NORTHWEST RAPID TRANSIT

PROJECT INTEGRATED MANAGEMENT SYSTEM

CONSTRUCTION HERITAGE MANAGEMENT PLAN

FOR

SYDNEY METRO NORTHWEST OPERATIONS, TRAINS and SYSTEMS PPP

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Construction Heritage Management Plan Approval Records

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Amendment Record

Changes made to this document since its last revision, which affect its scope or sense, are marked in the right margin by a vertical bar (|).

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1 Introduction

This *Construction Heritage Management Plan* (CHMP) outlines the construction environmental management arrangements by which Northwest Rapid Transit (NRT), in partnership with Transport for NSW (TfNSW), is delivering the Operations, Trains and Systems (OTS) Public Private Partnership (PPP) component of the North West Rail Link (NWRL) Project, now renamed as 'Sydney Metro Northwest'.

Note: In June 2015, TfNSW changed the project's name to Sydney Metro Northwest (from the North West Rail Link) to reflect its role in Sydney's new railway network. Any references to the North West Rail Link in this plan can be assumed to be referring to the Sydney Metro Northwest. Similarly, the Rapid Transit Rail Facility (RTRF) is now known as the Sydney Metro Trains Facility (SMTF).

1.1 OTS PPP

Sydney Metro is Australia's largest public transport project. Sydney Metro Northwest, formerly known as the North West Rail Link, is the first stage of Sydney's new fully-automated metro system and will open to customers in the first half of 2019.

Stage 2, Sydney Metro City & Southwest, will extend metro rail under Sydney Harbour, through the CBD and southwest to Bankstown.

The $8.3 billion Sydney Metro Northwest will deliver eight new railway stations and 4,000 commuter car parking spaces to Sydney's growing North West. Services will start with a train every four minutes in the peak. The project also includes the upgrade and conversion of five existing railway stations to metro standards.

The OTS PPP contract is a 15-year Public Private Partnership project – the largest in the history of New South Wales as well as the largest of the three delivery contracts for Sydney Metro Northwest.

NRT is delivering Sydney's new generation metro trains; building the new stations and car parks; installing tracks, signalling, mechanical and electrical systems; building and operating the RTRF at Tallawong Road; upgrading and converting the railway between Epping to Chatswood to rapid transit standards; and operating Sydney Metro Northwest – including all maintenance work.

1.2 Purpose and Application

This CHMP describes how the NRT team will manage heritage issues during OTS Works. The OTS Works include Phase 1 Works (RTRF and Cudgegong Road Station), Epping to Chatswood Rail Link (ECRL) Conversion Works, Phase 2 Works (remaining new stations and associated infrastructure), Norwest Pedestrian Link Works, 33kV Underground Feeder Powerline Works and Rouse Hill Temporary Bypass Powerline Works.

Figure 1 below illustrates the delineation of the Phase 1, ECRL Conversion and Phase 2 of the OTS Works.

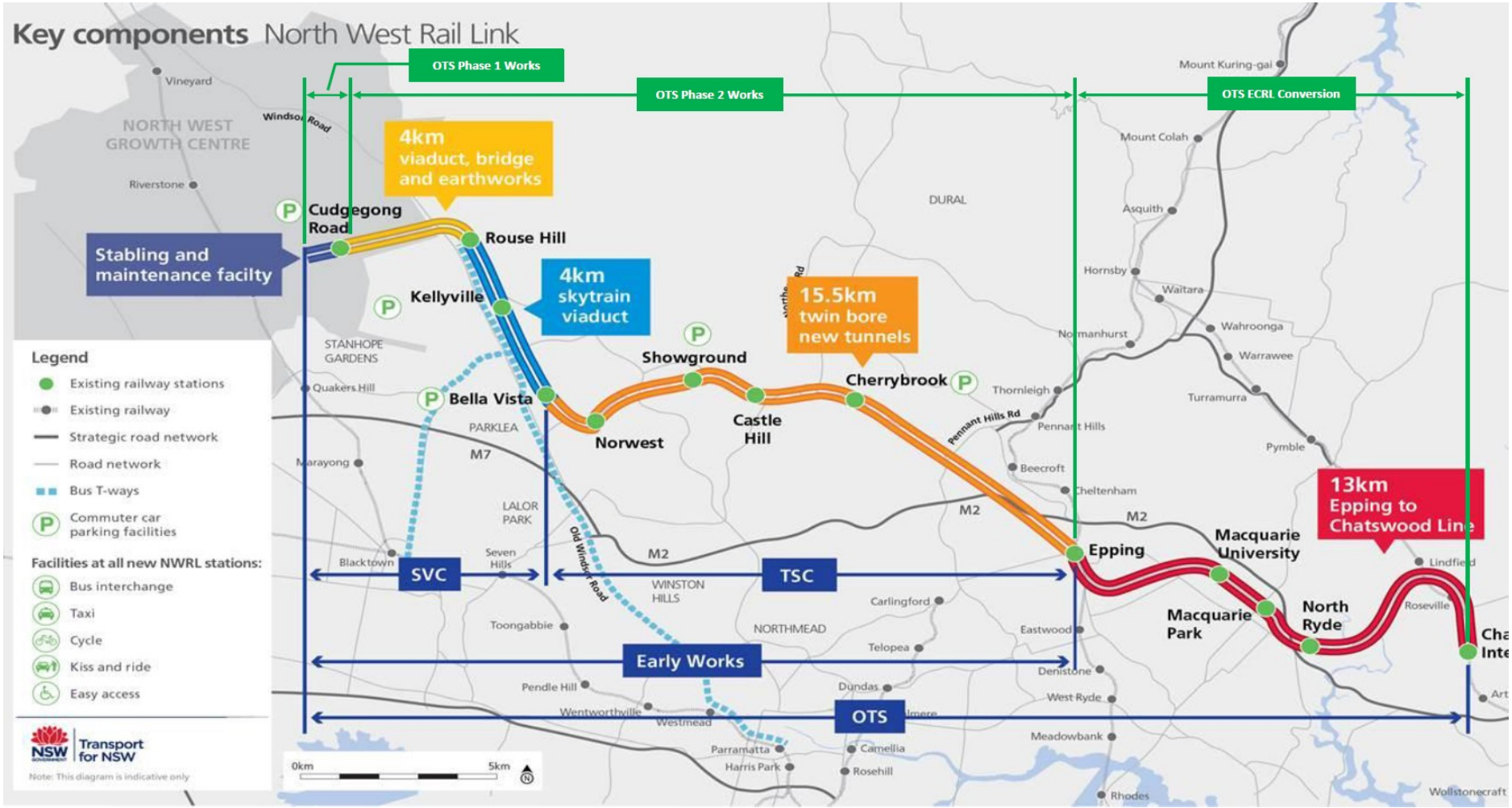


Figure 1 Schematic of NWRL OTS Phase 1, ECRL and Phase 2 Works

Phase 1 Works are those associated with the delivery of the RTRF and the Cudgegong Road Precinct Enabling Works, being the works west of Cudgegong Road and including the initial earth works in the vicinity of Cudgegong Road Station. Refer to Figure 2 below.

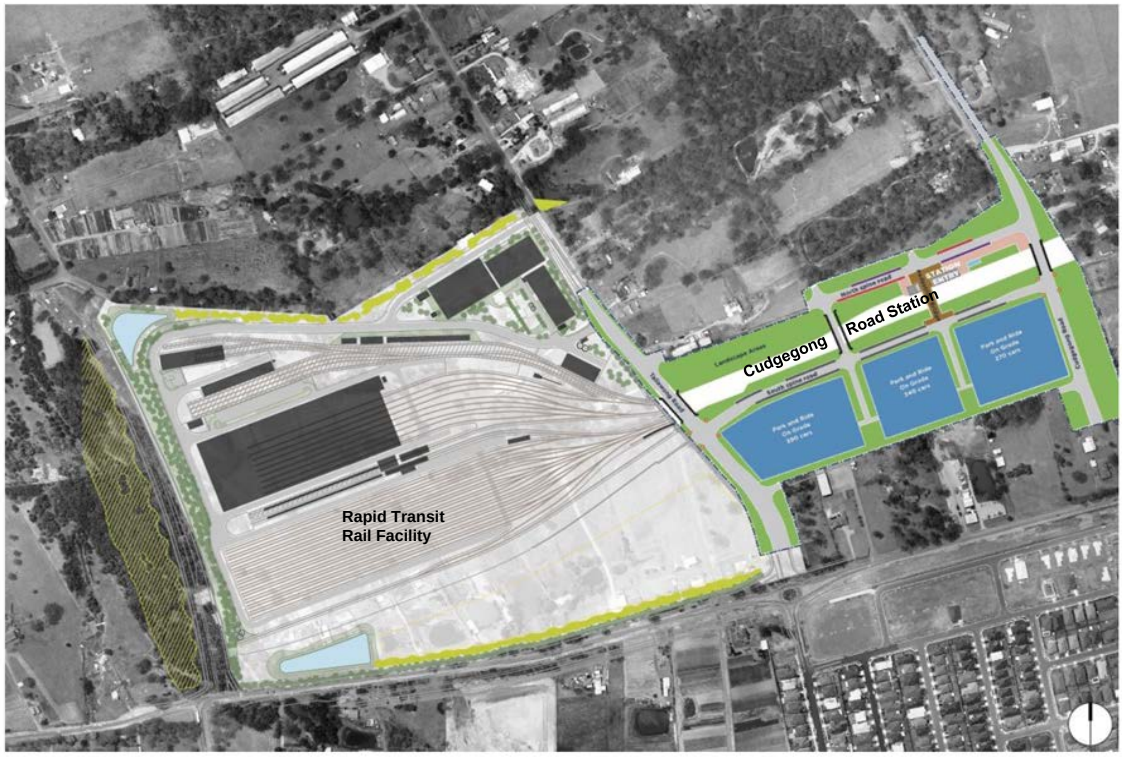


Figure 2 Indicative NWRL OTS Phase 1 Site: RTRF and Cudgegong Road Station

ECRL Conversion Works refer to the conversion of the existing Epping to Chatswood Rail Line to rapid transit. Refer to Figure 3 below.

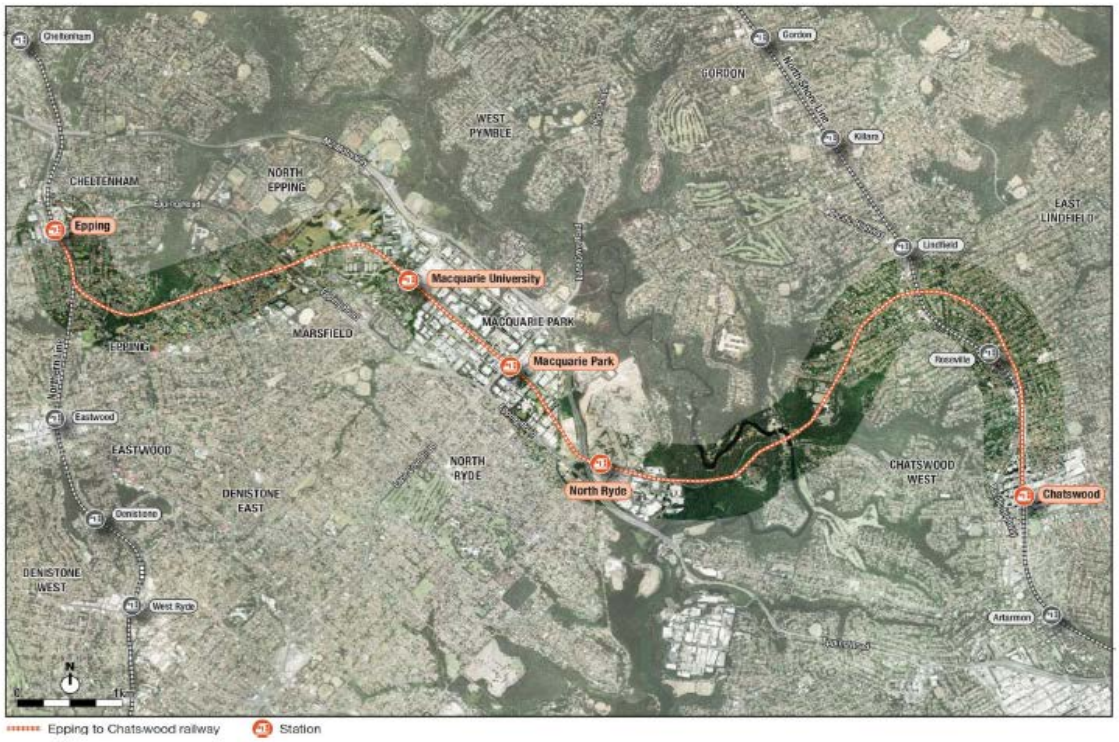


Figure 3 Indicative ECRL Conversion Works Location

Phase 2 Works refer to the construction of:

- New railway stations and precincts at Rouse Hill, Kellyville, Bella Vista, Norwest, Showground, Castle Hill and Cherrybrook (connecting to the Phase 1 works to the west and ECRL conversion works to the south-east. These works include the major civil construction work areas, including but not limited to the seven stations sites and six sites associated with the above rail corridor from Bella Vista to the Phase 1 work areas.
- Services facilities at Cheltenham and Epping
- Rail infrastructure and systems
- Infrastructure such as road works, pedestrian/cycle facilities, landscaping associated with construction of precincts and stations.

The scope of Phase 2 Works is illustrated in Figure 2 below.

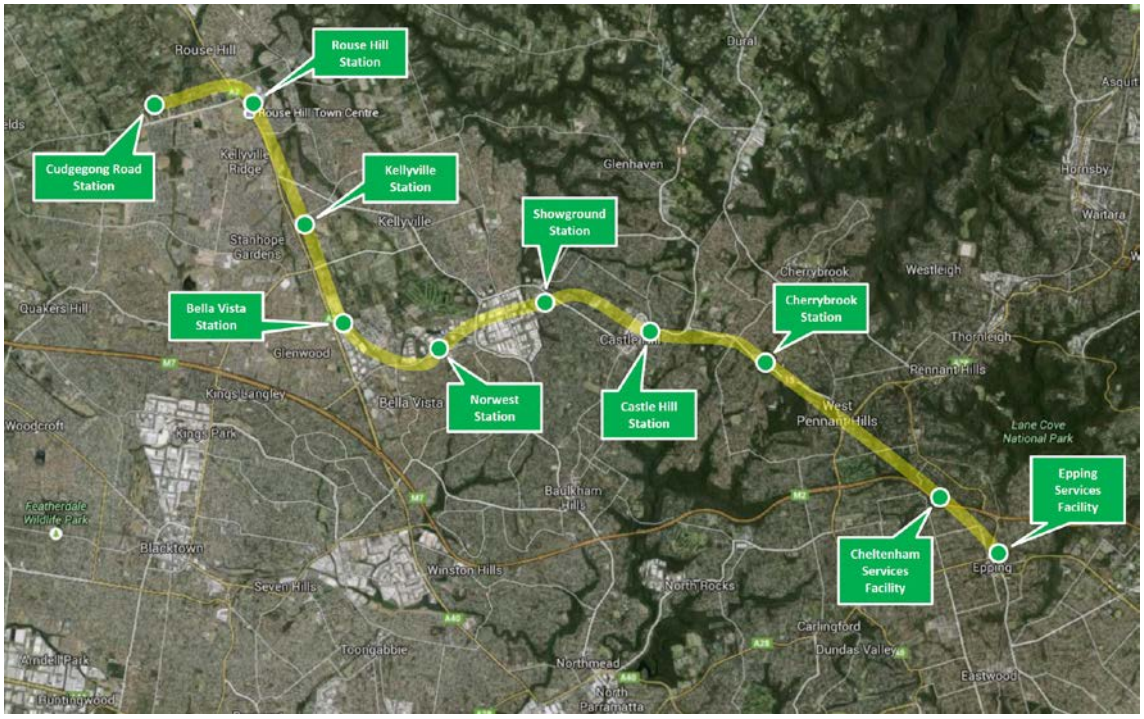


Figure 4 Indicative NWRL OTS Phase 2 Works Areas

Norwest Pedestrian Link works refer to the installation of an underground pedestrian link and second station entry on the northern side of Norwest Boulevard at Norwest Station. See Figure 5.

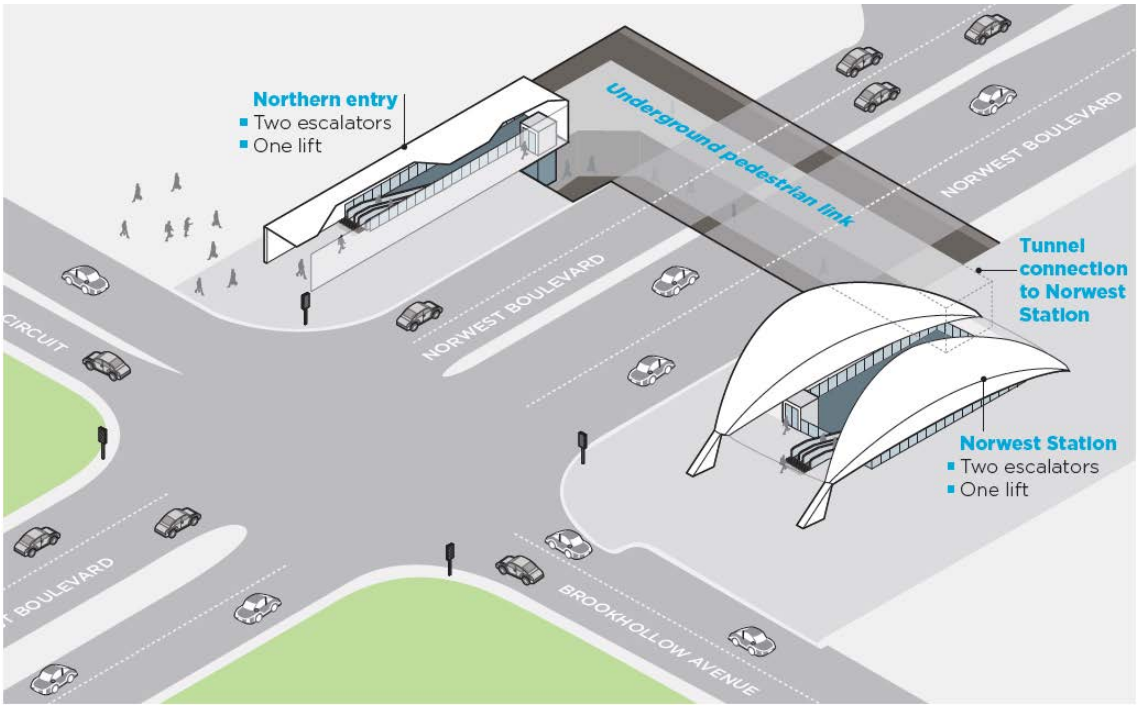


Figure 5 Artist Impression of the Norwest Pedestrian Link

The 33kV Underground Feeder Powerline works refer to the building and maintaining a new five kilometre 33kV feeder power line between Ausgrid's Willoughby

Subtransmission Substation and the TfNSW Chatswood North Traction Substation. The proposal is required to provide dedicated, independent 33kV connection in order to meet the reliable supply of electricity requirements for this project. See Figure 6.

