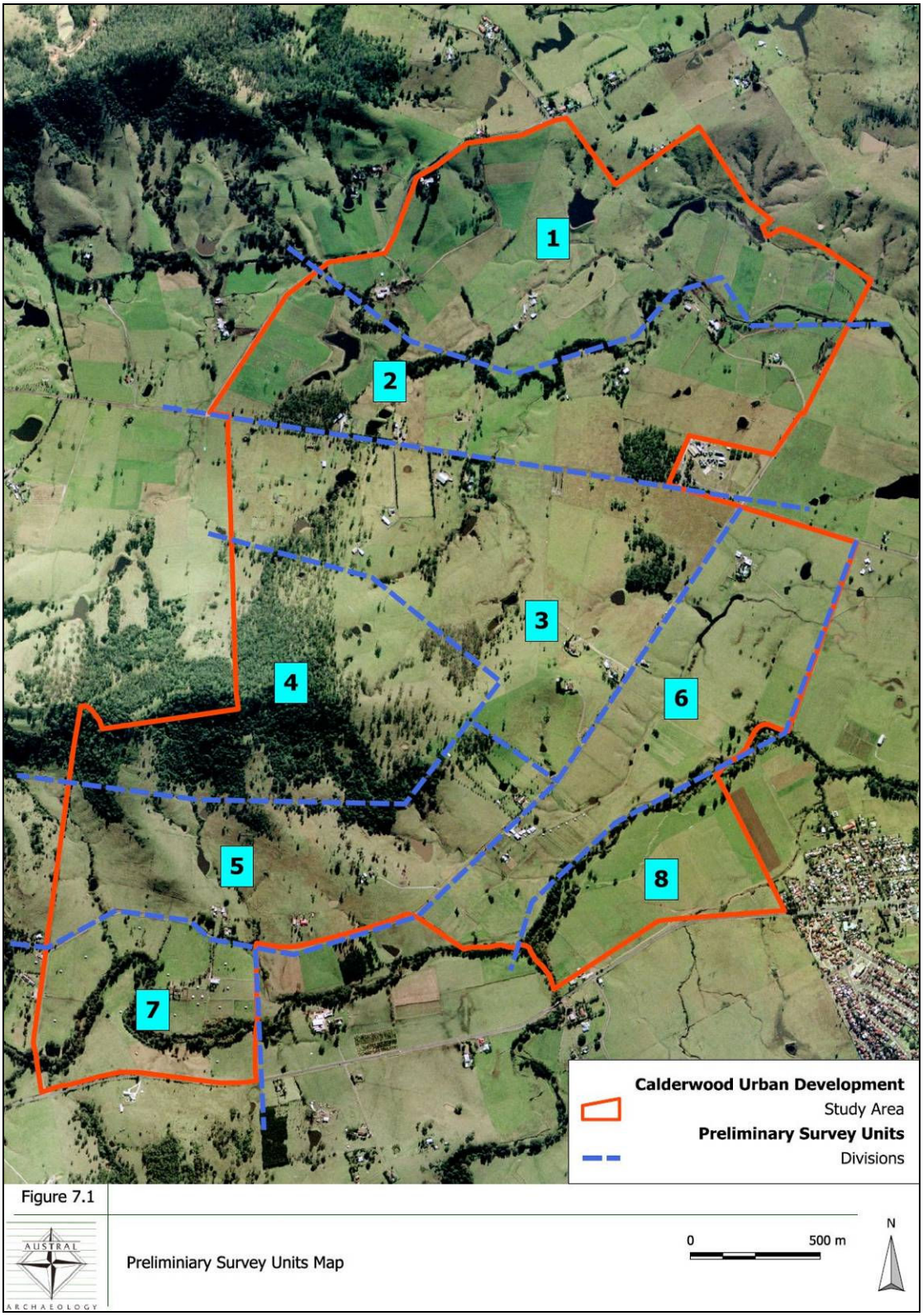
The Survey Units were be adjusted during the field survey in response to property access, landform features, the amount of ground covered in a day, and other variables which were encountered while onsite. This is described in Section 8.0.

Please refer to Section 6.1 of this report for an explanation of the terms used to describe Landform Unit.

Consistent recording methods, as outlined below in Section 7.1.2, were followed to allow comparison of findings between Survey Units and the production of a synthesis of results to inform discussion of the archaeological record and potential of the Calderwood Project area.

Table 7.1 Descriptions of Preliminary Survey Units

Survey Unit	Description	Landform Unit	Desktop Potential
1	The land between the northern boundary of the Calderwood Project and the north bank of Marshall Mount Creek.	• Creek bank • Flat • Hill slopes	• High • Low to moderate • Low to moderate
2	The land between the south bank of Marshall Mount Creek and Calderwood Road.	• Creek bank • Flat • Hill slopes	• High • Low to moderate • Low to moderate
3	The land south of Calderwood Road to Johnstons Spur.	• Creek bank • Flat • Hill slopes	• High • Low to moderate • Low to moderate
4	Johnstons Spur.	• Hill slopes • Crest • Creek bank	• Low to moderate • High • High
5	Land south of Johnstons Spur to North Macquarie Road.	• Flat • Hill slopes • Creek bank	• Low to moderate • Low to moderate • High
6	Land to the east of North Macquarie Road.	• Creek bank • Flat	• High • Low to moderate
7	Land south of North Macquarie Road and north of the Macquarie Rivulet (southwest corner of Calderwood Project area).	• Creek bank • Flat	• High • Low to moderate
8	Land south of Macquarie Rivulet and north of Illawarra Highway (southeast corner of Calderwood Project area).	• Creek bank • Flat	• High • Low to moderate



7.1.2 Recording

Each of the Survey Units had its own pro forma field recording sheet, to enable all finds and survey unit specifics to be recorded. This ensured that all terrain, land disturbance, resource location and Aboriginal site distribution information for each survey unit was comparable with data recorded for the others. Landform, landform unit, vegetation type, land use, distance to water, aspect and site features were recorded in accordance with the criteria provided in the DECCW AHIMS Aboriginal site recording cards.

Exposure and ground surface visibility were recorded following the system outlined in Table

7.2 and levels of disturbance were assessed according to a similar scale.

Likewise, a pro forma sheet for each artefact find recorded during assessment was kept. Recordable artefact attributes for field assessment include: type, length, breadth, width, material, cortex, and evidence of any diagnostic traits, as well as evidence of use wear and/or retouch. Artefacts were photographed in the field with visible scale reference. GPS co-ordinates (in GDA94) will be kept for each artefact find.

Artefacts were individually recorded unless a major artefact scatter was observed. In such cases, estimates of scatter size based on the number of artefacts per square meter over the estimated size of the area were employed. A sample of up to ten representative artefacts (by type and raw material) was individually recorded in order to characterize the artefact composition of the site. Site maps and sketches were also made where appropriate.

Each site and area of PAD was also recorded on a DECCW AHIMS Aboriginal site recording form for submission to the AHIMS registry with the completed report.

Table 7.2 Categories of Ground Surface Visibility

Ground Surface Visibility	Percentage Rating
Very Poor – heavy vegetation, scrub, foliage or debris cover, dense tree or scrub cover. Soil surface of the ground difficult to see.	0-9% ground surface visible.
Poor – moderate level of vegetation, scrub, and/or tree cover. Some small patches of soil surface visible in the form of animal tracks, erosion, scalds, blowouts etc, in isolated patches. Soil surface visible in random patches.	10-29% ground surface visible.
Fair – moderate levels of vegetation, scrub and/or tree cover. Moderate sized patches of soil surface visible, possibly associated with animal /stock tracks, unsealed walking tracks, erosion, blowouts etc. Soil surface visible as moderate to small patches, across a larger section of the study area.	30-49% ground surface visible.
Good – moderate to low level of vegetation, tree or scrub cover. Greater amount of areas of soil surface visible in the form of erosion, scalds, blowouts, recent ploughing, grading or clearing.	50-69% ground surface visible.
Very Good – low levels of vegetation/scrub cover. Higher incidence of soil surface visible due to past or recent land-use practices such as ploughing, grading, mining etc.	70-89% ground surface visible.
Excellent – very low to non-existent levels of vegetation/scrub cover. High incidence of soil surface visible due to past or recent land use practices, such as ploughing, grading, mining etc.	90-100% ground surface visible.

7.2 PROPOSED ABORIGINAL CULTURAL ASSESSMENT METHODOLOGY

The proposed Aboriginal cultural assessment methodology for the Calderwood Project was initiated in the Desktop Assessment phase of the study and has continued into the Field Assessment Phase.

As a result of discussions with DECCW and the DoP, it has been determined that the Aboriginal cultural assessment shall be undertaken as a distinct component independent of the Aboriginal archaeological heritage assessment; in other words, the Aboriginal stakeholders shall be specifically asked to identify issues, items or areas of *cultural* significance and offer comment regarding the cultural sensitivity and importance of these items to the Aboriginal community.

The Calderwood Project is to be assessed under Part 3A of the *EP&A Act*. Therefore the consent authority is the Department of Planning (DoP) and the relevant guidelines for Aboriginal community stakeholder consultation are the *Draft Guidelines for Aboriginal Cultural Heritage Impact Assessment and Community Consultation 2005* (the *Part 3A Guidelines*) (DEC 2005b).

However, in order to undertake comprehensive consultation, and in accordance with the DGR listed in Section 1.1, it was agreed in discussions with the DoP, the Department of Environment, Climate Change and Water (DECCW), Eco Logical Australia Pty Ltd and Delfin Lend Lease Ltd, to follow the consultation process outlined in the *DECCW Interim Community Consultation Requirements for Applicants 2005* (*the Part 5 Guidelines*) (DEC 2005a). These

consultation guidelines are explained in detail in Section 2.0 of this report.

