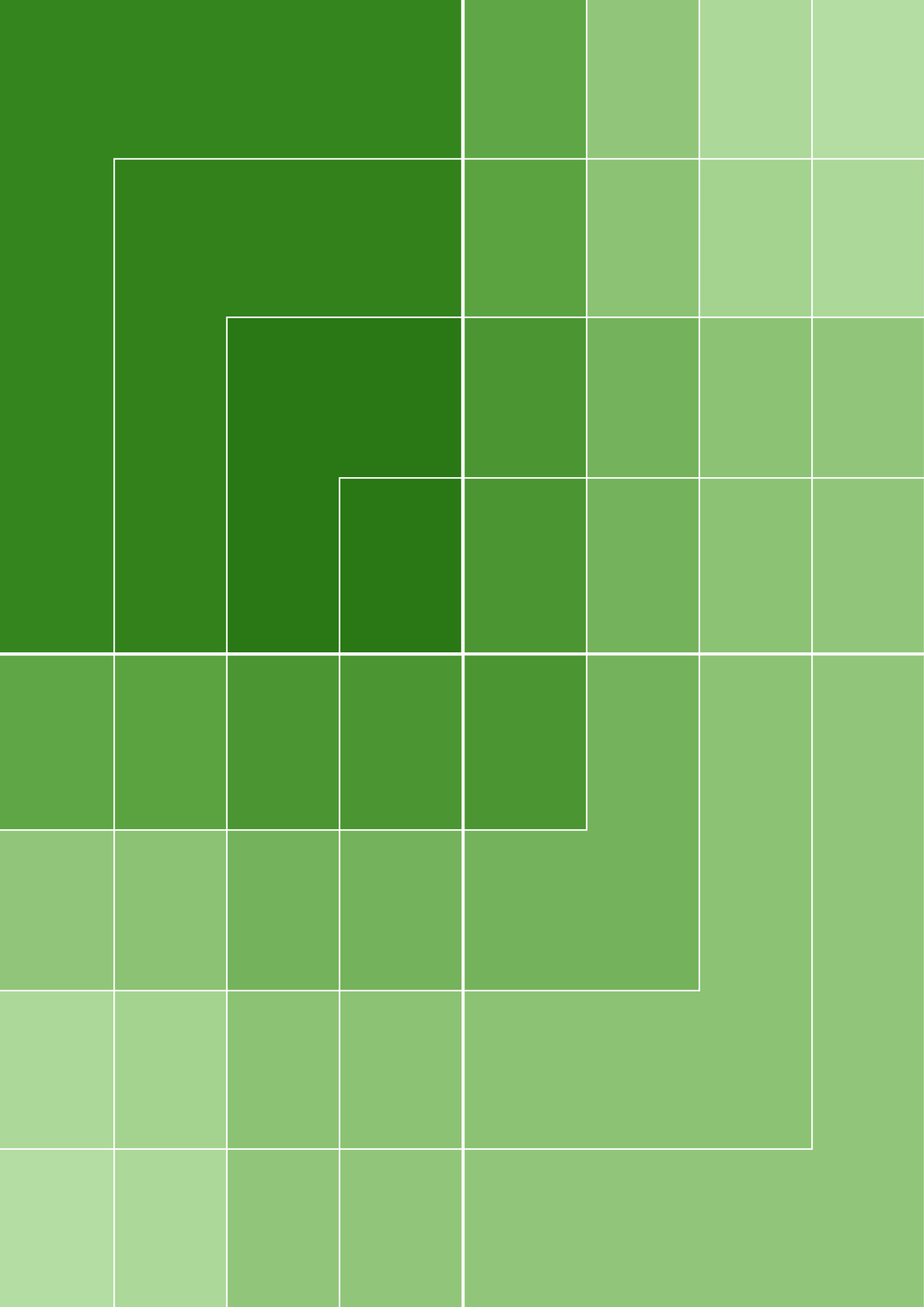


Technical Paper 5

Indigenous Heritage



Godden Mackay Logan

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&

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North West Rail Link

EIS 1—Major Civil Construction Works

Indigenous Heritage

Report prepared for NWRL Planning Approvals Team

March 2012

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Executive Summary

Godden Mackay Logan + Jo McDonald Cultural Heritage Management (GML + JMcDCHM) have been engaged to prepare an Indigenous Heritage Report to as part of the Environmental Impact Assessment (EIA) for the Major Civil Construction Works component of the North West Rail Link (NWRL).

The NWRL is a priority transport infrastructure project for the NSW Government. Transport for New South Wales (TfNSW) is proposing to undertake construction and operation of the NWRL, a new 23-kilometre electrified passenger rail line between Epping and Rouse Hill. The proposed route for the NWRL traverses through Hornsby, The Hills and Blacktown Local Government Areas (LGAs). The project includes eight new stations (Cherrybrook, Castle Hill, Hills Centre, Norwest, Bella Vista, Kellyville, Rouse Hill and Cudgegong Road), a stabling facility and associated ancillary infrastructure. This report addresses the potential impact on Aboriginal heritage within 17 construction sites.

In 2008 the NWRL project was granted Concept Plan Approval (Reference 06_0157) under Part 3A of the EP&A Act 1979. The Concept Plan Approval provided the project with Conditions of Approval, which provided the basis for environmental and heritage assessment. In addition a Statement of Commitments (SoC) was formerly endorsed in these conditions. After Part 3A of the EP&A Act was repealed in 2011, the NWRL project was declared a State Significant Infrastructure (SSI) Project, and will be assessed under Part 5.1 of the EP&A Act. Aboriginal Heritage Impact Permit(s) (AHIP), under the NPW Act 1974, are not required, unless requested by the Minister.

In order to assess the extent of Aboriginal heritage values associated with the NWRL project area, the Concept Plan Approval, and associated Statement of Commitments, has been used as the basis for this report. The requirements and conditions for Aboriginal consultation, impact assessment, significance assessment, development of mitigation strategies, are addressed in this report which has followed relevant best practice guidelines referred to in the Concept Plan Approval.

The objectives of this assessment were:

- to identify Aboriginal community members (the Registered Aboriginal Parties [RAPs]) who can speak for the Country within which the project is located, involve the RAPs in the cultural heritage assessment process and determine heritage management opinions with respect to the project and its potential 'harm' to Aboriginal cultural heritage;
- to understand the range and type of Aboriginal heritage values and places within the study area;
- to describe and understand the context of the identified Aboriginal sites within a wider Aboriginal cultural landscape, including consideration of Aboriginal tradition;
- to prepare a cultural heritage values assessment for identified aspects of Aboriginal cultural heritage;
- to determine how the proposed project may impact upon the identified Aboriginal cultural heritage;

- to provide recommendations to minimise impacts to Aboriginal cultural heritage through identifying sensible and pragmatic site and land management measures; and
- to develop a series of impact mitigation strategies and clear recommendations for the conservation of Aboriginal heritage values.

The proposed activity will remove all soil that bears, or has the potential to bear, Aboriginal objects within each of the NWRL's 17 construction sites. Sandstone bedrock associated with creek corridors which, in association with Caddies Creek, has the potential to contain grinding grooves will be modified by the proposed activity. The footprint of a number of Aboriginal heritage sites extends outside the boundaries of the construction site. The area of an Aboriginal site that extends outside the boundary of a construction site has the potential to be avoided by all impacts (such as vehicle movements, stockpiling of soils, etc.) with the result that conservation of portions of some identified Aboriginal sites may be possible.

At the current time there is no opportunity within the 17 construction sites for conservation of, or avoidance of impacts to, known Aboriginal sites and/or areas with archaeological potential. Therefore, construction of the proposed NWRL will result in an impact to 27 identified Aboriginal sites and areas with Potential Archaeological Deposit (PAD). The degree of impact depends upon the size of each Aboriginal site and how far it extends outside each of the construction sites.

The effect of impact arising from the proposed activity will be the complete and/or partial destruction of all known Aboriginal sites and places with a potential to contain Aboriginal sites associated with the NWRL's 17 construction sites. Overall, this impact will result in the potential loss of a further 27 Aboriginal sites from the Cumberland Plain (assuming all PADs contain archaeological deposit). Loss of such sites, without appropriate management and mitigation, culminates in a loss of Aboriginal heritage value.

Impacts and their consequence for all of known Aboriginal sites, places, landscape, values and areas of archaeological potential (as assessed in Chapters 5 and 6) are detailed in the table following. The description of harm, degree of harm and consequence of harm follows descriptions in the *OEH Code of Practice*.

In terms of the NWRL's future management of Aboriginal heritage, the following actions are recommended:

- develop an Aboriginal Heritage Management Plan for the project which aims to where possible consider conservation for sites with high archaeological potential and/or Aboriginal significance;
- consult with OEHS and provide AHIMS with records of all Aboriginal sites, archaeological test/salvage excavation and post-impact AHIMS cards;
- undertake archaeological test excavation following project approval but prior to construction works commencing at sites/PADs, within the construction footprint where required;
- determine the appropriate mechanism for the conservation of Aboriginal sites outside each construction site (as detailed in the table below);
- develop Aboriginal heritage training for site workers and include this training in all H&S inductions; and

- ensure the avoidance of Aboriginal sites where possible, and make the protection of the identified Aboriginal sites a priority during the construction works phase of the project.

The table below provides a summary of the known Aboriginal heritage sites/PADs by construction site and details the potential for reducing harm at each location, along with any requirements for further archaeological assessment through test, and possibly salvage, excavation.

Summary of Aboriginal sites, impact of the NWRL and proposed mitigation and management measures.

Construction site	Site/PAD name	Degree of harm	Aboriginal heritage management, mitigation and recommendations
1 – Epping Decline	None	None	No specific Aboriginal heritage management is required in this construction site.
2 – Epping Services Facility	None	None	No specific Aboriginal heritage management is required in this construction site.
3 – Cheltenham Services Facility	NWRL PAD 1	Partial	Limit harm as detailed in Table 7.2. Basic Phase 1 archaeological excavation in the areas of impact. Possibly Phase 2 archaeological excavation (to be determined based on the results of Phase 1).
4 – Cherrybrook Station	45-5-2861 and NWRL PAD 2	Partial	Limit harm as detailed in Table 7.2. Basic Phase 1 archaeological excavation in the areas of impact. Possibly Phase 2 archaeological excavation (to be determined based on the results of Phase 1).
5 – Castle Hill Station	None	None	No specific Aboriginal heritage management is required in this construction site.
6 – Hills Centre Station	NWRL PAD 3	Partial	Limit harm as detailed in Table 7.2. Detailed Phase 1 archaeological excavation in the areas of impact. Possibly Phase 2 archaeological excavation (to be determined based on the results of Phase 1).
7 – Norwest Station	None	None	No specific Aboriginal heritage management is required in this construction site.
8 – Bella Vista Station	None	None	No specific Aboriginal heritage management is required in this construction site.
9 – Balmoral Rd	14 Cumbelege Lane (1) and NWRL PAD 6	Total	Detailed Phase 1 archaeological excavation in the areas of impact. Possibly Phase 2 archaeological excavation (to be determined based on the results of Phase 1).
9 – Balmoral Rd	NWRL PAD4	Total	Detailed Phase 1 archaeological excavation in the areas of impact. Possibly Phase 2 archaeological excavation (to be determined based on the results of Phase 1).
9 – Balmoral Rd	NWRL PAD5	Total	Detailed Phase 1 archaeological excavation in the areas of impact. Possibly Phase 2 archaeological excavation (to be determined based on the results of Phase 1).
10 – Memorial Ave	Corner of Taggart Way and Balmoral Road	Total	Community collection of object. No further archaeological work required.
10 – Memorial Ave	NWRL PAD7	Near total	Basic Phase 1 archaeological excavation in the areas of impact. Possibly Phase 2 archaeological excavation (to be determined based on the results of Phase 1).