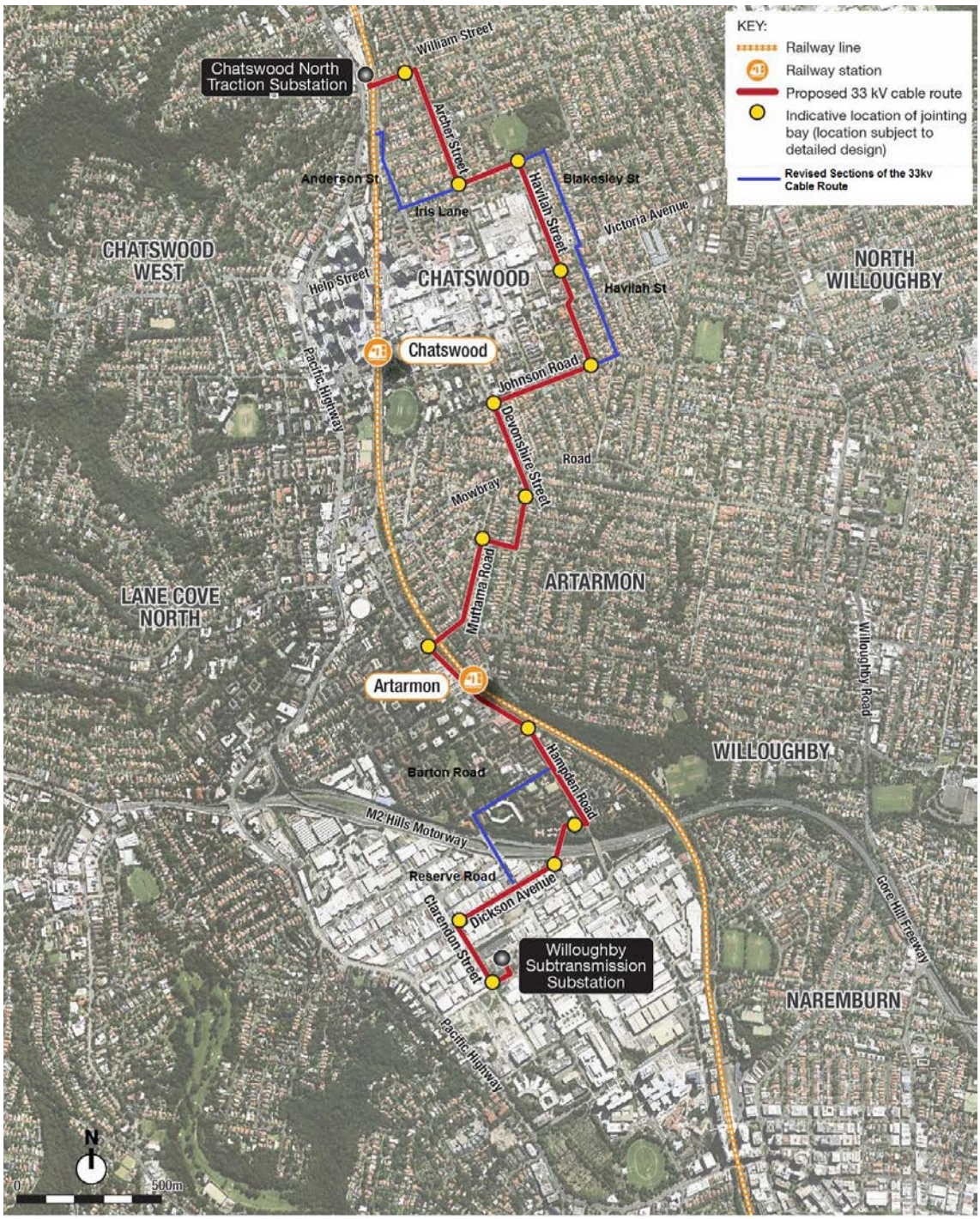


Figure 6 Overview of the 33kV Underground Feeder Powerline Route

The Rouse Temporary Bypass Powerline involves the construction of a temporary powerline from the southern side of the Sydney Metro Windsor Road Bridge crossing Schofields Road, running underground through Castlebrook Memorial Park transitioning back to overhead and crossing Windsor Road to the Rouse Hill traction substation located south of Sanctuary Drive. The purpose of the temporary powerline is

to enable energisation and commissioning of the rail systems associated with the construction of Sydney Metro Northwest. See Figure 7 below.

Figure 7 - Rouse Hill Temporary Bypass Powerline Work Area

Specifically, this Sub Plan:

- Describes the legislative framework specific to heritage issues and relevant guidelines that must be followed
- Identifies the existing heritage issues
- Identifies key heritage risks and impacts associated with the works
- Describes procedures that will be used for management of aspects and potential impacts associated with heritage items.

This Plan is a Sub Plan of the OTS Works Construction Environmental Management Plan (CEMP). The relationship of this Sub Plan to other NRT Sub Plans is described in Section 1.4.

1.3 Heritage Management Objectives and Targets

This CHMP addresses the following requirements:

- OTS Project Deed, Operations, Trains and Systems, Exhibit 1, Scope and Performance Requirements, Appendix 54 – Project Plan Requirements, Section 3.17
- Project Planning Approval – Rapid Transit Rail Facility (ref SSI-5931) – All Conditions applicable to Phase 1 and 2 NWRL OTS works

- Project Planning Approval (and Modification 20 May 14) – NWRL Stage 2 – Stations, Rail Infrastructure & Systems (SSI-5414) – applicable to Phase 1 and 2 NWRL OTS works, as defined in Staging Report
- ECRL Conversion Determination Report Conditions of Approval
- Applicable Environmental Management Measures from Project EISs:
- Environmental Impact Statement 2 (EIS2) and Submissions Report (including – NWRL Stage 2 Stations, Rail Infrastructure and Systems (2012/3)
- Environmental Impact Statement and Submissions Report – Tallawong Road, Rouse Hill Rapid Transit Rail Facility (JBA 2013)
- ECRL Conversion Review of Environmental Factors (Parsons Brinkerhoff, 10 October 2014) and Submissions Report (Parsons Brinkerhoff, 5 February 2015)
- Norwest Pedestrian Link Review of Environmental Factors (Parsons Brinkerhoff 4 June 2015) and Submissions Report (Parsons Brinkerhoff, 1 October 2015)
- Norwest Pedestrian Link Determination Report Conditions of Approval
- Willoughby to North Chatswood 33kV Underground Feeder Powerline Review of Environmental Factors (Parsons Brinkerhoff 20 October 2015) and Submissions Report (Parsons Brinkerhoff 9 March 2016)
- 33kV Underground Feeder Powerline Determination Report Conditions of Approval
- Rouse Hill Temporary Bypass Powerline Environmental Impact Assessment (EIA)
- NWRL Construction Environmental Management Framework (Rev 1.4)
- Applicable Legislative Obligations.

The Compliance Matrix in Annexure B details how the CHMP complies with the requirements of the applicable Conditions of Approval (CoA) requiring this Sub Plan to be prepared, consulted and approved. Annexure B provides a comprehensive list of compliance requirements, environmental documents and the contract documents. Additional detail on compliance management is also contained in Section 2.2.

NRT's Heritage management objectives and targets for the delivery of the OTS Works are:

- Minimise impacts on items or places of heritage value
- Avoid accidental impacts on heritage items through implementation of a procedure to identify and manage unexpected heritage finds
- Maximise the Project personnel's awareness of Aboriginal and historic heritage.

These objectives conform to TfNSW's objectives as described in the NWRL Construction Environmental Management Framework.

1.4 NRT Environmental Management System

In accordance with the OTS Project Deed, Exhibit 1, Scope and Performance Requirements, Section 5.2, NRT must implement and maintain an effective Management System, which addresses all its obligations under the Deed.

The Management Systems must seamlessly integrate all NRT's systems and processes, including those related to rail safety and rail accreditation quality, environmental, sustainability, health and safety and they must accommodate, coordinate and give effect to the Project Plans.

Details of NRT's Integrated Management System including the integrated relationship of the CHMP with the other Project Plans and with the delivery Core Processes are contained in the Project Management Plan. As improvements are made to the processes and systems, these will be reflected in updates to the relevant Project Plans. All elements of the Integrated Management System will reside on Aconex as controlled copies. An intranet will contain a front page to the Integrated Management System with links between documents, processes and forms utilising the Aconex search engine.

1.5 Approval Before Submission

The CHMP and future updates are to be approved by NRT's CEO before being submitted to TfNSW.

1.6 Certification by Independent Certifier

This updated CHMP and any future update is to be submitted, in accordance with the provisions of clause 8 of the Deed, to TfNSW for comment and to the OTS Independent Certifier for certification prior to its implementation by NRT.

1.7 Update and Ongoing development

The CHMP is incorporated as Appendix 76 of the Deed.

The CHMP will be updated regularly in accordance with the requirements of the *Deed,* clause 8 and annually as required in *Exhibit 1, Scope and Performance Requirements, Appendix 54 – Project Plan Requirements, Table 1.*

NRT will undertake the ongoing development, amendment and updating of the CHMP to ensure it remains consistent with Project priorities, risk management, client requirements and Project objectives, taking into account:

- The status and progress of NRT's activities
- Changes in the design, delivery and operations processes and conditions
- Lessons learnt during delivery and operations
- Changes in other related Project Plans
- Requirements and matters not covered by the existing Project Plans
- Changes to Plans resulting from any comments from the OTS Independent Certifier
- Changes to Project Plans as directed by TfNSW's Representative under the Deed
- Unexpected finds
- Updated heritage approvals

- Ongoing consultation with Registered Aboriginal Parties (RAP) (and others)
- Hand-over from previous contracts
- Actions and initiatives with regards to heritage from previous contracts
- Changes to scope of works
- New areas included into NRT's brief.

1.8 Agency and Stakeholder Consultation

1.8.1 OTS Works Consultation

The Minister's Condition of Approval (CoA) require that the CHMP be prepared in consultation with the Office of Environment and Heritage (OEH), relevant local councils and RAPs.

Further, the Plan (or Sub Plan) is required to be approved by Department of Planning and Environment (DP&E) prior to construction as part of the Construction Environmental Management Plan (CEMP).

This Sub Plan (and the CEMP) has been provided, for review and comment, to the following stakeholders:

- Office of Environment and Heritage
- Blacktown City Council
- The Hills Shire Council
- Hornsby Shire Council
- Department of Planning and Environment.

Consultation with the 11 Aboriginal groups/people registered for involvement in the consultation process for the Project was facilitated by Kelleher Nightingale Consulting. The outcomes of the consultation are listed in Annexure A.

Consultation that has been undertaken for Tunnel and Stations Civil Works (TSC) and Surface and Viaduct Civil Works (SVC) have also been referred to in this Sub Plan due to the previous ground disturbance and construction impacts to existing heritage items.

Further consultation would be carried out as per the Unexpected Finds procedure in Section 7.8

No further consultation was required for works approved under Part 5 of the EP&A Act.

2 Legal and Other Requirements

2.1 Relevant Legislation

The key NSW legislation relevant to heritage management includes:

- *Environmental Planning and Assessment Act 1979* (EP&A Act)
- *Heritage Act 1977*
- *National Parks and Wildlife Act 1974* (NPW Act)

For Phase 1 and 2 works, it is important to note that under Section 115ZG of the EP&A Act, approval and permits are not required under the *Heritage Act 1977* and NPW Act. Refer to the Construction Environmental Management Plan for further details.

2.2 Compliance Requirements

Relevant planning requirements from the Conditions of Approval are summarised in the Compliance Matrix in Annexure B.

Additional heritage management requirements from the Project Deed and Revised Environmental Mitigation Measures are included in Annexure B of this Plan.

All compliance requirements associated with this Sub Plan including the Revised Environmental Mitigation Measures from the NWRL Project Environmental Impact Assessments, the ECRL REF, the Norwest Pedestrian Link REF and Submissions and Determination Report and the 33kV Underground Feeder Powerline REF and Submissions and Determination Report that are pertinent to this sub plan are tracked and reported via the OTS compliance tracking program developed in accordance with CoA D5((a)-(h)).

2.3 Relevant Guidelines

The principles of the Australia ICOMOS 'Burra' Charter for the conservation of culturally significant places (Australia ICOMOS 1999) provide the foundation for all assessments of Aboriginal and historic heritage.

Additional guidelines and standards relating to the management of historic heritage include:

- NSW Heritage Manual (Heritage Office and Department of Urban Affairs & Planning 1996)
- Altering Heritage Assets (Heritage Office and Department of Urban Affairs & Planning 1996)
- Heritage Curtilages (Heritage Office and Department of Urban Affairs & Planning 1996)
- Conservation Areas (Heritage Office and Department of Urban Affairs & Planning 1996)

- Photographic Recording of Heritage Items Using Film or Digital Capture (Heritage Office, Department of Planning, 2006)
- Assessing Significance For Historical Archaeological Sites and 'Relics' (Heritage Branch, Department of Planning, 2009)
- Historical Archaeology Code of Practice (Heritage Office, Department of Planning 2006)
- Skeletal Remains; Guidelines for Management of Human Skeletal Remains (Heritage Office 1998)
- Managing risk with heritage trees (Heritage Office 2010)
- Street trees in NSW: Guidelines for conservation and management (Department of Planning 1990)
- Additional guidelines and standards relating to the management of Aboriginal heritage include:
- Aboriginal cultural heritage consultation requirements for proponents (DECCW 2010)
- Code of Practice for Archaeological Investigation of Aboriginal Objects in New South Wales (DECCW 2010)
- Guide to Investigating, Assessing and Reporting on Aboriginal Cultural Heritage in NSW (OEH 2011)
- Draft Guidelines for Aboriginal Cultural Heritage Impact Assessment and Community Consultation (DEC 2005).

3 Roles and Responsibilities

The roles and responsibilities of key NRT Personnel with respect to heritage are as follows:

Table 1 Roles and Responsibilities

Project Director	Manage the delivery of the Project including overseeing implementation of heritage management measures. Act as Contractor's Representative.
Environment Manager	Manage the on-ground application of heritage management measures during construction. Provide guidance to senior management with regard to aspects and risks associate with management of heritage items. Undertake ongoing consultation with RAPs as required. Oversee and manage heritage inductions and training. Responsible for managing ongoing compliance with the CoA and environmental document requirements.
Commercial Manager	Ensure that relevant heritage requirements are considered in procuring materials and services.
Construction Managers Site Superintendent (SS)	Manage the delivery of the construction process, in relation to heritage management across all sites in conjunction with the Environment and Sustainability team.
Sustainability Manager	Track and report heritage requirements against sustainability targets.
Environmental Coordinators (EC)	Develop and oversee implementation of on-ground management documents associated with heritage. Monitor and report on heritage management during construction.
Project Engineers	Implement heritage management activities during construction works, as directed by the Construction Manager and or the Environment Manager.
Specialist Consultant	Specialist consultants will be engaged to undertake investigations and respond to unexpected finds.

4 Existing Environment

4.1 Phase 1 Works

Table 2 below provides a brief description of the NRT worksites and the surrounding areas, as well as the historic and Aboriginal heritage contexts of each site. Information has been drawn from Environmental Impact Statement (EIS) 2 and RTRF EIS, associated technical papers and works conducted during the Early Works contract by Baulderstone Pty Ltd.

Table 2 Phase 1 Existing Heritage Environment

Construction Site	Existing Site and Surroundings Characteristics	Historic Heritage	Aboriginal Heritage	Salvage Works
RTRF (RTRF EIS)	The RTRF site comprised of predominately market gardens and farm paddocks in semi-rural allotments which have been demolished, with the exception of 6 properties remain that are yet to be demolished. Most of the land is cleared of native vegetation; however, there are small moderate areas of native tree canopy, in some instances with a native or partly native groundcover and in others with predominantly introduced weeds and other species. Lands in the general vicinity of the RTRF, and in the general locality, have long been substantially modified for a variety of small-scale rural and agricultural activities, with lands to the south	The historic heritage assessment and Statement of Heritage Impacts found that no heritage listed items are located within 1.2 kilometres of the study area, and that the proposal would not have any direct impacts on listed heritage items. The EIS also concluded that it is highly unlikely that any non-Indigenous archaeological material would be present within the study area, and any surviving material would be expected to be of low research significance.	The results of archaeological investigations suggest that large portions of the site have demonstrated high levels of disturbance and contain a corresponding low level of archaeological potential. Two Aboriginal sites listed on the OEH Aboriginal Heritage Information Management System (AHIMS) site register are located within the RTRF site. One Aboriginal site not listed on the OEH AHIMS site register was located within 65 Schofields Road. Six northern properties were not assessed during the EIS as they were still occupied. These properties have since been assessed and more detail is	The NWRL Staging Report (Stage 1) outlines how the archaeological salvage and excavation programs, including related consultation, be undertaken prior to the commencement of any works that may impact on heritage sites. The NWRL Staging Report identifies that these activities will be undertaken by TfNSW Early Works Managing Contractor (Baulderstone Pty Ltd). Baulderstone's heritage investigation, excavation and salvage program included: Phase 1 and 2 indigenous heritage investigation across the alignment (excavation of soil in areas where there is a high probability of finding relics or sites). This was undertaken in accordance with the approved Baulderstone's Heritage Management Plan and the Cultural Heritage Assessment Report (CHAR).

Construction Site	Existing Site and Surroundings Characteristics	Historic Heritage	Aboriginal Heritage	Salvage Works
	and west of the RTRF rapidly being developed for urban purposes.		contained in Section 7	Within two years of completing these above programs TfNSW will submit reports detailing the respective indigenous and non-indigenous heritage program, including the outcome of fieldwork, artefact analysis, and the identification of a final repository for any finds. The work area was previously cleared of Aboriginal Heritage by TfNSW in accordance with condition C30 (SSI 5414).
Cudgegong Road to Tallawong Road (EIS 2)	The site from Cudgegong Road to Tallawong Road is similar in nature to the RTRF site. Several properties were recently demolished. There are small areas of native tree canopy, in some instances with a native or partly native groundcover and in others with predominantly introduced weeds and other species.	The historic heritage assessment and Statement of Heritage Impacts found that no heritage listed items are located within 1.5 kilometres of the study area, and that the proposal would not have any direct impacts on listed heritage items. The archaeological potential of the area was considered to be low.	Prior survey work identified a number of Aboriginal sites, including two isolated finds, four stone artefact concentrations and three areas of potential archaeological deposit (PAD) within these sites. Further survey work identified a number of previously unrecorded Aboriginal sites (including two isolated finds, two stone artefact concentrations and two areas of PAD) confirmed the presence of previously recorded Aboriginal sites and confirmed zones with PAD.	As above.

4.2 ECRL Conversion Works

Table 3 below provides a brief description of the NRT worksites and the surrounding areas, as well as the historic and Aboriginal heritage contexts of each ECRL site. Information has been drawn from the ECRL Conversion REF and associated technical papers.

Table 3 ECRL Existing Heritage Environment

Construction Site	Existing Site and Surroundings Characteristics	Historic Heritage	Aboriginal Heritage
Epping	In the vicinity of Epping Station, residential land uses and smaller commercial shops are the predominant land uses. The residential land uses within this area consist predominantly of low to medium-density housing, in particular to the east of Epping Station. Some low-density housing is also located to the north-west and south-east of Epping Station.	• Epping Railway Station Group • Forest Park, Epping • School of Arts and garden, Epping • Group of Shops, Epping • Our Lady Help of Christians Church, Epping • House at 48 Oxford Street, Epping • St Alban's Anglican Church and grounds, Epping Archaeological sites • Barren Hills Sawing Establishment	No Aboriginal objects were identified within the accessible portions of the Epping Station buffer zone.
Macquarie Uni – North Ryde	Macquarie Shopping Centre. A range of large business park commercial offices within the vicinity of Macquarie Park and North Ryde stations.	• Macquarie University (ruins) • Northern Suburbs Cemetery	No Aboriginal objects were identified within the accessible portions of the Macquarie University Station buffer zone. No Aboriginal objects were identified within the accessible portions of the Macquarie Park Station buffer zone. No Aboriginal objects were identified within the accessible portions of the North Ryde Station buffer zone.

Construction Site	Existing Site and Surroundings Characteristics	Historic Heritage	Aboriginal Heritage
Chatswood	Chatswood Westfield Shopping Centre. Various commercial office tower buildings within the Chatswood town centre.	• Chatswood Public School • Garden of Remembrance, Chatswood • Old Fire Station, Chatswood • Orchard Tavern, Chatswood • South Chatswood Heritage Conservation Area	No Aboriginal objects were identified within the accessible portions of the Chatswood Station buffer zone.

4.3 Phase 2 Works

Table 4below provides a brief description of the NRT worksites and the surrounding areas, as well as the historic and Aboriginal heritage contexts of each site. Information has been drawn from EIS 2 and RTRF EIS and associated technical papers. Works conducted during the Early Works contract by Baulderstone Pty Ltd, Tunnel and Stations Civil (TSC) works contract by Thiess John Holland Dragados (TJHD) and Surface and Viaduct Civil (SVC) works contract by Impregilo S.p.A. (Australia) and Salini (Australia) Joint Venture (ISJV).