7.2.1 Aboriginal Cultural Assessment Methodology – Phase 1: Desktop Assessment

In accordance with the *DECCW* Part 5 *Guidelines* (DEC 2005a), the following was undertaken to initiate the consultation process for the Aboriginal archaeological and cultural heritage assessment of the Calderwood Project:

- A letter introducing the Calderwood Project was sent to the Illawarra Local Aboriginal Land Council (ILALC);
- Advertisements which invited Aboriginal community stakeholders to register their interest in the Calderwood Project were placed in the public notice sections of the Illawarra Mercury and the Koori Mail on the 14th and 21st of October 2009 respectively;
- A search request for the Wollongong and Shellharbour Local Government Areas was submitted to the National Native Title Tribunal Registry;
- A letter introducing the Calderwood Project was sent to the Registrar of Aboriginal Owners.

As a result, contact was made with the Illawarra Local Aboriginal Land Council (ILALC), and the Wollongong Northern Districts Aboriginal Community (WNDAC) registered their interest in response to the newspaper advertisements. No Native Title Holders or Claimants were identified for the Calderwood Project study area, nor any Registered Aboriginal Owners pursuant to *Division 3 of the Aboriginal Land Rights Act 1983* (NSW). These search results are provided in Appendices B.5 and B.6.

As part of the initial consultation for this Desktop Assessment, an infopack outlining the Calderwood Project, and the proposed Aboriginal cultural and archaeological assessment methodologies, was provided to ILALC and WNDAC. This infopack sought feedback from these organizations regarding the proposed cultural assessment methodologies and sought information on any Aboriginal cultural or historical information regarding the Calderwood Project area which ILALC and WNDAC would like to bring to the attention of Austral Archaeology prior to undertaking fieldwork. It was indicated to ILALC and WNDAC that any cultural information provided prior to fieldwork would be taken into consideration in planning the field assessment.

Cultural information provided at this initial stage of the assessment process related to the cultural values of the Calderwood Project area at a regional level rather than referring to specific sites.

The responses provided by the stakeholder groups are provided in Appendix B.2.

7.2.2 Aboriginal Cultural Assessment Methodology – Phase 2: Field Assessment

The Aboriginal cultural component of the field assessment aims to identify cultural values within the Calderwood Project area both prior to and during field survey, through consultation with representatives from ILALC and WNDAC.

The ultimate aim of consultation with ILALC and WNDAC is to elicit information to identify areas, items or places of Aboriginal cultural heritage within the Calderwood Project area. Comment will be sought regarding the cultural values of any identified areas, sites or places. In addition appropriate management and mitigation strategies will be developed in concert with the Aboriginal stakeholders to ensure that appropriate consideration is given to any cultural heritage values during DLL's planning and design for the Calderwood Project.

The following questions of Aboriginal cultural significance (after AMBS 2006: 96) will be taken into consideration during consultation (see Table 7.3). It is recognised that it may not be culturally appropriate for certain information to be provided to archaeologists and therefore that the full range of questions provided below may not be asked. Best efforts will be made to elicit information and if possible, location data, on the cultural values of the Calderwood Project area without overstepping cultural boundaries.

Table 7.3 Questions for Assessing Places of Aboriginal Cultural Heritage Significance

Issue	Approaches for Consultation
Use of the Information	Discuss the recording, storage and access to the information
	What, if any, restrictions should apply to the information?
Knowledge Holders	Who are the knowledge holders?
	Contact details for the knowledge holders.
	What is the basis on which the people who have the information have status?
	Why do they have rights or responsibilities to speak for the place?
	What country/s do they affiliate with?
	Is this affiliation traditional and/or historical and/or contemporary?
Location and Extent of the Place	What is the area that is significant?
	What is the location and extent of the place?
	What is the connection of the place to other places in the area?
	What are the physical features comprising or constituting the place or site?
Significance of the Place?	Why is the place significant?
	What is the story of the place according to Aboriginal tradition?
	Why is it important to the knowledge holder?
	Are there other stories which are historical and/or contemporary?
	If not told, how did the knowledge holder find out about the place?
	Who told the story to the knowledge holder?
	Where were they when they were told the story?
	What were the circumstances under which they were told the information or story?
Management Issues	How would you like to see this place managed?
	What kinds of activities can be carried out here (without requiring Section 90 consent)?
	Are there any restrictions, according to Aboriginal tradition, on activities that may be carried out in the vicinity of the place?
	What are the locations in which these activities may not take place?

7.3 SECTION SUMMARY

Austral has proposed Aboriginal archaeological and cultural heritage assessment methodologies tailored to the Calderwood Project. The Aboriginal archaeological field assessment methodology aims to undertake complete coverage and systematic recording of the archaeological resource of the study area, which providing flexibility in response to onsite conditions and stakeholder and Client requirements. The Aboriginal cultural heritage assessment methodology aims to undertake community consultation and thereby characterise the Aboriginal cultural values of the study area in a culturally appropriate way.

8.0 RESULTS

8.1 INTRODUCTION

The Phase 1 Desktop Assessment and Phase 2 Field Assessment components of the Aboriginal archaeological and cultural heritage assessment of the Calderwood Project area aimed to: identify known Aboriginal archaeological and cultural heritage sites and places within the Calderwood Project area; initiate cultural consultation with relevant Aboriginal community stakeholders; produce a predictive model and mapping of likely areas of Aboriginal archaeological and cultural potential within the study area; and ground-truth the predictive model through a program of field assessment and ongoing cultural consultation.

The following section summarises the results achieved regarding these aims.

8.2 DESKTOP ASSESSMENT RESULTS

As identified in the Aboriginal background section (Section 4.0) and the review of archaeological assessments near the study area (Section 5.0), a number of potential Aboriginal archaeological and/or cultural items/places within the Calderwood Project area were identified as a result of the desktop assessment.

These are described in Table 8.1 and Figure 8.1.

The information provided in Table 8.1 and Figure 8.1 has been amalgamated from DEC (2005e), AMBS (2006), Biosis (2006, 2007) and Austral (initial site visit 2009), as discussed in Sections 4.0, 5.0 and 6.0 of this report.

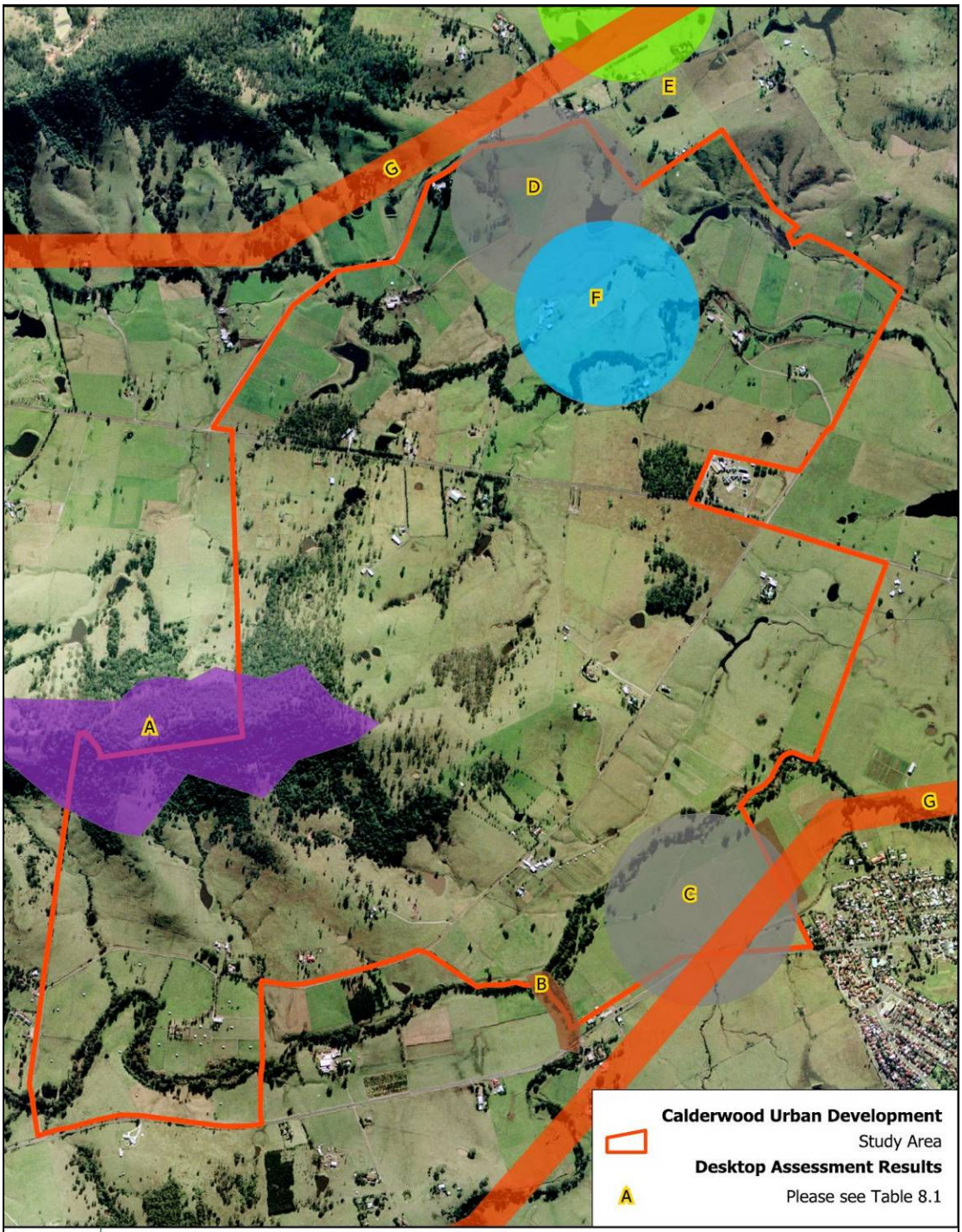
Table 8.1 Archaeological and Cultural Potential within the Calderwood Project area

Name	Description	Reference	Key for Figure 8.1
Potential continuation of Calderwood PAD 1 (AHIMS 52-5-0515)	Archaeological potential	Biosis 2007	A
Sandstone Outcrops suitable for Grinding Grooves	Archaeological potential	Austral's initial site visit 2009	B
Unnamed Post-Contact Aboriginal Camp – approximate location	Archaeological and cultural potential	DEC 2005e	C
Unnamed Post-Contact Aboriginal Camp – approximate location	Archaeological and cultural potential	DEC 2005e	D
Marshall Mount School Camp - – approximate location	Archaeological and cultural potential	DEC 2005e	E
Camp Opposite Marshall Mount School - – approximate location	Archaeological and cultural potential	AMBS 2006	F
Traditional Travel Route(s)	Archaeological and cultural potential	DEC 2005e	G
AHIMS 52-5-0515	Known archaeological site (outside of study area)	Biosis 2006, 2007	H

Please note that all areas shown in Figure 8.1 are preliminary, indicative locations. Their accuracy is limited by the quality of the mapping and/or descriptions available in the source documents.