Construction site	Site/PAD name	Degree of harm	Aboriginal heritage management, mitigation and recommendations
10 – Memorial Ave	45-5-3354	Total	Detailed Phase 1 archaeological excavation in the areas of impact. Possibly Phase 2 archaeological excavation (to be determined based on the results of Phase 1).
10 – Memorial Ave	45-5-3158	Total	Community collection of object. No further archaeological work required.
11 – Kellyville Station	45-5-2365 and NWRL PAD 8	Partial	Limit harm (Table 7.2); archaeological excavation in the areas of impact.
11 – Kellyville Station	NWRL PAD9	Total	Basic Phase 1 archaeological excavation in the areas of impact. Possibly Phase 2 archaeological excavation (to be determined based on the results of Phase 1).
12 – Samantha Riley Drive to Windsor Rd	45-5-0933	Near total	Detailed Phase 1 archaeological excavation in the areas of impact. Possibly Phase 2 archaeological excavation (to be determined based on the results of Phase 1).
13, 14 – Old Windsor Rd to White Hart Dr, Rouse Hill Station	NWRL PAD 10	Partial	Limit harm as detailed in Table 7.2. Basic Phase 1 archaeological excavation in the areas of impact. Possibly Phase 2 archaeological excavation (to be determined based on the results of Phase 1).
13 – Old Windsor Rd to White Hart Dr	45-5-3188	Total	Determine whether an area with archaeological potential remains through a basic Phase 1 archaeological excavation in the areas of impact. Possibly Phase 2 archaeological excavation (to be determined based on the results of Phase 1).
14, 15 – Rouse Hill Station, Windsor Road Viaduct	NWRL PAD 11	Partial	Limit harm as detailed in Table 7.2. Basic Phase 1 archaeological excavation in the areas of impact. Possibly Phase 2 archaeological excavation (to be determined based on the results of Phase 1). This PAD has a low level of potential—single objects have been found in the area. Some basic testing is warranted across the wider impact area to confirm the general absence of dense archaeological deposit and impact in this area.
16 – Windsor Rd Viaduct to Cudgegong Rd	45-5-2805 RH/SP15	Partial	Limit harm as detailed in Table 7.2. Detailed Phase 1 archaeological excavation in the areas of impact. Possibly Phase 2 archaeological excavation (to be determined based on the results of Phase 1).
16 – Windsor Rd Viaduct to Cudgegong Rd	45-5-3930	Total	Community collection of object. No further archaeological work required.
16 – Windsor Rd Viaduct to Cudgegong Rd	69 Schofields Road 45-5-4112	Total	Detailed Phase 1 archaeological excavation in the areas of impact. Possibly Phase 2 archaeological excavation (to be determined based on the results of Phase 1). This site may be subject to some test excavation by the RMS (in 2012). This work may alter the required scope of work for the NWRL.
16/17 – Windsor Rd Viaduct to Cudgegong Rd/ Tallawong Stabling Facility	59 Schofields Road	Total	Detailed Phase 1 archaeological excavation in the areas of impact. Possibly Phase 2 archaeological excavation (to be determined based on the results of Phase 1).

Construction site	Site/PAD name	Degree of harm	Aboriginal heritage management, mitigation and recommendations
16/17 – Windsor Rd Viaduct to Cudgegong Rd/ Tallawong Stabling Facility	65 Schofields Road	Total	Community collection of object. No further archaeological work required.
16 – Windsor Rd Viaduct to Cudgegong Rd	45-5-3931	Total	Community collection of object. No further archaeological work required.
17 – Tallawong Stabling Facility	45-5-3392	Total	Determination as to the extent of archaeological excavation undertaken under Part 3A. Potentially a detailed Phase 1 archaeological excavation in the areas of impact. Possibly Phase 2 archaeological excavation (to be determined based on the results of Phase 1).
17 – Tallawong Stabling Facility	45-5-3933 RH/A20P 18	Total	Community collection of object. No further archaeological work required.
17 – Tallawong Stabling Facility	45-5-3355	Total	Community collection of object. No further archaeological work required.
17 – Tallawong Stabling Facility	RH/A20P PAD 5	Total	Detailed Phase 1 archaeological excavation in the areas of impact. Possibly Phase 2 archaeological excavation (to be determined based on the results of Phase 1).
17 – Tallawong Stabling Facility	28 Tallawong Road	Total	Community collection of object. No further archaeological work required.

1.0 Introduction

1.1 Project Background

Godden Mackay Logan + Jo McDonald Cultural Heritage Management (GML + JMcDCHM) have been engaged to prepare an Aboriginal Heritage Report as part of the Environmental Impact Assessment (EIA) for the Major Civil Construction Works component of the North West Rail Link (NWRL).

The NWRL is a priority transport infrastructure project for the NSW Government. Transport for New South Wales (TfNSW) is proposing to undertake construction and operation of the NWRL, a new 23km electrified passenger rail line between Epping and Rouse Hill. The project includes eight new stations (Cherrybrook, Castle Hill, Hills Centre, Norwest, Bella Vista, Kellyville, Rouse Hill and Cudgegong Road), a stabling facility and associated ancillary infrastructure.

This report addresses the potential impact on Aboriginal heritage within 17 construction sites:

- Construction Sites 1 to 4—Epping to Cherrybrook
- Construction Site 5—Castle Hill Station
- Construction Site 6—Hills Centre Station
- Construction Site 7—Norwest Station
- Construction Site 8—Bella Vista Station
- Construction Site 9—Balmoral Road (Bella Vista Station to Balmoral Road)
- Construction Site 10—Memorial Avenue (Balmoral Road to Memorial Avenue)
- Construction Site 11—Kellyville Station (Memorial Avenue to Samantha Riley Drive)
- Construction Site 12—Samantha Riley Drive to Windsor Road
- Construction Site 13—Old Windsor Road to White Hart Drive
- Construction Site 14—Rouse Hill Station
- Construction Site 15—Windsor Road Viaduct
- Construction Sites 16 and 17—Windsor Road Viaduct to Cudgegong Road, Cudgegong Road Station and Tallawong Stabling Yard

1.2 Statutory Context

In NSW Aboriginal heritage is principally protected under two Acts:

- the *National Parks and Wildlife Act 1974* (NPW Act); and
- the *Environmental Planning and Assessment Act 1979* (EP&A Act).

In 2008 the NWRL project was granted Concept Plan Approval (Reference 06_0157) under Part 3A of the EP&A Act 1979. The Part 3A Concept Plan Approval provided the project with Conditions of Approval, which provided the basis for environmental and heritage assessment. In addition a Statement of Commitments (SoC) was formerly endorsed in these conditions.

In 2011 Part 3A, of the EP&A Act, was repealed and an approval mechanism for State significant development was implemented—the State and Regional Development State Environmental Planning Policy 2011 (SEPP).

In December 2011 Transport for NSW made an application to the Department of Planning and Infrastructure (DPI) for the NWRL project to be assessed as a State Significant Infrastructure (SSI) Project (application number SSI-5100).

As a declared SSI Project, the project will be assessed under Part 5.1 of the EP&A Act. Aboriginal Heritage Impact Permit(s) (AHIP), under the NPW Act 1974, are not required, unless requested by the Minister.

In order to assess the extent of Aboriginal heritage values associated with the NWRL project area, the Part 3A Concept Plan Approval, and associated Statement of Commitments, have been used as the basis for this report. These documents specify adherence to the Department of Environment and Conservation (DEC NSW) 2005 *Draft Guidelines for Aboriginal Cultural Heritage Impact Assessment and Community Consultation—for development applications assessed under Part 3A of the Environmental Planning and Assessment Act 1979*.

In addition, the Concept Plan Approval Condition 3.14 Aboriginal Heritage is relevant and has been addressed in this report:

The Proponent shall review the Indigenous heritage impacts of the project considering cumulative impacts from surrounding development consistent with:

- a) Steps 1 to 4 of the Protocol for Aboriginal Stakeholder Involvement in the assessment of Aboriginal cultural heritage in the Sydney Growth Centres (Context Pty Ltd, 2006a) and the Precinct Assessment Method for Aboriginal Cultural Heritage in the Sydney Growth Centres (Context Pty Ltd, 2006a), for land within the North West Growth Centre; and*
- b) Guidelines for Aboriginal Cultural Heritage Impacts Assessment and Community Consultation (DECC July 2005), for all other areas.*

The Proponent shall identify mitigation priorities with consideration to the regional significance of impacts.

In meeting the conditions of approval and the Director General's requirements, the Department of Transport has made a statement of commitments to do the following in relation to Aboriginal heritage:

Potential for environmental impacts on Aboriginal and non-Aboriginal heritage minimised through management measures that are consistent with established protocols and guidelines.	<p>30. Additional research would be undertaken to determine the history and potential heritage significance of the sites identified in Castle Hill. Site-specific archaeological assessments would be undertaken in the event that they are found to have heritage significance.</p> <p>31. Site-specific archaeological assessments would be undertaken for the two archaeological sites identified along Old Windsor Road and Windsor Road.</p> <p>33. The Aboriginal Heritage protocol and methodology developed</p>
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for the Growth Centres would continue to be applied as the project progresses, in consultation with DECC and relevant Aboriginal groups.

34. A detailed assessment would be undertaken in the vicinity of sites identified to have moderate to high archaeological potential. The assessment would identify areas to be avoided, construction related impacts and how these can be managed; and, where required, salvage excavation prior to any subsurface impacts on the deposit. Advertising for interested parties would need to be undertaken prior to any subsurface investigations, in accordance with DECC requirements.

The requirements and conditions for Aboriginal consultation, impact assessment, significance assessment, and development of mitigation strategies, are addressed in this report.

1.3 NWRL Proposed Route

The proposed route for the NWRL traverses through Hornsby, The Hills and Blacktown Local Government Areas (LGAs). As a result the focus of this report is both the rail link stations and the areas where the rail line enters or exits the ground surface, or where it is in tunnel, runs atop the ground or on a viaduct. The stations are located at Epping, Cherrybrook, Castle Hill, Hills Centre, Norwest, Bella Vista, Kellyville, Rouse Hill and Cudgegong Road, with stabling at Tallawong. The location and boundary of the study area is shown in Figure 1.1.



Figure 1.1 North West Rail Link proposed route, stations and works. (Source: NSW Government Department of Transport)

1.4 Approach to Heritage Management

The following best practice guidelines referred to in this approval were taken into consideration during preparation of this assessment (the acronyms used here refer to the previous names for the NSW Environmental Protection Agency [EPA]):

- *The Protocol for Aboriginal Stakeholder Involvement in the Assessment of Aboriginal Heritage in the Sydney Growth Centres* (Context 2006a);

- *Precinct Assessment Method for Aboriginal Cultural Heritage in the Sydney Growth Centres* (Context 2006a);
- Office of Environment and Heritage (OEH) 2010, *Guide to investigating, assessing and reporting on Aboriginal cultural heritage in NSW*;
- Department of Environment, Climate Change & Water (DECCW) 2010, *Aboriginal cultural heritage consultation requirements for proponents*;
- Department of Environment and Conservation (DEC NSW) 2005, *Draft Guidelines for Aboriginal Cultural Heritage Impact Assessment and Community Consultation—for development applications assessed under Part 3A of the Environmental Planning and Assessment Act 1979*;
- Department of Environment and Conservation (DEC NSW) 2004, *Interim Community Consultation Requirements for Applicants*;
- *The Australia ICOMOS Burra Charter 1999* (Burra Charter); and
- Australian Heritage Commission *Ask First—A guide to respecting Indigenous heritage places and values*.

1.5 Objectives of Assessment

The objectives of this assessment were:

- to identify Aboriginal community members (the Registered Aboriginal Parties [RAPs]) who can speak for the Country within which the project is located, involve the RAPs in the cultural heritage assessment process and determine heritage management opinions with respect to the project and its potential 'harm' to Aboriginal cultural heritage;
- to understand the range and type of Aboriginal heritage values and places within the study area;
- to describe and understand the context of the identified Aboriginal sites within a wider Aboriginal cultural landscape, including consideration of Aboriginal tradition;
- to prepare a cultural heritage values assessment for identified aspects of Aboriginal cultural heritage;
- to determine how the proposed project may impact upon the identified Aboriginal cultural heritage;
- to provide recommendations to minimise impacts to Aboriginal cultural heritage through identifying sensible and pragmatic site and land management measures; and
- to develop a series of impact mitigation strategies and clear recommendations for the conservation of Aboriginal heritage values.

1.6 Author Identification

This report has been prepared by Diana Cowie, Graduate Consultant; Fiona Leslie, Associate; and Dr Tim Owen, Senior Consultant; with input from Lyndon Patterson, Senior Consultant; and Anita Yousif, Senior Consultant. This report has been reviewed by Professor Richard Mackay, Partner; Peter Romey, Partner; and Dr Jo McDonald, Director of JMcDCHM.