Table 4 Phase 2 Existing Heritage Environment

Construction Site	Existing Site and Surroundings Characteristics	Historic Heritage	Aboriginal Heritage
Epping Services Facility and Epping Decline	The Epping Services Facility covers an area of approximately 3,400m^2 on the western side of Beecroft Road, approximately 400 metres north of the intersection with Carlingford Road. The Epping Decline civil construction works is located on the east side of Beecroft Road and covers an area of 4,500m^2. Vegetation clearance of remnant forest and sandstone outcropping, as well as removal of commercial buildings during the civil construction works under package 1 (Tunnels and Surface Civil works) has modified the existing environment. The existing Epping Services Facility and Epping Decline sites represent a construction compound with hard stand, sheds and compound site amenities and areas designated to site storage, spoil handling and other temporary structures associated with construction activities.	• 'Woodlands' House - The Federation bungalow on Edensor Street, exists to the west of the Epping site • Stone causeway over Devlin's Creek (Local).	No Aboriginal objects were identified within the accessible portions of the Epping Station buffer zone. The Epping worksite is described in EIS 1 as disturbed with a high level of ground surface impact arising from the processes of residential development and transport infrastructure. It was determined that there is no potential for Aboriginal heritage in the NWRL impact zones at Epping due to the already developed nature of the area.
Cheltenham Service Facility	The site lies within the boundary of the broader Beecroft/Cheltenham Heritage Conservation Area, demonstrating local heritage significance with layers of suburban subdivision, re-subdivision and development from the 1880s until the present day.	• Bushland Reserve, Beecroft /Cheltenham Park Castle Howard Road, Beecroft Local (Hornsby LEP) • Street trees Castle Howard Road, Beecroft Local (Hornsby LEP)	The Cheltenham worksite was assessed in EIS 1 as having a low to moderate potential for Aboriginal objects, due to lack of previous disturbance and its landscape context. NWRL PAD 1 was assigned within this

Construction Site	Existing Site and Surroundings Characteristics	Historic Heritage	Aboriginal Heritage
	The construction area contained numerous individual houses, churches and other structures of fine aesthetic quality from the Victorian, Federation, Inter-war and Post-war periods, many of which were designed by architects of note. The intactness of the early twentieth century residential fabric and streetscape contributes to the significance of this area. The area demonstrates the influence of the natural topography and vegetation on the suburban fabric. Remnant vegetation is closely integrated into the street patterns and residential allotments, and the dominant character of the area is derived from the tall tree canopy in pockets of remnant forests and in reserves. The forest trees provide a backdrop behind the majority of the buildings. Records show that the oval at Cheltenham Park was constructed in circa 1934 and aerial photographs of the area indicate that the oval was well established by 1943. The existing amenities block near Castle Howard Road appears to have been constructed at a later date. Street trees associated with Castle Howard Road and adjacent bushland are also listed on the Hornsby LEP as local heritage items.	• Beecroft / Cheltenham Heritage Conservation Area - Area generally bounded by Boundary Road, Hull Road, Beecroft and Castle Howard Bushland Reserves and the suburb boundaries of Epping and North Epping.	construction site.
Cherrybrook Station	The Cherrybrook Worksite is surrounded by a number of residential properties, limited bushland and a transmission line. The Early Works Contractor cleared the worksite of vegetation and demolished all structures within this site. The surrounding areas consist mainly of low density dwellings (with some pockets of medium density housing) surrounded by established vegetation, green open space and corridors, and an undulating topography.	• 'Glenhope', 113 Castle Hill Road, West Pennant Hills Local (Baulkham Hills LEP) • Inala School 160-168 Castle Hill Road, Cherrybrook Local (Hornsby LEP) • House Site – Franklin Road, Cherrybrook.	The Cherrybrook Worksite contained a mixture of disturbed (from residential development) and undisturbed (containing dense vegetation) land. A registered Aboriginal site (45-6-2861, Stone Artefact Concentration (SAC)) was found to be located within the centre of this construction site, therefore this area was assessed in EIS 1 as possessing a low to moderate potential for subsurface Aboriginal objects and PAD (NWRL PAD 2).
Castle Hill Station	This Castle Hill Worksite is situated within the major retail precinct of Castle Hill. The footprint of the construction site is located on land previously utilised	• Arthur Whitling Park Old Northern Road, Old Castle Hill Road and McMullen Avenue	The Castle Hill Station worksite is highly disturbed by landscaping, including gardens, lawns and exotic trees and the construction of

Construction Site	Existing Site and Surroundings Characteristics	Historic Heritage	Aboriginal Heritage
	as open space associated with Arthur Whitling Park, part of Old Northern Road reserve and one commercial property on Old Castle Hill Road. The Early Works Constructor removed heritage items and demolished all structures at this site. The area is surrounded by residential uses, consisting mainly of single detached dwellings on larger blocks, with some higher density residential integrated throughout the surrounding area.	• Archaeological remains – Parramatta to Castle Hill Tramway.	the adjacent roads and bulk excavation around the buildings at the eastern end of Arthur Whitling Park. No Aboriginal objects and/or sites were observed within this construction site during field work undertaken for EIS 1. EIS concluded that there is a very low potential for intact Aboriginal sites to be present at this construction site.
Showground Station	The Showground Worksite is located on land previously utilised as open space associated with the Castle Hill showground complex and the former Hills Shire Council depot. The Early Works Contractor has demolished the Arts Centre located within the worksite, and additional buildings, including horse stables associated with the Showground, were demolished as part of the TSC Works. The surrounding area consists of industrial, civic, residential, and community land uses. To the west of the site is the Castle Hill light industrial land, an area which also contains indoor recreation facilities, hotels and motels, and a motor registry. The surrounding residential development consists of established low density low rise dwellings.	• Castle Hill Showground • House sites, off Carrington Road, Castle Hill.	The eastern portion of the Showground worksite has been heavily impacted by building and construction, parkland development, terracing, landscaping, construction of gardens and the showground ring, therefore EIS 1 considered that it has no archaeological potential. EIS 1 concluded that the western portion of the Showground worksite has a moderate level of archaeological potential for Aboriginal objects to be located within a subsurface context. Development of this worksite will impact the area of NWRL PAD 3.
Norwest Station	The Norwest Worksite is located on Norwest Boulevarde in the existing specialised centre of Norwest. Two existing commercial buildings located within the site boundary were demolished. Norwest is a major employment area characterised by large commercial buildings.	No archaeological potential was identified within the construction zone. Consequently it is anticipated that the proposed construction works and operation of the Norwest Station are unlikely to result in any archaeological impacts.	The Norwest worksite is highly disturbed by modern buildings, cut and imported fills, roads and introduced landscaping and EIS 1 concluded that there is a very low to no potential for intact Aboriginal sites.
Bella Vista Station	The Bella Vista Precast Facility site was previously vegetated, including Cumberland Plain Woodland. There is some residential development scattered throughout the site. Surrounding areas are characterised as rural and low density residential	• Bella Vista Farm	EIS 1 found the worksite to have been impacted by housing development and service installations, however despite this, Aboriginal objects have previously been recorded within this construction site, and a new site (14 Cumbelege Lane (NWRL PAD 6)) was

Construction Site	Existing Site and Surroundings Characteristics	Historic Heritage	Aboriginal Heritage
	development exists to the west. The Bella Vista Tunnelling site was previously occupied by the Totally Home Centre bulky goods retail complex. The site is located to the north of the western extent of the Norwest Specialised Centre with frontage to Old Windsor Road. EIS 1 indicates that the area to the east of the site is mostly low density residential with small pockets of medium density townhouse development. Areas to the north and north east are mostly rural.		observed. As a result, this construction worksite was assessed as having archaeological potential associated with properties 82 (12 Cumbelege Lane) and 74 (2 Cumbelege Lane) which are identified as NWRL PADs 4 and 5. The Bella Vista Worksite has already been highly impacted by development and the course of the creek bank along the northern end of Celebration Drive has been modified in the past. As such, EIS 1 concluded that this construction site has a very low to no potential for Aboriginal heritage sites.
Balmoral Road and Memorial Avenue sites	These two construction sites are surrounded by residential development and service installations. The natural creek line and riparian vegetation surrounding Elizabeth Macarthur Creek demonstrates some areas of moderate to high environmental sensitivity. The T-way is a recent transport infrastructure with parking and roadway running parallel to Windsor Road, running adjacent to these worksites.	• Boundary stones along Windsor Road	EIS 1 found the Balmoral Road worksite to have been impacted by housing development and service installations with low surface visibility. Due to the landform that abuts the creek flat of Elizabeth Macarthur Creek and despite residential development, Aboriginal objects have been previously recorded within this construction site and a new site – 14 Cumbelege Lane. The allocation of NWRL PADs 4, 5 and 6 are contained within the worksite. Similar to Worksite 9 (Balmoral Road), the Memorial Avenue Worksite (worksite 10) also demonstrates surrounding residential development, however this site also shows a relatively low level of disturbance relating primarily to historical vegetation stripping. A number of Aboriginal sites have been previously recorded within and adjacent to this construction site and in relation to Elizabeth Macarthur Creek, has the potential for relatively undisturbed archaeological deposits,

Construction Site	Existing Site and Surroundings Characteristics	Historic Heritage	Aboriginal Heritage
			characterised through NWRL PAD 7.
Kellyville Station	This site is surrounded by residential and services development and the establishment of the Northwest T-way. Native vegetation has been largely stripped, except adjacent to Elizabeth Macarthur Creek.	• Old Windsor Road Heritage precinct • Archaeological site (Archaeological site item 74 or RH/35 or site no. 49- RTA European Heritage Item 4227) and boundary markers. • Site of the Battle of Vinegar Hill.	This site is characterised by the T-way car park, residential development and historical vegetation stripping. Three Aboriginal sites were located directly adjacent to this construction site and one within its boundary. These have been characterised in NWRL PAD 9.
Samantha Riley Drive to Windsor Road	This area has been developed more recently with housing and water utilities and the establishment of the Northwest T-way. Native vegetation has been largely stripped, except adjacent to Elizabeth Macarthur Creek.	• A series of eucalyptus trees along Old Windsor Road, to the north of Samantha Riley Drive • Boundary stones along Old Windsor Road.	Previously identified PAD covers the whole site due to the proximity to Elizabeth Macarthur Creek and potential for Aboriginal occupation.
Old Windsor Road to White Hart	The site is located on the eastern side of Windsor Road, north of the intersection with Old Windsor Road Note that although listed separately in the EIS report on which this document is based, it has since been determined by the heritage consultants that the Swan Inn and the White Hart Inn are the same structure which have historically been referred to by different names.	• Windsor Road Heritage Precinct • Mungerie Property and House • Former Swan Inn.	The northern portions of the site contain several previously recorded Aboriginal sites. Creek flat landforms 100m either site of the two creek lines have archaeological potential for relatively undisturbed deposits and were designated as NWRL PAD 10.
Rouse Hill	The site is surrounded by the grounds of the Rouse Hill Town Centre with the majority of the area cleared and subject to extensive urban development.	• The Battle of Vinegar Hill Memorial.	There is no archaeological potential for intact Aboriginal sites to remain within the previously development land. Caddies Creek precinct was subject to archaeological salvage excavation. In the south-west of the site in the lower slope landforms close to Caddies Creek, there is a potential for relatively undisturbed archaeological deposits. These have been designated as NWRL PAD 11.
Windsor	This area is relatively undeveloped, with low-level of	• Royal Oak Inn (known now as the Mean	This site has been recently surveyed and

Construction Site	Existing Site and Surroundings Characteristics	Historic Heritage	Aboriginal Heritage
Road Viaduct	ground disturbance through vegetation clearance. Agricultural, low level rural properties and some light industrial/commercial land use is common in this area.	Fiddler Hotel).	shows a low-level of previous impact. The ridge top and ridge spur landforms in this construction site have a potential to contain intact Aboriginal sites, designated as NWRL PAD 11.
Windsor Road Viaduct to Cudgegong Road	This area has predominant land use characteristic of rural properties concerned with agricultural, grazing and farming activities. Schofields Road has recently been widened and residential development to the south of Schofield Road is rapidly growing. To the north of Schofields Road, the landscape is changing to accommodate the construction of the proposed rail corridor; however various rural properties still surround the proposed alignment.	• No heritage items.	Survey work has noted agricultural and low level rural-residential development. Site 16 has included areas previously identified as areas of potential archaeological deposits. Together with Site 17, four previously unrecorded Aboriginal sites conformed zones with PAD.

4.4 Norwest Pedestrian Link Works

Table 5 below provides a brief description of the Norwest Pedestrian Link worksite and the surrounding areas, as well as the historic and Aboriginal heritage contexts of each site. Information has been drawn from the Norwest Station Subsurface Pedestrian Link and Northern Entry Review of Environmental Factors.

Table 5 Norwest Pedestrian Link Existing Heritage

Construction Site	Existing Site and Surroundings Characteristics	Historic Heritage	Aboriginal Heritage
Norwest Pedestrian Link and Northern Entry	In the 1980's the Norwest Business Park was established and over the intervening 35 years the area has continued to develop. Norwest is a major employment area characterised by large commercial buildings.	No Non-Aboriginal heritage items were identified or recorded within the Project area	No Aboriginal objects were identified within the Project area

4.5 33kV Underground Feeder Powerline Works

Table 6 below provides a brief description of the 33kv Underground Feeder Powerline worksite and the surrounding areas, as well as the historic and Aboriginal heritage contexts of each site. Information has been drawn from the Willoughby to North Chatswood 33kV Underground Feeder Powerline Review of Environmental Factors.

Table 6 33kV Underground Feeder Powerline Existing Heritage

Construction Site	Existing Site and Surroundings Characteristics	Historic Heritage	Aboriginal Heritage
33kV Underground Feeder Powerline Existing Heritage	Land adjacent to the alignment comprises a range of uses including low and medium density residential, commercial, mixed use, industrial and recreational land uses.	*Section 170 Registers* • Willoughby Stormwater Channel No. 26 – Sydney Water • Artarmon Railway Station Group – Sydney Trains • Homes – 2 Muttama Road, Artarmon – NSW Department of Health LEP Listings • House – 283 Mowbray Road, Chatswood • House – 277 Mowbray Road, Chatswood • House- 8 Devonshire Street, Chatswood • House – 15 Johnson Street, Chatswood • House – 17 Johnson Street, Chatswood • House – 34 Johnson Street, Chatswood • House - 23 Neridah Street, Chatswood • House - 28 Neridah Street, Chatswood • House - 37 Neridah Street, Chatswood • House - 27 Archer Street, Chatswood	46 Aboriginal sites / objects have previously been recorded in the wider Willoughby are (approximately 2km radius from the alignment). There are three identified sites within approximately 1 kilometre of the alignment with the nearest recorded Aboriginal artefact located approximately 100 – 150 meters east where the feeder travels along Oscar Street in Chatswood

Construction Site	Existing Site and Surroundings Characteristics	Historic Heritage	Aboriginal Heritage
		• Community Hospital – 256 Victoria Avenue, Chatswood • House – 105 Archer Street, Chatswood • House – 107 Archer Street, Chatswood • North Chatswood heritage conservation area • South Chatswood heritage conservation area • Industrial building (including surviving industrial elements) – 1 Frederick Street, Artarmon	

4.6 Rouse Hill Temporary Bypass Powerline Works

Table 7 Rouse Hill Temporary Bypass Powerline Existing Heritage

Construction Site	Existing Site and Surroundings Characteristics	Historic Heritage	Aboriginal Heritage
Entire alignment	The alignment of the powerline is between the Rouse Hill Substation and the viaduct adjacent to the Windsor Road Bridge. It traverses through the project alignment, crosses Windsor Road and is trenched through the Castlebrook Memorial Park before crossing over Schofields Road.	The following heritage registers were searched with one result for heritage items in the project area: • State Heritage Register (SHR): no items in the project area; • Blacktown Local Environmental Plan 2015:	TfNSW engaged EMM to prepare an Aboriginal Due Diligence Report for the proposal. An AHIMS search was completed on 29 May 2017 for an area covering the alignment. The AHIMS search identified 15 Aboriginal sites, none of which are within the project area. Most

Construction Site	Existing Site and Surroundings Characteristics	Historic Heritage	Aboriginal Heritage
		"Place – Battle of Vinegar Hill" (I32) on Lot 1 DP 1086553: I28 – Windsor Road from Baulkham Hills to Box Hill; • National Heritage List: no items in the project area; and • Commonwealth Heritage list: no items in the project area. Certain sections of Windsor Road are listed on the SHR but none occur in the project area. The alignment of Windsor Road is significant as are elements of the road including alignment stones and milestones. The project area also passes through what is one of the locations nominated as the battle of Vinegar Hill site, although this is yet to be confirmed and it is unlikely that physical evidence of the battle survive, therefore the battle site does not pose any constraints to the project.	of these sites have been destroyed by nearby residential development or infrastructure. The Native Title Vision website was searched on 29 May 2017. No registered or determined native title claims or Indigenous Land Use Agreements (ILUAs) are registered over the project area. The Aboriginal places register was search on 29 May 2017. No Aboriginal places are registered in or near the project area. A desktop assessment and site inspection did not identify any previously recorded Aboriginal objects or areas of PAD within the project area. Furthermore, the project area is considered to have low archaeological potential because of the following reasons: • the alignment does not contain prominent features that would indicate areas of PAD and nearby test excavation of PADs identified either no artefacts or very low density subsurface artefacts; • the project area is approximately 750 m from reliable watercourses which are areas statistically less likely to contain archaeological material; and • the project area is generally disturbed as the result of vegetation clearance, ground disturbance from development and infrastructure and landscaping; It is therefore reasonable to conclude, in accordance with the due diligence guidelines, that there is a low probability of Aboriginal objects occurring within the project area; visual inspection did not result in Aboriginal objects being found.

5 Aspects and Potential Impacts

The key aspects and potential impacts associated with the management of heritage during the delivery of the entire OTS Works are listed in Table 8.

These identified risks have been taken into account in the development of the Heritage Management Strategy and site-specific procedures for the works.

Table 8 Summary of Overall Aspects and Potential Impacts

Aspects	Potential Impacts/Opportunities	Risk level for OTS Works (qualitative) (L=low, M=Med, H=High)
Excavation Works	• Removal of soil that contains aboriginal artefacts resulting in complete or partial destruction or sites.	L
Known Heritage Areas	• Permanent or temporary alteration to the curtilage or heritage setting of an identified area.	L
Unexpected finds	• Disturbance or destruction of previously undiscovered historic or Aboriginal heritage artefacts, which may require additional archival recording.	L
Modifications to design and construction methodology	• Change to the construction footprint resulting in impacts to areas not previously assessed to be affected.	M

6 Historic Heritage Management

6.1 Affected Historic Heritage Items – Phase 1 Works

There are several known historic heritage items that will be affected by the OTS works, as detailed in EIS 2 and the RTRF EIS and the subsequent technical papers (GML Heritage, March 2012) and (Artefact, June 2013).

A summary of anticipated impacts is contained in Table 9 below.

Table 9 Affected Historic Heritage Items – Phase 1 Works

Item	Address	Listing	Location in relation Worksite	Impact	Management Recommendations
RTRF Site					
Rouse Hill House & Farm	Windsor Road	State Significant	1.5 kilometres north of the site	The RTRF would not result in any appreciable heritage impacts to Rouse Hill House and Farm and would not negatively affect the heritage significance of the property. It is highly unlikely that any views of the RTRF would be available from the property, and if any such views did exist they would only be available from the southern or western edges of the property, rather than from the main farmstead complex	The inclusion of a vegetated buffer or boundary screening along the northern frontage of the site would minimise the potential for views. These measures will form part of the Urban Design and Landscape Plan

Item	Address	Listing	Location in relation Worksite	Impact	Management Recommendations
House	128 Westminster Street, Schofields)	Alex Avenue and Riverstone Precinct Plan 2010	1.2 kilometres north-west of the of the site	Limited views of the proposed RTRF area may be visible from the house, however, the RTRF proposal would not have a significant impact on the views or setting of the item.	The inclusion of a vegetated buffer or boundary screening along the northern frontage of the site would minimise the potential for views. These measures will form part of the Urban Design and Landscape Plan
Cudgegong Road Precinct					
Rouse Hill House and Farm	Windsor Road	State Significant	1.5 kilometres north of the site	The construction work are would be barely visible from the Rouse Hill Estate, and that the possibility of these works resulting in any appreciable negative heritage impacts upon this historic property and its curtilage would be very low.	None.

6.2 Affected Historic Heritage Items – ECRL Conversion Works

A summary of anticipated impacts associated with the ECRL Conversion Works (referencing ECRL Conversion REF, Submissions Report and CoA) is contained in Table 9 below.

Table 10 Affected Historic Heritage Items – ECRL Conversion Works

Item	Address	Listing	Location in relation Worksite	Impact / Constraints	Management Recommendations
Epping					
Epping Railway Station Group	Beecroft Road	RailCorp's Section 170 Register	Within worksite	No impact on heritage buildings/fabric from the works in this location. No constraints on potential archaeology There is a view corridor between the station platform and the proposed location of the chiller unit	None
Forest Park Epping	Blaxland Road	Hornsby LEP	The curtilage of Forest Park is located in the south of the project area although the full extent of the curtilage is not within the project area	No constraints. There is a clear view east to the park from the railway line. This is partially screened by the brick fence and mature trees on the western boundary of the park	Screening should be retained where possible
School of Arts and garden, Epping	Oxford St	Hornsby LEP	Outside of project area	No constraints.	Care should be taken to maintain the view corridor between the hall and other heritage items on Oxford Street, especially the heritage-listed group of shops located to the south-east

Item	Address	Listing	Location in relation Worksite	Impact / Constraints	Management Recommendations
Group of Shops, Epping	Pembroke St	Hornsby LEP	Outside of project area	No constraints. There is the potential for remains of the barracks and other buildings associated with the convict period Barren Hills Sawing Establishment to remain underneath the building.	Care should be taken to maintain the view corridor between the hall and other heritage items on Oxford Street, especially the heritage listed school of arts hall to the north-west
Our Lady Help of Christians Church	Oxford St	Hornsby LEP	Outside of project area	No constraints. There is the potential for remains of saw pits associated with the convict period Barren Hills Sawing Establishment to remain underneath the building	Care should be taken to maintain the view corridor between the hall and other heritage items on Oxford Street.
House	48 Oxford St	Hornsby LEP	Outside of project area	No constraints. There is the potential for remains of saw pits associated with the convict period Barren Hills Sawing Establishment to remain underneath the building.	Care should be taken to maintain the view corridor between the hall and other heritage items on Oxford Street.
Alban's Anglican Church and grounds	Pembroke St	Hornsby LEP	Outside of project area	No constraints. There is limited potential for remains associated with the convict period Barren Hills Sawing Establishment to remain underneath the church.	Care should be taken to maintain the views between the church buildings and the park on the opposite side of the road, which contribute to the heritage qualities of Pembroke Street.