In particular, it is not known whether item E, "Marshall Mount School Camp" (DEC 2005e), corresponds to item F, "Camp Opposite Marshall Mount School" (AMBS 2006).

The relationship of these preliminary locations for areas of archaeological potential based on the Desktop Assessment is compared with the results of the Field Assessment in Section 9.0 of this report.



As described in Section 7.2, implementation of the *Part 5 Guidelines* (DEC 2005a) has resulted in the identification of the ILALC and WNDAC as Aboriginal community stakeholders for the Calderwood Project area.

8.2.1 Additional Information

Additional information regarding ground surface disturbance on Johnstons Spur was obtained after the development of the predictive model. An aerial photograph of the Calderwood Project area, dated 1948, shows that the area of Johnstons Spur shaded purple in the figure above has undergone some vegetation clearance and regrowth from 1948 to the present day (Shellharbour City Council 2010). Ground surface disturbance caused by the vegetation

clearance and possible subsequent erosion may have impacted on the level of preservation of Aboriginal archaeological material.

A draft flora and fauna assessment (Eco Logical Australia 2010 *in draft*) has also since been made available to Austral. This document provides an assessment of the condition of the sections of the Macquarie Rivulet and Marshall Mount Creek which fall within the Calderwood Project area. The condition of the Macquarie Rivulet has been defined as Good to Moderate/Good (experiencing from minor localised erosion to generally stable with limited areas of localised erosion).The condition of Marshall Mount Creek has been defined as poor (large scale localised erosion and moderate erosion, bank slumping and tracks throughout), moderate/poor (moderate to locally severe erosion along banks), and moderate/good.

8.3 FIELD ASSESSMENT RESULTS

8.3.1 Field Survey

Fieldwork was undertaken in three blocks, making up a total of nine days in the field. The dates of survey covered the 7th to the 9th of December 2009, the 13th to the 15th of January 2010 and the 18th to the 20th of January 2010.

Site Officers from ILALC were present throughout the survey. WNDAC representatives were not able to attend; however, consultation with WNDAC continued through provision of draft reports to WNDAC for comment at relevant times throughout the project.

Four surveyors were present on any given day of field survey, consisting of two archaeologists from Austral Archaeology and two Site Officers from Illawarra Local Aboriginal Land Council. ILALC Site Officers included Aaron Broad and John Pagett (7th – 9th December 2009), Neville Maher and Roy Stewart (13th – 15th January 2010), and Margaret Mongta and Jay Marsden (18th – 20th January 2010).

Consent was sought from ILALC Site Officers prior to making any modifications to the proposed survey methodology. During the survey, ILALC Site Officers were also asked to consider whether there were any Aboriginal cultural values or issues that they wished to raise, identify or have recorded in this report.

8.3.2 Scope of the Field Survey

The survey methodology was followed, though some modifications as to approach and scope were made. These modifications were discussed with the Client and ILALC Site Officers prior to implementation.

The proposed landform-based survey methodology was adhered to in the first three days of survey; however, issues of property access led to a property-based survey methodology being followed in the remaining six days of survey. This modification did not impact on coverage, only on the order in which areas were accessed. Landform information has been recorded for all properties accessed and therefore testing of the predictive model remains possible.

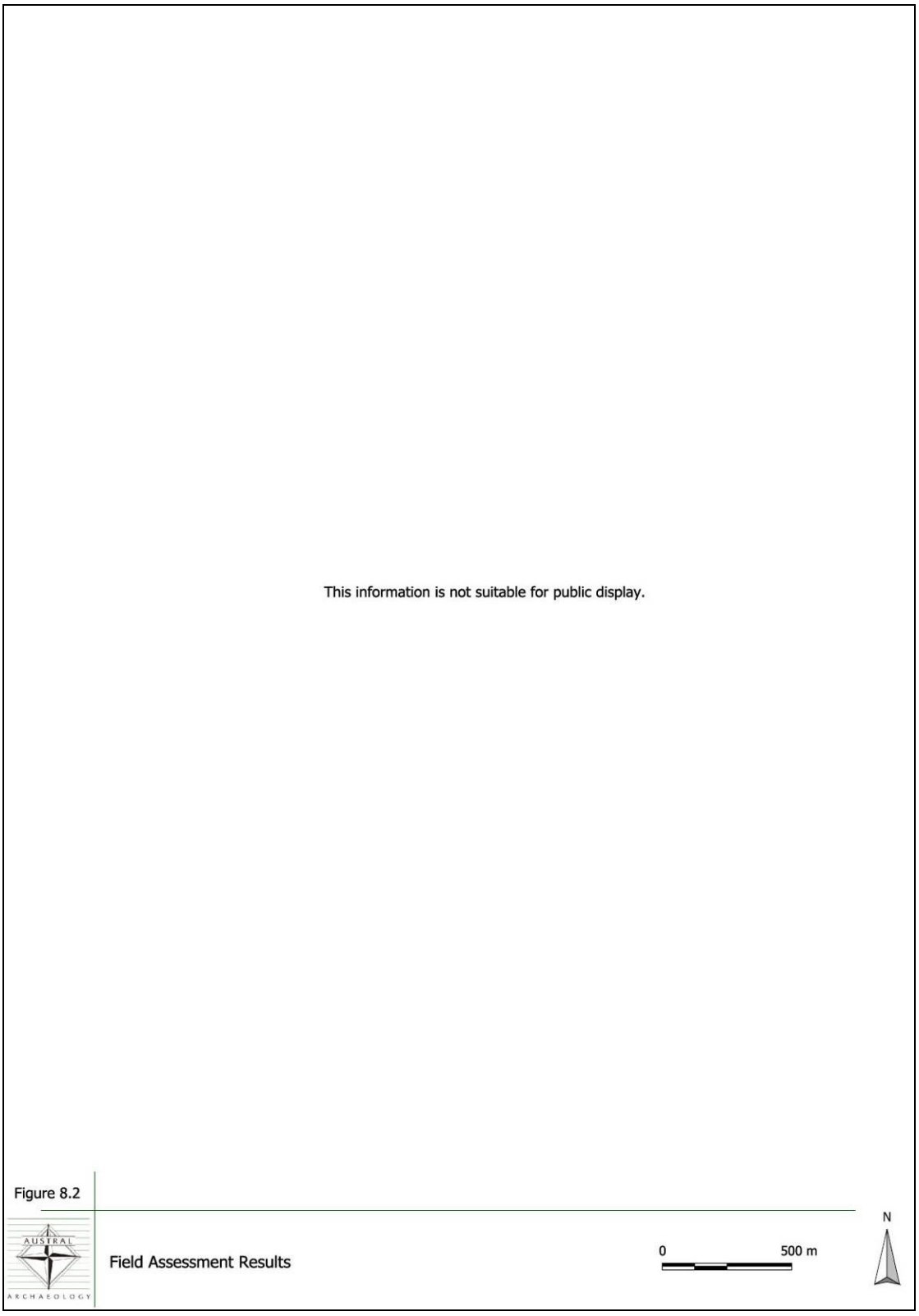
Best efforts were made to obtain total coverage of the study area. However, conditions encountered in the field prevented 100% coverage:

- 342 Calderwood Road (Lot 21 DP 809156) and 269 North Macquarie Road (Lot 1 DP 558196) could not be accessed and therefore could not be assessed.
- The upper slopes and crest of Johnstons Spur were heavily overgrown with lantana, regrowth trees and other weeds. As a result, accessing some of the area was physically impossible. When attempts were made to access small clearings within the overgrown areas, ground surface visibility within them was found to be zero due to thick leaf litter. Surveyors followed access tracks and clearings into the overgrown areas wherever possible in the hope of locating exposures or other landforms of archaeological interest. Best efforts were made to survey these overgrown areas.
- The same limitation was encountered along heavily overgrown and/or steeply incised sections of the banks of Marshall Mount Creek and the Macquarie Rivulet. Surveyors made best efforts to access less-overgrown sections of the banks.

This level of coverage is considered realistic and sufficient to characterise the archaeological

record of the Calderwood Project area. Some discussion regarding the archaeological potential of these areas is undertaken in Section 9.1.2 of this report. This restriction in scope should not detract from the findings of this report.

Ground surface visibility was uniformly poor in all survey units, except for in areas of exposure. Field surveyors attempted to walk regularly-spaced transects across landforms, as well as focussing on areas of exposure and increased surface visibility. As a result, attention was paid to surface erosion, drainage lines and dam exposures.



8.3.3 Details of Field Assessment Results

As a result of the field survey undertaken for the Calderwood Project, a total of 34 sites were recorded, with a total of at least 188 artefacts. Site location mapping is provided in Figure 8.2 above.

The newly recorded sites consisted of 18 isolated finds (52.94%), 11 open artefact scatters (32.35%), four open artefact scatters with associated potential archaeological deposit (11.76%) and one potential archaeological deposit (2.94%).

From the at least 188 artefacts observed during the Field Assessment, a sample of 120 artefacts was recorded in detail. Analysis of this assemblage has found it to be dominated by silcrete (61.66%) followed by chert (15%), mudstone (7.5%), FGS, petrified wood and quartz (4.16% each), basalt (2.5%) and river cobble (0.83%). Flakes or flake fragments were the most common artefact type (58.33%), followed by cores (23.33%), flaked pieces (15.83%), and then a single instance each of a hand axe, a milling stone or pestle, and a possible broken hammer stone (0.83% each).