1.7 Acknowledgements

Fiona Leslie, Lyndon Patterson and Diana Cowie conducted the survey activities with the following Aboriginal representatives:

Representative	Group/Association
Steve Randall	Deerubbin Local Aboriginal Land Council
John Reilly	Darug Tribal Aboriginal Corporation
Gordon Workman	Darug Land Observations
Margaret Crawford	Darug Land Observations
Anne Crawford	Darug Land Observations
Libby Coplin	Darug Custodial Aboriginal Corporation
Gordon Morton	Darug Aboriginal Cultural Heritage Assessments
Des Dyer	Darug Aboriginal Landcare Inc.

Neville Hattingh, AECOM, provided assistance with background research and the field survey. Cecilia Densham, TfNSW, provided extensive support and assistance in organising property access for the field survey.

2.0 Aboriginal Consultation

2.1 Introduction

Aboriginal community consultation is a vital component of making a valid assessment of Aboriginal (heritage) values; especially values which include Aboriginal memories, stories and associations between the Aboriginal people and their traditional lands or Country. Aboriginal people frequently express an enduring connection to their Country, a connection that transcends generations, both past and present. This connection is expressed as a sense of belonging, which may manifest through physical objects or place; alternatively it may be presented as an intangible value, where an appreciation of an unseen quality or non-materialistic value connects a place in the landscape, tradition, observance, custom, lore belief and/or history to the person or group describing the item, event or value. The notion of intangible, social, or community values is essential to Aboriginal people as 'the effective protection and conservation of this heritage is important in maintaining the identity, health and wellbeing of Aboriginal people'.¹

Aboriginal community consultation followed the requirements of the following policy documents:

- DECCW 2010, *Aboriginal cultural heritage consultation requirements for proponents*
- DEC 2005, *Draft Guidelines for Aboriginal Cultural Heritage Impact Assessment and Community Consultation*

2.2 Aboriginal Groups Consulted and Consultation Method Used

In order to gather social and community views and opinions with respect to Aboriginal heritage, the NSW OEH/EPA has established a formal process involving identification, registration, engagement and consultation with Aboriginal peoples who may hold cultural knowledge relevant to determining the significance of an Aboriginal object and/or place.

Consultation with Aboriginal stakeholders was undertaken in the following stages:

Stage 1: Notification and Registration of Interests

Stage 1 in the consultation process is intended to notify potential stakeholders of the project and register interested Aboriginal stakeholders. These are generally people who hold cultural knowledge relevant to determining the cultural significance of Aboriginal objects and/or places in the area of the proposed project.

Letters requesting contact details of Aboriginal people or organisations that may hold cultural knowledge relevant to the study area, and any known heritage issues to be taken into consideration in the area, were sent via post on 21 October 2011 to the following agencies and groups:

- Blacktown City Council;
- Hornsby Shire Council;
- The Hills Shire Council;
- Parramatta City Council;
- Deerubbin Local Aboriginal Land Council (DLALC);

- Metropolitan Local Aboriginal Land Council (MLALC);
- Planning and Aboriginal Heritage Department, EPA;
- National Native Title Tribunal (NNTT);
- Native Title Service Corporation (NTSC);
- Office of the Registrar—Aboriginal Land Rights Act;
- Sydney Metropolitan Catchment Management Authority; and
- Hawkesbury Nepean Catchment Management Authority.

Owing to impending changes to legislation and the planning approvals process when these letters were sent out, a revised notification letter and covering letter was sent to the above organisations on 1 November 2011.

This letter informed organisations that GML + JMcDCHM had received confirmation that the project is a State Significant Infrastructure Project.

A notification was placed in *Hills News* and *Hills Shire Times* on 25 October 2011 and the *National Indigenous Times* and *Rouse Hill Times* on 26 October 2011, inviting Aboriginal people who hold relevant cultural knowledge to register in the process of community consultation by 11 November 2011.

Subsequently, those Aboriginal people or organisations that had been identified by the aforementioned agencies were contacted (Table 2.1), provided with information regarding the project and invited to register as an Aboriginal stakeholder for further consultation.

Table 2.1 Table of Aboriginal people or organisations identified in Stage 1

Aboriginal Organisation/Person	Contact	Date Sent	Reference
Metropolitan Local Aboriginal Land Council (MLALC)	Mr Ricky Lyons	14/11/11	Via email
Deerubbin Local Aboriginal Land Council (DLALC)	Mr Kevin Cavanagh	14/11/11	Via email
Parramatta Council Aboriginal and Torres Strait Islander Advisory Committee	Ms Maggie Kyle	14/11/11	Via email
Mr Tony Williams	Mr Tony Williams, 1 Pyrenees Way, Beaumont Hills NSW 2155	14/11/11	Via email
Darug Custodial Aboriginal Corporation (DCAC)	Ms Leanne Watson	14/11/11	Via email
Darug Aboriginal Cultural Heritage Assessments (DACHA)	Mr Gordon Morton and Ms Celestine Everingham	14/11/11	Via fax
Darug Land Observations (DLO)	Mr Gordon Workman	14/11/11	Via email
Darug Tribal Aboriginal Corporation (DTAC)	Ms Sandra Lee	14/11/11	Via email
Darug Aboriginal Land Care Inc (DALCI)	Mr Des Dyer	14/11/11	Via email

Aboriginal Organisation/Person	Contact	Date Sent	Reference
Gunjeewong Cultural Heritage Aboriginal Corporation	Ms Cherie Carroll Turrise	15/11/11	Via letter
Yarrawalk / Tocumwall	Mr Scott Franks	14/11/11	Via email
Bidjigal Reserve Trust	PO BOX 342, Baulkham Hills NSW 1755	15/11/11	Via letter
Northwest Aboriginal Development Association	Michael Wilmshurst PO Box 6062, Baulkham Hills BC NSW 1755	15/11/11	Via letter
Aunty Edna Watson	Aunty Edna Watson	22/11/11	Contacted by telephone. Aunty Edna Watson said she is represented by Leanne Watson, DCAC.
Community Care Northern Beaches (CCNB)	Contact: Jeanne Townsend, CCNB Aboriginal Advisor	22/11/11	Via email

The outcome of these processes was a list of 11 Aboriginal groups/people who registered for involvement in the consultation process. These stakeholders are termed the Registered Aboriginal Parties (RAPs) and are listed in Table 2.2.

Table 2.2 Registered Aboriginal Parties (RAPs)

Aboriginal Organisation/Person	Contact	Date Registration Received and Comments	Reference
MLALC	Paul Morris, CEO	14/11/11	Email registration
DLALC	Steven Randall	15/11/11	Email registration
Parramatta Council Aboriginal and Torres Strait Islander Advisory Committee	Ms Maggie Kyle	26/10/11 Email registration 15/11/11 GML received telephone call from Gill Saunders who said he is a traditional owner/elder and is a member of the committee and wishes to be involved with the project but registered as part of the committee. 16/11/11 GML received an email from the Committee regarding Bruce Gale, Chairperson of Council's Aboriginal and Torres Strait Islander Advisory Committee will attend the project briefing and will invoice for his time.	Email registration
Mr Tony Williams (Individual)	Mr Tony Williams	27/10/11 Email from Tony – he is a registered traditional owner and a community elder and wishes to register for the NWRL project. He has lived in the Hills Shire for over 65 years and has a cultural interest in the project as his great grandfather is buried on the creek bed near when he lives.	Received email from Mr Tony Williams

Aboriginal Organisation/Person	Contact	Date Registration Received and Comments	Reference
DCAC	Ms Leanne Watson	30/10/11 Registration of interest	Email registration
DACHA	Mr Gordon Morton and Ms Celestine Everingham	01/11/11 Registration of interest	Fax registration
Darug Aboriginal Land Care Inc (DALCI)	Mr Des Dyer	14/11/11 Registration of interest	Email registration
Darug Land Observations (DLO)	Mr Gordon Workman	15/11/11 Registration of interest	Email registration
Yarrawalk / Tocumwall	Mr Scott Franks	15/11/11 Registration of interest	Email registration
Darug Tribal Aboriginal Corporation (DTAC)	Ms Sandra Lee	16/11/11 DTAC wishes to register as primary registrants and will provide one representative for the meeting this Friday.	Email registration
Gunjeewong Cultural Heritage Aboriginal Corporation	Ms Cherie Carroll Turrise	16/11/11 Interest in attending briefing meeting for more project information and registered interest in project.	Phone registration

These RAPs are to be involved for the remainder of the project; no additional Aboriginal consultation outside of the RAPs will be undertaken.

Stage 2: Presentation of Information

A letter was sent to all RAPs, inviting them to attend a project briefing on Friday 18 November 2011, starting at Rouse Hill Shopping Centre. The attendants had an opportunity to visit a number of key locations, including the proposed stations. Refer to Appendix B for attendance details and correspondence related to this project briefing. Following this, GML+ JMcDCHM provided RAPs with written details of the proposed project, the proposed assessment methodology and background information, including some previous reports. This material was provided in hard copy and on CD by post on 22 November. RAPs were requested to provide comments on the methodology by Friday 2 December due to the proposed survey schedule.

Aboriginal stakeholders who responded in relation to the proposed survey methodology indicated their agreement verbally or in writing (refer to Appendix B for details). Where applicable, comments were incorporated into the methodology.

Stage 3: Gathering Information and Cultural Heritage Assessment

The field surveys took place on 29–30 November, 1, 6, 8 and 9 December 2011. Those RAPs who attended the survey are listed in Table 2.3. During the surveys, GML+ JMcDCHM archaeologists discussed with the community representatives the local Aboriginal heritage values and site patterning. This provided an understanding of the local perspective for Aboriginal habitation and subsistence patterns; as well as an understanding of some local intangible values. All participants were involved in identifying Aboriginal objects, recording the survey units and determining areas of potential archaeology and cultural heritage values. At the completion of the survey an open discussion was held, during which the objects were recorded, the archaeological potential and

required mitigation strategies were discussed and agreed upon by all present. The outcomes of this survey and consultation process underwrite this heritage assessment.

Table 2.3 RAP involvement in the field survey

RAP	Representative	Dates Involves in Survey
John Reilly	DTAC	6/12/11, 8/12/11, 9/12/11
Gordon Workman	DLO	6/12/11, 8/12/11, 9/12/11
Margaret Crawford (Anne)	DLO	6/12/11, 8/12/11, 9/12/11
Libby Coplin	DCAC	6/12/11, 8/12/11, 9/12/11
Gordon Morton	DACHA	6/12/11, 9/12/11
Des Dyer	DALCI	6/12/11, 9/12/11
Danny Franks	Yarrawalk/ Tocumwal	6/12/11
Steve Randall	Deerubbin LALC	29/11/11, 30/11/11, 01/12/11

Stage 4: Review of Draft Report by Registered Aboriginal Parties

The consultation process for the NWRL EIS project has provided an opportunity for RAPs to make an informed comment on the cultural significance of the project area. Following client review of the draft Aboriginal heritage assessment, each RAP was provided with the draft report by post on the 29 February 2012, for their review and feedback on the content, assessment and recommendations. Comments were due by 28 March 2012 and incorporated into this report.

2.3 Registered Aboriginal Party Submissions

Table 2.4 details all submissions made by the RAPs with respect to cultural knowledge and the cultural heritage values of the study area.

Table 2.4 RAP comments with respect to cultural heritage

#	RAP	Date of Submission	Format	Comment
1	Tony Williams	27 October 2011	Email	Tony is a community elder and traditional owner who has lived in the Hills Shire for over 65 years. His great grandfather is buried on the creek bed near where he lives.
2	DLO – Gordon Workman	15 November 2011	Email	DLO comprises traditional owners from the area under study. These traditional owners retain strong story and song lines, oral history and continued contact.
3	DACHA – Celestine Everingham	29 November 2011	Fax	Gordon Morton has over 20 years of field experience in the area and is aware of the cultural values and significance of the area.
4	DACHA – Celestine Everingham	7 March 2012	Fax	DACHA supports the summary of heritage management, mitigation and recommendations made in the heritage assessment report. DACHA would like to participate in all future field work as this area is a very important Darug Landscape.

#	RAP	Date of Submission	Format	Comment
5	DLALC – Kevin Cavanagh	12 March 2012	Email attachment	DLALC 'report that a number of areas within the Land Council boundary have the potential to contain subsurface Aboriginal cultural materials, namely, the Hills Centre, Kellyville, Samantha Riley Drive, Rouse Hill and the Tallawong stabling yards, as well as near the waterways along the rail route. Deerubbin LALC recommends further investigation be undertaken with salvage or excavations program before any development occurs.'
6	Bidjigal Reserve Trust – Wendy Goonan	26 March 2012	Email	'Bidjigal Reserve Trust manages Bidjigal Reserve, a substantial bushland located south of the proposed route of the NWRL in West Pennant Hills and Castle Hill. It is unlikely that the Rail Link will impact on the Aboriginal Cultural Heritage of the Reserve in any way.'