Item	Address	Listing	Location in relation Worksite	Impact / Constraints	Management Recommendations
Macquarie University					
Macquarie University (ruins)	Herring Road	Draft Ryde LEP	Outside the project area	The ruins are outside the 250 metres buffer zone and there are therefore no constraints on the fabric of the heritage item or archaeological potential of the heritage item. The ruins are outside the 250 metres buffer zone there is no visual connection between the buffer zone and the item. View corridors from the station into the curtilage of Macquarie University are limited due to screening vegetation.	Screening vegetation should be maintained.
North Ryde					
Northern Suburbs Cemetery	Delhi Road	Draft Ryde LEP	Outside the project area	No constraints There is no potential for non-Indigenous archaeological remains pre-dating the cemetery within the 250-metre buffer There are clear visual links between the cemetery and the concourse of the railway station, although this is screened in places by vegetation	As this is a functioning cemetery care should be taken to avoid all impact within the curtilage of the cemetery. Large trees and vegetation should be retained to maintain the peaceful setting of the cemetery and provide separation from the railway station and busy Delhi Road.
Chatswood					
Chatswood Public School	Willoughby LEP	Intersection of Centennial Avenue and the Pacific Highway	Outside the project area	No constraints There is potential for the remains of earlier building to be located underneath the buildings, although the focus of Chatswood was originally further south. The school is clearly visible from the Pacific Highway and it provides an aesthetically pleasing focal point on the intersection with Centennial Avenue.	If excavation work is required within the school grounds additional research should be undertaken to determine the historical occupation of the area. Care should be taken to maintain screening vegetation.

Item	Address	Listing	Location in relation Worksite	Impact / Constraints	Management Recommendations
Garden of Remembrance, Chatswood	Willoughby LEP	Albert Avenue	Outside the project area	No constraints The location of the garden next to the train line would suggest that the area has been subject to impacts. The visual relationship between the garden and the historical centre of Chatswood has been compromised by modern construction to the north	If excavation work is required within the park additional research should be undertaken to determine the historical occupation of the area. The view to the south, over Albert Avenue towards Chatswood Park and the South Chatswood HCA should be maintained where possible.
Old Fire Station, Chatswood	Willoughby LEP	Pacific Highway	Outside the project area	No constraints. The fire station is clearly visible from the Pacific Highway within a range of shops dating to different periods	If excavation in the vicinity of the building is required (in the rear yards or in the frontage/footpath) additional research should be undertaken to determine the historical occupation of the area. The Old Fire Station is a visually pleasing reminder of the history of the area and care should be taken to maintain this
Orchard Tavern, Chatswood	Willoughby LEP	455 Victoria Ave	Outside the project area	No constraints The tavern was originally constructed in 1900 and has been modified in recent times with the lower floor converted to shops and a small arcade The Orchard Tavern is an example of early 20th century building styles now rare in the Chatswood Mall. The tavern is a visually attractive reminder of the heritage of the area	If excavation work is required within the vicinity of the tavern additional research should be undertaken to determine the historical occupation of the area. Visual links should be retained and enhanced where possible from the railway station and lifts, and from the pedestrian mall.

Item	Address	Listing	Location in relation Worksite	Impact / Constraints	Management Recommendations
South Chatswood Heritage Conservation Area	Willoughby LEP	Albert Avenue	Outside the project area	No constraints.	If excavation work is required within the park or Oval additional research should be undertaken to determine the historical occupation of the area. Views through Chatswood Park and towards the oval should be maintained. Views from Chatswood Park to the Garden of Remembrance should be retained.

6.3 Affected Historic Heritage Items – Phase 2 Works

There are several known historic heritage items that will be affected by the OTS works, as detailed in EIS 1 and EIS 2 and the subsequent technical papers (GML Heritage, March 2012) and (Artefact, June 2013).

A summary of anticipated impacts is contained in Table 9 below.

Table 11 Affected Historic Heritage Items – Phase 2 Works

Item	Address	Listing	Location in relation Worksite	Impact	Management Recommendations
Epping Decline and Epping Services Facility					
Woodlands' House (Local)	25 Ray Road, Epping	Local (Hornsby LEP)	Outside the project area, approximately 100m west of the site	Demolition of commercial buildings and vegetation on perimeter of the site has occurred as part of the TSC works.	Archival recording of street frontage occurred prior by Early Works occurring. No further mitigation necessary.
Remnant bushland	Road reserve along Beecroft Rd, between Carlingford Road and Kandy Avenue	Local (Hornsby LEP)	Part of the bushland is within the site	TfNSW Early Works and TSC construction works have already removed the majority of the trees and vegetation contained within the heritage-listed bushland between Carlingford Road and Kandy Avenue. No further adverse impacts are expected to occur as a result of the OTS construction works.	Maintaining the vegetation retained, reinstated and planted during the construction phase. These measures will form part of the Urban Design and Landscape Plan.
Stone causeway over Devlin's Creek (Local	Beecroft Road, Epping	Local (Hornsby LEP)	Outside the project area, approximately 100m north of the site	The stone causeway over Devlin's Creek is located outside the construction sites and would not be affected by the works. However, there is possibility of indirect impacts on the causeway from erosion and sedimentation associated with construction works.	Site boundary will be fenced, ensuring this area is protected and not accessible.

Item	Address	Listing	Location in relation Worksite	Impact	Management Recommendations
Cheltenham Services Facility					
Bushland Reserve, Beecroft /Cheltenham Park	Castle Howard Road, Beecroft	Local (Hornsby LEP)	Within the worksite.	Part of the former heritage-listed bushland reserve in the vicinity of the Cheltenham Oval area was impacted by the tree removal to enable TSC works. However, the affected area represents a relatively small percentage of the total tract of bushland in this area. The proposed construction works as part of the TSC works have a minor adverse impact on the bushland reserve. No additional impacts to the Bushland Reserve, other than those assessed in EIS1, would result from the proposed OTS construction.	• Unnecessary removal of existing bushland vegetation would be avoided, where practicable. • The Construction Site boundary will remain fenced; ensuring adjacent bushland area is not accessed. • Existing offsite vegetation will act as a visual screen in accordance with the Visual Amenity Management Plan • Where required, all onsite vegetation management, including removal, will be undertaken in accordance with the Construction Flora and Fauna Management Plan • Maintaining the vegetation retained, reinstated and planted during the construction phase. These measures will form part of the Urban Design and Landscape Plan.
Street trees	Castle Howard Road, Beecroft	Local (Hornsby LEP)	The street trees are located Castle Howard Road approximately 100m northeast of the main site.	The street trees along the full length of Castle Howard Road were listed as a landscape heritage item of local significance on Hornsby LEP. Construction of the service facility as part of the TSC Works has had a minor adverse impact on this item resulting from the necessary removal of a number of trees along the southern side of the road at Cheltenham Park. No additional impacts to remaining Street trees, other than those assessed in EIS1, would result from the proposed OTS	• Avoid unnecessary removal of existing street trees • Existing offsite vegetation will act as a visual screen in accordance with the Visual Amenity Management Plan • Where required, all onsite vegetation management, including removal, will be undertaken in accordance with the Construction Flora and Fauna Management Plan • Maintain the vegetation retained, reinstated and planted during the construction phase. These measures will form part of the Urban Design

Item	Address	Listing	Location in relation Worksite	Impact	Management Recommendations
				construction.	and Corridor Landscape Plan.
Beecroft / Cheltenham Heritage Conservation Area	Area generally bounded by Boundary Road, Hull Road, Beecroft and Castle Howard Bushland Reserves and the suburb boundaries of Epping and North Epping	Local (Hornsby LEP)	The worksite is within the Beecroft / Cheltenham Heritage Conservation Area.	The existing areas of bushland in the vicinity of Cheltenham Oval are important factors shaping the character and landscape of the Beecroft / Cheltenham Conservation Area. Vegetation clearance has occurred resulting from the TSC construction activities associated with the Cheltenham Services Facility site. The OTS construction works would not require further vegetation removal, however during the construction period the OTS works would result in a minor adverse impact upon the significance of the broader conservation area.	• Unnecessary removal of existing bushland vegetation would be avoided, where practicable. • The Construction Site boundary will be fenced, ensuring adjacent bushland area is not accessed. • Existing offsite vegetation will act as a visual screen in accordance with the Visual Amenity Management Plan. • Where it is required, all onsite vegetation management, including removal, will be undertaken in accordance with the Construction Flora and Fauna Management Plan. • Maintaining the vegetation retained, reinstated and planted during the construction phase. These measures will form part of the Urban Design and Landscape Plan. • Replacement planting of any heritage listed trees removed at Cheltenham would occur where feasible and reasonable in consultation with Council per EIS 2 REMM EH10.

Item	Address	Listing	Location in relation Worksite	Impact	Management Recommendations
Cherrybrook Station					
Glenhope	113 Castle Hill Road, West Pennant Hills	Local (Baulkham Hills LEP)	The worksite is located approximately 50m north of the Glenhope property	The construction works will continue to have temporary adverse impacts upon the setting of (and the outlook from) the heritage-listed Glenhope, which is directly opposite the access road to Cherrybrook Station construction site. The TfNSW Early Works and TSC works removed vegetation on the northern side of the road (within the construction site) reducing the visual setting for Glenhope house. The OTS construction works will continue to have a temporary impact on the visual setting of Glenhope during the construction period.	• Where feasible and reasonable, retain or reinstate an adequate buffer of vegetation along the northern side of Castle Hill Road opposite the Glenhope property to preserve the character of its setting and to screen the visual impacts of the station construction site in the northern outlook from the Glenhope property.
Inala School	160-168 Castle Hill Road, Cherrybrook	Local (Hornsby LEP)	The worksite is directly west of the Inala School property	Removal of vegetation on Franklin Road during the TSC works has caused some minor impacts on the setting of the property. The OTS construction works would continue to have a minor adverse impact on Inala during the construction period.	• Where feasible and reasonable, retain or reinstate a buffer of vegetation along the western side of Franklin Road opposite Inala School.
House Site –	Franklin Road, Cherrybrook	Not listed (noted in Casey and Lowe (2006)	On the southeast end within the worksite.	Any archaeological remains were removed during the TSC works. No further impact is anticipated as a result of the OTS construction works.	• Should unexpected finds occur, the Unexpected Finds protocol would be followed in accordance with the Section 6.6 of this plan.

Item	Address	Listing	Location in relation Worksite	Impact	Management Recommendations
Castle Hill Station					
Arthur Whitling Park	Old Northern Road, Old Castle Hill Road and McMullen Avenue	Not listed	This is located entirely within the construction footprint, as established by the TSC works.	The entire area of Arthur Whitling Park would be directly affected by the proposed construction works, as assessed in EIS1. No additional impacts to Arthur Whitling Park, other than those assessed in EIS1, would result from the proposed construction.	• If feasible, the existing mature plantings along the Old Northern Road edge of Arthur Whitling Park would be retained and protected during construction. • Reinstate key elements of Arthur Whitling Park in consultation with The Hills Shire Council, the Hills District Historical Society and the Castle Hill sub-branch of the RSL, where feasible and reasonable. • Reinstate the landscaped public parkland (Arthur Whitling Park) following completion of construction. • TfNSW to identify, collect and store key components such as signage, for future re-instatement or use in future site interpretation. • TfNSW are responsible (with NRT) for REMMs EH6 and EH7, involving the reinstatement of Arthur Whitling Park, and associated consultation requirements. • Should unexpected finds occur, the Unexpected Finds protocol would be followed in accordance with the Section 6.6 of this plan.

Item	Address	Listing	Location in relation Worksite	Impact	Management Recommendations
Parramatta to Castle Hill Tramway	Arthur Whitling Park	Not listed	Arthur Whitling Park is located entirely within the construction footprint.	No impacts on potential archaeological remains from the Parramatta to Castle Hill Tramway are anticipated. TSC works have incorporated measures associated with uncovering and removing relics associated with the Parramatta to Castle Hill tramway.	• Archaeological monitoring for relics associated with the Parramatta to Castle Hill tramway to be addressed in TfNSW's investigation, salvage and reporting covered by Condition of Approval E10. • Should unexpected finds occur, the Unexpected Finds protocol would be followed in accordance with the Section 6.6 of this plan.
Showground Station					
Castle Hill Showground	Showground Road, Castle Hill	Not listed	Castle Hill Showground is directly north of the worksite, with part of the area within the worksite.	The establishment of the TSC worksite has resulted in adverse impacts upon parts of the Castle Hill Showground, which is a rare example of a rural-style showground within the Sydney metropolitan area. It is anticipated that no further additional impacts to the Castle Hill Showground, other than those assessed in EIS1, would result from the proposed construction. The prototype train is proposed to be located within the southern car park of the existing building (formerly the Hills Council chambers).	• Reinstate or rejuvenate any areas of the Showground disturbed for construction works following completion of the works. • TfNSW to identify, collect and store key components such as signage, for future re-instatement or use in future site interpretation under its investigation, salvage and reporting covered by Condition of Approval E10 (SSI-5100).

Item	Address	Listing	Location in relation Worksite	Impact	Management Recommendations
Two former house sites	Off Carrington Road, Castle Hill	Not listed	Within the worksite.	Potential archaeological remains associated with the two pre-1920s buildings identified on historic plans and aerials are located within the area designated for earthworks construction of the Showground Station, which was assessed as part of EIS 1. These remains are likely to have been removed, disturbed or adversely impacted during the TSC works. No additional impacts would result from the proposed OTS construction works.	• Should unexpected finds occur, the Unexpected Finds protocol would be followed in accordance with the Section 6.6 of this plan.
Bella Vista Station					
Bella Vista Farm	Elizabeth Macarthur Drive, Bella vista	State Heritage Register	1km south of the worksite	No archaeological potential was identified within the construction zone. Consequently the construction works are unlikely to result in any archaeological impacts.	No mitigation measures required
Memorial Avenue					
Boundary stones along Windsor Road	Old Windsor Road, north of Memorial Avenue	Not listed	North of the Memorial Avenue construction site	These boundary stones were likely to have buried when constructing the North-West T-way. The boundary stones along Old Windsor Road, would be located outside the Memorial Avenue construction site.	• Should unexpected finds occur, the Unexpected Finds protocol would be followed in accordance with the Section 6.6 of this plan.

Item	Address	Listing	Location in relation Worksite	Impact	Management Recommendations
Kellyville Station					
Old Windsor Road Heritage precinct and Archaeological site (Archaeological site item 74 or RH/35 or site no. 49- RTA European Heritage Item 4227) and boundary markers.	Windsor Road and Old Windsor Road RTA S170 Heritage and Conservation South from Samantha Riley Drive, Kellyville	Register (State significance)	Located within the section of works including railway viaduct and Kellyville Station. Boundary stones located outside the construction boundary.	As the proposed construction works site is located adjacent to one of the identified historic precincts along Old Windsor Road, there may be some impacts upon this historic roadway precinct. Since there have been numerous physical changes to this part of Windsor Road in recent times, any negative heritage impacts resulting from the proposed construction are likely to be of a relatively minor adverse nature. Remains associated with a house captured on Mackenzie's 1885 Road Survey may still exist in part however the previously constructed Northwest Transit and car park has been constructed over the northern part of this heritage site. The most significant item affected by the SVC works is located south of Samantha Riley Drive. Boundary stones were likely to have buried when constructing the North-West T-way. The boundary stones along Old Windsor Road, would be located outside the construction site.	• Re-establish planted vegetation along the eastern side of the North-West T-way following completion of the construction works. • Should unexpected finds occur, the Unexpected Finds protocol would be followed in accordance with the Section 6.6 of this plan.

Item	Address	Listing	Location in relation Worksite	Impact	Management Recommendations
Site of the Battle of Vinegar Hill	Kellyville	Memorial site listed - Local (Blacktown LEP)	Located 400m west of the station site, uncertain if the memorial is on the actual site of the battle.	Given the exact location of the site of the battle of Vinegar Hill has not been accurately identified, there is the potential, although minor, of survival of archaeological evidence associated with this significant even. The nature of proposed earthworks for the SVC construction has potentially disturbed this resource. The likelihood of OTS construction works having an impact of the existing Battle site in considered remote.	• Should unexpected finds occur, the Unexpected Finds protocol would be followed in accordance with the Section 6.9 of this plan.
A series of eucalyptus trees along Old Windsor Road, to the north of Samantha Riley Drive.	Old Windsor Road, north of Samantha Riley Drive	Not listed Windsor and Old Windsor Roads Conservation Management Plan.	Located outside the construction works zone.	Visual impacts resulting from removal of tress south along Windsor Road was assessed in EIS 1. No additional construction impacts are anticipated.	• Re-establish planted vegetation along the eastern side of the North-West T-way following completion of the construction works.

Item	Address	Listing	Location in relation Worksite	Impact	Management Recommendations
Mungerie Property and House	Windsor Road (south of White Hart Drive), Rouse Hill	Local (Baulkham Hills LEP and Department of Planning s170 Heritage and Conservation Register)	Located outside the construction works zone	The impacts of the Major Civil Construction Works upon the setting and curtilage of Mungerie were assessed in EIS 1. The SVC works has removed vegetation as part of their work, including tree clearance. The proposed OTS is anticipated to not generated additional construction impacts however issues such as erosions of the traditional setting of the house would constitute and major adverse heritage impact.	• A buffer of trees between Mungerie and the rail corridor would be maintained. Any trees removed to facilitate construction would be reinstated on completion of works. • Maintain fence along the length of the construction area boundary adjacent to the Mungerie site. • All items on the site are to be retained and protected throughout construction. • Adequately protect any mature vegetation on the Mungerie site from the construction zone. • Re-establish planted vegetation along the eastern side of the North-West T-way / construction zone following completion of the construction works. • The area of the carriage drive that will be removed during construction works will be reinstated. • A Sensitive Area / No Go sign is to be located at the entry to the adjacent construction zone identifying the Mungerie House location. • Monitoring of the property is to be conducted in accordance with the requirements of the Monitoring and Protection Plan.

Item	Address	Listing	Location in relation Worksite	Impact	Management Recommendations

Former Swan Inn (also known as the White Hart Inn)	Eastern side of Windsor Road, north of the intersection with Old Windsor Road	Local (Baulkham Hills LEP)	Outside the OTS construction sites	The site of the former Swan Inn is located within the proposed Old Windsor Road to White Hart Drive construction site. The Major Civil Construction Works (under the TSC and SVC works) would result in a major impact on the site of the former Swan Inn as was assessed as part of EIS 1.
				
				No additional construction impacts are anticipated with the Phase 2 OTS works.
					• A Sensitive Area / No Go sign is to be located at the entry to the adjacent construction zone identifying the former Swan Inn heritage site.
					• Should unexpected finds occur, the Unexpected Finds protocol would be followed in accordance with the Section 6.6 of this plan.
					• Monitoring of the site is to be conducted in accordance with the requirements of the Monitoring and Protection Plan.
					• Ensure recommended actions to best preserve the archaeological site known as White Hart Inn, Lot 1 and Lot 3 Windsor Road, Beaumont Hills within the context of the Construction Site include:
					  • (i) a buffer or alternative construction method to provide acceptable vibration mitigation to former Swan Inn
					  • (ii) temporary covers and protection be provided to the former Swan Inn should access across these areas be required during NRT's Activities
					  • (iii) archaeological monitoring of the former Swan Inn be undertaken during NRT's Activities
					  • (iv) should NRT's Activities require access to the former Swan Inn, site specific heritage management measures must be documented and implemented.

Item	Address	Listing	Location in relation Worksite	Impact	Management Recommendations
Royal Oak Inn (known now as the Mean Fiddler Hotel)	2 Commercial Road, Rouse Hill	State Heritage Register	Located outside the construction works zone	As no archaeological potential has been identified within the construction site, it was determined that the proposed construction works are unlikely to result in archaeological impacts. Visual impacts resulting from removal of tress south along Windsor Road was assessed in EIS 1. No additional construction impacts are anticipated.	• Should unexpected finds occur, the Unexpected Finds protocol would be followed in accordance with the Section 6.6 of this plan.
Rouse Hill House and Farm	Windsor Road, Rouse Hill	State Heritage Register	Located outside the construction works zone.	As no archaeological potential has been identified within the proposed Rouse Hill Station site, it was determined that the proposed construction works and operations are unlikely to result in any archaeological impacts.	• Should unexpected finds occur, the Unexpected Finds protocol would be followed in accordance with the Section 6.6 of this plan.
Windsor Road Viaduct to Cudgegong Road	Windsor Road and Schofields Road	Not listed	Located within the SVC works alignment.	Due to the topography of the area and the existing vegetation on either side of the proposed construction site, it is considered that no heritage items in the vicinity of the construction site would be impacted by the proposed construction works or operations. Since the potential for archaeological remains to survive in situ within the construction site is low, the construction works and operations are unlikely to result in any archaeological impacts.	• Should unexpected finds occur, the Unexpected Finds protocol would be followed in accordance with the Section 6.6 of this plan.