Please note that this section aims to provide a précis of survey results only. Detailed Survey Unit recordings are provided in Appendix D.1 and detailed Site Recordings are provided in Appendix D.2. Please note that this location information is not suitable for public display and therefore has been removed from this version of the report.

The following naming scheme has been adopted for finds recorded during the field assessment:

Table 8.2 Site Naming Conventions employed during the Field Assessment

Abbreviation	Explanation
CP	Calderwood Project
IF	Isolated Find
S	Site (Open Artefact Scatter)
PAD	Potential Archaeological Deposit

Table 7.1 Survey Results

Site Name	Size	# of artefacts	Landform Unit	Exposure type (dam, track etc)	Archaeological Potential
CP-IF-01	<1 m²	1	Mid-slope	Patchy grass	Low
CP-IF-02	<1 m²	1	Upper slope	Ditch/cut	Low
CP-S-01	5 m x 2 m	3	Creek terrace	Animal track	Low
CP-S-02	10 m x 20 m	6	Flat/Levee	Dam	Low
CP-IF-03	<1 m²	1	Mid-slope	Animal track	Low
CP-S-03	1 m²	2	Lower slope	Animal track	Low
CP-IF-04	<1 m²	1	Flat	Vehicle track	Low
CP-IF-05	<1 m²	1	Flat	Vehicle track	Low
CP-S-04	5 m x 15 m	3	Flat/Levee	Dam	Low
CP-IF-06	<1 m²	1	Lower slope	Animal track	Low
CP-IF-07	<1 m²	1	Lower slope/Levee	Dam	Low
CP-IF-08	<1 m²	1	Mid-slope	Animal track	Low
CP-S-05	1 m x 10 m	2	Upper slope	Animal track	Low
CP-IF-09	<1 m²	1	Upper slope	Animal track	Low
CP-IF-10	<1 m²	1	Upper slope	Cut	Low
CP-IF-11	<1 m²	1	Mid-slope /Valley/Levee	Dam	Low

Site Name	Size	# of artefacts	Landform Unit	Exposure type (dam, track etc)	Archaeological Potential
CP-IF-12	<1 m²	1	Mid-slope /Valley/Levee	Rubble mound	Low
CP-PAD-01	170 m x 150 m	0	Upper slope	-	Low
CP-S-06 / CP-PAD-02	580 m x 280 m	53	Flat/Levee	Dam, animal track, patchy grass	Moderate – High
CP-S-07	30 m x 10 m	3	Flat	Animal track	Low
CP-IF-13	<1 m²	1	Lower slope/Levee	Dam	Low
CP-S-08	20 m x 5 m	4	Flat	Patchy grass	Low
CP-IF-14	<1 m²	1	Mid-slope	Animal track	Low
CP-IF-15	<1 m²	1	Lower slope	Animal track	Low
CP-S-09 / CP-PAD-03	150 m x 120 m	11	Mid-slope	Erosion scald/patchy grass	Moderate – High
CP-IF-16	<1 m²	1	Flat/Levee	Dam	Low
CP-S-10	2 m²	3	Flat	Animal track	Low
CP-S-11 / CP-PAD-04	150 m x 60 m	10	Lower slope/Levee	Dam / Animal track	Moderate
CP-S-12	20 m x 10 m	5	Mid-slope	Drainage line/animal track	Low
CP-S-13	20 m x 5 m	3	Lower slope/Flat/ Levee	Dam	Low – Moderate
CP-S-14 / CP-PAD-05	400 x 200 m	>60	Flat/Creek terrace	Animal track/patchy grass	High
CP-S-15	2 m x 5 m	2	Mid-slope	Animal track	Low
CP-IF-17	<1 m²	1	Lower slope	Animal track	Low
CP-IF-18	<1 m²	1	Flat/Creek terrace	Animal track/Vehicle track	Low

In addition, one scarred paperbark tree of *European* origin was observed. ILALC Site Officers Aaron Broad and John Pagett, present at the time that the tree was recorded, were satisfied that the scar was of European origin based on the pattern of bark removal.

8.4 CULTURAL ASSESSMENT RESULTS

Both the ILALC and WNDAC have expressed a cultural interest in the Calderwood Project area. ILALC has indicated that the area is significant (S. Robinson pers. comm. 24/11/2009, see Appendix B.7). WNDAC has indicated that several members of WNDAC "have a strong cultural connection to the Illawarra/Shellharbour area and may have cultural information that is relevant to the Calderwood project" (see Appendix B.1).

At the request of ILALC, cultural information provided by ILALC Site Officers has been removed from Appendix B.3. However the cultural information provided in this section has been approved as suitable for public display and therefore has been retained. In their response to the draft version of this report, WNDAC states that there was no additional cultural knowledge that they wished to include in the report. Stakeholder responses to the draft report are included in Appendix B.4.

In addition to the 34 new Aboriginal archaeological sites, natural resources including paperbark, wild yams/native potatoes, eels and freshwater mussels were observed during the field assessment.

In general terms, the cultural information provided by ILALC Site Officers shows that a cultural connection remains between these representatives of the Aboriginal community and the Calderwood Project area. Cultural information has been passed on to the Site Officers from older relatives and other members of the community. This information can relate to everyday activities that would have taken place in the Calderwood Project area, such as identifying good places to camp or bathe children, and collecting natural resources. This information can also relate to specific historic events, including skirmishes which took place in the vicinity of the Calderwood Project area, between Yallah and Albion Park. In addition, cultural beliefs relating to burial can relate to specific landscape features – although none were located within the Calderwood Project area. Certain animal species with associated traditional roles were also observed during the field assessment. Aboriginal walking tracks which pass near to the Calderwood Project area were also pointed out by Site Officers during survey.

An ILALC Site Officer indicated that Johnstons Spur / Mount Johnston would have been called *Merrigong*, which means “barter”: as it was a striking landscape feature, people would have gathered there for trade and other meetings.

In their response to the draft report, WNDAC members mentioned that grinding stones such as the possible grinding pestle recorded as CP-IF-05 would have been associated with women’s work (see Appendix B.4).

No archaeological sites were identified in association with cultural areas or features.

8.5 SECTION SUMMARY

As a result of the Field Assessment, 34 new Aboriginal archaeological sites have been recorded for the study area. The general area has also been identified as being culturally significant to the registered Aboriginal stakeholders for the project, ILALC and WNDAC. No archaeological sites were identified in association with cultural areas or features. However it is understood that all archaeological material is likely to be of cultural importance to the Aboriginal community as it is material produced by past Aboriginal people.

The archaeological and cultural significance of these sites shall be evaluated in the Discussion and Significance Assessment in the following section.

9.0 DISCUSSION AND SIGNIFICANCE ASSESSMENT

9.1 DISCUSSION OF RESULTS

The field assessment component of the Aboriginal archaeological and cultural heritage assessment of the Calderwood Project area has identified 34 previously unrecorded Aboriginal archaeological sites.

Analysis of the site type and distribution will allow characterisation of the Aboriginal archaeological record of the Calderwood Project area and, in conjunction with the cultural assessment, may also give some information on the lifestyles of past Aboriginal people within that area.

Ground-truthing of the predictive statement through comparison of the model with the results of the field assessment tests the accuracy of the predictive statement to the Calderwood Project area in general and also, through comparison with previous archaeological work in the vicinity as discussed in Section 5.0, the applicability of the predictive statement to the Illawarra Coastal Plain physiographic region in general.

9.1.1 Discussion of Desktop Assessment Results

The results of the Phase 1 Desktop Assessment identified several areas of archaeological and/or cultural potential within the Calderwood Project Area. These potentials have been identified by two avenues of research: the investigation of the Aboriginal historical record of the study area (Section 4.0), and the generation of a predictive statement based on the known regional archaeological context (Section 6.3).

Figure 9.1 has been generated by overlaying the zones of very low to low, low to moderate and high archaeological potential identified in the predictive statement (see Section 6.0 and Figure 6.2), with the potential archaeological and/or cultural items/places identified through investigation of the environmental Aboriginal and archaeological background of the Calderwood Project area (see Sections 3.0, 4.0 and 5.0, and Figure 8.1).

As can be seen in Figure 9.1, there is a fairly close correlation between areas of archaeological potential identified in Section 6.0 and the areas of archaeological and/or cultural potential identified in Section 8.1.2. This is not an unexpected outcome. This may be explained by the fact that the predictive modelling of levels of archaeological potential in the Calderwood Project area has been generated based on a number of factors, inclusive of the past archaeological research and Aboriginal historical information which informed the map of potential archaeological and/or cultural items/places.