The complete consultation log and relevant letters, responses and details pertaining to this consultation are provided in Appendices A and B.

2.4 Requirements for Future RAP Consultation

Any future work relating to the Aboriginal archaeological mitigation, or any significant changes to the development, should include consultation with the RAPs.

2.5 Endnotes

¹ DECCW 2010 (April). *Aboriginal cultural heritage consultation requirements for proponents 2010*. DECCW, Sydney.

3.0 Aboriginal Heritage Context

In line with OEH reporting requirements¹, this section provides a review of previous archaeological work, the landscape context, regional character and an Aboriginal heritage predictive model.

3.1 Ethnohistory

The NWRL study area lies within the territory of the Darug or Dharug linguistic group² which consisted of smaller dialect/clans, including:

- Bidjigal or Bediagal, “woods tribes” or bediagal-tugagal-tugara—to the north west of Parramatta, between Parramatta and the Hawkesbury River, probably centred around the Castle Hill area³; and
- Buruberongal—to the north-west of Parramatta, approximately two hours walk from the Hawkesbury River.⁴

The Darug people’s subsistence was based on fishing, possum hunting and digging for yams, supplemented with foods such as kangaroo, wallabies, other small animals, creek and swamp resources such as eels, edible flowers and plant roots, honey from native bees, berries and fruits. Many different types of plants were used for containers, carriers and medicines.⁵

Near the coast and riverine margins of the Hawkesbury sandstone geology of the NWRL study area provided Aboriginal people with overhangs and rock shelters suitable for shelter and sometimes a “canvas” for art production. Exposed sandstone around creek lines was useful for ground-edged tool sharpening.

Stone suitable for lithic manufacture occurs across the Cumberland Plain. Some of the closest silcrete sources would have been the St Mary’s formation at Plumpton Ridge, Eastern Creek, and at Marsden Park. The Rickabys Creek Gravel and Maroota Sands contain flakeable stone such as silcrete, tuff, quartzite, porphyry and hornfels and as such would also have been a useful stone source for people on the northern side of the Cumberland Plain.

JMcDCHM 2006 identified the following resources which, in summary, would have attracted prehistoric Aboriginal occupation and use of the NWRL study area:

- Reliable freshwater;
- Freshwater plants and animals;
- Hinterland resources—tall open forest, woodland, and sheltered gully plants and animals;
- Timber/bark for fuel, shelter, material culture;
- Where present, sandstone overhangs for shelter and/or art;
- Where present, sandstone platforms for axe grinding;
- Local stone for tool making, e.g. quartz.⁶

3.2 Previous Archaeological Work

The purpose of this section is to synthesise available information from previous archaeological and ethno-historical studies to provide a context and baseline for what is known about Aboriginal cultural heritage in the subject area.

A literature review of the NSW Aboriginal Heritage Information Management System (AHIMS) library (and additional reports held by GML + JMcDCHM) was undertaken to understand the broader region's archaeological patterning. This review was targeted to those reports relevant to the study area. Previous investigations have been largely concentrated on the western end of the NWRL alignment, as the other sections are already highly urbanised. Keyword searches were used to find reports for the locality in AHIMS. A review of key reports is provided, in chronological order, below. Previous reports covering the whole NWRL study area are addressed first. Summaries of other reports are then presented according to construction site.

It should be noted that a number of reports requested from the AHIMS library, were not supplied. In such instances, the name of the report is provided, but the annotated notes indicate that the report was not available for review. Despite the absence of these reports, the Aboriginal heritage sites recorded during the studies have been recorded in the AHIMS database. AHIMS site cards were accessed and relevant information (such as the site content, extent and recommended management) has been used in the production of this report.

3.2.1 NWRL Project: Previous Reports

Rouse Hill Development Area Reports (JMcDCHM 1993, 2000, 2001, 2002, 2005 and McDonald and White 1993; McDonald, White and Barton 2004; White and McDonald 2010)

The Rouse Hill Infrastructure Project (RHIP) was undertaken within the Rouse Hill Development Area between Cattai Creek and Second Ponds Creek. There have been three stages of the infrastructure project and various archaeological assessments done for these stages. Some of these previous assessments examined land included in the NWRL corridor. In 1993 and 2002 Jo McDonald CHM undertook surveys for the RHIP. The 2002 survey (for Stage 3 works) covered land between Windsor Road, Rouse Road, Cudgegong Road and Schofields Road and included the land proposed for the Tallawong stabling facility. Parts of the alignment at Rouse Hill and the proposed location of Rouse Hill Station were surveyed with some Potential Archaeological Deposits (PADs⁸) test excavated during 1993 (for RHIP Stage 1 works). The survey covered land along Windsor and Old Windsor Roads, along Caddies Creek and the area between the roads and the creek, as well as Second Ponds Creek and Cattai Creeks. The Windsor Road to Caddies Creek land was investigated again under Stage 2.

The surface surveys and subsurface test excavations during all stages of the RHIP identified and recorded a total of 80 Aboriginal sites, comprising a mixture of open artefact sites, PADs and isolated artefacts. JMcDCHM 2006 identified that seven of these Aboriginal archaeological sites are likely to be impacted by the proposed NWRL alignment.

Consequent to the aforementioned studies, salvage excavations were completed for all three RHIP stages. All salvage excavations found subsurface archaeological deposits, even in areas where no surface artefacts were found. The most intact sites with greatest scientific value due to their integrity were in aggrading and stable landscapes. Ploughing had occurred across most of the sites; however, it only affected generally the top 30cm of soil.

Mills Archaeological and Heritage Service Pty Ltd 2003

The initial impact assessment for the NWRL was undertaken by Mills Archaeological and Heritage Services Pty Ltd in 2003. This assessment included a comprehensive pedestrian survey of the proposed surface route and the station site impact areas of proposed 2002 NWRL alignment (which differs to that proposed in 2010). This survey involved local Aboriginal representatives. Mills recorded a high degree of disturbance and few areas where potentially sensitive archaeological landforms had not already been impacted by development. These were concentrated on elevated areas adjacent to creeks, hill crests and areas of old growth timber and were considered to have the most potential to contain archaeologically sensitive deposit. The sites identified were predominantly open camp sites. At this time it was indicated that 13 Aboriginal sites (stone artefact sites and PADs) would be directly impacted by the NWRL proposal, ten of which were assessed as having high or potentially high significance. The subsequent realignment(s) of the NWRL avoids the majority of these sites.

Jo McDonald CHM Pty Ltd, 2006⁹

After the initial assessment of the NWRL 2002 proposed alignment (Mills 2003), JMcDCHM undertook a detailed Aboriginal heritage assessment of the proposed alignment of the NWRL to inform the Environmental Assessment prepared by GHD. The study included:

- identification of 14 Aboriginal sites (stone artefact sites and PADs), three of which were previously unrecorded, and some of which have moderate to high archaeological potential;
- community consultation;
- a significance assessment; and
- management recommendations.

The Rouse Hill area in particular was found through research and community consultation to have a high density of artefacts and any undisturbed deposits, despite the significant disturbance activities that have occurred in the area, are likely to retain evidence of Aboriginal occupation.

It was found that the identified sites and PADs may be impacted by the NWRL surface alignment, train stabling facility, ancillary tunnel support facilities and construction work sites. The report recommended avoidance of identified Aboriginal sites and PADs where possible: i.e. boring of the tunnel would be unlikely to have any impact on extant archaeological deposits above it. JMcDCHM 2006 also recommended that management planning for heritage sites should consider the broader archaeological landscape and noted there is potential for further, currently unidentified sites to be present in the study area.

Kelleher Nightingale 2010¹⁰

Kelleher and Nightingale undertook an Aboriginal Heritage Assessment to inform the Department of Planning on the opportunities and constraints for land and delivery of infrastructure in the Area 20 Precinct. The Area 20 Precinct is situated west of Windsor Road and north of Schofields Road with Second Ponds Creek running through the middle and incorporating part of the Riverstone East precinct. An AHIMS search for the precinct study area returned 118 sites in the vicinity of the study area: 85 were isolated artefacts; seventeen were PADs; three were shelters with art; three sites had with art and an archaeological deposit; two sites contained Aboriginal artefacts and grinding grooves; two sites were just locations with grinding grooves; there were two scarred trees; and four

other sites of various types. Of these sites, sixteen open camp sites, some with PADs, were located within the precinct boundary.

Kelleher and Nightingale undertook a field survey of the majority of Area 20 precinct lots. The survey recorded 19 new Aboriginal archaeological sites and eight new PADs in the precinct in addition to redefining the boundaries and condition of some previously recorded sites and PADs. Nine newly identified sites were on the lower slopes, five of which were artefact scatters and four of which were isolated finds. The lower slope landform possessed a total of 29 artefacts, mostly silcrete. The mid slopes contained five isolated silcrete artefact sites. The ridge crest contained two scatters and one isolated find—in total seven silcrete artefacts—while the creek flat had a scatter of five silcrete artefacts and one isolated quartz artefact. Therefore, the surfaces of the lower slopes presented with a greater site and artefact density.

A summary of the PADs identified included:

- RH/A20P PAD 1—located on a gently sloping spur crest which extended from a main ridge line. It was located 480m from Second Ponds Creek and 400m from Killarney Chain of Ponds.
- RH/A20P PAD 2—recorded on the crest of a low-lying ridgeline. This PAD was 400m from Second Ponds Creek and 200m from Killarney Chain of Ponds.
- PAD 3—located on a flat to very gently sloping part of a ridge crest.
- PAD 4—on a saddle in the main ridgeline on the western boundary of Area 20.
- PAD 5—on an upper to mid slope
- PAD 6—on a well-drained raised area of a mid-slope close to Second Ponds Creek.
- PAD 7—on the gently sloping northern flats of Second Ponds Creek.
- PAD 41 (previously recorded by JMcDCHM 2002)—on the Second Ponds Creek flats. Parts of it were found to have been significantly impacted since recording.

Kelleher and Nightingale recommended that Aboriginal sites 01, 09, 10, 18 and all PADs newly recorded were of moderate significance, in relatively good condition and should be conserved where possible to retain the Aboriginal cultural heritage of the Precinct. The other sites identified (2-8, 11-17, 19) were of some significance due to the low degree of impact. It was considered that any further disturbance to these was unlikely to diminish Aboriginal cultural heritage values associated with the precinct.

3.2.2 Construction Site 1—Epping Services and Construction Site 2—Epping Decline

Riverside Corporate Park North Ryde NSW (Tess Corkill 1997)¹¹

This report was requested from OEH, but to date has not been provided.

3.2.3 Construction Site 3—Cheltenham Services Facility

F2 Castlereagh Freeway, Pennant Hills Road to Lane Cove River (Laila Haglund 1989)¹²

M2 Construction Zone, Cheltenham (Tess Corkill 1996)¹³

These reports were requested from OEH, but have not been provided.

3.2.4 Construction Site 4—Cherrybrook Station

M2 Motorway (Laila Haglund 1995)¹⁴

Devlins Creek, Sydney (Tess Corkill 1995)¹⁵

These reports were requested from OEH, but have not been provided.

3.2.5 Construction Site 5—Castle Hill Station

In the vicinity of the Castle Hill station, Jo McDonald undertook an excavation of site RH/CC2 (formerly PAD 31) at Wrights Road.¹⁶ It is on a terrace about three metres above the stream line of Cattai Creek. This salvage excavation uncovered two temporally discrete assemblages of artefacts indicating long term use of the site by Aboriginal people. The total number of artefacts salvaged was 7,790, 58% of these being silcrete, 34% silicified tuff, 6% quartz and the remaining 1.4% a variety of other materials.

3.2.6 Construction Site 6—Hills Centre Station

Spurway Drive Development Baulkham Hills (Jim Wheeler 2006)¹⁷

This report was requested from OEH, but has not been provided.

3.2.7 Construction Site 7—Norwest Station

Norwest Estate, Baulkham Hills (Helen Brayshaw 1985)¹⁸

Norwest Business Park (Helen Brayshaw 1997, 2002a, 2002b, 2004)¹⁹

These reports were requested from OEH, but have not been provided.

3.2.8 Construction Site 8—Bella Vista Station

Bella Vista Farm Park (Jim Wheeler 2006)²⁰

ResMed Campus Development (Helen Brayshaw 2002)²¹

These reports were requested from OEH, but to date have not been provided.