6.4 Affected Historic Heritage Items – 33kV Underground Feeder Powerline Works

There is one known historic heritage item that may be affected by the 33kV Underground Feeder Powerline Works as detailed in the Willoughby to North Chatswood 33kV Underground Feeder Powerline REF (Parsons Brinkerhoff, October 2015).

A summary of anticipated impacts is contained in Table 12below.

Table 12 Affected Historic Heritage Items – 33kV Underground Feeder Powerline Works

Item	Address	Listing	Location in relation Worksite	Impact	Management Recommendations
Willoughby Stormwater Channel No. 26	Multiple Crosses alignment at Havilah Street	Section 170 – Sydney Water	Crosses alignment at Havilah Street	The feeder would cross the alignment of this existing heritage item. Whilst the depth of this item within Havilah Street is not currently known, if detailed investigations identify the stormwater channel as being potentially impacted by normal trenching methods, it is proposed that this item would be underbored using HDD techniques to avoid impacting the heritage items	Survey for depth of existing heritage items. Should impact be identified, underboring techniques would be used for construction to avoid the heritage item

6.5 Affected Historic Heritage Items – Norwest Pedestrian Link Works

There are no anticipated non-Aboriginal heritage impacts as there are no known heritage items within the Norwest Pedestrian Link Works site as detailed in the Norwest Station Subsurface Pedestrian Link and Northern Entry REF (Parsons Brinkerhoff, June 2015).

The potential for encountering any archaeology during construction has been assessed as negligible.

6.6 Affected Historic Heritage Items – Rouse Hill Temporary Bypass Powerline Works

There are no anticipated non-Aboriginal heritage impacts and there is low potential for relics, including known alignment stones, to exist in the project area.

The Hills Shire Council will be informed that transmission poles will be installed within the curtilage of heritage item I23. Care will be taken when removing the power line at the end of its use.

6.7 Further Assessments

No further assessments or archival recordings are required currently for the OTS Works. During Phase 2 Works, should any Unexpected Finds be identified, further assessments may be required.

A detailed plan for the implementation of any measures resulting from further investigations associated with potentially affected heritage items, including Glenhope, Inala School, Windsor Road and Old Windsor Road, and Mungerie House would be documented and updated in this plan where required.

Any change to the construction footprint that goes outside areas already assessed for heritage will require further assessment before works in that area may proceed.

6.8 Heritage Protection

The boundary of the construction worksites will be fenced to prevent construction personnel entering known sites of heritage significance outside the construction footprint. These areas will be signed and staff tool-boxed as to the significance of these areas.

Identification and monitoring of potential effects of vibration on sensitive heritage items is addressed in the Construction Noise and Vibration Management Plan.

6.9 Unexpected Finds

In the event that an unexpected historic heritage item is encountered during construction the unexpected finds procedure contained within Historic and Aboriginal Heritage Procedure will be implemented. The process is as follows:

Where an unexpected find is skeletal material, the Environment Manager is to notify NSW Police. Works are not to recommence until clearance is received from the Police. If the remains are confirmed to be of heritage potential the find is to be assessed as set out below.

1 Potential heritage item/site encountered during excavation/construction activities

If a potential heritage item or relic is encountered during excavation / construction activities:

- STOP ALL WORK within 20 metres of the find, or at a suitable distance to ensure no impacts occurs, as deemed necessary by the Environment Manager
- Ensure the artefact is protected and not disturbed further.
- Immediately notify the Environment Manager who will notify TfNSW
- NRT will comply with all requirements of Authorities and any Directions of TfNSW's Representative in relation to the potential heritage item or relic
- NRT will continue to carry out works, except where:
  - Directed by TfNSW's Representative
  - Ordered by a court or tribunal
  - Required by law.

2 Heritage significance / integrity confirmed by the Heritage Consultant

- The Heritage Consultant will confirm whether the find is genuine.
- If the find is genuine the Heritage Consultant will:
  - Officially record the find;
  - Conduct an assessment of significance; and
  - Determine management options.

3 Assessment of available options

- Environment Manager with Project Engineers and support from the Heritage Consultant to assess the requirements / necessity to disturb / destroy the find.
- Is destruction or removal of the find the only available option? (Note: If the find involves skeletal remains, destruction is not considered an appropriate option).
- IF ‘No’ – Go to Step 4
- IF ‘Yes’ – Go to Step 5

4 No. Destruction or removal of the heritage find is not necessary

- If removal or destruction of the heritage find is not required the following steps should be taken:
  - Define works to protect the area by completely fencing off the area with signage
  - The Heritage Consultant would record and report the find to OEH where necessary
  - Include the find and its sensitivity within the project inductions, toolbox (consultation) meetings and daily prestart briefing
  - Archaeological protective works are inspected by the relevant regulatory authorities if required
  - Inform TfNSW of the heritage find and decision not to destroy.
- Go to Step 6.

5 Yes. Destruction or removal of the heritage find is required

- If it is concluded that the destruction or removal of the heritage find is required, consult with the Environment Manager, TfNSW and OEH and DP&E to determine which method to pursue.
- Management measures for non-Aboriginal items will be developed in consultation with TfNSW, relevant regulatory authorities and heritage organisations.
- Go to step 6.

6 Construction to recommence

- After completion of all the relevant steps, construction works may recommence.

7 Close-out and finalise reporting / notification and assessment

- Heritage consultant to complete reporting
- Include the find and its sensitivity within the project inductions, toolbox (consultation) meetings and daily prestart briefings
- The Environment Manager to submit to relevant authorities/organisations.

7 Aboriginal Heritage Management

7.1 Affected Aboriginal Heritage Items – Phase 1 and 2 Works

There are several known Aboriginal heritage sites identified in EIS 1, EIS 2 and RTRF EIS, and the subsequent technical papers that will be directly impacted by the OTS Works. A summary of the site and anticipated impact for each item is detailed in Table 13 below.

For the Phase 1 works, it is noted that no further assessment or actions are required on the RTRF site, or for the Cudgegong Road Precinct. The work area has previously been cleared of Aboriginal Heritage by TfNSW in accordance with CoA C30 (SSI 5414).

For the Phase 2 works, it is anticipated that no further assessment or actions are required across the station precinct worksites. The work areas have been cleared of Aboriginal Heritage by TfNSW in accordance with CoA C30 (SS 5414).

Table 13 Affected Aboriginal Heritage Items

OTS Phase	Heritage Site	Site Type	Location in relation Worksite	Level of Archaeological Potential	Grade of Scientific Value	Impact	Management Recommendations
RTRF Site							
Phase 1	45-5-4112	Artefact Scatter	Tallawong Road realignment	Low	Low	Total loss of value	No further archaeological investigation is required. Surface collection was not suggested by the Aboriginal community as a mitigation measure for the impacted sites. As the sites have a low significance no mitigation measures are required. Heritage induction/awareness for staff and Unexpected Find Process

OTS Phase	Heritage Site	Site Type	Location in relation Worksite	Level of Archaeological Potential	Grade of Scientific Value	Impact	Management Recommendations
	45-5-4188	Artefact Scatter	Within site – 59 Schofields Road	Low	Low	Total loss of value	No further archaeological investigation is required. Surface collection was not suggested by the Aboriginal community as a mitigation measure for the impacted sites. As the sites have a low significance no mitigation measures are required. Heritage induction/awareness for staff and Unexpected Find Process
	65 Schofields Road	Artefact Scatter	Within site – 65 Schofields Road	Low	Low	Total loss of value	No further archaeological investigation is required. Surface collection was not suggested by the Aboriginal community as a mitigation measure for the impacted sites. As the sites have a low significance no mitigation measures are required. Heritage induction/awareness for staff and Unexpected Find Process
Cudgegong Road Precinct							
Phase 1	69 Schofields Road 45-5-4112	Artefact scatter and Potential Artefact Deposit	Within site - 69 Schofields Road	Moderate to High	Moderate, but potentially high if the site possesses good condition and integrity with a dense archaeological deposit	No additional loss of value	None required. Area has been confirmed to be cleared of Aboriginal heritage by TfNSW
	28 Tallawong Road	Isolated find	Within site - 28 Tallawong Road	Low	Low	No additional loss of value	None required. Area has been confirmed to be cleared of Aboriginal heritage by TfNSW

OTS Phase	Heritage Site	Site Type	Location in relation Worksite	Level of Archaeological Potential	Grade of Scientific Value	Impact	Management Recommendations
	45-4-3933	Artefact Scatter	Within site	None to low	Low	No additional loss of value	None required. Area has been confirmed to be cleared of Aboriginal heritage by TfNSW
	RH/A20P PAD5	Potential Artefact Deposit	Within site	Moderate	Unknown	No additional loss of value	None required. Area has been confirmed to be cleared of Aboriginal heritage by TfNSW
	45-5-3355	Artefact Scatter	Within site	None	Low	No additional loss of value	None required. Area has been confirmed to be cleared of Aboriginal heritage by TfNSW
	45-5-3392	Artefact scatter and Potential Artefact Deposit	Within site	Moderate to High	Unknown	No additional loss of value	None required. Area has been confirmed to be cleared of Aboriginal heritage by TfNSW
Rouse Hill to Cudgegong Road							
Phase 2	45-5-2805 RH/SP15	Artefact scatter and potential archaeological deposit (PAD)	Partially within site	Moderate		No additional loss of value	None required. Area has been confirmed to be cleared of Aboriginal heritage by TfNSW
Phase 2	45-5-3355 SCR/UPG1	Artefact scatter	Within site	Low	Low	No additional loss of value	None required. Area has been confirmed to be cleared of Aboriginal heritage by TfNSW
	45-5-3392 Pole 45 and Compound	Artefact scatter and potential archaeological deposit (PAD)	Within site	Moderate to high	Moderate	No additional loss of value	Artefact salvaged through surface collection with Aboriginal stakeholders during early works contract. No further action required. Area has been confirmed to be cleared of Aboriginal heritage by TfNSW.

OTS Phase	Heritage Site	Site Type	Location in relation Worksite	Level of Archaeological Potential	Grade of Scientific Value	Impact	Management Recommendations
	45-5-3930 RH/A20P 15	Isolated find	Within site	Low	Low	No additional loss of value	Artefact salvaged through surface collection with Aboriginal stakeholders during early works contract. No further action required. Area has been confirmed to be cleared of Aboriginal heritage by TfNSW.
	45-5-3931 RH/A20P 16	Isolated find	Within site	Low	Low	No additional loss of value	Artefact salvaged through surface collection with Aboriginal stakeholders during early works contract. No further action required. Area has been confirmed to be cleared of Aboriginal heritage by TfNSW.
Rouse Hill							
Phase 2	NWRL PAD 11	Potential archaeological deposit (PAD)	Partially located with site	Low to moderate	moderate	No additional loss of value	Limited Phase 1 archaeological excavation in areas of impact has been undertaken to confirm general absence of dense archaeological deposit. No further action required. Area has been confirmed to be cleared of Aboriginal heritage by TfNSW.

OTS Phase	Heritage Site	Site Type	Location in relation Worksite	Level of Archaeological Potential	Grade of Scientific Value	Impact	Management Recommendations
Kellyville to Rouse Hill							
Phase 2	45-5-3188 Mungerie Park Open Artefact Scatter and associated PAD	Artefact scatter and potential archaeological deposit (PAD)	Within site	Moderate	Moderate	No additional loss of value	Phase 1 archaeological excavation has occurred during early works contract. No further action required. Area has been confirmed to be cleared of Aboriginal heritage by TfNSW.
	NWRL PAD 10	Potential archaeological deposit (PAD)	Partially located with site	Low to moderate	Low	No additional loss of value	Phase 1 archaeological excavation has occurred during early works contract. No further action required. Area has been confirmed to be cleared of Aboriginal heritage by TfNSW.
Kellyville							
Phase 2	45-5-0933 RH/CD9	Artefact scatter and potential archaeological deposit (PAD)	Within site	Moderate to high	Moderate	No additional loss of value	Phase 1 archaeological excavation has occurred during early works contract. No further action required. Area has been confirmed to be cleared of Aboriginal heritage by TfNSW.
Phase 2	45-5-2365 KV/CD1 and NWRL PAD 8	Artefact scatter and potential archaeological deposit (PAD)	Partially located with site	Low to moderate	Low	No additional loss of value	Phase 1 archaeological excavation has occurred during early works contract. No further action required. Area has been confirmed to be cleared of Aboriginal heritage by TfNSW.

OTS Phase	Heritage Site	Site Type	Location in relation Worksite	Level of Archaeological Potential	Grade of Scientific Value	Impact	Management Recommendations
	NWRL PAD 9	PAD	Within site	Moderate	Moderate	No additional loss of value	Phase 1 archaeological excavation has occurred during early works contract. No further action required. Area has been confirmed to be cleared of Aboriginal heritage by TfNSW.
Kellyville (Balmoral Road to Memorial Ave)							
Phase 2	14 Cumbelege Lane (1) and NWRL PAD 6	Artefact scatter and potential archaeological deposit (PAD)	Partially located with site	Moderate to high potential	Moderate, but potentially high if the site possesses good condition and integrity with a dense archaeological deposit.	No additional loss of value	Phase 1 archaeological excavation has occurred during early works contract. No further action required. Area has been confirmed to be cleared of Aboriginal heritage by TfNSW.
	NWRL PAD 4 & 5	PAD	Within site	Moderate	Moderate	No additional loss of value	Phase 1 archaeological excavation has occurred during early works contract. No further action required. Area has been confirmed to be cleared of Aboriginal heritage by TfNSW.
Phase 2	NWRL PAD 7	PAD	Partially located with site	Moderate	Moderate	No additional loss of value	Phase 1 archaeological excavation has occurred during early works contract. No further action required. Area has been confirmed to be cleared of Aboriginal heritage by TfNSW.

OTS Phase	Heritage Site	Site Type	Location in relation Worksite	Level of Archaeological Potential	Grade of Scientific Value	Impact	Management Recommendations
	45-5-4195 Corner of Taggert Way and Balmoral Road	Isolated find	Within site	Low	Low	No additional loss of value	Artefact salvaged through surface collection with Aboriginal stakeholders during early works contract. No further action required. Area has been confirmed to be cleared of Aboriginal heritage by TfNSW.
Showground							
Phase 2	NWRL PAD 3 PAD TBC	PAD	Within site	Moderate	Unknown, until excavated	Partial loss of value	None required. Area has been confirmed to be cleared of Aboriginal heritage by TfNSW. Unexpected finds management (see Section 7.5 and Historic and Aboriginal Heritage Procedure).
Cherrybrook							
Phase 2	45-5-2861 and NWRL PAD 2	SAC with PAD	Within site	Low to moderate	Low, until tested	Partial loss of value	None required. Area has been confirmed to be cleared of Aboriginal heritage by TfNSW. Unexpected finds management (see Section 7.5 and Historic and Aboriginal Heritage Procedure).
Cheltenham							
Phase 2	NWRL PAD1	PAD	Within site	Low to moderate	Unknown, until excavated	Partial loss of value	None required. Area has been confirmed to be cleared of Aboriginal heritage by TfNSW Unexpected finds management (see Section 7.5 and Historic and Aboriginal Heritage Procedure).

OTS Phase	Heritage Site	Site Type	Location in relation Worksite	Level of Archaeological Potential	Grade of Scientific Value	Impact	Management Recommendations
All sites							
Phase 2	All	N/A	N/A	N/A	N/A	N/A	Per EIS 2 REMM IH5: TfNSW would consider permanent public interpretation within at least one of the new railway stations following development if an extensive and high value archaeological deposit were to be uncovered during the excavation of a site. NRT will collaborate with TfNSW to achieve this as required.
Phase 2	All	N/A	N/A	N/A	N/A	N/A	Per EIS 2 REMM IH6: Results and recommendations of the Phase 1 and 2 archaeological excavations undertaken as per the EIS1 mitigation measures (IH1 and IH2) would be followed.

7.2 Affected Aboriginal Heritage Items – ECRL Conversion Works

All proposed impacts assessed in the ECRL REF were limited to the station precincts which are within areas of built environment and are unlikely to contain Aboriginal objects.

The chiller units will be located within areas of built environment and are unlikely to contain Aboriginal objects. No constraints have been identified in association with those areas assessed as demonstrating low archaeological sensitivity or located within the built environment. No further investigation would be required.

This assessment has identified that those areas designated as 'built environment' are likely to represent high levels of surface disturbance and are unlikely to contain Aboriginal objects. No further investigation would be required in these areas, although it should be noted that there is a possibility that archaeological deposits may occur within remnant soil profile beneath developed areas.

7.3 Affected Aboriginal Heritage Items – Norwest Pedestrian Link Works

There are no anticipated Aboriginal heritage impacts as there are no known Aboriginal heritage items within the Norwest Pedestrian Link Works site as detailed in the Norwest Station Subsurface Pedestrian Link and Northern Entry REF (Parsons Brinkerhoff, June 2015).

The potential for encountering any Aboriginal heritage during construction has been assessed as negligible.

7.4 Affected Aboriginal Heritage Items – 33kV Underground Feeder Powerline Works

The Aboriginal Heritage assessment in the Willoughby to North Chatswood 33kV Underground Feeder Powerline REF concluded that the registered sites that were identified within the vicinity of the proposed alignment would not be affected by the work. The alignment has undergone significant disturbance due to ongoing urbanisation, and sub-surface artefacts are considered unlikely to be present in the areas of impact.

Archaeological sensitivity of the alignment is considered to be low.

7.5 Affected Aboriginal Heritage Items – Rouse Hill Temporary Bypass Powerline Works

There is a low probability of Aboriginal objects occurring within the project area. A visual inspection did not result in Aboriginal objects being found during the preparation of the EIA. Care will be taken when removing the power line at the end of its use.

7.6 Further Assessments

7.6.1 Phase 1 Works

During the preparation of RTRF EIS, the properties in the area outlined Figure 8 below were still occupied and subsequently an assessment of ground conditions was unable to be completed.

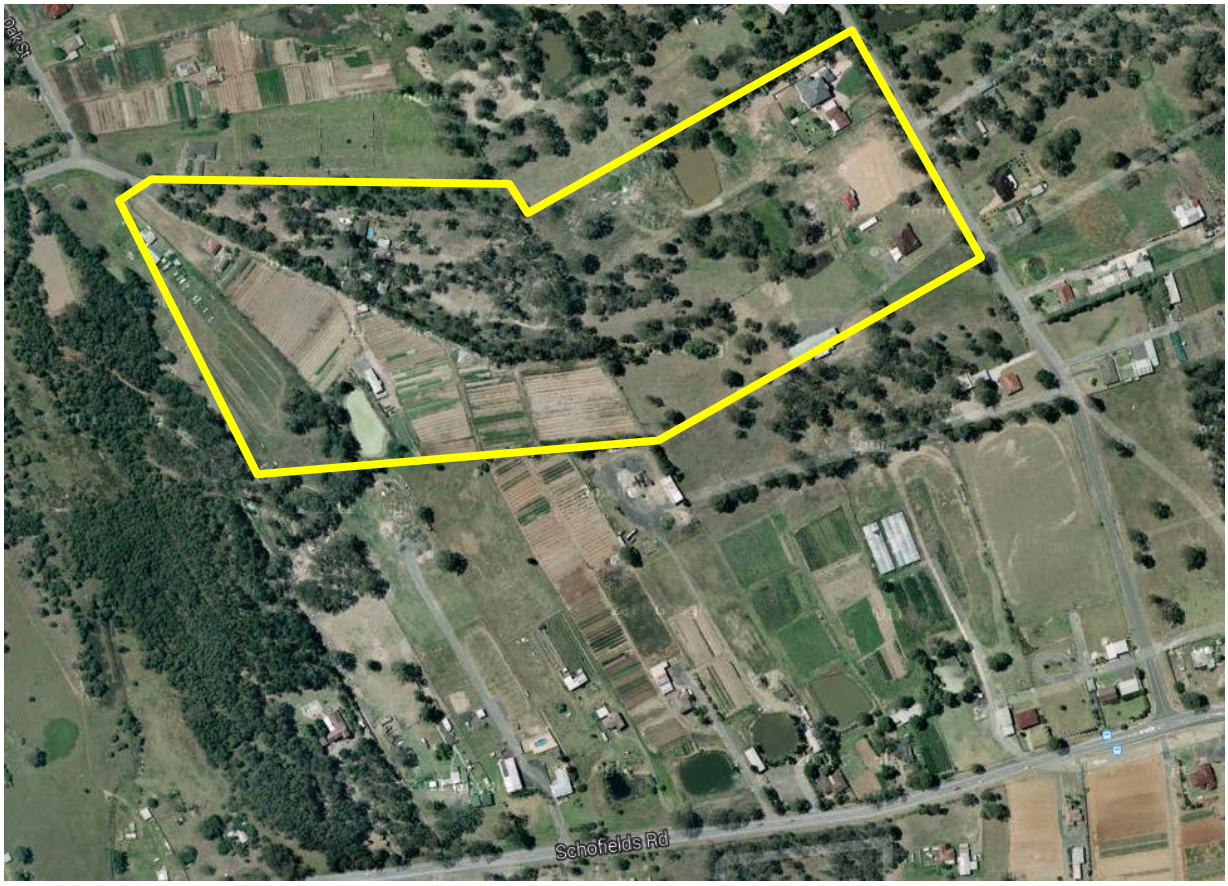


Figure 8 Area Requiring Further Aboriginal Heritage Assessment

During the design investigation phase, the heritage consultant and a representative from the DLALC conducted a field investigation of these remaining properties – see Annexure C. No Aboriginal objects or areas of archaeological potential were located within this area. It was found that are no Aboriginal heritage constraints in the area bounded in yellow in Figure 8.