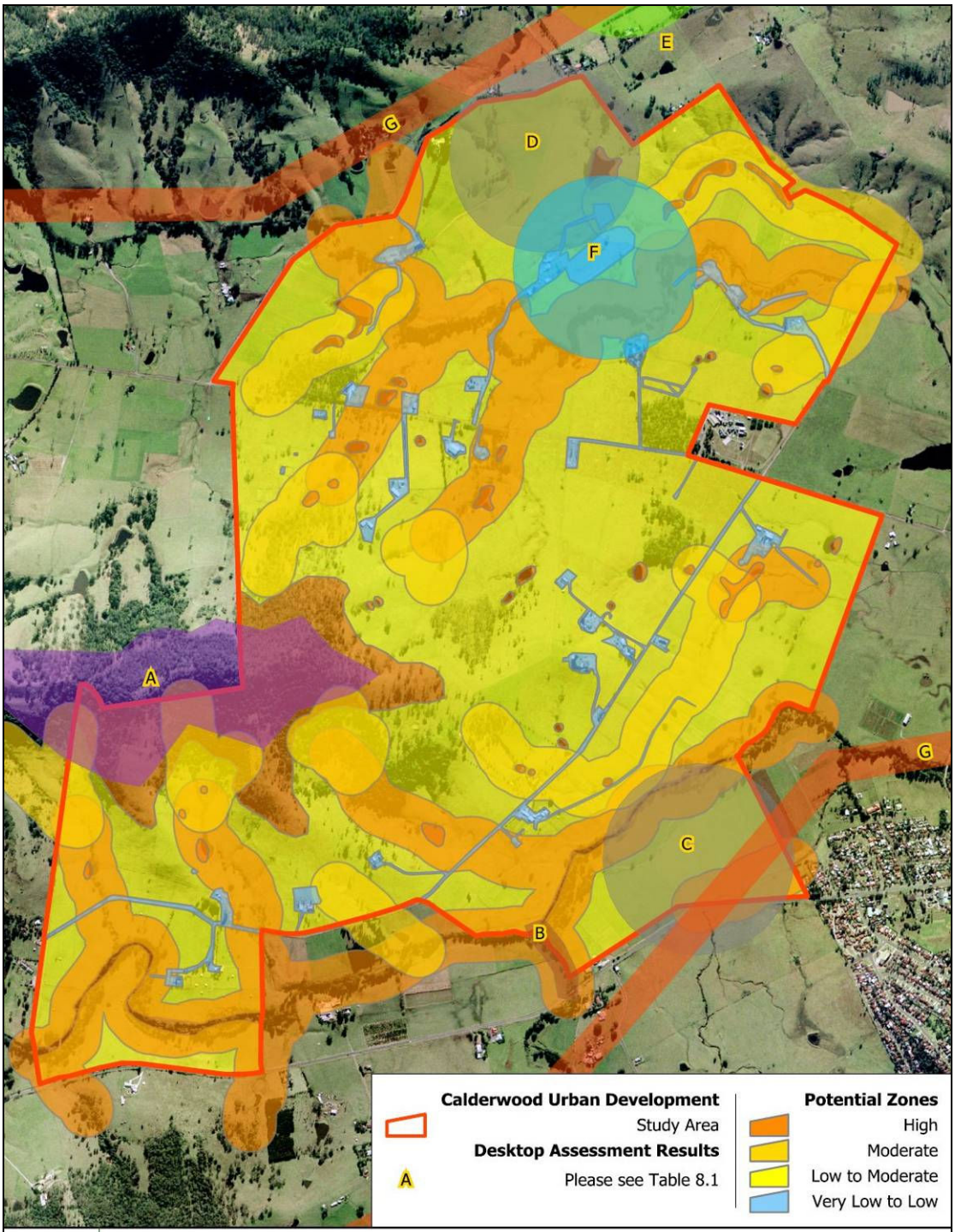


Figure 9.1

Comparison of potential archaeological sites identified through Desktop Assessment with areas of archaeological potential identified through Predictive Statement

0 500 m

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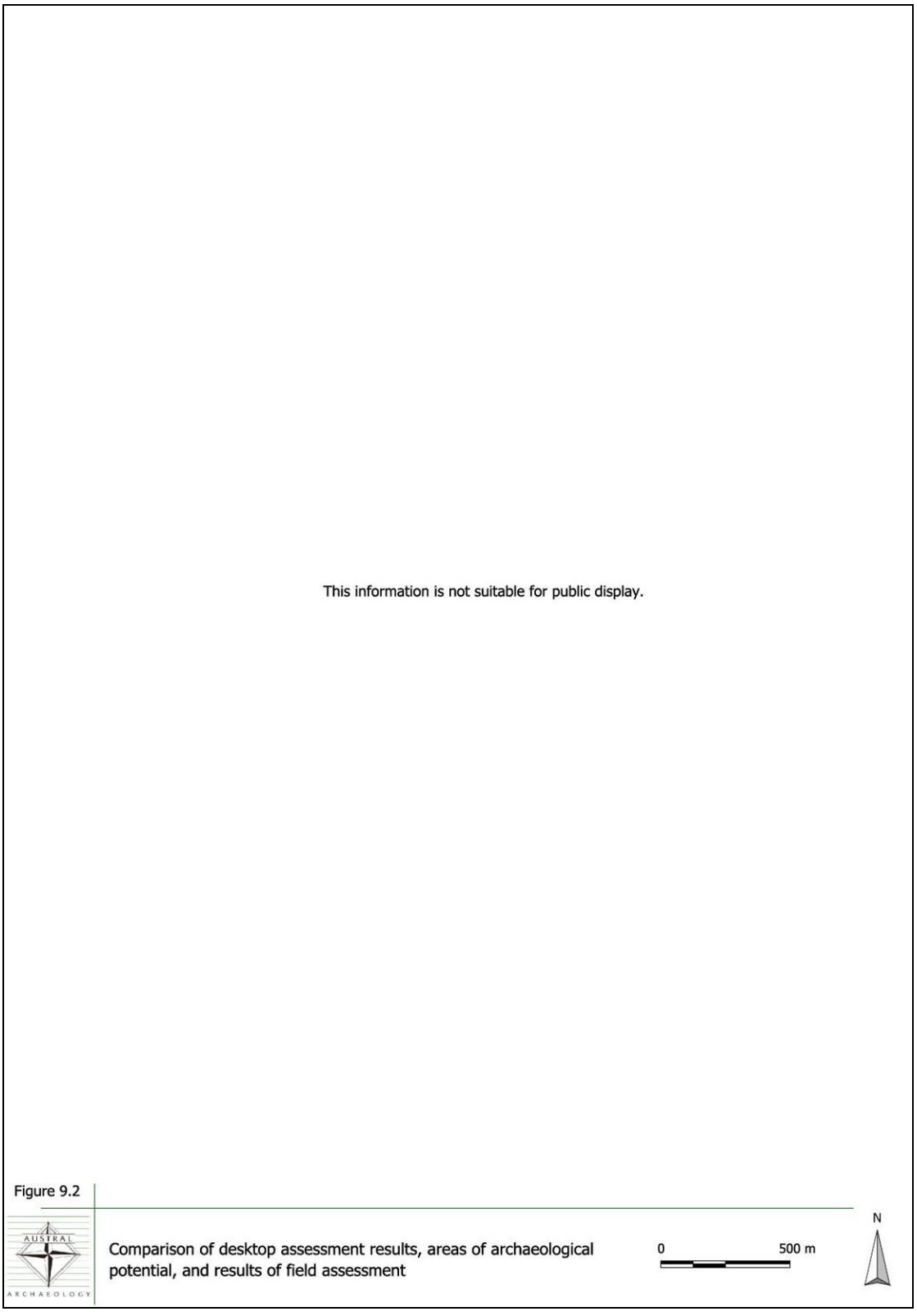
9.1.2 Comparison of the Desktop and Field Assessment Results



The Phase 2 Field Assessment allowed ground-truthing of the results of the Phase 1 Desktop Assessment and the testing of the predictive statement. The following discussion compares the results of the Desktop Assessment with those of the Field Assessment in terms of archaeological and cultural potential, the predictive statement, and the results of previous archaeological assessments in the vicinity of the Calderwood Project area.

The results of the Field Assessment generally corresponded with those expected in light of the predictive statement. In brief, the level of disturbance estimated in Section 6.2 was supported by the results of the Field Assessment. Sites were found on almost all landforms

within the Calderwood Project area: levees, the flat, creek terraces, valleys and on all hill slopes (lower, upper and mid slope). All sites with the exception of CP-PAD-1 were stone artefact sites (some also with associated PAD); the lack of any scarred or modified tree sites is understandable in light of the long history of vegetation clearance in the last 150 – 200 years. All sites had undergone at least some disturbance as a result of historic land use practices and natural taphonomic processes.

Of these sites, 17 (50%) were found in areas identified as having High archaeological potential; 11 (32.35%) were identified in areas of Low to Moderate potential; five (14.70%) were recorded in areas of Moderate potential within 100 m of lesser streams; and one site (2.94%) was found in an area of Very low to Low potential.

Of the 17 sites found in areas of High archaeological potential, nine (52.94%) were found on dam exposures, or included them within the extent of the scatter or area of potential archaeological deposit. Of these dam exposures, five (55.55%) were outside of the areas of High and Moderate potential determined by landform unit (in all cases, the 100 m buffer around watercourses). This highlights the influence of surface disturbance, such as that produced by earthmoving to construct dams, in both bringing artefacts to the surface and severely impacting on the stratigraphic integrity and the preservation of a site's archaeological context and potential for additional information.

That more surface sites or areas of potential archaeological deposit were not identified within the zone of High potential around higher order watercourses may result from the impact of past land use practices and other taphonomic processes on the landscape of the Calderwood Project area. It is possible that fluvial disturbance around the Macquarie Rivulet and Marshall Mount Creek has acted to remove or obscure surface archaeological material. Historic land use has also resulted in modification of and disturbance to deposit around these major streams. It is noted that landscape features which would have made an area attractive to past Aboriginal people – such as reliable water, gentle terrain, and shady trees – also would have had an appeal to non-Aboriginal settlers and their livestock. This situation continues today: it can be observed in the number of properties whose boundaries extend directly to the banks of these streams, and in the modifications to the banks to improve access for livestock, vehicles and for recreational reasons.

Five areas of potential archaeological deposit were identified during the Field Assessment; four of these have associated surface archaeological material in the form of open artefact scatters. The locations of the areas of PAD (and their associated surface archaeological material) and the varying levels of archaeological potential ascribed to them are in keeping with the predictive statement.

CP-S-14/CP-PAD-05 is located on gently sloped terrain and the creek terrace on the south bank of Marshall Mount Creek, to the east of the confluence of an unnamed second order tributary with Marshall Mount Creek. The discovery of some artefacts *in situ* in the soil profile at the lip of a dish-shaped horse tread exposure suggests that there is potential for intact archaeological deposit in less disturbed areas. This area of PAD is considered to have the highest archaeological potential, based on the extent of the scatter, the variety of raw materials and artefact types present, the low to moderate disturbance and the landform unit. Of particular relevance to the designation of high potential PAD is the relatively high number of cores found in the assemblage at CP-S-14/CP-PAD-05; the high frequency of cores suggests that a primary knapping event may be represented in the surface material. Investigation of the subsurface deposit has potential to clarify this and gain a clearer understanding of past Aboriginal activities in this area.