3.2.9 Construction Site 9—Balmoral Rd (Bella Vista Station to Balmoral Road)

Biosis Research, 2003²²

Biosis undertook an Indigenous archaeological assessment in 2003 of Lot 5227, DP 868693, Glenwood, on the corner of Forman Avenue and Glenwood Park Drive for a proposed high school. From examination of previous studies and undertaking a site inspection, two isolated artefacts and a potential modified tree were recorded in the study area and four sites were identified adjacent to the study area. These 31 recorded archaeological features, most of which were open camp sites, were found in varying proximity within five kilometres of the study area on the AHIMS register. Though previous salvage excavation had been undertaken on the site, the map reference points

could no longer be correlated and so a program of test excavation was recommended for the study area in addition to a permit application for the artefact sites and conservation of the scar tree.

3.2.10 Construction Site 10—Memorial Avenue (Balmoral Road to Memorial Avenue) and Construction Site 11—Kellyville Station (Memorial Avenue to Samantha Riley Drive

*Muir's Land Part 60 DP1004614, Kellyville (Mary Dallas 2001)*²³

This report was requested from OEH, but has not been provided.

3.2.11 Construction Site 12—Samantha Riley Drive to Windsor Road

*The Balmoral Road Release Area (Jo McDonald Cultural Heritage Management Pty Ltd 2002)*²⁴

The 2002 JMcDCHM report presents the findings of a site survey for revised proposed infrastructure items in the Balmoral Road Release Area. These items included potable water mains between Kellyville Reservoir and President Road, and Parklea Reservoir and Fairway Drive, corner of Windsor Road. The Balmoral Road Release study area has incorporated land between Windsor Rd, Old Windsor Rd, south of Samantha Riley Drive and north of Brighton Drive (within construction sites 11 and 12).

This study found that most of the proposed infrastructure ran along existing road verges or utility easements which are heavily impacted. No Aboriginal archaeological sites or places were identified in the 2002 survey and it was concluded the likelihood of previously unknown sites being disturbed by the proposed works was extremely low.

This work was done following previous surveys conducted by PPK (the proposed Burns Road Station and construction site) in 2001 and by Jo McDonald CHM in 2001 of the Balmoral Road Release Area. One open camp site, three isolated finds and a PAD were recorded in the previous studies. The latter, recorded by Jo McDonald CHM 2001, was considered to have moderate to high archaeological potential. Steve Randall, also located artefacts on Elizabeth Macarthur Creek, adjacent to the potential Samantha Riley Drive Station.²⁵

*Archaeological Test Excavations PADs 1, 3 and 4 (Austral Archaeology Pty Ltd 2005)*²⁶

This report was requested from OEH, but was not provided.

3.2.12 Construction Site 13—Old Windsor Road to White Hart Drive

*Mungerie Park Town Centre (AMBS 1999; AMBS 2000)*²⁷

As a part of the Mungerie Park Town Centre Project (AMBS 2000), salvage works were undertaken within the Rouse Hill Development Area between Windsor Road and Caddies Creek, including parts of registered Aboriginal sites RH/CD6 and RH/CD10 (this investigation area was renamed Mungerie Park 1 [MP1]).

Excavations at MP1 revealed an extremely high density and diverse range of tools across the site. Average artefact densities were highest within 100m of Caddies Creek and dropped significantly further upslope from the Creek. Beyond 100m, higher densities of artefacts were generally found in clusters associated with discreet knapping floors amidst a much lower density background scatter. No artefacts were recovered at more than 220m distance from the creek. The assemblage demonstrated a continuous archaeological deposit between sites previously identified as RH/CD6

and RH/CD10. The MP1 data also suggested a distinction between the apparent manufacturing foci closer to the creek and activities being conducted further away from the creek.

*Northern Suburbs Cemetery Sewage Pipeline (Robynne Mills 1997)*²⁸

*Windsor Road Upgrade, between Schofields Road and Merriville Road (Michael Therin 2001)*²⁹

These reports were requested from OEH, but were not provided.

3.2.13 Construction Site 14—Rouse Hill Station

*Caddies Creek Precinct (Jo McDonald CHM Pty Ltd 2007)*³⁰

Four archaeological landscapes within Caddies Creek Precinct were excavated in 2006. The precinct study area runs along Caddies Creek to the 1:100 year flood line. The salvage excavation was to mitigate previously identified sites and areas of high archaeological sensitivity which were to be impacted by trunk drainage and transport infrastructure. 22,000 lithics were recovered from the excavation of 145 dispersed 1m² test pits and 400m² open area excavation. 18,000 of these lithics had technical attributes denoting them as artefacts. Grinding grooves were previously recorded on two of the landforms. JMcDCHM compared the findings of the Caddies Creek Precinct and Mungerie Park (AMBS 2000) and found that site and artefact density varied with stream order and proximity to stone sources. The preferred landscape for sites in the Caddies Creek Precinct, based on the highest densities of artefacts and sites, was lower and mid slopes about 200m from the creek with northerly and north-easterly aspect. Artefact density declined with distances about 200m from the creek and all low lying areas adjacent to the creek had low average artefact densities. Silcrete was the most common lithic source. A number of occupation and landscape use trends were identified across the landscapes in the Caddies Creek Precinct, with RH/CC2 having stratification and both Bondaian and Pre-Bondaian assemblages, while RH/CD7 was significant as its stratified deposit showed evidence of substantial lithic change over time.

*Caddies Creek western and eastern side land proposed for rezoning (Robynne Mills 2000a, 2000b)*³¹

This report was requested from OEH, but has not been provided to date.

3.2.14 Construction Site 15—Windsor Road Viaduct

*Rouse Hill Sports Complex (Jo McDonald CHM Pty Ltd 2003)*³²

This report presents the findings of a site survey undertaken on an area of land at the corner of Commercial Road and Withers Road. Caddies Creek runs to the north and west of the study area. The area has been heavily impacted by various activities meaning there is little potential for undisturbed archaeological deposit. Nevertheless, a 3km² AHIMS search area centred over the study area revealed 27 recorded Aboriginal sites including open sites, sandstone rock shelters and grinding grooves. Many of these sites have been tested or salvaged through the Rouse Hill Infrastructure Project with the Rouse Hill Development Area now having destroyed or impacted at least part of all these sites, according to JMcDCHM 2003. No sites were identified during survey of the study area and it was recommended that the development could proceed unconstrained by archaeology.

RHAC/PAD1 and RHAC/PAD 2, proposed Rouse Hill Anglican College (Stephanie Garling 2000)³³/Schofields/Windsor Road Intersection Upgrade (Robynne Mills 1999)³⁴

This report was requested from OEH, but was not provided.

Schofields Road. Archaeological Test Excavation (GML+JMCHM 2011)³⁵

ISF SCR/UPG2 (recently registered with AHIMS, number not yet known) was subject to archaeological test excavation under *The Code of Practice* in April 2011. The results, from the excavation of eight one metre square test units, yielded one Aboriginal object.

This site is located approximately 100m south of construction site 15 will be subject to a future AHIP application by Roads and Maritime Services (RMS).

3.2.15 Construction Site 16—Windsor Road Viaduct to Cudgegong Road and Construction Site 17—Cudgegong Road Station and Tallawong Stabling Yard

Rouse Hill Electrical Substation-Switch Building (Vanessa Hardy 2007, 2008)³⁶

This report was requested from AHIMS, but was not provided. The summary from AHIMS card 45-5-3392 states that archaeological test excavation was undertaken for eight 1m by 1m test trenches, associated with the location of a proposed impact. The outcome was the identification of an intact soil profile, albeit with a low density of objects at the locations excavated. However, the area was designed with a level of high archaeological potential and salvage excavation was recommended. It is not known whether salvage excavation was every undertake, as the project was approved under Part 3A of the EP&A Act and thus a Section 90 permit for this site was not required.

Lot 80, Cudgegong Road, Rouse Hill (David Crew 1998)³⁷

Second Ponds Creek Landscape (Hassell Pty Ltd 2003)³⁸

Tebutts Poultry Farm (Michael Therin 2001)³⁹

These reports were requested from OEH, but have not been provided.

3.2.16 Summary

Numerous archaeological surveys have been undertaken surrounding and including portions of the study area. The intensity of archaeological survey has resulted in the recording of many Aboriginal sites and the patterning observed in the AHIMS data. In addition, a number of archaeological excavations have been undertaken, all of which have recovered subsurface material from buried deposits. Many of the sites have contained extremely high artefact densities and a wide range of lithic artefacts and materials based on activities undertaken there. The earliest occupation of the Cumberland Plain predates the Bondaian phase, dating to 30,000 years Before Present (BP). Previous research and excavations in the vicinity of the NWRL corridor (e.g. at RH/SP7 and SP9—JMCDCHM 2001; 2006) suggest that occupation in some places could date to this much earlier period. Technological change and variation in stone tools corresponds with phases of continuing occupation across the Cumberland Plain (McDonald 2008; White and McDonald 2010). Research themes and general patterning arising from the prior reports is discussed below.

3.3 Aboriginal Heritage Information Management System Search

Two searches of the OEH AHIMS database of the area along the rail corridor were undertaken on 28 November 2011, with a 1km and a 450m buffer surrounding the study area respectively. The

search with a 1km buffer revealed 220 sites. The results of the search with a 400m buffer identified 132 Aboriginal sites. Isolated artefact or open artefact sites constitute the predominant remnants recorded in this area. An overview of the AHIMS results is shown in Table 3.1. The results of the AHIMS search are provided in Appendix C.

Table 3.1 Results of the AHIMS search with a 450m buffer of the rail corridor.

Predominant site feature	Frequency	Percentage
Open artefact site	56 (1 with a scarred tree)	42%
Isolated artefact	21	16%
PAD	19	14%
Shelter with art and/or occupation	11	8%
Sites with no information on site card or site card unavailable	11	8%
Midden	7	5%
Rock art/engraving	5	4%
Axe grinding grooves	2	2%
TOTAL	132	100%

General patterning indicates artefact scatters and isolated finds can be found in any location, on any landform. However, recorded sites appear to become denser towards the margins of the creeks and near the confluences of the water courses. AHIMS registered sites are higher in density at the western end of the rail alignment due to the frequency of studies, particularly excavations which have been undertaken in that area. The eastern end of the route is highly urbanised and, due to high levels of previous disturbance, retains fewer locations which may have retained evidence of Aboriginal occupation. Due to the extensive nature of the rail link and resulting maps, the results of the AHIMS search within a 450m buffer of the rail corridor are shown in figures 5.1 to 5.18, along with the results of the current study.

3.3.1 Known Aboriginal Objects and/or Places

Prior archaeological studies have identified that the proposed construction sites contain 26 sites within them or very near to their impact zone. Newly recorded sites as a result of field survey are not included in this count, but are provided in chapter five and will be registered on the AHIMS database. Pre-existing recorded sites have been registered on the AHIMS database. Table 3.2 provides a list of those previously known sites within or very near to the impact zone.

Table 3.2 Previously recorded Aboriginal sites located within or very near to the North West Rail Link construction sites.

Aboriginal site name/number	Construction site number	Site type
45-6-2861	4	Stone artefact concentration
45-5-0981/ 45-5-0989 very close to	10	Stone artefact concentration
45-5-3354	10	Stone artefact concentration
45-5-2027 very close to	11	Stone artefact concentration + PAD

Aboriginal site name/number	Construction site number	Site type
45-5-2365	11	Stone artefact concentration
45-5-3064 very close to	11	Isolated find/open artefact scatter—SITE CARD NOT AVAILABLE
45-5-0933	12	Stone artefact concentration + PAD
45-5-0961 very close to	13	Stone artefact concentration
45-5-2649 very close to	13	Isolated find
45-5-3188	13	Stone artefact concentration + PAD
45-5-3930	16	Isolated find
45-5-3931	16	Isolated find
45-5-3932	16	Stone artefact concentration
45-5-2805	16	PAD
45-5-2756 close to	17	Stone artefact concentration
45-5-3355	17	Isolated find
45-5-3392	17	Stone artefact concentration
45-5-3517	17	Stone artefact concentration
RH/A20P 18 (45-5-3933)	17	PAD
RH/A20P PAD 5	17	PAD
45-5-3158	9, 10	Isolated find
45-5-0960 very close to	13, 14	Stone artefact concentration
45-5-2904	13, 14	PAD
45-5-2905	13, 14	PAD
45-5-3077	13, 14	Stone artefact concentration
45-5-0959 very close to	14, 15	Stone artefact concentration

3.4 Landscape Context

The purpose of this section is to provide contextual information for use in developing a predictive model relating to the remains for evidence of Aboriginal occupation and use of the study area. Interactions between people and their surroundings are of integral importance in both the initial formation and the subsequent preservation of the archaeological record. The nature and availability of resources including water, flora and fauna and suitable raw materials for the manufacture of stone tools and other items had (and continues to have) a significant influence over the way in which people utilise the landscape.