7.6.2 Handover from TSC and SVC

The Worksite Access Handover Procedure sets out a process to streamline the handover of land between TfNSW, TSC and SVC Contractors. This procedure stipulates that clearance certificates for Aboriginal heritage must be issued via TfNSW to NRT prior to commencement of OTS construction.

It is unlikely the OTS works would impact on areas outside those assessed under EIS 1, 2 and the RTRF EIS. Should areas of construction required by the OTS construction

works be located outside of the EIS 1, 2 and RTRF EIS assessed footprints, further assessment of archaeological potential would be undertaken and salvage activities conducted (where required) to ensure works could commence in these areas.

7.6.3 Corridor Shared Path

A further assessment of was completed where a section of the proposed shared path deviated outside of the project area between Kellyville Station and Rouse Hill Station. The Aboriginal archaeological site, RH/CD9 (AHIMS #45-5-0933) exists along the alignment of the shared path as it follows Elizabeth Macarthur Creek and Caddies Creek and runs adjacent to Clovelly Circuit and along the cul-de-sacs of Fitzroy Place, Swann Place, Austen Place and Lycett Avenue.

Archaeological excavation of the Aboriginal archaeological site RH/CD9 was undertaken in accordance with the Project Approval and DP&E approved archaeological methodology to determine if the impact from the proposed shared path was consistent with the findings of the Sydney Metro Northwest Archaeological Salvage Program (KNC 2015).

Archaeological excavation of the shared path alignment at site RH/CD9 consisted of 30 1m2 squares and recovered a total of 439 artefacts (15 artefacts/m2). Much of the assessed area was highly disturbed with the majority of the artefacts emanating from a single test square (TS14) containing 276 artefacts. The high density TS14 archaeological deposit was 7x greater than any other deposit salvaged during the Sydney Metro archaeology program. Two other areas of moderate artefact density were identified around TS12 (38 artefacts) and TS1 (29 artefacts).

NRT will modify the path design to minimise impact to the TS14 archaeological deposit within site RH/CD9. However the proposed works would still constitute an impact to the TS14 deposit and to other moderate density deposits identified during the test excavation program at TS1 and TS12.

General Recommendations

- The TS14 deposit located outside of the shared path construction footprint would be protected by temporary fencing. The fenced areas should be clearly identified as environmentally sensitive and a “no-go zone”. The adequacy of the fencing would be assessed by an Environmental Manager prior to any construction activity in the vicinity.
- The TS14 deposit located outside of the shared path construction footprint should be identified in the construction environmental management plan (or similar document) and workers inducted as to appropriate protection measures (depending on the selected impact option).

See Annexure E for detail of the assessment completed.

7.7 Heritage Protection

The boundary of the construction worksites will be fenced to prevent construction personnel entering known sites of heritage significance outside the construction footprint.

Identification and monitoring of potential effects of vibration on sensitive heritage items is addressed in the Construction Noise and Vibration Management Plan.

7.8 Unexpected Finds

In the event that an unexpected Aboriginal heritage item is encountered during construction the unexpected finds procedure within the Historic and Aboriginal Heritage Procedure will be followed. The process is as follows:

1 Potential heritage item/site encountered during excavation/construction activities

If a potential Aboriginal object or site is encountered during excavation / construction activities:

- STOP ALL WORK within 20 metres of the find, or at a suitable distance to ensure no impacts occurs, as deemed necessary by the Environment Manager
- Ensure the artefact is protected and not disturbed further
- Immediately notify the Environment Manager who will notify TfNSW
- NRT will comply with all requirements of Authorities and any Directions of TfNSW's Representative in relation to the potential Aboriginal object or site
- NRT will continue to carry out works, except where:
  - Directed by TfNSW's Representative
  - Ordered by a court or tribunal
  - Required by law.

2 Heritage significance / integrity confirmed by the Heritage Consultant

- The Heritage Consultant will confirm whether the find is genuine.
- If the find is genuine the Heritage Consultant will:
  - Conduct an assessment of archaeological significance.
  - Submit site information to the Environment Manager for submission to TfNSW.

3 Significance/Consistency Assessment

- TfNSW will assess the consistency of the find with approved OTS impacts based on archaeological significance and materials already salvaged as described in the NWRL Aboriginal Heritage Archaeological Salvage Program – Completion Report (Kelleher Nightingale, 2014).
- If the find is assessed as being consistent with SSI approvals to impact Aboriginal objects it will be managed in accordance with 3.1 below. If the find is

assessed as not being consistent with SSI approvals to impact Aboriginal objects it will be managed in accordance with 3.2 below.

3.1 If the find is consistent with SSI approvals to impact:

- TfNSW will sign off on consistency.
- Go to Step 4.

3.2 The find is not consistent with SSI approvals to impact:

- TfNSW will sign off on lack of consistency and advise of any further assessment and approval requirements.
- The Aboriginal stakeholders will be notified of the find and the intention to impact the find.
- DP&E will be notified of the find and the intention to impact the find. Appropriate investigation, management and mitigation measures would be developed in consultation with TfNSW, DP&E and the Aboriginal stakeholders.
- The Heritage Consultant will officially record the find on an OEH site recording form and submit it to AHIMS (OEH) after impacts have occurred
- Go to Step 4.

4 Construction to recommence

- After completion of all the relevant steps, construction works may recommence subject to any additional assessment approvals required under Step 3.2.

5 Close-out and finalise reporting / notification and assessment

- Heritage consultant to complete reporting
- Include the find and its sensitivity within the project inductions, toolbox (consultation) meetings and daily prestart briefings
- Environment Manager to submit to relevant authorities/organisations.

8 Training, Reporting and Review

8.1 Training

All personnel working on site will undergo site induction training relating to Aboriginal and non-Indigenous heritage issues. The induction training will address elements related to Aboriginal and Non-Indigenous heritage management including:

- Legislative and other requirements and penalties for impacting heritage sites
- Roles of personnel with regard to Aboriginal heritage management measures.
- The location and protection of identified heritage sites.
- Means of identifying Aboriginal and Non-Indigenous heritage items and places.
- Procedure to follow in the event of the discovery of human remains during construction works
- Procedure to follow in the event of the unexpected heritage item find during construction works
- Importance of relevant documentation i.e. WRAs, AMSs, TRAs, SEPs
- Overview of assessments completed and artefacts discovered.

Further details regarding staff induction and training are outlined in the CEMP.

8.2 Monitoring, Compliance and Reporting

Monitoring and inspection of identified ‘no-go zones’ and activities with the potential to impact Aboriginal and non-Indigenous heritage, will occur as required for the duration of construction. No-go zones will be established with fencing and signage for delineation, documented in SEPs, and discussed in Inductions.

The Environment Manager will consider heritage impacts and inspect controls as part of their weekly inspection and the performance of mitigation measures. These inspections will be documented on the Environmental Inspection Form.

The Environmental Representative will inspect the site regularly and will inspect any heritage controls.

Typical Compliance records would consist of:

- Inspections undertaken in relation to heritage management measures
- Archival recordings undertaken of any heritage item
- Any unexpected finds and stop work orders
- Records of any impacts avoided or minimised through design or construction methods
- Vibration monitoring records relevant to heritage items

Results and outcomes of inspections, monitoring and auditing will be reported internally on a monthly basis. Six-monthly construction compliance reports will be prepared to report on compliance with the Project Approval.

8.3 Review and Improvement

A non-conformance is an action or omission that does not conform with the requirements of this Plan or any legal and other requirements. Any member of the project team or the Environmental Representative can identify a non-conformance or opportunity for improvement. The CEMP identifies the process for identifying, reporting, recoding and reviewing non-conformances. This will ensure continual improvement.

The processes described in the CEMP may result in the need to update or revise this Plan. This will occur as needed. This Plan will be audited within six months of the commencement of construction and thereafter as per the CEMP. The Plan shall be reviewed and updated based on the findings of the audit

Annexure A Stakeholder Consultation Feedback

Condition of Approval SSI-5931	Condition of Approval SSI-5414	CEMP Document	Agency Consultation	Status	Comments	NRT Response
Phase 1						
E29(e)	E35(e)	Construction Heritage Management Plan	Office of Environment and Heritage	Submitted	No comments received as at 12/2/15	NA
			Blacktown City Council	Submitted	No comments received as at 12/2/15	NA
			Indigenous Stakeholders			RAPs have been given 28 days for consultation which closed on 22 December 2014.
			• Deerubbin Local Aboriginal Land Council	Feedback received	Steve Randall stated that DLALC had no issues with the CHMP.	Noted
			• Parramatta Council Aboriginal & Torres Strait Islander Advisory Committee	No feedback received	Unable to contact by phone. No response to correspondence received as of 12/2/15.	Noted
			• Mr Tony Williams (individual)	Feedback received	Tony Williams advised that he does not share the same view as Tocomwall.	Noted
			• Darug Custodian Aboriginal Corporation	Feedback received	DCAC stated support for the CHMP. DCAC believes that the amount of groups for consultation is high and that many are not from the area. DCAC would like to add that the sites are a complex and not all separate sites and recommend that the connections are interpreted throughout the project. DCAC confirms that the information gathered during these projects is of high significance because once the sites are gone there is no other evidence of the sites or connections.	Noted
			• Darug Aboriginal Cultural Heritage Assessments	No feedback received	No response to correspondence received as of 12/2/15.	Noted
			• Darug Aboriginal Land Care Inc.	Feedback received	DALC stated agreement with the recommendations in the CHMP.	Noted
			• Darug Land Observations	Feedback received	DLO is not happy with some aspects of the CHMP but happy with other aspects. DLO advised that there had not been enough participation for the Darug people.	All appropriate correspondence has been undertaken for the NWRL project. The consultation for NRT OTS constitutes the last of the legislated consultative requirements for NWRL.
			• Tocomwall	Feedback received	Tocomwall rejects the HMP. Tocomwall has advised that several complaints have been lodge to government departments for non-compliance and possible breaches of the current work permit and pending approvals. Tocomwall stated that the draft CHMP has several problems that Tocomwall does not support and insists that a meeting be called with all stakeholders to discuss the issues.	Noted. The CHMP complies with the requirements of the relevant conditions of approval.
			• Darug Tribal Aboriginal Corporation	Feedback received	DTAC did not have any specific issues with the CHMP and are happy with the NWRL project so far.	Noted

Condition of Approval SSI-5931	Condition of Approval SSI-5414	CEMP Document	Agency Consultation	Status	Comments	NRT Response
			• Metropolitan Local Aboriginal Land Council	Feedback received	Project is outside of MLALC boundaries.	Noted
			• Gunjeewong Cultural Heritage Aboriginal Corporation	No feedback received	No response to correspondence received as of 12/2/15.	Noted
Phase 2						
N/A	E35(e)	Construction Heritage Management Plan	Office of Environment and Heritage	Submitted	No comments regarding the CHMP received.	
			Blacktown City Council	Submitted	No response received as of 27 October 2015.	
			The Hills Shire Council	Submitted	No comments regarding the CHMP received.	
			Hornsby Shire Council	Submitted	No comments regarding the CHMP received.	
			Registered Aboriginal Parties:			RAPs were sent copies of the CHMP for review and comment on 2 October 2015.
			• Deerubbin Local Aboriginal Land Council	No feedback received	No response received as of 27 October 2015.	Noted
			• Parramatta Council Aboriginal & Torres Strait Islander Advisory Committee	No feedback received	No response received as of 27 October 2015.	Noted
			• Tony Williams and Mr Andrew Williams (Aboriginal Archaeology Service and Rane Contracting)	Feedback received	Letter received via email on 12 October 2015. Commented that they agree with the methodology and is complete in all aspects of the survey. Would like any artefacts collected to be displayed for all to see in library/local government building. Has had family in the area since 1897 and retains local and oral history and are happy to provide assistance on the project.	Noted
			• Darug Custodian Aboriginal Corporation	No feedback received	No response received as of 27 October 2015.	Noted
			• Darug Aboriginal Cultural Heritage Assessments	No feedback received	No response received as of 27 October 2015.	Noted
			• Darug Aboriginal Land Care	No feedback received	No response received as of 27 October 2015.	Noted
			• Darug Land Observations	No feedback received	No response received as of 27 October 2015.	Noted
			• Tocomwall	Feedback received	Phone discussion on 7 October 2015 with Scott Franks. No specific comments on the NRT CHMP.	Noted
			• Darug Tribal Aboriginal Corporation	Feedback received	Has not had a chance to read it, may get to it later in the week. No further comments received as of 27 October 2015.	Noted

Condition of Approval SSI-5931	Condition of Approval SSI-5414	CEMP Document	Agency Consultation	Status	Comments	NRT Response
			• Metropolitan Local Aboriginal Land Council	Feedback received	Project is outside of MLALC boundaries.	Noted
			• Gunjeewong Cultural Heritage Aboriginal Corporation	Feedback received	Cherie Carroll Turrise commented that she had received the document but has been unwell. Asked us to update our contact information for them. Phone discussion on 22 October 2015. No additional comments on the NRT CHMP.	Noted

Annexure B Heritage Management Measures and Compliance Matrix

	Measure	Timing	Requirement	Responsibility	Reference
Project Conditions of Approval – Sub Plan Requirements					
1)	Construction Heritage Management Plan to detail how construction impacts on Aboriginal and Historic heritage will be minimised and managed. The plan shall include, but not necessarily be limited to:	Before Construction	RTRF Approval SSI-5931 CoA E29(e)i	ENVIRONMENT MANAGER	This Plan
2)	In relation to Aboriginal Heritage:				
3)	developed in consultation with registered Aboriginal stakeholders;	Before Construction	RTRF Approval SSI-5931 CoA E29(e)i(I)	ENVIRONMENT MANAGER	Section 1.8, Annexure A
4)	procedures for dealing with previously unidentified Aboriginal objects (excluding human remains) including cessation of works in the vicinity, assessment of the significance of the item(s) and determination of appropriate mitigation measures including when works can re-commence by a suitably qualified archaeologist in consultation with the Department and registered Aboriginal stakeholders and assessment of the consistency of any new Aboriginal heritage impacts against the approved impacts of the SSI, and registering of the new site in the OEH's Aboriginal Heritage Information Management System (AHIMS) register;	Before Construction	RTRF Approval SSI-5931 CoA E29(e)i(II)	ENVIRONMENT MANAGER / Environment Coordinator	Section 7.6, 7.8
5)	procedures for dealing with human remains, including cessation of works in the vicinity and notification of the Department, NSW Police Force, OEH and registered Aboriginal stakeholders and not recommencing any works in the area unless authorised by the OEH and/ or the NSW Police Force;	Before Construction	RTRF Approval SSI-5931 CoA E29(e)i(III)	ENVIRONMENT MANAGER / Environment Coordinator	Section 6.9
6)	heritage training and induction processes for construction personnel (including procedures for keeping records of inductions) and obligations under the conditions of this approval including site identification, protection and conservation of Aboriginal cultural heritage; and	Before & during Construction	RTRF Approval SSI-5931 CoA E29(e)i(IV)	ENVIRONMENT MANAGER / Environment Coordinator	Section 8.1
7)	procedures for ongoing Aboriginal consultation and involvement for the duration of the SSI; and	Prior to and during construction	RTRF Approval SSI-5931 CoA	ENVIRONMENT MANAGER	Section 1.8

	Measure	Timing	Requirement	Responsibility	Reference
		as needed	E29(e)i(V)		
8)	In relation to Historic Heritage:				
9)	developed in consultation with the NSW Heritage Council and the relevant Council;	Before Construction	RTRF Approval SSI-5931 CoA E29(e)ii(I)	ENVIRONMENT MANAGER	Section 1.8, Annexure A
10)	identification of Heritage items directly and indirectly affected by the SSI;	Before Construction	RTRF Approval SSI-5931 CoA E29(e)ii(II)	TfNSW	Section 6.1
11)	details of management measures to be implemented to prevent and minimise impacts on heritage items (including further heritage investigations, archival recordings and/ or measures to protect unaffected sites during construction works in the vicinity);	Before Construction	RTRF Approval SSI-5931 CoA E29(e)ii(III)	ENVIRONMENT MANAGER	Section 6
12)	details of monitoring and reporting requirements for impacts on heritage items; and	Before Construction	RTRF Approval SSI-5931 CoA E29(e)ii(IV)	ENVIRONMENT MANAGER	Section 8.2
13)	procedures for dealing with previously unidentified relics, including cessation of works in the vicinity, assessment of the significance of the item(s) and determination of appropriate mitigation measures including when works can re-commence by a suitably qualified and experienced archaeologist in consultation with the OEH and the Department, and assessment of the consistency of any new heritage impacts against the approved impacts of the SSI.	Before Construction	RTRF Approval SSI-5931 CoA E29(e)ii(V)	ENVIRONMENT MANAGER	Section 6.9
14)	heritage training and induction processes for construction personnel (including procedures for keeping records of inductions) and obligations under the conditions of this approval including site identification, protection and conservation of Aboriginal and historic heritage; and	Before & during Construction	RTRF Approval SSI-5931 CoA E29(e)iii	ENVIRONMENT MANAGER	Section 8.1
15)	mechanisms for the monitoring, review and amendment of this plan.	Before Construction	RTRF Approval SSI-5931 CoA E29(e)iv	ENVIRONMENT MANAGER	Section 1.7 Section 8.3

	Measure	Timing	Requirement	Responsibility	Reference
16)	Construction Heritage Management Plan to detail how construction impacts on Aboriginal and Historic heritage will be minimised and managed. The plan shall include, but not necessarily be limited to	Before Construction	OTS Approval SSI-5414 CoA E35(e)	ENVIRONMENT MANAGER	This Plan
17)	In relation to Aboriginal Heritage	Before Construction	OTS Approval SSI-5414 CoA E35(e)i	ENVIRONMENT MANAGER	
18)	developed in consultation with registered Aboriginal stakeholders	Before Construction	OTS Approval SSI-5414 CoA E35(e)i(I)	ENVIRONMENT MANAGER	Section 1.8, Annexure A
19)	details of further investigation and identification of Aboriginal cultural heritage sites impacted by and within the construction areas except where the requirements of condition C30 have been met;	Before Construction	OTS Approval SSI-5414 CoA E35(e)i(II)	ENVIRONMENT MANAGER	Section 7.6
20)	details of management measures to be carried out in relation to Aboriginal heritage, including a detailed methodology and strategies for protection, monitoring, salvage, and conservation, of sites and items associated with the SSI and the long term storage and curation of any Aboriginal objects recovered in accordance the section 85A of the National Parks and Wildlife Act;	Before Construction	OTS Approval SSI-5414 CoA E35(e)i(III)	ENVIRONMENT MANAGER	Section 7.1, 7.6
21)	procedures for dealing with previously unidentified Aboriginal objects (excluding human remains) including cessation of works in the vicinity, assessment of the significance of the item(s) and determination of appropriate mitigation measures including when works can re-commence by a suitably qualified archaeologist in consultation with the Department, OEH and registered Aboriginal stakeholders and assessment of the consistency of any new Aboriginal heritage impacts against the approved impacts of the SSI, and registering of the new site in the OEH's Aboriginal Heritage Information Management System (AHIMS) register; and	Before Construction	OTS Approval SSI-5414 CoA E35(e)i(IV)	ENVIRONMENT MANAGER	Section 7.6, 7.8
22)	procedures for ongoing Aboriginal consultation and involvement for the duration of the SSI; and	Before Construction	OTS Approval SSI-5414 CoA E35(e)i(V)	ENVIRONMENT MANAGER	Section 1.8, Annexure A
23)	In relation to Historic Heritage:	Before Construction	OTS Approval SSI-5414 CoA E35(e)ii	ENVIRONMENT MANAGER	