CP-S-06/CP-PAD-02 is located on a dam exposure and surrounding gently undulating terrain between the dam and a lesser stream. This area has been ascribed moderate to high archaeological potential, based on discovery of over 60 artefacts, dividedly roughly evenly across the surfaces of two discrete 10 m x 10 m and 10 m x 20 m exposures. It was considered likely that subsurface artefactual material continued in the grassed-over areas between and around the exposures. In comparison with CP-S-14/CP-PAD-05, this area of PAD is considered to have less potential to represent a knapping event, or possibly represent a secondary flake reduction event, due to the lower number of cores and smaller size of observed artefacts; subsurface investigations would serve to clarify this issue.

CP-S-09/CP-PAD-03 is located on the mid slope of a gentle north facing rise beside the drainage line/lesser stream which flows into Marshall Mount Creek near CP-S-14/CP-PAD-05. Although soils appeared skeletal on the banks of the drainage line they were less so outside

of areas of exposure. The discovery of several artefacts embedded 2 – 5 mm in the soil and therefore *in situ* suggests that there is potential for subsurface archaeological deposit outside of the areas of exposure. However the increased distance from reliable water has led to the attribution of moderate to high potential for this PAD.

CP-S-11/CP-PAD-04 is located further north and down slope along the same drainage line as CP-S-09/CP-PAD-03. It is an area of exposure and scatter between two dams along the drainage line. Based on the smaller variety in raw material, lower artefact counts, landform unit and soil profile, this PAD is considered to have moderate archaeological potential.

CP-PAD-01 was determined to have low archaeological potential based on landform unit alone; no surface archaeological material is directly associated with this PAD. The PAD is confined to a gently sloped 'step' between two steeper slopes on the south facing flank of Johnstons Spur. No areas of exposure were present and ground surface visibility was very poor. Although no surface archaeological material was observed within the extent of the PAD, a number of isolated finds and an open artefact scatter were recorded to the east and down slope to the south of this area of PAD. It is possible that those isolated finds directly to the south of CP-PAD-01, which are located on cleared and semi-overgrown track on the steep slope, have washed down from a more level area such as is occupied by CP-PAD-01. However, the archaeological potential of CP-PAD-01 was defined as low based on distance to water and the landform unit.

There is very little corroboration of the specific items of archaeological potential identified during the Phase 1 Desktop Assessment as shown in Figure 8.1 and Table 8.1, and reproduced in Figure 9.2 above. The open artefact scatter (CP-S-01) located near Item B in Figure 9.2 does not directly relate to the archaeological potential identified in the Desktop Assessment. Rather, Item B referred to "Sandstone Outcrops Suitable for Grinding Grooves' (see Table 8.1 and Figure 8.1) observed by Austral during the initial site visit in 2009. No grinding grooves were observed despite best efforts to access the sandstone platforms in the bank of Yellow Rock Creek. The location of the scatter CP-S-01 does, however, correspond with an area of High archaeological potential based on proximity to a higher order watercourse as identified in the predictive statement.

Comparison with other archaeological assessments in the vicinity of the Calderwood Project area allows characterisation of the archaeological record of the study area on a regional basis.

As described in Section 5.3.2, the four areas of PAD identified by Navin Officer Pty Ltd (2002c) in the Tullimbar Village Development were described as having potential to contain low to moderate densities of artefacts. The two areas of PAD (PAD 1 and PAD 2) subjected to test excavation produced low densities of artefacts considered to represent background scatter. The artefacts were concentrated in the upper levels of the deposit, and so it was considered that there was low potential for artefacts to be present in deeper deposits (Navin Officer Pty Ltd 2005: 9).

In comparison, the area of high potential PAD (CP-S-14/CP-PAD-05) may represent a knapping event and therefore artefact densities above the usual background scatter. It is located in a similar landform unit to the Tullimbar PADs 1 and 2; subsurface investigation would offer the opportunity to test whether the shallow artefact deposition identified in the Tullimbar PADs on Hazelton Creek is also found in CP-S-14/CP-PAD-05 on Marshall Mount Creek.

The remaining PADs identified in the Calderwood Project area are located on different landforms to the Tullimbar PADs, and therefore offer potential for identifying levels of preservation by landform unit on the Illawarra Coastal Plain physiographic region.

Extensive landform unit testing within the Illawarra Coastal Plain physiographic region was undertaken by AMBS (2006) during testing for the WDRA. As described in Section 5.3.3, the WDRA study area ends at the northern bank of Marshall Mount Creek; test pitting done on four landform units (spur crest, alluvial flat, third order stream and lower hill slope) within the Marshall Mount Creek catchment area discovered an average artefact density of 0.8 artefacts per square metre. Inclusion of the surface material discovered in CP-S-14/CP-PAD-05 would serve to increase the average artefact density for the Marshall Mount Creek catchment and thereby provide additional detail on the archaeological record of the catchment.

As described in Section 5.3.3, Biosis (2006, 2007) raised the possibility that an area of potential archaeological deposit identified to the west of the Calderwood Project area

boundary where it crosses Johnstons Spur could extend into the study area. Test excavation of this PAD (Biosis 2007) led to the PAD being identified as an artefact site of low scientific significance. It was not possible to access all of the crest of Johnstons Spur due to thick lantana and poor ground surface visibility; however, investigation of an aerial photograph dated 1948 does indicate that the crest of the spur has been subjected to vegetation clearance. Therefore it is considered less likely that an undisturbed area along the ridge crest – as was proposed in the predictive statement of this report – is present. If the area of PAD/artefact site identified by Biosis (2006, 2007) does extend into the Calderwood Project area, it is considered likely that it would be of low archaeological potential in terms of the stone artefacts. As mentioned by Biosis, the area of potential relates only to recovering stone tools – uses of the Spur unrelated to stone tool production, such as for a travel route or vantage point, would likely have left no archaeological trace.

Some discussion may also be made regarding the two properties which could not be accessed during the Field Assessment – namely 342 Calderwood Road (Lot 21 DP 809156) and 269 North Macquarie Road (Lot 1 DP 558196).

342 Calderwood Road is located in an area of high potential based on the predictive statement, and also contains a large dam exposure. Areas outside the dam exposure were observed from the fence line to be heavily grassed and no surface artefacts were visible. However, due to the presence of a dam exposure, and the high rate of artefacts that are often found in such contexts, it is not possible to say that there is no archaeological potential within 342 Calderwood Road. There remains potential for an isolated find or open artefact scatter to be located in the disturbed context of the dam exposure. However, based on the severe disturbance caused by the construction of the dam, it is likely that artefacts recorded in the area would be out of context and therefore offer limited archaeological potential.

269 North Macquarie Road is located in an area of moderate potential based on the predictive statement, and also contains two dams which – as illustrated by the results of the Field Assessment as well as the predictive statement – have high potential for Aboriginal artefacts. This property was observed from the fence line where possible but was found to be heavily overgrown with poor ground surface visibility. It was not possible to observe the dams from the adjoining properties. As in the case of 342 Calderwood Road, there remains potential for artefacts – albeit in severely disturbed contexts – to be located in the dam exposures, and also for less disturbed material to be present adjacent to the drainage line/lesser stream as isolated finds, open artefact scatters and/or potential archaeological deposits.

As a result, 269 North Macquarie Road may be said to offer higher archaeological potential than 342 Calderwood Road; however both areas have some archaeological potential as based on the predictive statement and supported by the results of the Field Assessment in the surrounding properties.

9.1.3 Discussion of Results of Cultural Consultation

Cultural consultation with registered Aboriginal stakeholder organisations ILALC and WNDAC provides an extra level of information to support and in cases stand apart from the archaeological record.

As a result of consultation with ILALC and WNDAC, it was found that the Calderwood Project area is of significance to these organisations. The broader landscape context wherein the Calderwood Project area is located, including the Illawarra Escarpment and Lake Illawarra, is also culturally significant – several references were made to past Aboriginal activities and myths taking place on or in relation to the Escarpment. The cultural information provided by ILALC Site Officers during the field assessment illustrated the range of daily activities which would have taken place in the Calderwood Project area, including identification of food sources and landforms which are associated with particular activities (as described in Section 8.4).

However the areas identified for cultural reasons do not overlap with the distribution of archaeological material. For example, regarding the areas of cultural potential identified in the Phase 1 Desktop Assessment (reproduced in Figure 9.1 above), it is found that there is only very weak correlation between the Field Assessment results and the Desktop Assessment results.

Two artefact sites (CP-S-15 and CP-IF-17), were located within the very approximate area associated with the “Unnamed Post-Contact Aboriginal Camp” (see Item D in Figure 9.2,

above; see also Table 8.1 and Figure 8.1) marked on the Illawarra Region Early Contact Map (DEC 2005e).

There is no way to specifically link these artefacts to the post-contact Aboriginal camp identified on the Illawarra Region Early Contact Map (DEC 2005e). The artefacts were located mid slope on the bank of a drainage line running down a steep east-facing slope. Both the scatter and the isolated find were located in animal track exposures on the bank of the drainage line. Close inspection of the surrounding area failed to locate any additional archaeological material. These artefacts are surface finds, and may have washed down slope from level ground further up. Due to their lack of context and lack of specific dateable features, it cannot be said that these artefacts are directly associated with a known historic Aboriginal site, although – and for the same reasons – this cannot be ruled out. These artefacts may also be interpreted as part of the background scatter – consisting of the debris of one-off episodic tool production, maintenance and/or discard events – likely to be found throughout the landscape.

Cultural information provided by ILALC Site Officers during the Field Assessment included some oral history relating to four family groups who were known to camp along the north bank of the Macquarie Rivulet. No more specific location information was known, and so it cannot be definitely stated that the camps were located within the Calderwood Project area. No archaeological sites or areas of potential archaeological deposit were recorded along the north bank of the Macquarie Rivulet during the Field Assessment. It is again possible that past land use practices and natural taphonomic processes have removed any archaeological trace of these camps, if they were in fact present along the sections of the Macquarie Rivulet which lie within the Calderwood Project area.

However, all sites discovered during the Field Assessment add general corroborating evidence to the oral histories, in that they show a physical record of past Aboriginal people in the general area. The absence of archaeological material in a particular location should in no way be seen to diminish the cultural relevance of an area identified in Aboriginal oral history.

The salvage and storage of archaeological material which could be impacted by the proposed development was discussed in general terms with the ILALC Site Officers during the survey. They expressed the view that any such material should be stored in a Keeping Place or local museum. The WNDAC would also need to be consulted about this matter.