Alterations to the natural environment also impact upon the preservation and integrity of any cultural materials that may have been deposited whilst current vegetation and erosional regimes affect the visibility and detectability of Aboriginal sites and objects. For these reasons, it is essential to consider the environmental context as a component of any heritage assessment.

3.4.1 Geology and Geomorphic Activity

The study area lies on Wianamatta Group (Liverpool Sub-group) shales from Rouse Hill to Castle Hill. From Castle Hill to Epping the predominant geology is Hawkesbury Sandstone which includes quartz and some shale.

The primary modes of geomorphological activity within the study area are gradational eroded or aggraded. Objects are likely to be concealed just below the ground surface in aggrading landscapes and in some exposures where there is erosion. However, within smaller landscape contexts such as a district or even single properties, the mode of geomorphological activity varies and any site within the study area could have gradational geomorphological activity. Gradational geomorphological activity includes eroded, eroded and aggraded and aggraded. Mountains, hills, rises and certain types of plains are predominately eroded. Aggrading activity tends to be on alluvial plains, flood plains, alluvial fans, bar plains, and various other types of plains and tidal flats. Anti-gradational activity would be human induced.⁴⁰

Of the common rock types used for stone tool manufacture, the closest rock sources to the study area are silcrete beds in the St Marys Formation at Plumpton Ridge, Marsden Park, St Marys, the Rickabys Creek Gravels and at Homebush Bay. There may be other as yet unknown source sites in or nearer to the study area.

3.4.2 Landforms and Landscape Features

The NWRL alignment lies on undulating landforms. The following topographic categories are used to define landscape parameters and assess archaeological sensitivity.

Creek bank	<50m to water, flat land
Flood plain	>50m to water, flat land to slightly sloping
Hill Slope/Creek Bank	<50m to water, sloping land
Hill slope	>50m to water, site on slope
Plain	>500m to water
Creek Bank/Low Ridge	Rocky cliff or elevated area next to/ near water
Low ridge	<200m to water, <10m elevation above creek
Low ridge top	>200m from water, <10m elevation above creek
Ridge top	>200m from water, >10m elevation above creek

JMcDCHM 2006 mapped these landscape elements across the area surrounding the then proposed NWRL alignment (Figure 3.1).

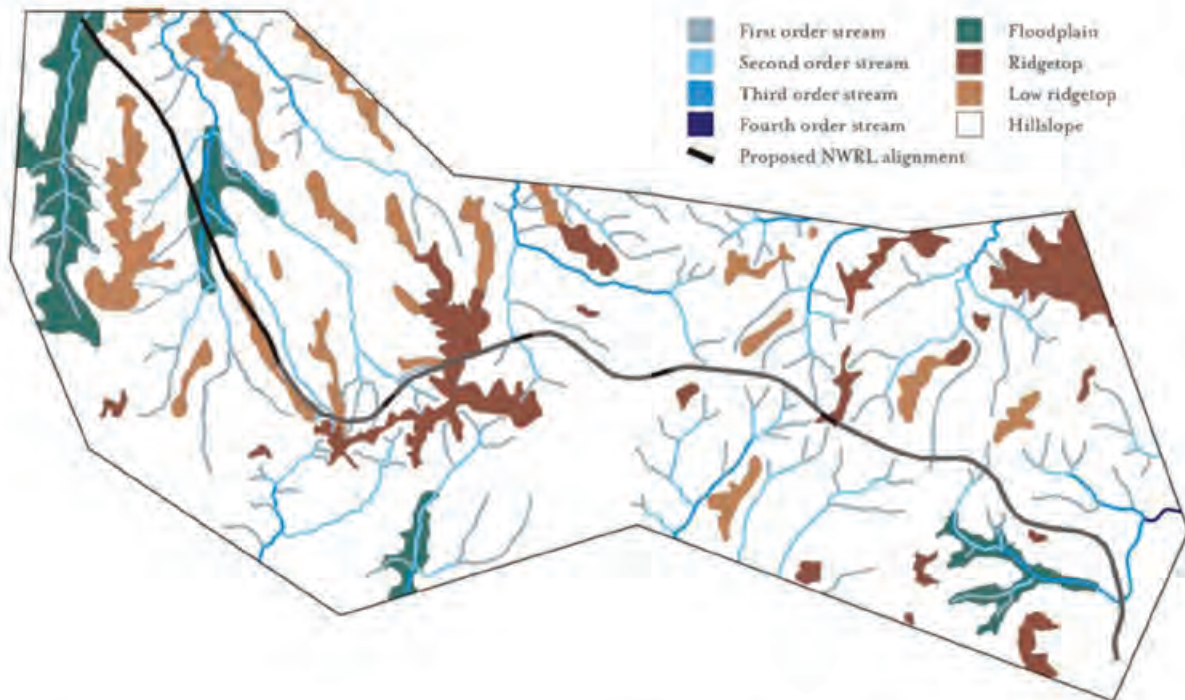


Figure 3.1 Landscape elements in the vicinity of the 2006 NWRL alignment. Note this figure provides landscape elements but the alignment does not reflect the current proposal. (Source: JMcDCHM 2006: Figure 2).

The landscape pattern indicates that ridge top and hill slope features adjacent to creeks may have preserved an Aboriginal signature.

3.4.3 Soils

Soil information was accessed from The Australia Soil Resource Information System produced and managed by CSIRO. The Soil Archive and National Soil Grid information describes the soil through the NWRL study area as mostly clay loam or clay to various densities. From Epping to Beecroft the soil type is clay loam which includes silty or sandy clay loam, with patches of loam (silty or sandy). From Beecroft to Cherrybrook the soil is mostly medium clay (medium to heavy clay) but toward Cherrybrook becomes light or light medium clay. Cherrybrook to Castle Hill exhibits light to light medium clay increasing in density to medium to medium heavy around Castle Hill. From Castle Hill to Kellyville the soil is light medium clay but closer to Kellyville becomes more clay loam with patches of sandy loam. Kellyville to Rouse Hill has mostly clay loam or light clay (Figure 3.2).

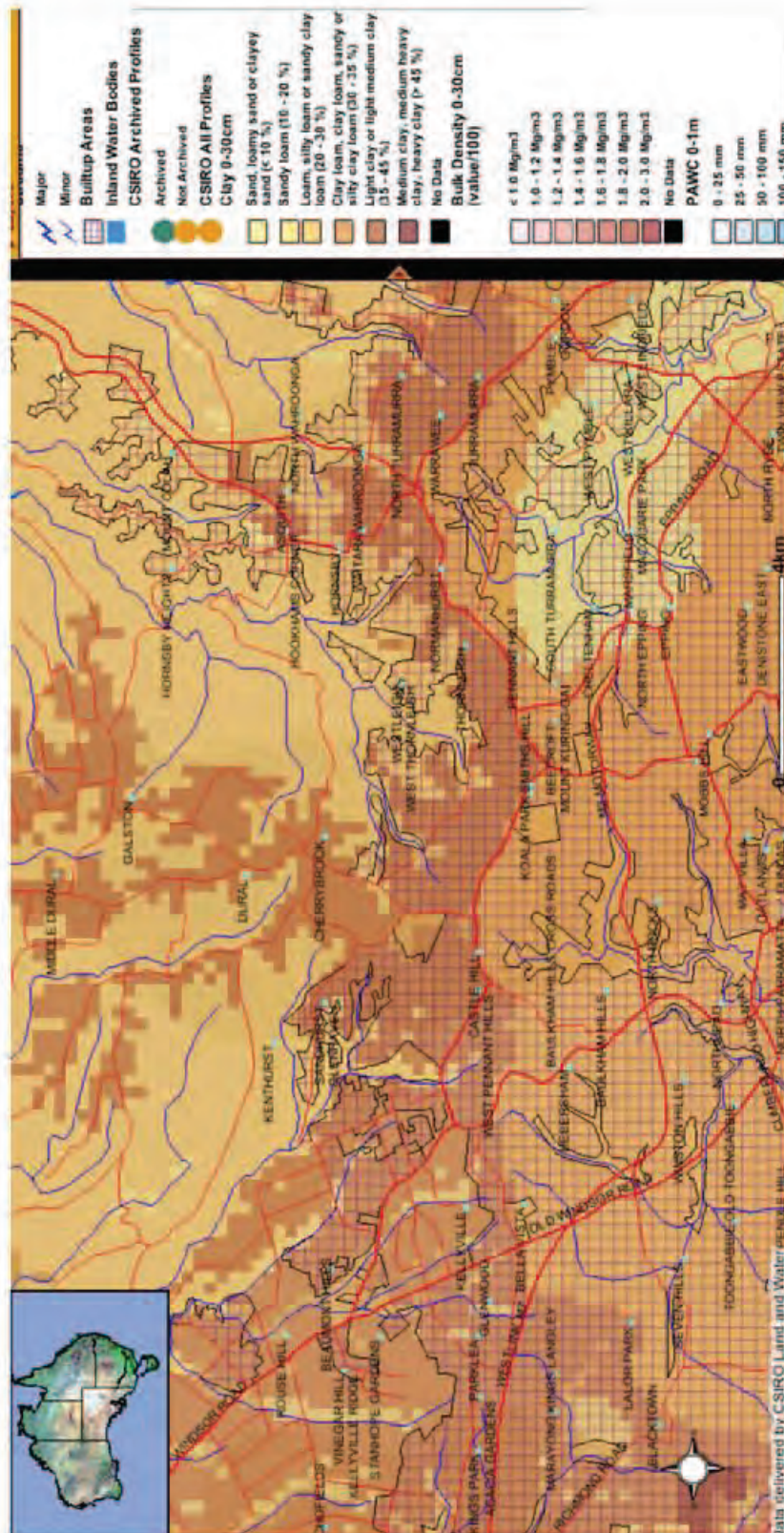


Figure 3.2 Soil typology across the study area (Source: CSIRO Land and Water).

The NSW Soil and Land Information System was accessed to determine whether any soil technical reports existed for the study area. A large number of reports were available relating to sample sites positioned from Second Ponds Creek to Rocky Creek. The logs associated with the sample sites provide the following description:

- Survey profile (footslope of Second Ponds Creek)—Shale Lithology, A1 sandy clay loam from 0 to 25cm deep, A2 clay from 25 to 35cm, A3 and also clay from 35 to 85cm deep;
- Survey profile (36 Merryville Rd, front yard, corner of Vinegar Hill Rd)—A1 clay loam to 13cm, A2 clay to 22cm, B1 clay loam to 44cm and B2 clay to 79cm;
- Survey profile (Paperbark Crescent, 5m from road)—A1 clay to 31cm, A2 clay to 74cm, B1 clay to 1 metre;
- Survey profile (Lot 160, 10m from road in middle of site, Mardi Court)—sandy clay A1 to 19cm, sandy loam A2 to 25cm, clayey sand B1 to 38cm, followed by B2 clay to 88cm;
- Survey profile (Evans Rd, Castle Hill)—sandstone-quartz lithology, A1 loamy sand to 5cm, A2 sand to 15cm, clay to 25cm;
- Survey profile (unnamed E316405, N6269840)—shale lithology, loam A1 to 8cm, clay loam A2 to 20cm, clay B1 to 66cm;
- Survey profile (unnamed E317855, N6269490)—sandstone-quartz lithology, A1 loamy sand to 3cm, A2 clayey sand to 22cm, B1 sandy clay loam to 48cm;
- Survey profile (Pennant Hills Park, North Epping)—sandstone-quartz lithology, loamy sand A1 to 30cm.
- Survey profile (Kissing Point Rd and Currong Place)—sandstone quartz lithology, sandy clay loam B1 to 25cm and B2 to 80cm.

Field observation of soil horizons indicated that the study area was covered by clay loam. Hill slope loam or sand based topsoils were very erosional along the NWRL alignment.

Soil profiles associated with the study area suggest that archaeological deposits are, in general, not likely to be deeper than 25cm, unless associated with sandstone-quartz lithology which could contain deposits up to 50cm deep.