	Measure	Timing	Requirement	Responsibility	Reference
24)	developed in consultation with the NSW Heritage Council;	Before Construction	OTS Approval SSI-5414 CoA E35(e)ii(I)	ENVIRONMENT MANAGER	Section 1.8
25)	identification of Heritage Items directly and indirectly affected by the SSI	Before Construction	OTS Approval SSI-5414 CoA E35(e)ii(II)	ENVIRONMENT MANAGER	Section 6.1, 6.2, 6.3
26)	details of management measures to be implemented to prevent and minimise impacts on heritage items (including further heritage investigations, archival recordings and/ or measures to protect unaffected sites during construction works in the vicinity);	Before Construction	OTS Approval SSI-5414 CoA E35(e)ii(III)	ENVIRONMENT MANAGER	Section 6.1, 6.2, 6.3
27)	details on how the recommendations identified in the North West Rail Link EIS: Technical Paper – European Heritage, prepared by Godden Mackay Logan, dated March 2012 will be implemented, including archaeological research designs for all archaeological sites except where the requirements of condition C31 have been met	Before Construction	OTS Approval SSI-5414 CoA E35(e)ii(IV)	TfNSW	Section 6.1, 6.2, 6.3
28)	a detailed plan for the implementation of any measures resulting from further investigations associated with potentially affected heritage items, including Glenhope, Inala School, Windsor Road and Old Windsor Road, and Mungerie House	Before Construction	OTS Approval SSI-5414 CoA E35(e)ii(V)	TfNSW	Section 6.5
29)	details of monitoring and reporting requirements for impacts on heritage items; and	Before Construction	OTS Approval SSI-5414 CoA E35(e)ii(VI)	TfNSW	Section 8.2
30)	procedures for dealing with previously unidentified relics, (including cessation of works in the vicinity, assessment of the significance of the item(s) and determination of appropriate mitigation measures including when works can re-commence by a suitably qualified and experienced archaeologist in consultation with the OEH and the Department, and assessment of the consistency of any new heritage impacts against the approved impacts of the SSI	Before Construction	OTS Approval SSI-5414 CoA E35(e)ii(VII)	ENVIRONMENT MANAGER	Section 6.9
31)	heritage training and induction processes for construction personnel (including procedures for keeping records of inductions) and obligations under the conditions of this approval including site identification, protection and conservation of	Ongoing	OTS Approval SSI-5414 CoA E35(e)iii	ENVIRONMENT MANAGER / Environment	Section 8.1

	Measure	Timing	Requirement	Responsibility	Reference
	Aboriginal and historic heritage;			Coordinator	
32)	procedures for dealing with human remains, including cessation of works in the vicinity and notification of the Department, NSW Police Force, OEH and registered Aboriginal stakeholders and not recommencing any works in the area unless authorised by the NSW Police Force and/ or the Department; and	Before Construction	OTS Approval SSI-5414 CoA E35(e)iv	ENVIRONMENT MANAGER	Section 6.9
33)	mechanisms for the monitoring, review and amendment of this plan.	Before Construction	OTS Approval SSI-5414 CoA E35(e)v	ENVIRONMENT MANAGER	Section 1.7 Section 8.3
EIS Environmental Management Measures					
34)	The inclusion of a vegetated buffer or boundary screening along the northern frontage of the study area will be provided to minimise the potential for views from Rouse Hill House and the house at 128 Westminster Street, Schofields.	N/A to this stage of works	RTRF REMM OpEH2	ENVIRONMENT MANAGER	Landscape Design
35)	The Indigenous Heritage component of the site induction would include information on: • Aboriginal heritage conservation areas and/or no-go zones for each construction site. • The legislation and penalties for impacting Aboriginal heritage objects would be conveyed to all construction managers and personnel	Ongoing	RTRF REMM IH4	ENVIRONMENT MANAGER	Site Induction
36)	Prior to the commencement of construction further ground verification of indigenous cultural and archaeological heritage will be carried out on the six northern properties for which access was not attained in the preparation of the Aboriginal Cultural Heritage Report prepared by Artefact.	Before Construction	RTRF REMM IH7	ENVIRONMENT MANAGER	Completed Section 7.6
37)	Maintain the vegetation retained, reinstated and planted during the construction phase.		EIS 2 REMM OpEH1	N/A	Section 6.3
38)	Where feasible and reasonable, retain or reinstate an adequate buffer of vegetation along the northern side of Castle Hill Road opposite the Glenhope property to preserve the character of its setting and to screen the visual impacts of the station construction site in the northern outlook from the Glenhope property.		EIS 2 REMM EH3	N/A	Section 6.3, Urban Design and Corridor Landscape Plan

	Measure	Timing	Requirement	Responsibility	Reference
39)	Where feasible and reasonable, retain or reinstate a buffer of vegetation along the western side of Franklin Road opposite Inala School.		EIS 2 REMM EH4	N/A	Section 6.3
40)	If feasible, the existing mature plantings along the Old Northern Road edge of Arthur Whitling Park would be retained and protected during construction.		EIS 2 REMM EH5	N/A	Section 6.3, Urban Design and Corridor Landscape Plan
41)	Reinstate key elements of Arthur Whitling Park in consultation with The Hills Shire Council, the Hills District Historical Society and the Castle Hill sub-branch of the RSL, where feasible and reasonable.		EIS 2 REMM EH6	N/A	Section 6.3, Urban Design and Corridor Landscape Plan
42)	Reinstate the landscaped public parkland (Arthur Whitling Park) following completion of construction.		EIS 2 REMM EH7	N/A	Section 6.3, Urban Design and Corridor Landscape Plan
43)	Reinstate or rejuvenate any areas of the Showground disturbed for construction works following completion of the works.		EIS 2 REMM EH8	N/A	Section 6.3, Urban Design and Corridor Landscape Plan
44)	Re-establish planted vegetation along the eastern side of the North-West T-way following completion of the construction works.		EIS 2 REMM EH9	N/A	Section 6.3, Urban Design and Corridor Landscape Plan
45)	The viaduct would be designed and constructed to be as visually light and streamlined as possible. At Mungerie, the viaduct piers would be spaced widely and, where feasible and reasonable, symmetrically on either side of the carriage loop from Old Windsor Road.		EIS 2 REMM EH10	Not applicable to NRT's works.	N/A
46)	A buffer of trees between Mungerie and the rail corridor would be maintained. Any trees removed to facilitate construction would be reinstated on completion of works		EIS 2 REMM EH11	N/A	Section 6.3, Urban Design and Corridor Landscape Plan

	Measure	Timing	Requirement	Responsibility	Reference
47)	The area of the Mungerie carriage drive that would be removed during construction works would be reinstated.		EIS 2 REMM EH12	N/A	Section 6.3, Urban Design and Corridor Landscape Plan
48)	Replacement planting of any heritage listed trees removed at Cheltenham would occur where feasible and reasonable in consultation with Council		EIS 2 REMM EH13A	N/A	Section 6.3, Urban Design and Corridor Landscape Plan
49)	The two identified brick cisterns / wells at the Kellyville Station site would be retained in situ if feasible and reasonable.		EIS 2 REMM EH17	N/A	NA – Stage 1a excavated and removed the identified brick cisterns as part of the European Excavation required from condition E10 of Stage 1 PA
50)	Results and recommendations of the further research undertaken as per the EIS1 mitigation measures regarding areas of archaeological potential would be followed.		EIS 2 REMM EH20	N/A	Section 6.3, Urban Design and Corridor Landscape Plan
51)	The boundary of the construction sites would be fenced to prevent construction personnel entering a PAD or known sites outside the construction footprint.	Before Construction	EIS 2 REMM IH3	Construction Manager	Section 7.7
52)	The Indigenous Heritage component of the site induction would include information on: • Aboriginal heritage conservation areas and/or no-go zones for each construction site. • The legislation and penalties for impacting Aboriginal heritage objects would be conveyed to all construction managers and personnel.	Before Construction	EIS 2 REMM IH4	ENVIRONMENT MANAGER	Section 8.1
53)	TfNSW would consider permanent public interpretation within at least one of the new railway stations following development if an extensive and high value		EIS 2 REMM IH5	N/A	Section 7.1, 7.8

	Measure	Timing	Requirement	Responsibility	Reference
	archaeological deposit were to be uncovered during the excavation of a site.				Urban Design and Corridor Landscape Plan
54)	Results and recommendations of the Phase 1 and 2 archaeological excavations undertaken as per the EIS1 mitigation measures (IH1 and IH2) would be followed.		EIS 2 REMM IH6	N/A	Section 7.1, 7.8 Urban Design and Corridor Landscape Plan
Project Approval – Specific Conditions					
55)	During detailed design and construction of the SSI, impacts to heritage items shall, where feasible and reasonable, be avoided and minimised, under the guidance of an appropriately qualified heritage specialist. Where impacts identified in the EIS are unavoidable, works shall be undertaken in accordance with the strategy outlined in the Construction Heritage Management Plan (condition E34(e)).		OTS Approval SSI-5414 CoA C28	N/A	Section 6.3, Urban Design and Corridor Landscape Plan
56)	Archival recording of affected heritage items shall be undertaken in accordance with the NSW Heritage Council guidelines as relevant.		OTS Approval SSI-5414 CoA C29	N/A	Section 6.3, Urban Design and Corridor Landscape Plan
57)	Prior to the commencement of pre-construction and/ or construction activities that will impact the Aboriginal archaeological sites identified in table 7.3 of the North West Rail Link EIS: Technical Paper - Indigenous Heritage, dated March 2012 and table 12.6 of the North West Rail Link EIS: Volume 1B – Environmental Impact Statement Stage 2 – Stations, Rail Infrastructure and Systems, the Proponent shall undertake an archaeological salvage program using a methodology prepared in consultation with the registered Aboriginal stakeholders, and to the satisfaction of the Director-General. This work shall be undertaken by an appropriately qualified archaeological heritage consultant. Within 2 years of completing the salvage, unless otherwise agreed by the Director General, the Proponent shall submit a report containing the findings of the salvage, including artefact analysis, and the identification of a final repository for any Aboriginal objects, prepared in consultation with the Aboriginal stakeholders and to the satisfaction of the Director-General.	Complete	OTS Approval SSI-5414 CoA C30	N/A	Completed. See Section 7.1

	Measure	Timing	Requirement	Responsibility	Reference
	If the impacts or works to the Aboriginal archaeological sites identified in table 7.3 of the North West Rail Link EIS: Technical Paper – Indigenous Heritage, dated March 2012 have been addressed in accordance with Condition E9 of State Significant Infrastructure Approval SSI-5100, the requirements of this part of the condition are taken to be fulfilled.				
58)	Prior to the commencement of pre-construction and/ or construction activities that will impact the historical archaeological sites identified in identified in table 4.2 of the North West Rail Link EIS: Technical Paper – European Heritage, dated March 2012, the Proponent shall undertake an archaeological excavation program in accordance with the Heritage Council of NSW Archaeological Assessments Guideline (1996) using a methodology prepared in consultation with the Heritage Council of NSW, and to the satisfaction of the Director-General. This work shall be undertaken by an appropriately qualified archaeological heritage consultant. Within 2 years of completing the above work, unless otherwise agreed by the Director General, the Proponent shall submit a report containing the findings of the excavations, including artefact analysis, and the identification of a final repository for any finds, prepared in consultation with the Heritage Council of NSW and to the satisfaction of the Director-General. If the impacts or works have been addressed in accordance with Condition E10 of State Significant Infrastructure Approval SSI-5100, the requirements of this condition are taken to be fulfilled.		OTS Approval SSI-5414 CoA 31	N/A	N/A to this stage of works as these items are outside the boundary of works
Northwest Rail Link Construction Environmental Management Framework					
59)	The following heritage management objectives will apply to the construction of the project: • Minimise impacts on items or places of heritage value • Avoid accidental impacts on heritage items. • Maximise worker's awareness of indigenous and non-indigenous heritage	Ongoing	NWRL CEMP Framework Section 10.1	ENVIRONMENT MANAGER	Section 1.3
60)	NWRL Principal Contractors will develop and implement a Heritage Management Plan which will include as a minimum:	Prior to start on site	NWRL CEMP Framework Section 10.2	ENVIRONMENT MANAGER / Works Engineer	This Plan
61)	The heritage mitigation measures as detailed in the environmental approval		NWRL CEMP Framework		This Table

	Measure	Timing	Requirement	Responsibility	Reference
	documentation		Section 10.2		
62)	The responsibilities of key project personnel with respect to the implementation of the plan.		NWRL CEMP Framework Section 10.2		Section 3
63)	Procedures for undertaking any recordings of heritage items prior to works commencing		NWRL CEMP Framework Section 10.2	N/A	Section 6.5
64)	Procedures for unexpected heritage finds		NWRL CEMP Framework Section 10.2		Section 6.9
65)	Heritage monitoring requirements.		NWRL CEMP Framework Section 10.2		Section 8.2
66)	Compliance record generation and management		NWRL CEMP Framework Section 10.2		Section 8.2
67)	The Contractors regular inspection will include checking of heritage mitigation measures.		NWRL CEMP Framework Section 10.2		Section 8.2
68)	Compliance records will be retained by the Contractor. These will include: • Inspections undertaken in relation to heritage management measures • Archival recordings undertaken of any heritage item. • Unexpected finds and stop work orders • Records of any impacts avoided or minimised through design or construction methods.		NWRL CEMP Framework Section 10.2		Section 8.2
69)	Any heritage item not affected by the works will be retained and protected throughout construction. Prior to the commencement of construction undertake professional archaeological excavation, investigation and reporting of any		NWRL CEMP Framework Section 10.3		Section 6.8, 7.7

	Measure	Timing	Requirement	Responsibility	Reference
	historical Indigenous heritage sites of state significance which will be affected				
70)	Undertake archival recordings of all non-Indigenous heritage items affected by the works prior to commencement of works.		NWRL CEMP Framework Section 10.3		Section 6.3
71)	Implement unexpected heritage find procedures for Indigenous and non-Indigenous heritage items.		NWRL CEMP Framework Section 10.3		Section 6.9, 7.8
Project Deed Requirements					
72)	Artefacts (a) All Artefacts found on or under the surface of the NWRL Site will, as between the parties, be the absolute property of TfNSW. (b) Where such an Artefact is found, OpCo must: (i) immediately notify TfNSW's Representative; (ii) ensure that the Artefact is protected and not disturbed further; (iii) comply with all requirements of Authorities and any Directions of TfNSW's Representative in relation to the Artefact; and (iv) continue to perform OpCo's Activities, except to the extent otherwise: A. directed by TfNSW's Representative; B. ordered by a court or tribunal; or C. required by law. (c) If OpCo is directed, ordered or required to cease to perform any of OpCo's Activities (or to change the way it does so) as contemplated by this clause causing a Compensation Event will occur.	Ongoing	Project Deed Section 12.7	ENVIRONMENT MANAGER	Section 6.9 Section 7.8
73)	Protection of White Hart Inn heritage site (a) Further to mitigation measures identified in Schedule 5, OpCo must ensure the recommended actions to best preserve the archaeological site known as White Hart Inn, Lot 1 and Lot 3 Windsor Road, Beaumont Hills within the context of the Construction Site include:		Project Deed Exhibit 1 - App 49	N/A	Section 6.3 and the urban Design and Landscaping Plan

	Measure	Timing	Requirement	Responsibility	Reference
	(i) a buffer or alternative construction method to provide acceptable vibration mitigation to the contents of Area 'S25' (in Figure 2.1 in Appendix 02); (ii) temporary covers and protection be provided to Area 'S25' (in Figure 2.1 in Appendix 02) levels should access across these areas be required during OpCo's Activities; (iii) archaeological monitoring of Area 'S25' (in Figure 2.1 in Appendix 02) be undertaken during OpCo's Activities; and (iv) should OpCo's Activities require access to Area 'S24' (in Figure 2.1 in Appendix 02), site specific heritage management measures must be documented and implemented.				
74)	In addition to the requirements identified in the Environmental Documents, the Construction Heritage Management Plan must: Identify initiatives that will be implemented to enhance heritage values and minimise of heritage impacts; and	Before Construction	Project Deed Exhibit 1 – App 54 – Section 3.17 (h)(i)	ENVIRONMENT MANAGER	Section 6, 7
75)	include procedures and processes that will be used to implement and document heritage management initiatives.	Before Construction	Project Deed Exhibit 1 – App 54 – Section 3.17 (h)(ii)	ENVIRONMENT MANAGER	Section 8.2
ECRL Determination Report Conditions of Approval					
76)	The CEMP must include as a minimum an unexpected finds procedure that incorporates the environmental management measures documented in the EIA in relation to heritage.	Before Construction	ECRL CoA 35a)	ENVIRONMENT MANAGER	Section 6.9, 7.8 Annexure B
77)	Any significant findings of heritage shall be documented and then reported to the relevant authority and stakeholders for updating of the relevant heritage listing.	During Construction	ECRL CoA 35b)	ENVIRONMENT MANAGER	Section 6.9, 7.8
ECRL Revised Environmental Management Measures					
78)	Should any potential non-Aboriginal artefacts be uncovered during the demolition works, work would cease, and the NSW Planning and Environment (Heritage Branch) would be contacted in accordance with the requirements of the *Heritage Act 1977*.	During Construction	ECRL REMM C1	ENVIRONMENT MANAGER	Section 6.9

	Measure	Timing	Requirement	Responsibility	Reference
79)	If suspected Aboriginal objects are located during construction, an archaeologist would be notified to assess the nature and significance of the find. If the find is an Aboriginal object, further investigation and permits may be required before works commence. If the find is an Aboriginal object the Office of Environment and Heritage (OEH) and the Metropolitan Local Aboriginal Land Council (MLALC) would be notified.	During Construction	ECRL REMM D1	ENVIRONMENT MANAGER	Section 7.8
80)	If suspected human skeletal remains were uncovered at any time within the study area, the following actions would need to be followed: • immediately cease all excavation activity in the vicinity of the remains • notify NSW Police • notify OEH via the Environment Line on 131 555 to provide details of the remains and their location • no recommencement of activity in the vicinity of the remains unless authorised in writing by OEH.	During Construction	ECRL REMM D2	ENVIRONMENT MANAGER	Section 6.9 OEH would only be notified if the finds are confirmed to be skeletal by the NSW Police.
Norwest Pedestrian Link Determination Report Conditions of Approval					
81)	a) The Construction Environmental Management Plan (CEMP) must include as a minimum an unexpected finds procedure that incorporates the environmental management measures documented in the EIA in relation to heritage b) Any significant findings of heritage shall be documented and then reported to the relevant authority and stakeholders for updating of the relevant heritage listing	Before Construction During Construction	CoA 24	ENVIRONMENT MANAGER	Section 6.6 Section 7.5
Norwest Station Subsurface Pedestrian Link and Northern Entry REF					
82)	Non-Aboriginal Heritage Immediately cease all works within 10 metres of discovering an unexpected find (e.g. archaeological remains, heritage item, potential relic). Subsequently implement the following actions: • Inform the TfNSW Heritage Officer / Environment Officer • TfNSW to subsequently notify Heritage Division of NSW OEH in accordance with Section 146 of the *Heritage Act 1977* (NSW Government, 1977)	During Construction	Norwest Pedestrian Link REF EMM 77	Environment Coordinator Project Engineer	Section 6.6

	Measure	Timing	Requirement	Responsibility	Reference
	• For an archaeologist to record the location and context of any historic heritage and implement controls to avoid, record, excavate and store materials Manage any significant finds to allow for their long-term storage				
83)	Aboriginal Heritage Stop work within 10 metres of an unexpected find discovery and: • Inform the TfNSW Heritage Officer / Environment Officer • For an archaeologist to record the location and context of any historic heritage and implement controls to avoid, record, excavate and store materials • Manage any significant finds to allow for their long-term storage	During Construction	Norwest Pedestrian Link REF EMM 78	Environment Coordinator Project Engineer	Section 7.5
84)	An Aboriginal heritage impact permit (AHIP) would be obtained prior to restarting works in the event of discovering an unexpected find: • Have a qualified heritage specialist prepare a cultural heritage application report (CHAR) that would support an application for the permit • Consult with the local Aboriginal land council in preparing the CHAR • Obtain the permit from the Heritage Council of NSW. This application would be accompanied by a prepared by a heritage specialist	During Construction	Norwest Pedestrian Link REF EMM 79	ENVIRONMENT MANAGER	Section 7.5
Willoughby to North Chatswood 33kV Underground Feeder Powerline Submissions Report Revised Environmental Management Measures					
85)	Construction would be consistent with the management and mitigation measures identified within the existing Heritage Management Plan for the construction of the Sydney Metro Northwest.	During Construction	REMM 9	Environment Coordinator Project Engineer	This Plan
86)	If detailed investigations of the proposed alignment identify the stormwater channel as being potentially impacted by normal trenching methods, it is proposed that this item would be underbored using HDD techniques to avoid impacting the heritage item. The potential requirement to underbore ,the Willoughby Stormwater Channel No. 26 using horizontal directional drilling techniques would be determined during detailed design.	Before Construction During Construction	REMM 10	Environment Coordinator Project Engineer	Section 6.4
87)	If suspected Aboriginal objects are located during construction, an archaeologist would be notified to assess the nature and significance of the find. If the find is an	During	REMM 11	Environment	Section 7.5

	Measure	Timing	Requirement	Responsibility	Reference
	Aboriginal object, further investigation and permits may be required before works commence. If the find is an Aboriginal object the Office of Environment and Heritage and the Metropolitan Local Aboriginal Lane Council would be notified.	Construction		Coordinator Project Engineer	
88)	If suspected human skeletal remains were uncovered at any time within the study area, the following actions would need to be followed: • Immediately cease all excavation activity in the vicinity of the remains. • Notify NSW Police. • Notify the Office of Environment and Heritage via the Environment Line on 131 555 to provide details of the remains and their location. • No recommencement of activity in the vicinity of the remains unless authorised in writing by the Office of Environment and Heritage.	During Construction	REMM 12	Environment Coordinator Project Engineer	Section 7.5
Rouse Hill Temporary Bypass Powerline					
89)	Given the low potential for relics, including known alignment stones, to exist in the project area, the following recommendations apply: 1) No further assessment is required for the project and the proposed activity can proceed with caution. 2) The contractor will make all workers (including contractors) aware that relics are protected by section 139 of the Heritage Act. While it is not anticipated that relics exist in the project area, if during the project they are unearthed, work must cease in the immediate area and a qualified heritage professional will be contacted to make an assessment of the find. 3) Inform The Hills Shire Council that transmission poles will be installed within the curtilage of heritage item I23. 4) Human skeletal remains as recommendation 3 above. 5) Care to be taken when removing the power line at the end of its use	During Construction	EIA Control Measure	Environment Coordinator Project Engineer	Section 8.1 Section 6.6 Section 6.9
90)	1) No further assessment is required for the project and the proposed activity can proceed with caution. 2) Although no Aboriginal heritage constraints were identified as part of the project, Aboriginal objects and places remain protected under the NPW Act. The contractor will make all workers (including subcontractors) aware that it is illegal to harm Aboriginal objects, and if it is believed that Aboriginal objects are encountered during activities associated with the project all work will cease in the immediate vicinity of the item and a qualified heritage professional will be contacted. 3) In the event that known or suspected human skeletal remains are encountered during the activity, a) the following procedure will be followed: b) - all work in the immediate vicinity will cease and the find will be immediately reported to the work supervisor who will immediately advise the Environment	During Construction	EIA Control Measure	Environment Coordinator Project Engineer	Section 8.1 Section 7.8

	Measure	Timing	Requirement	Responsibility	Reference
	Manager or other nominated senior staff member; c) - the Environment Manager or other nominated senior staff member will promptly notify the police and the state coroner (as required for all human remains discoveries); d) - the Environment Manager or other nominated senior staff member will contact OEH for advice on identification of the skeletal material; e) - if it is determined that the skeletal material is Aboriginal ancestral remains, the Local Aboriginal Land Council will be contacted and consultative arrangements will be made to discuss ongoing care of the remains; f) - if it is determined that the skeletal material is not Aboriginal ancestral remains, further investigation will be conducted to determine if the remains represent a historical grave or if further involvement of the police is required. 4) Care to be taken when removing the power line at the end of its use.				