9.2 INTRODUCTION TO THE HERITAGE ASSESSMENT PROCESS

An assessment of significance seeks to determine and establish the importance or value that an object or site may have to the community at large. The concept of cultural significance is intrinsically connected to the object 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 Aboriginal community.

Archaeological sites require a different approach to significance assessment because the extent of the heritage resource, and the degree to which it can contribute to our understanding of history, is not fully known at the outset. Also of significance is the type of information that can be revealed by potential archaeological deposits, especially where the information is not available through any other source, and the contribution it can make to our understanding of a place, which may also be of cultural heritage significance.

9.3 BASIS FOR ASSESSMENT OF ABORIGINAL SITES

The NSW National Parks and Wildlife Service (1997) assessment criteria for archaeological significance have been developed to deal specifically with archaeological resources and cover:

A) Research Potential. This criterion is designed to qualify the significance of potential research which may be carried out at a site. Significance is apportioned according to the amount of new information which might be contained in the deposit, rather than the potential to yield a large number of artefacts. A site may have high significance under this criterion if it has an intact stratigraphic sequence and good integrity, the potential to provide a chronology extending into the past, or if it is connected to other sites within the region. Within this criterion are the subsets of representativeness and rarity. Representativeness is the ability of the site to demonstrate a type of site or deposit. This is important to maintain a contingency

sample of all site types. Rarity is often described within the framework of representativeness as it relates to the distinctive features of a site which set it apart from similar sites.

B) Educational Potential. This criterion allows the educational value of a site to be considered as a component of significance. Under this criterion, an archaeologist may assess the potential of a site to educate the general public. DECCW has acknowledged that this criterion is open to misinterpretation by archaeologists who have the ability to convey the value of a site to other archaeologists. DECCW recommends that, in cases where significance is determined on educational potential, the onus is on the archaeologist to go to the public for an assessment of this value.

C) Aesthetic Significance. Aesthetic significance is not inherent in a place, but arises from the response that people have to it. It is pertinent to remember that this response can vary dramatically between cultures and social groups; therefore an assessment of significance based on aesthetic value should incorporate the views of different cultures.

For a full description of assessment procedures refer to the Aboriginal Cultural Heritage: Standards and Guidelines Kit (NPWS 1997). These criteria have been designed to deal specifically with the archaeological resource; however they do not provide a framework for the assessment of social significance to the Aboriginal community. For this reason, the criteria for assessment provided in the *Australia ICOMOS charter for the conservation of places of cultural significance* (the Burra Charter) are also used to assess significance as they provide a framework for a more holistic assessment of significance.

9.4 ASSESSMENT OF AREAS IDENTIFIED IN THIS STUDY

The comments made in this section are a reflection of significance from a scientific perspective only, based on established DECCW approved significance assessment criteria. They are not intended as a reflection of cultural significance. Please refer to stakeholder comments for relevant views and statements of cultural significance (Appendix B.4).

Each of the criteria of assessment outlined in the previous section will now be considered in the sub-sections below.

9.4.1 Research Potential

The research and educational potential of the sites and areas of potential archaeological deposit identified in the field assessment is presented in Table 9.1 and discussed below.

As described in Section 9.3, the research potential of Aboriginal archaeological sites is based on the amount of new information which might be obtained from more detailed investigation of the site; the representativeness or ability of the site to demonstrate a type of site or deposit; and, the rarity or distinctiveness of the site in relation to other sites.

Due to the disturbed context in which they were found and the lack of potential for associated subsurface material, the isolated finds recorded during the Calderwood Project are considered to offer low potential for new information, representativeness and rarity and therefore have low research potential. CP-IF-11, a large core of banded red silcrete, was given a rating of moderate representativeness as a good example of a core due to the seven distinct flake scars and the large size of the core. However, it was found in the severely disturbed context of a dam exposure and so it still offers low potential for new information; the large number of cores found in CP-S-14/CP-PAD-05 means that CP-IF-11 is also of low rarity for the Calderwood Project area. As a result the overall research potential of CP-IF-11 is considered to be low.

The scatters recorded during the Phase 2 Field Assessment for the Calderwood Project represented different levels of research potential. The majority were considered to be of low potential due to the disturbed context, the lower potential of the area in which they were located based on past land use and condition as observed during the Field Assessment, and the number and variety of associated artefact type and raw material. CP-S-13 was ascribed low to moderate potential for subsurface archaeological deposit based on the landform where the dam exposure is located. However, the overall research potential is still considered to be low in comparison with other sites in the Calderwood Project area and surrounds.

These sites include those open artefact scatters considered to have high potential for intact subsurface deposit, namely CP-S-14/CP-PAD-05, and those with moderate to high potential,

namely CP-S-06/CP-PAD-02, CP-S-09/CP-PAD-03, and that site with moderate potential, namely CP-S-11/CP-PAD-04.

CP-S-14/CP-PAD-05 is considered to offer high potential for providing additional information for past Aboriginal activity in the Marshall Mount Creek catchment area, and thereby clarifying the findings of AMBS' landscape-based study and test excavation of the WDRA (AMBS 2006). Based on the surface assemblage it is considered possible that the area could represent a primary knapping location, due to the relatively high number of cores present. An open artefact scatter of this size, and with potential to be a primary knapping location, may be both representative and rare within the Calderwood Project area and also in the immediate vicinity. The site has been given a representativeness rating of moderate to high, as it is not known whether the site definitely represents a primary knapping location – test excavation will be necessary to determine this. The site has been given a rarity rating of high due to its rarity in comparison to other sites found in the Calderwood Project area and also in the immediate vicinity.

CP-S-06/CP-PAD-02 and CP-S-09/CP-PAD-03 are considered to offer moderate to high potential for intact archaeological deposit, and corresponding potential to offer new information. As they are located on different landform units to CP-S-14/CP-PAD-05, they have potential to offer additional information on past Aboriginal activities and the effect of past land use and taphonomic processes on the archaeological record in areas further away from major streams. Based on the surface material, CP-S-06/CP-PAD-02 is considered to have potential to represent a secondary flake reduction location, however further testing would be required to confirm this; therefore it has been ascribed a representativeness rating of moderate. CP-S-09/CP-PAD-03 has also been ranked as being of moderate representativeness based on its landform location. A rarity rating of moderate to high has been ascribed to both scatters and their associated PADs based on comparison to other sites in the Calderwood Project area and surrounds.

Table 9.1 Assessments of Research Potential

Site Name	Potential for new information	Representativeness	Rarity	Research Potential
CP-IF-01	Low	Low	Low	Low
CP-IF-02	Low	Low	Low	Low
CP-S-01	Low	Low	Low	Low
CP-S-02	Low	Low	Low	Low
CP-IF-03	Low	Low	Low	Low
CP-S-03	Low	Low	Low	Low
CP-IF-04	Low	Low	Low	Low
CP-IF-05	Low	Low	Low	Low
CP-S-04	Low	Low	Low	Low
CP-IF-06	Low	Low	Low	Low
CP-IF-07	Low	Low	Low	Low
CP-IF-08	Low	Low	Low	Low
CP-S-05	Low	Low	Low	Low
CP-IF-09	Low	Low	Low	Low
CP-IF-10	Low	Low	Low	Low
CP-IF-11	Low	Moderate	Low	Low
CP-IF-12	Low	Low	Low	Low
CP-PAD-01	Low	Low	Low	Low
CP-S-06 / CP-PAD-02	Moderate to High	Moderate	Moderate to High	Moderate to High
CP-S-07	Low	Low	Low	Low

Site Name	Potential for new information	Representativeness	Rarity	Research Potential
CP-IF-13	Low	Low	Low	Low
CP-S-08	Low	Low	Low	Low
CP-IF-14	Low	Low	Low	Low
CP-IF-15	Low	Low	Low	Low
CP-S-09 / CP-PAD-03	Moderate to High	Moderate	Moderate	Moderate to High
CP-IF-16	Low	Low	Low	Low
CP-S-10	Low	Low	Low	Low
CP-S-11 / CP-PAD-04	Moderate	Moderate	Moderate	Moderate
CP-S-12	Low	Low	Low	Low
CP-S-13	Low	Low	Low	Low
CP-S-14 / CP-PAD-05	High	Moderate – High	High	High
CP-S-15	Low	Low	Low	Low
CP-IF-17	Low	Low	Low	Low
CP-IF-18	Low	Low	Low	Low

9.4.2 Educational Potential

The educational potential of a study area is best considered in light of its value to the general public, the Aboriginal stakeholders, and other researchers: those people whom the archaeologist has a duty to inform. Therefore the educational potential of the current study area is directly linked to its research potential: what can be learnt from further archaeological investigation, and whom will that knowledge benefit?

The educational value of a site to the general public is the most important criterion. The educational potential must be linked to something that can add to the public's knowledge of the Aboriginal past of a particular area.

In the case of the Calderwood Project area, the educational value of the study area is low to moderate. The variety of surface sites and their distribution across different landforms has potential to provide an overview of past Aboriginal land use across the Calderwood Project area.

However, the sites of highest archaeological potential are those large open artefact scatters with associated PAD. The concept of 'archaeological potential' is neither tangible nor accessible to a public audience and would be unlikely to excite considerable interest.

Exceptions would occur should direct evidence of contact era archaeology (i.e. glass or ceramic artefacts modified by past Aboriginal people and/or relatively intact artefact deposits in areas directly associated with historic Aboriginal camps) be uncovered during subsequent archaeological excavations. This is likely to increase the public's interest in the archaeology of the Calderwood Project area. It is emphasised that as yet no such evidence has been noted.

The perspective of Aboriginal stakeholders is likely to differ from that of the archaeologist and that of the general public: the archaeological record is a component of Aboriginal oral history and prehistory. As a non-Aboriginal person, the consultant is unable to offer such a valuation as has been provided in consideration of the general public or other researchers.