3.4.4 Hydrology

The availability of water has significant implications for the range of resources available and the suitability of an area for human occupation. The Cumberland Plain predictive model states that sites increase in occurrence, density and complexity with ascending stream order.⁴¹ The study area is located within the periphery of a significant network of creeks including 100 plus first order creeks, 35 second order creeks, 12 third order creeks and the Lane Cove River as the only fourth or fifth order watercourse (Figure 3.3). Creeks within the study area that have been the most significant based on past archaeological investigations are Caddies Creek (and its major tributary, Strangers Creek), Second Ponds Creek, Devlin's Creek as well as Cattai Creek and Elizabeth Macarthur Creek.

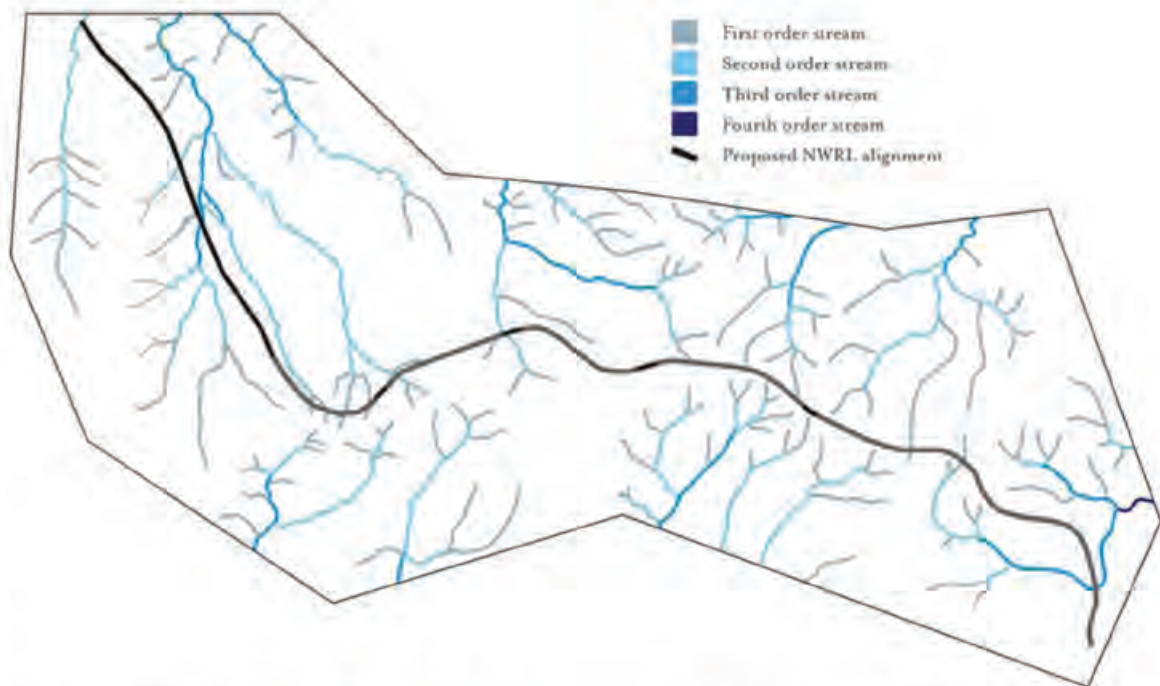


Figure 3.3 Watercourses and their stream order within the vicinity of the NWRL 2006 alignment. Note this figure provides landscape elements but the alignment does not reflect the current proposal. (Source: JMcDCHM 2006: Figure 3).

3.4.5 Fauna and Flora

Native flora and vegetation communities range from woodland with a grass understorey at the western extent of the alignment, dry sclerophyll forest in the middle and woodland with shrub understorey at the eastern end. However, it has been estimated that as little as 20% of the vegetation within the NWRL corridor is remnant or regrowth native vegetation.⁴² The remainder is highly modified or introduced. At the eastern end of the alignment to Castle Hill, some forest areas would have included Blue Gum and Blackbutt; other forest would have comprised Turpentine, White Stringybark, Red Mahogany and Grey Ironbark. The woodlands of the western end of the alignment would have been characterised by Grey Box and Forest Red Gum. Vegetation on the watercourse flat in the western extent could have included Cabbage Gum and Rough-barked Apple.⁴³

Numerous land mammals would have inhabited the study area, including kangaroo, wallaby, possum, echidna, bandicoot and smaller mammals. Birds, reptiles such as lizards, freshwater fish and shellfish would also have been faunal resources nearby the study area for Aboriginal use.⁴⁴ The number of species, individuals and their habitat has been much decreased now.

3.4.6 Land Use History

The study area has been subject to a number of land uses since European colonisation of Sydney. These land uses are likely to have resulted in a substantial impact to Aboriginal heritage places and sites.

By 1796 agricultural settlement was established adjacent to Lane Cove River in the east of the NWRL study area. The western end of the NWRL alignment was also subject, in the early settlement years, to clearing and grazing activities. Rural-residential development has characterised much of the land-use history of the NWRL alignment, with areas around Castle Hill and Rouse Hill

also being known for market gardening. Industrial estates are adjacent to the suburban centres within the NWRL and residential development has and continues to become increasingly dense and less associated with rural activities and property along the NWRL alignment. Residential and industrial development has completely covered and heavily impacted the majority of land through which the NWRL alignment runs. The alignment also follows major roadways which are also associated with a high level of disturbance. Landscapes heavily disturbed by previous activities have little potential to contain archaeological deposits. Areas of archaeological sensitivity are identified as those areas where extensive disturbance has not occurred, and thus the soil may contain intact archaeological deposits. Areas of low disturbance, and thus archaeological sensitivity, are the remaining undeveloped or minimally disturbed areas along waterways and in highly vegetated lands such as the Cumberland State Forest south of Castle Hill Road and large properties on Balmoral Road.

In keeping with previous studies (JMcDCHM 1997, 1999, 2002a, 2006), the following definitions were used:

- High disturbance—severe disturbance to the soil. Buildings, houses, suburbs, roads, market gardens, poultry farms, BMX tracks, rubbish tips, formed tracks, dams, drains and other excavations.
- Moderate disturbance—cleared of trees at some time, cultivated or extensive soil disturbance probably caused by machinery or extended periods of trampling. Much of this area has been used for small agricultural pursuits such as orchards, and the remainder carries improved pasture.
- Low disturbance—partly cleared and grazed at some time, but apparently never subject to extreme soil disturbance.

3.4.7 Erosion

Considering the soil typology and the land use history, the following forms of erosion have occurred across the study area:

- Active erosion;
- Stabilised and partly stabilised;
- Water; and
- Gully stream bank.

Erosion disturbs the integrity of sites and often relocates material from sites, thus affecting the archaeological significance of any material found. Eroded areas are less likely to have substantial intact archaeological deposits in comparison to non-eroded areas.

3.5 Regional Character

This section considers the evidence at a regional level for Aboriginal landscape use of the broader study area. The aim is to highlight the main issues and regional character of Aboriginal land use and the material traces it has produced.

The following is a summary of the findings of previous archaeological work on the Cumberland Plain:

- the complexity of the Cumberland Plain's archaeological record and time span of Aboriginal occupation is far greater than was identified in previous studies on the basis of surface recording and more limited test excavation; and
- archaeological landscapes on permanent water, as reflected by Aboriginal people's preference for artefact discard, are more complex than sites on ephemeral or temporary water lines (McDonald 2008, White & McDonald 2010⁴⁵).

Specifically, it can be stated that:

- Most areas within a landscape that contains residual soil horizons, even those with sparse or no surface manifestations, contain subsurface archaeological deposits.
- Where lithic concentrations are found in aggrading or stable landscapes, they are largely intact and have the potential for internal structural integrity. Sites in alluvium possess potential for stratification.
- Most sites will be of mid- to late-Holocene age. Suitable geomorphic conditions (e.g. deep sand bodies) for the preservation of Pleistocene-aged assemblages do occur but are not common on the Cumberland Plain.
- Frequently, the density and diversity of implements and debitage (the unused, waste stone artefacts) is conditioned by permanence of water (stream order) and landscape unit.
- Distance to known silcrete sources seems to have little influence on artefact discard generally, although many silcrete sources are perhaps still to be identified. Proximity to known sources does influence the proportion of flaked to blocky silcrete material on sites.
- Where silcrete outcrops occur naturally there will be evidence for quarrying and likely some stone reduction activity in the vicinity.
- Contrary to earlier models for the region (e.g. Kohen 1986, Smith 1989) many areas contain extremely high artefact densities, with variability appearing to depend on the range of lithic activities present. Densities in excess of 400/600 artefacts per square metre are not uncommon along major streams on the Cumberland Plain.
- Around the periphery of the plain, sandstone features such as overhangs and/or platforms may have been used for habitation, processing basalt ground-edged axes and/or the production of art.

The numerous archaeological subsurface investigations in the vicinity of the route of the NWRL have recovered large assemblages of artefacts and addressed research questions, specifically in terms of assemblage material and tool composition. Overall, all excavated sites appear to have been formed within the last 5,000 years (which can be attributed to a general intensification in Aboriginal occupation of this area connected to the formation of the barrier estuary swamps and landforms). Assemblages are dominated by either silcrete or tuff, which are obtained from local sources. Stone tool types within assemblages have been predominated by the Small Tool Tradition, principally flakes with reduced and retouched backed artefacts.

Aboriginal site locations appear to focus around the margins of drainage lines, creeks, or on mid-low slopes associated with riparian corridors, often with a northerly or easterly aspect.

Representativeness is important because few areas in similar environmental contexts (elevated, low gradient terrain bordering watercourses) with an obvious archaeological signature for mid-late Holocene Aboriginal use remain unaffected by urban development (c.f. Kuskie 1997: 62).

Following the results of inter- and intra-site patterning (particularly from the results of previous survey work), local research questions which remain to be answered should start to address a larger scale focus, i.e. inter-site and local landscape use, rather than intra-site content analysis of artefact assemblages. Patterns of Aboriginal Holocene landscape use should be addressed, investigating modes of Aboriginal demography, economy and society across the Cumberland Plain. Detailed investigations, arising from mitigation work connected to studies such as the NWRL, have the ability to examine large landscapes and, as such, should be able to assess the available evidence from across the Cumberland Plain.

3.6 Aboriginal Heritage Predictive Model

Through a process of landscape characterisation and the assessment of site distribution, an archaeologist is able to infer those locations most frequently visited and used by Aboriginal people. Such assessment may be used to interpret long term subsistence and habitation patterns.

Based upon the landscape context, land use history, and regional and local archaeological patterns it is possible to provide a predictive statement for the likely occurrence of Aboriginal sites within the study area. Prior to the current survey 26 sites were previously recorded within the NWRL impact corridor. Over 220 sites were registered on AHIMS within 1km of the NWRL study area, with 132 of these being within 450 metres of the proposed route. Based on previous investigations, the AHIMS search findings and local environment, the most likely site types to be found within the study area are open camp sites or artefact scatters and isolated finds.

Open artefact scatters are often found on slightly sloping to level ground, usually in the vicinity of a watercourse. Most previous recordings along the NWRL have been made on major creeks such as Caddies and Second Ponds Creeks or on surrounding shale ridges and hills. Open camp sites may be expected on elevated banks and slopes nearer to major creek confluences. Open potential archaeological deposit (PAD) may be expected in landforms where undisturbed soil horizons with intact subsurface archaeological material remain. Isolated finds may be found as a background scatter anywhere across the landscape.

Axe-grinding grooves, the next most frequent site types, are usually found along creek lines and tributaries. This depends on the occurrence of suitable sandstone platforms, preferably with rock pools and flowing water to facilitate grinding. Elsewhere in the Sydney region, these have often been identified as part of site complexes, sometimes near engraving sites and rock shelters. A number of grinding grooves occur along Caddies Creek, immediately east of the proposed alignment. It is possible that grinding grooves could occur between Windsor Road and Burns Road, on Elizabeth Macarthur Creek. There is little surface sandstone upstream of the confluence of Caddies and Elizabeth Macarthur Creeks. Grinding grooves are often highly worn by water action and may be difficult to detect.

Scarred trees could be found although land use history suggests that logging, land clearing and bushfires have occurred across most of the Cumberland Plain. Aboriginal scars would be on old growth trees >150-200 years old or large, recently dead trees. Scars made by Indigenous people are usually fairly symmetrical, unlike natural scarring produced by lightning or branch removal.