What can be offered in terms of considering educational value and Aboriginal stakeholders is that which has been offered before in this consideration of overall potential. That is, that the information from the current study area is unlikely to shed new light on Aboriginal people's use of landscape in times past, and may also be assessed as low. However it is appreciated that perspectives do differ and unlike the general public or other researchers, Aboriginal stakeholders may see the compilation of further archaeological data of the same type as a confirmation of their story, which may be of high educational value to them.

Lastly, although the consultant acknowledges that in consideration of a study area's educational potential that its value in educating other archaeologists and researchers is not paramount, it is still of importance. The open artefact scatters and associated PADs which have been identified as being of moderate to high and high research potential were designated as such based on their potential to offer additional archaeological information pertaining to the Calderwood Project area and the surrounding Coastal Plain physiographic region. Therefore the educational value of the current study area for other researchers is considered to be moderate.

Taking these three perspectives into consideration, the overall educational value of the current study area is considered to be low to moderate. The educational value would be increased should excavation be necessary and identifiably Contact-era artefacts be uncovered.

9.4.3 Aesthetic Significance

Professional archaeologists view aesthetic significance as an attribute that can only be culturally determined by Aboriginal stakeholders. As noted in Section 9.3, the concept of aesthetic significance deals with the response that people have to a particular place. This criterion differs from the other two in that it is not so readily quantifiable but takes into account a subjective or emotive response to a place as opposed to providing comment upon a tangible item (such as an Aboriginal artefact) or an issue of research relevance (such as an area of PAD).

The criteria that deal with research and educational significance are almost wholly concerned with the archaeological or 'scientific' significance. These are values that are determined by archaeologists, as has been included in subsections 9.4.1 & 9.4.2. However this report must also take into account the Aboriginal *cultural* heritage value of a site or study area. It is this criterion that is utilised to such an end. Only members of the local Aboriginal community can advise of the cultural significance of an area or place.

To gain a determination of cultural significance, the consultant has approached and consulted with the identified Aboriginal stakeholders. This is in keeping the DECCW Aboriginal community consultation guidelines and ethical consultative practice. Each stakeholder organisation was asked to consider the study area from the perspective of the Aboriginal cultural heritage and offer any insights and/or knowledge they may have specific to the current study area.

Both of the Aboriginal stakeholder organisations consulted for the Aboriginal archaeological and cultural heritage assessment of the Calderwood Project study area – namely ILALC and WNDAC – expressed a contemporary link with the local area and the archaeological record contained within. Comments on the project received from these groups are presented in Appendix B.4

10.0 CONCLUSION AND RECOMMENDATIONS

10.1 CONCLUSIONS

The Aboriginal archaeological and cultural heritage Phase 1 Desktop Assessment of the Calderwood Project area was undertaken in December 2009; the Phase 2 Field Assessment was undertaken over nine days in December 2009 and January 2010. Representatives from ILALC and WNDAC were registered as Aboriginal stakeholder groups and consulted with as per the Part 3a Guidelines (DEC 2005b). ILALC representatives participated in the Field Assessment; WNDAC was not able to provide representatives for the Field Assessment but was provided, with ILALC, the opportunity to review a draft of the current report and its recommendations.

34 new Aboriginal archaeological sites, containing at least 188 surface artefacts, were identified during field assessment. They consisted of 18 isolated finds (52.94%), 11 open artefact scatters (32.35%), four open artefact scatters with associated potential archaeological deposit (11.76%) and one potential archaeological deposit without surface material (2.94%). The dominant raw material was silcrete, followed by chert, mudstone, FGS, petrified wood, quartz, basalt and river cobble. The most common artefact type was the flake, followed by cores, flaked pieces, and a single instance each of a hand axe, a milling stone or pestle, and a possible broken hammer stone.

28 of these sites have been assessed as having low archaeological potential and therefore do not warrant further archaeological investigation. CP-S-13 is considered to have low to moderate archaeological potential and also is not considered to warrant further archaeological investigation. If the surface artefacts in these sites are to be impacted by the proposed development, salvage through surface collection has been discussed while onsite with representatives of ILALC. No further archaeological investigation or salvage excavation is recommended for CP-PAD-01. This is reproduced as a recommendation in Section 10.2 below.

The four open artefact scatters with associated PAD (namely CP-S-09/CP-PAD-02, CP-S-09/CP-PAD-03, CP-S-11/CP-PAD04 and CP-S-14/CP-PAD-05) were identified on the basis of surface archaeological material and landform. The potential of the associated PADs range from low to moderate, moderate, moderate to high and high depending on such factors as proximity to waterways, predictive modelling potentials and past land disturbance. They also cover a range of landform types across the Calderwood Project area. As such a programme of subsurface archaeological testing has been included as a recommendation in Section 10.2 below.

10.1.1 Compliance Report for State Significant Site and Director General's Requirements

The process which has been followed to meet the Director General's Requirement is provided as a checklist in Table 10.1 below. This table will be reproduced as a separate document for DLL's use as per the requirements of the Brief.

Table 10.1 Compliance Report Checklist

Director General's Requirement	Response
• The EA [Environmental Assessment] is to identify the nature and extent of impacts on any Aboriginal cultural heritage and address the requirements set out in the draft *"Guidelines for Aboriginal Cultural Heritage Impact Assessment and Community Consultation".*	• The Phase 1 Desktop Assessment and Phase 2 Field Assessment components will inform the EA required by the DGR. • The Phase 1 Desktop Assessment and Phase 2 Field Assessment have been undertaken as per the DECCW *Draft Guidelines for Aboriginal Cultural Heritage Impact Assessment and Community Consultation* 2005 (*the Part 3A Guidelines*) (DEC 2005b) and also take into consideration the *Part 5 Guidelines* (DEC 2005a), in the interest of completing full and comprehensive consultation (inclusive of Aboriginal stakeholders) for this project. • Both the Phase 1 Desktop Assessment and Phase 2 Field Assessment components have been undertaken as per the best practice heritage

	management requirements of the DECCW "Guidelines" and the ICOMOS Burra Charter.
Requirements of the *NP&W Act*	
• As the Calderwood Project is being assessed under *Part 3A of the EP&A Act*, AHIP consents from DECCW under Sections 87 and 90 of the *NP&W Act* are not required. Section 91 still applies and is triggered upon the discovery of any Aboriginal objects or places.	• Site cards have been prepared for all Aboriginal archaeological sites recorded during the Phase 2 Field Assessment component. • These site cards will be submitted to the DECCW AHIMS Registrar in accordance with the notification requirement of Section 91 of the *NP&W Act*.

10.2 RECOMMENDATIONS

As a result of the Phase 2 Field Assessment of the full Aboriginal archaeological and cultural heritage assessment of the Calderwood Project, the following recommendations are made.

1. No further archaeological investigation is deemed necessary for sites CP-IF-01, CP-IF-02, CP-S-01, CP-S-02, CP-IF-03, CP-S-03, CP-IF-04, CP-IF-05, CP-S-04, CP-IF-06, CP-IF-07, CP-IF-08, CP-S-05, CP-IF-09, CP-IF-10, CP-IF-11, CP-IF-12, CP-S-07, CP-IF-13, CP-S-08, CP-IF-14, CP-IF-15, CP-IF-16, CP-S-10, CP-S-12, CP-S-15, CP-IF-17 and CP-IF-18, or the area of low potential PAD CP-PAD-01.

2. Salvage through collection and relocation of surface artefacts is recommended for CP-IF-01, CP-IF-02, CP-S-01, CP-S-02, CP-IF-03, CP-S-03, CP-IF-04, CP-IF-05, CP-S-04, CP-IF-06, CP-IF-07, CP-IF-08, CP-S-05, CP-IF-09, CP-IF-10, CP-IF-11, CP-IF-12, CP-S-07, CP-IF-13, CP-S-08, CP-IF-14, CP-IF-15, CP-IF-16, CP-S-10, CP-S-12, CP-S-15, CP-IF-17 and CP-IF-18 if they are to be impacted by development for the Calderwood Project.

3. The development and implementation of a programme of test excavation and reporting is required to clarify the archaeological potential of CP-S-06/CP-PAD-02, CP-S-09/CP-PAD-03, CP-S-11/CP-PAD-04 and CP-S-14/CP-PAD-05, if they are to be impacted by development for the Calderwood Project.

4. The development and implementation of a programme of salvage excavation and reporting is recommended for CP-S-06/CP-PAD-02, CP-S-09/CP-PAD-03, CP-S-11/CP-PAD04 and CP-S-14/CP-PAD-05, if it is warranted by the results of the test excavation programme.

5. The development and implementation of a Care and Control of artefacts strategy, devised through consultation with ILALC and WNDAC, is recommended for all collected and excavated archaeological material retrieved during the abovementioned surface collection, testing and/or salvage excavation works. Such a strategy should be agreed and finalised with the Aboriginal stakeholders prior to any archaeological site works commencing.

6. Two properties, located at 269 North Macquarie Road and 342 Calderwood Road, were not accessible during the archaeological survey. If they are to be impacted by development for the Calderwood Project it is recommended that they be assessed for their archaeological potential.

7. If additional unrecorded Aboriginal archaeological material is encountered during development, works must cease immediately to allow an archaeologist to make an assessment of the finds, as all Aboriginal artefacts (known and unknown) are protected under Section 90 of the *NP&W Act*. The archaeologist may need to consult with NSW DECCW and registered stakeholder groups concerning the significance of any such material. DECCW must be notified of any such finds as per Section 91 of the *NP&W Act*.

8. As required by the *NSW Heritage Act 1977* (amended), in the event that historic relics are encountered, works must cease immediately to allow an archaeologist to make an assessment of the finds. The archaeologist may need to consult with the Heritage Branch Department of Planning concerning the significance of any historic cultural material encountered.

9. Restriction of access to Aboriginal archaeological information is recommended, in the event that this report is to go on public exhibition. Consultation with Austral Archaeology Pty Ltd, the registered Aboriginal stakeholders ILALC and WNDAC, DoP and DECCW will be necessary to determine the appropriate level of public release.

10. It is recommended that copies of the finalised report be provided to ILALC, WNDAC and NSW DECCW, and that the completed site cards be provided to the DECCW AHIMS Registrar as per Section 91 of the *NP&W Act*.