These should show considerable regrowth. They may show stone or steel hatchet cut marks. There may be potential for toehold notch scars or cut hollows on tall old trees.

An overview of the types of Aboriginal sites and/or places and their potential location within the study area's landscape is provided in Table 3.3.

Table 3.3 Types of Aboriginal sites that may be located within the study area

Feature	Description and potential location
Stone artefacts	<p>Stone artefact concentrations are collections of stone, frequently brought from other areas, which demonstrate evidence for Aboriginal working, use and/or discard of the stone at a single location. Stone artefact concentrations may be associated with any of the below site types.</p> <p>Where such sites are buried by sediment they may not be noticeable unless exposed by erosion or disturbed by modern activities.</p> <p>These sites may be found within 100m of creek lines, on lower slopes and ridge tops where there is dry, flat land with good views or close to resource zones.</p>
Isolated finds	<p>Sites consisting of a single stone artefact, isolated from any other artefacts or archaeological evidence. They are generally indicative of sporadic past Aboriginal use of a location.</p> <p>A distinction should be drawn between isolated finds which are a component of the background distribution of objects and specialised objects such as axes, hammer stones, grinding dishes, etc., which would have been used repeatedly and may have been carried from place to place.</p> <p>These sites are more likely to be found within 100m of creek lines, on lower slopes and ridge tops but can be on any landform in any landscape due to the nature of discard.</p>
Potential Archaeological Deposits (PADs)	<p>PAD is an area where sub-surface stone artefacts and/or other cultural materials are likely to occur. Allocation of PADs should be accompanied by a level of potential—high, moderate or low. The designation is made on the basis of an assessment of the soil's condition and integrity, contrasted against the likelihood of finding buried evidence at the location.</p>
Shelter sites	<p>Sandstone shelters and overhangs were used by Aboriginal people to provide habitation areas sheltered from the rain and sun. The deposits in such sites are commonly very important because they often contain clearly stratified material in a good state of preservation.</p> <p>These sites are likely to be found in sandstone outcrops, such as those in the area of the eastern end of the rail link, around the Lane Cove River.</p>
Shell middens	<p>Middens predominantly consist of accumulations of shell that represent the exploitation and consumption of shellfish by Aboriginal people. Shell species may be marine, estuarine or freshwater depending on the environmental context. Middens frequently also include faunal remains, stone artefacts, hearths and charcoal.</p> <p>These sites may be around rivers such as the Lane Cove River.</p>
Grinding grooves	<p>Grooves resulting from the grinding of stone axes or other implements are found on flat areas of suitable sandstone. They are often located near waterholes or creek beds as water is necessary in the sharpening process. In areas where suitable outcrops of rock were not available, transportable pieces of sandstone were used.</p> <p>These sites may be found near creeks within the study area.</p>
Art sites	<p>Aboriginal paintings, drawings and stencils are commonly found where suitable surfaces occur in sandstone shelters and overhangs. These sites are often referred to as rock shelters with painted art.</p> <p>Rock engravings, carvings or peckings are also to be found on sandstone surfaces both in the open and in shelters. These are referred to as rock engraving sites.</p> <p>These sites may be found in sandstone outcrops at the eastern end of the rail link, particularly near rivers and at the top of hills.</p>

Feature	Description and potential location
Scarred trees	<p>Scarred trees bear the marks of bark and wood removal for utilisation as canoes, shields, boomerangs or containers. It is commonly very difficult to confidently distinguish between Aboriginal scars and natural scars or those made by Europeans. Scars may also originate as foot marks, small pockets cut into the bark of a tree enabling the tree to be climbed.</p> <p>These sites may be found in association with an artefact scatter, burial or traditional movement path. They can be on any landform, anywhere.</p>

3.7 Endnotes

- ¹ DECCW *Code of Practice for Archaeological Investigation of Aboriginal Objects in New South Wales* (24 September 2010) pp20–21.
- ² Robert Murray and Kate White, 1988, *Dharug & Dungaree—The History of Penrith and St Marys to 1860*. Hargreen Publishing Company, North Melbourne, p19;
James Kohen, 1993, *The Darug and Their Neighbours—The traditional Aboriginal owners of the Sydney region*. Alken Press, Smithfield, p21.
- ³ James Kohen 1993, *The Darug and Their Neighbours—The traditional Aboriginal owners of the Sydney region*. Alken Press, Smithfield, pp21, 24.
- ⁴ Val Attenbrow, 2010, *Sydney's Aboriginal Past—Investigating the archaeological and historical records*. University of Sydney Press, Sydney, pp.24–26.
- ⁵ James Kohen, 1993, *The Darug and Their Neighbours—The traditional Aboriginal owners of the Sydney region*. Alken Press, Smithfield, pp1–8.
- ⁶ Jo McDonald CHM Pty Ltd, 2006, *Archaeological Assessment of Indigenous Heritage for the North West Rail Link*. Consultancy report prepared for GHD, pp10–11; Corkhill, T. 1999, *Here and There, Links Between Stone Sources and Aboriginal Archaeological Sites in Sydney, Australia*. Unpublished Masters Thesis, Department of Archaeology, Sydney University.
- ⁷ Brayshaw McDonald Pty Ltd, 1993, *Archaeological Investigation of PAD 11 (Site RH/SC4) at Rouse Hill, NSW*. Consultancy report for Rouse Hill (Stage 1) Pty Ltd;
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Brayshaw McDonald Pty Ltd, 1993, *Additional archaeological survey in the Rouse Hill Development Area along Second Ponds and Caddies Creeks, Rouse Hill, NSW*. Consultancy report for Landcom;
Jo McDonald CHM Pty Ltd, 1999, *Test Excavation of PAD5 (RH/SP9) and PAD 31(RH/CC2) for the Rouse Hill (Stage 2) Infrastructure Project at Rouse Hill and Kellyville, NSW*. Consultancy report prepared for Rouse Hill Infrastructure Consortium;
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- Jo McDonald CHM Pty Ltd, 2002, *Rouse Hill Infrastructure Project (Stage 3) Balmoral Road Release Area Indigenous and European Heritage Issues*. Consultancy report for Rouse Hill Infrastructure;
- Jo McDonald CHM Pty Ltd, 2005, *Archaeological Salvage Excavations of Eight Archaeological Landscapes in the Second Ponds Creek Valley Rouse Hill Development Area, NSW—Volume I*. Consultancy report prepared for Rouse Hill Infrastructure Pty Ltd and Landcom;
- Jo McDonald CHM Pty Ltd, 2005, *Rouse Hill Regional Centre Summary of Indigenous Archaeological Site Management*. Consultancy Report to Lend Lease;
- ⁸ A Potential Archaeological Deposit (PAD) is an area where sub-surface stone artefacts and/or other cultural materials are likely to occur. PADs can be allocated on their own (eg NWRL PAD 1) or as a component of another Aboriginal sites (eg Site X with PAD). If identified without visible evidence for Aboriginal cultural materials, PAD locations are treated by AHIMS as Aboriginal sites. Therefore this report treats all PAD locations as Aboriginal sites.
- ⁹ Jo McDonald CHM Pty Ltd, 2006, *Archaeological Assessment of Indigenous Heritage for the North West Rail Link*. Consultancy report prepared for GHD.
- ¹⁰ Kelleher Nightingale Consulting Pty Ltd, 2010, *Area 20 Precinct North West Growth Centre—Aboriginal Heritage Assessment*. Consultancy report prepared for the NSW Department of Planning.
- ¹¹ Tess Corkill, 1997, *Test excavation of rockshelter CSIRO PAD 1/Site 2 Riverside Corporate Park North Ryde NSW*.
- ¹² Laila Haglund, 1989, *Preliminary survey for Aboriginal site along F2—Castlereagh Freeway, Pennant Hills Road to Lane Cove River*. Consultancy report to the NSW Department of Main Roads.
- ¹³ Tess Corkill, 1996, *Discovery of an Aboriginal Artefact within the M2 construction zone—Cheltenham NSW*.
- ¹⁴ Laila Haglund, 1995, *The Proposed M2 Motorway: Investigation of Aboriginal Heritage Significance —Test excavation of rock shelter PAD1/DC1 on Devlins Creek, Pennant Hills—Beecroft*.
- ¹⁵ Tess Corkill, 1995, *Discovery of Alleged Aboriginal Archaeological Site at Devlin's Creek, Sydney, NSW*.
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4.0 Survey Methodology

4.1 Overview

The NWRL was previously surveyed by JMcDCHM with Aboriginal representatives in 2006. The study identified 14 Aboriginal sites and Potential Archaeological Deposits (PADs). The Rouse Hill area, in particular, was found to have potential for evidence of Aboriginal occupation in the form of high density artefact scatters. JMcDCHM found that boring of the tunnel was unlikely to impact on extant archaeological deposits.

The current alignment of the NWRL is very similar to that surveyed previously by JMcDCHM, with the exception of the Tallawong stabling area at Rouse Hill. The field survey therefore aimed to achieve the following:

- survey coverage of the Tallawong Stabling Area (excluding areas that have been recently extensively surveyed, such as Area 20; here the focus was on relocation of previously recorded sites), focusing on areas where excavation and ground disturbance is proposed;
- identification and assessment of sites previously identified by JMcDCHM along the NWRL alignment;
- inspection of proposed rail stations with the RAPs; and
- survey of construction sites along the proposed alignment.

The survey recording methodology followed best practice and incorporated elements from the Department of Environment and Conservation (DEC NSW) 2005 *Draft Guidelines for Aboriginal Cultural Heritage Impact Assessment and Community Consultation—for development applications assessed under Part 3A of the Environmental Planning and Assessment Act 1979*.

Owing to the dense grass cover over the majority of the construction sites, and in some places buildings and development, a decision was made to undertake the pedestrian survey across zones with a good level of ground surface visibility. This methodology precluded systematic transects separated by set distances between people. Within each construction site, the field team began by attempting to relocate any previously recorded sites. The team then focused their attention on creek corridors, the natural drainage line corridors, hillslopes and hilltops where artefacts would be more likely to occur, and areas of exposures, such as dam banks, vehicle and animal tracks where artefacts and sites would be more visible.

All items of Aboriginal cultural heritage located during the course of the field survey were recorded and plotted using a Garmin handheld GPS set to the GDA co-ordinate system. Photographic records (using a digital Canon Powershot A550 camera), GML site recording forms, sketch plans, and diary descriptions were also compiled as part of the field records.

The site recording detailed the sizes, types and boundaries of archaeological sites, topography (whether Aboriginal archaeological sites, features or areas of potential archaeological sensitivity were located on slopes or flats, etc.), their contexts, existing vegetation, ground exposures, ground-surface visibility (GSV) and the presence and extent of obvious ground disturbance. The distinction between site categories (open camp sites or artefact scatters as opposed to isolated finds, etc.) was made according to the following categories:

- Isolated finds—single artefacts that are positioned with no tangible connection to other objects.
- Sites—open artefact scatters that consist of two or more artefacts with a tangible connection.
- PADs—areas with visible evidence, but which have the potential for evidence within a buried context.

The following attributes of each stone artefact were recorded:

- Raw material—raw materials may include silcrete, tuff, basalt, chert, quartz, quartzite and indurated mudstone, etc.
- Artefact type—this category records the presence of items such as flakes, flaked pieces, blades, cores and hammerstones, etc.
- Tool type—this category records specialised tool types such as scraper, Bondi point, Elouera, geometric microliths, ground edge axe. Non-tools such as un-retouched waste flakes were identified in the catalogue as N/A.
- Dimensions—the maximum lengths, widths and thicknesses of artefacts were recorded.
- Landform unit—the landform where the artefact was located, such as plain, creek bank, swamp, upper slope, middle slope, lower slope, etc.
- Other—comments include additional information such as the colour of the raw material and the presence of cortex and retouch.

Common attributes of culturally scarred trees¹ have been used to assess whether trees within the subject land are likely to have been scarred by Aboriginal people. Any trees with scars identified as being of possible Aboriginal cultural origin were to be recorded as such and be the subject of a visual (but non-invasive) estimate of age prior to recording the scars as an Aboriginal site. As tree age is difficult to estimate and is often the most crucial factor in determining whether scars have a cultural or natural origin, it is considered prudent that a qualified arborist should have the opportunity to examine any possibly culturally modified/scarred trees prior to registering the item on the AHIMS register.

The following figures (4.1 to 4.33) show the extent of the NWRL corridor. The areas subject to archaeological survey for this report are detailed as the construction sites (numbered 1-17); the locations surveyed as part of this assessment are highlighted with a green hatching.