Annexure C (Support Document) – Addendum to RTRF Aboriginal Cultural Heritage Assessment Report

artefact

13 November 2014

Cameron Newling
Environmental Planning and Approvals Manager
Northwest Rapid Transit
cameron.newling@jhg.com.au

Dear Cameron,

Re: Addendum to the Aboriginal Cultural Heritage Assessment Report (ACHAR) for the Rapid Transit Rail Facility, Schofields.

Artefact Heritage prepared an Aboriginal Cultural Heritage Assessment Report (ACHAR) in 2013 as part of North West Rail Link (NWRL) project, for a train stabling and maintenance facility (Rapid Transit Rail Facility or RTRF) at Tallawong Road, Schofields.

During the field investigations as part of the 2013 ACHAR, not all properties were accessible for assessment. Therefore the ACHAR recommended that a field survey of properties that could not accessed for the field investigation would be conducted prior to impacts occurring.

Following the finalisation of that document in July 2013, Northwest Rapid Transit engaged Artefact Heritage to prepare an updated addendum to the ACHAR. The aim of this addendum report is to provide the results of the additional investigation which address the recommendations of the ACHAR. This addendum report is to be read in conjunction with Rapid Transit Rail Facility ACHAR (Artefact 2013).

The Proposal

The RTRF proposal would include the following infrastructure:

- Train stabling facilities.
- Train maintenance facilities including facilities for cleaning, inspection, preventative maintenance, corrective maintenance, component repair and major overhauls of rolling stock.
- A test track.
- Facilities for maintenance and repair of rail systems, equipment and infrastructure.
- Warehousing for spare parts, tools and equipment.
- Administration, staff facilities and training facilities including an Operations Control Centre.
- Ancillary buildings as required for security services, power supply systems, refuse disposal and hazardous material storage.
- Internal access and maintenance roads.

- Safeguarding for a future transport corridor to Marsden Park.

The RTRF would be designed with a maximum capacity to stable 45 trains and maintain 76 trains. The facility would operate 24 hours a day, seven days a week.

The full proposal with concept designs are contained in the Rapid Transit Rail Facility ACHAR (Artefact 2013).

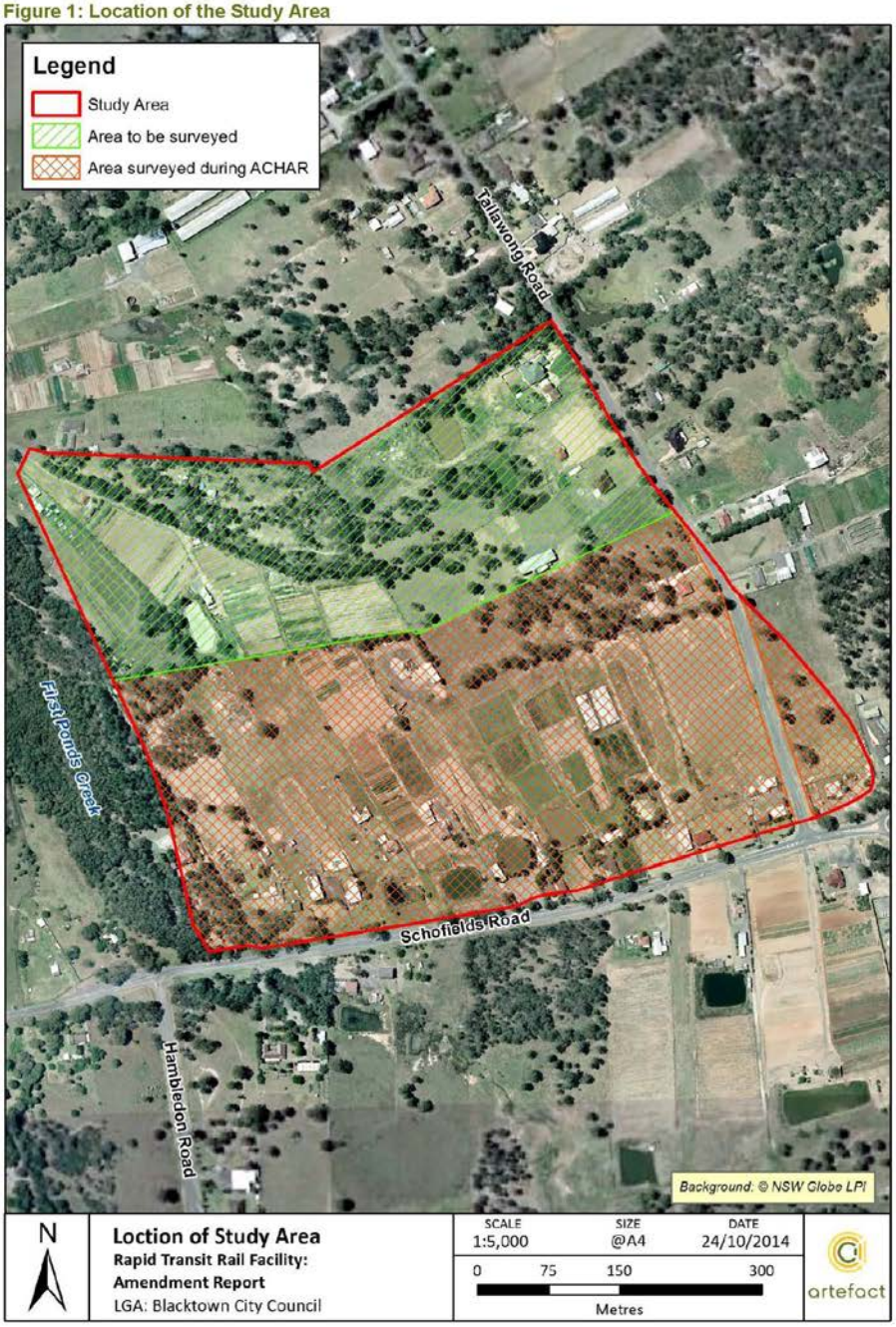
Study Area

The study area is located mid-way along Schofields Road, between Richmond Road and Windsor Road, and falls within the Riverstone East Precinct of the North West Growth Centre. The study area is bounded by Schofields Road to the south, Tallawong Road to the east, First Ponds Creek to the west, with properties 2 Oak Street and 57 Tallawong Road forming the northern boundary (Figure 1).

The ACHAR (Artefact 2013) involved the field investigation of the southern half of the study area (Figure 1). This area comprises 51, 55, 57, 59, 61, 63 and 65 Schofields Road, as well as 31 Tallawong Road.

This addendum report will detail the results of the addition survey of the northern half of the study area; which were unable to be surveyed during the course of the ACHAR investigations (Figure 1). This area comprises 47, 51 and 57 Tallawong Road; 2 and 5 Oak Street, as well as a portion of 68 Gordon Road.

Figure 1: Location of the Study Area



Objectives of Addendum

This letter report outlines the following information:

- An updated Office of Environment and Heritage (OEH) Aboriginal Heritage Information Management System (AHIMS) search.
- Provide a description of the methodology and results of the additional archaeological survey
- Recommendations based on the results

Further details of the proposal, including environmental and archaeological context of the local area, and Aboriginal histories of the area are outlined in the ACHAR (Artefact Heritage 2013).

Aboriginal stakeholder consultation

The ACHAR (Artefact 2013) was conducted in accordance with GCC Aboriginal consultation protocol and the 2005 Aboriginal Cultural Heritage Impact Assessment and Community Consultation guidelines. For full details see the ACHAR.

In accordance with the principals of the GCC Aboriginal consultation protocol, a representative of Deerubbin Local Aboriginal Land Council (DLALC) was invited to take part in the additional field investigation of the north portion of study area. Steve Randall, representative of DLALC, took part in the field investigation and provided input on the Aboriginal heritage values for the assessment.

Following the field investigation of the northern portion of the study area, Steve Randall noted that the area was disturbed by past land use and stated that DLALC has no objection to the RTRF. A letter from DLALC discussing the additional field investigation is attached in full in Appendix A

Legislative context

This letter report addendum was prepared in accordance with the following NSW legislation and legislative guidelines:

National Parks and Wildlife Act (1974)

The *National Parks & Wildlife Act 1974*, administered by the OEH provides statutory protection for all Aboriginal 'objects' (consisting of any material evidence of the Aboriginal occupation of NSW) under Section 90 of the Act, and for 'Aboriginal Places' (areas of cultural significance to the Aboriginal community) under Section 84.

The protection provided to Aboriginal objects applies irrespective of the level of their significance or issues of land tenure. However, areas are only gazetted as Aboriginal Places if the Minister is satisfied that sufficient evidence exists to demonstrate that the location was and/or is, of special significance to Aboriginal culture.

A Section 90 permit or Aboriginal Heritage Impact Permit (AHIP) is granted by the OEH. Various factors are considered by OEH in the AHIP application process, such as site significance, Aboriginal consultation requirements, ESD principles, project justification and consideration of alternatives. The penalties and fines for damaging or defacing an Aboriginal object have also increased.

As this project is being assessed under Part 5.1 of the EP&A Act 1979 permits issued under the NPW Act 1974 are not required.

Environmental Planning and Assessment Act (1979)

The *Environmental Planning and Assessment Act 1979 (*EP&A Act) establishes the framework for cultural heritage values to be formally assessed in the land use planning and development consent process. The EP&A Act requires that environmental impacts are considered prior to land development.

The RTRF proposal will be assessed under Part 5.1 of the EP&A Act, which establishes an assessment and approval regime for SSI. Part 5.1 applies to development that is declared to be SSI by a State Environmental Planning Policy (SEPP). Section 115ZG of the EP&A Act specifies that approvals or permits under section 90 of the NPW Act 1974 are not required for approved SSI. However, approval from the Minister of Planning and Infrastructure is required and an EIS must be submitted. The EIS must address the impact of the RTRF proposal on Aboriginal sites and Aboriginal places, through the framework of existing heritage legislation including the NPW Act 1974 and the 2005 DEC draft Aboriginal cultural heritage impact assessment and community consultation guidelines.

Investigators and contributors

This report was written by Alexander Timms, archaeologist at Artefact Heritage. Artefact Director Dr Sandra Wallace provided management input and review.

Aboriginal Heritage Information Management System

A search of the Aboriginal Heritage Information Management System (AHIMS) was completed for the ACHAR by Artefact Heritage (2013) on the 10 April 2013. An updated search was completed for this amendment report on 24 October 2014. The updated search had the same search parameters as the initial search. The details of the AHIMS search parameters are as follows:

GDA 1994 MGA 56	303012E – 306450E 6268331N – 6271241N
Buffer	50 m
Number of sites	59
AHIMS Search ID	52076

A total of fifty-nine sites were identified by the extensive AHIMS search. The frequency of recorded site types is summarised in Table 1 below. The distribution of recorded sites within the AHIMS search area is shown in Figure 2

The location of Aboriginal sites is considered culturally sensitive information. It is advised that this information, including the AHIMS data appearing on the heritage map for the proposal be removed from this report if it is to enter the public domain.

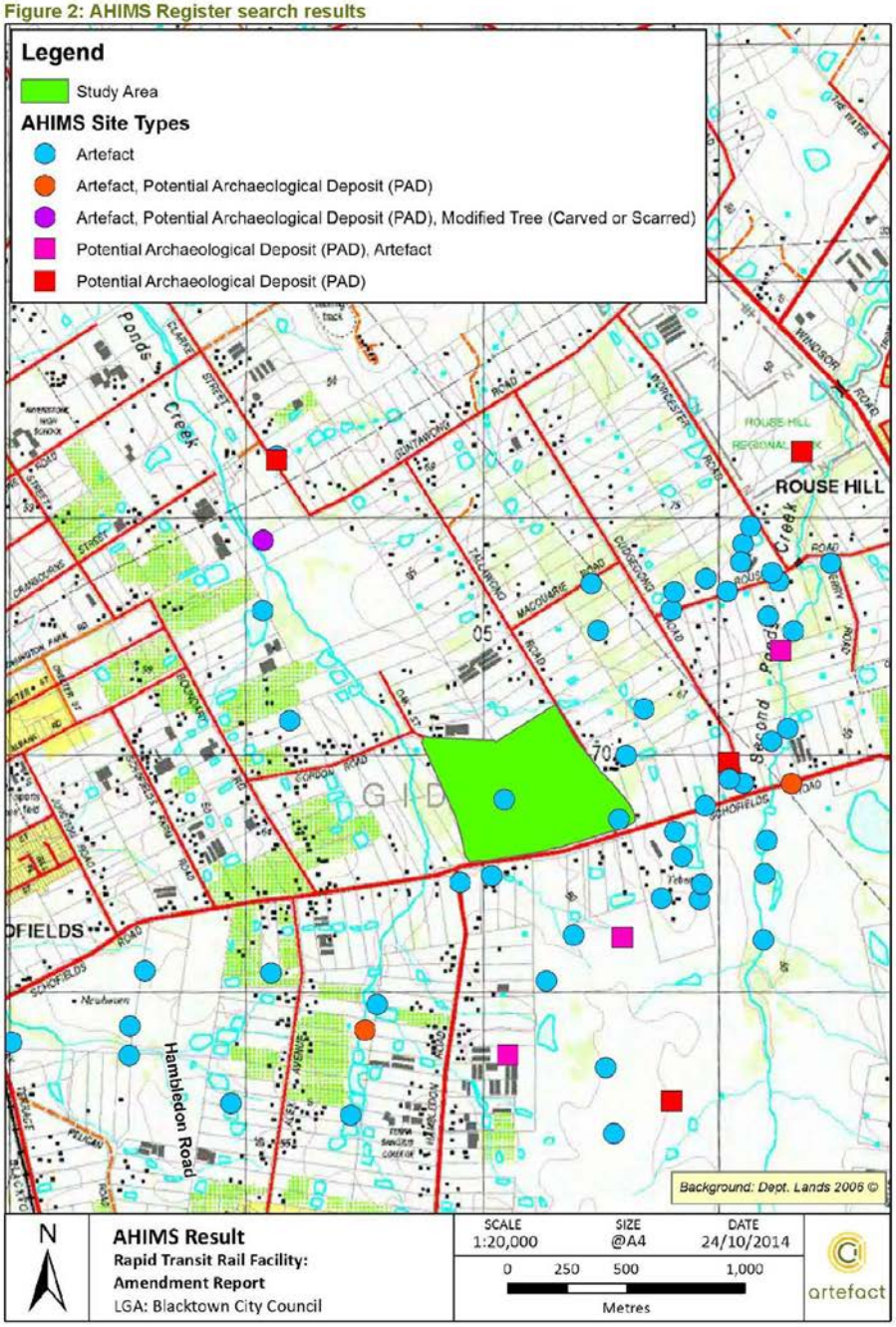
Table 1: Frequency of site features from AHIMS data

Site Features	Frequency	Percentage
Artefact	49	83
Artefact, Potential Archaeological Deposit (PAD)	5	8
Potential Archaeological Deposit (PAD)	4	7
Artefact, Potential Archaeological Deposit (PAD), Modified Tree (Carved or Scarred)	1	2

A large number of Aboriginal sites have been recorded in the locality, the vast majority within the Second Ponds Creek valley (Figure 2). Surface artefact sites, including artefact scatters and isolated finds, were the most frequently recorded Aboriginal site type within the AHIMS extensive search area. While the overall number of sites have increased in the area since the ACHAR AHIMS search, the general site type and patterning remain consistent.

Two Aboriginal sites listed on the OEH AHIMS site register are located within the study area. This includes artefact scatters AHIMS site 45-5-4112 and 45-5-4188. One Aboriginal site not listed on the OEH AHIMS site register was located within the study area. The site, referred to as '65 Schofields Road', was an isolated artefact (GML 2012). As these sites were located within the southern portion of the study area, they were assessed as part of the ACHAR (Artefact 2013).

Figure 2: AHIMS Register search results



Additional Field Survey

Survey included 47, 51 and 57 Tallawong Road; 2 and 5 Oak Street, as well as a portion of 68 Gordon Road. These areas were unable to be accessed during the field survey as part of the ACHAR (Artefact 2013).

Field Methodology

For consistency the same survey methodology was employed as presented in the ACHAR (Artefact 2013).

The survey was undertaken on 23 October 2014. The survey team included two archaeologists from Artefact Heritage, Alexander Timms and Adele Zubrzycka, and one representative of the Deerubbin Local Aboriginal Land Council (DLALC), Steve Randall. The survey team was accompanied by Project Manager John Langford and Environmental Planning and Approvals Manager Cameron Newling from Northwest Rapid Transit.

The survey involved accessing each property from Tallawong Road, then walking across the property area to investigate general levels of disturbance and any areas of surface visibility. In areas where surface visibility was low, the survey team walked one linear transect to the rear of the property then one separate transect to the front of the property before moving to the next area of investigation. Where areas of surface visibility were larger, the survey team spread out to cover the greatest portion of those areas as possible.

Colour aerial photography and topographic maps of the study area were carried by the survey team in the field. Areas walked were marked on these maps during the survey. A non-differential GPS was carried by the survey team throughout the survey to log areas walked and to record Aboriginal sites and areas of archaeological potential.

Effective Survey Coverage

The study area was covered by three survey units (Figure 13). Survey units 1 and 2 was investigated during the course of the ACHAR. Please see the ACHAR (Artefact 2013) for details of the survey of these areas.

The current study focused on the areas unable to be accessed during the ACHAR; this area is referred to as survey unit 3 (Figure 13).

Survey unit 3 covered two landforms, which included slope and crest contexts. A summary of survey coverage and landform survey coverage is provided in Table 2 below

Table 2: Survey Coverage

Survey Unit	Landform	Unit area (m^2)	Visibility (%)	Exposure (%)	Effective coverage (m^2)	Effective Coverage (%)
3	Crest, Slope	133,655	5	10	668	0.5

Survey Observations

The street frontage portions of 47, 51 and 57 Tallawong Road, all contained houses with associated sheds, dams and vehicle access roads (Figure 3 to Figure 5). These portions of the properties are highly disturbed. Large-scale landform modification and introduced materials were observed across those portions of each property. Large amounts of introduced materials formed into spoil piles were observed in the rear of 51 and 57 Tallawong Road (Figure 6). While 47 Tallawong Road has undergone substantial modifications during the construction of a large shed in the central portion of the property (Figure 7); undulations evident in the grassed area at the rear indicate past ground disturbance.

The properties in the southwest corner of the survey unit, 5 Oak Street and 68 Gordon Road, were former market gardens. Plough and furrow undulations were observed across these properties. However the ploughed areas have become overgrown, which hindered both access and visibility (Figure 8). A large dam is located within the south of 5 Oak Street, which has severely impacted the area (Figure 9).

The street frontage of 2 Oak Street has been impacted by the construction of access tracks which run to the dwelling in centre of the property (Figure 10 and Figure 11). Around these dwelling are sheds, landscaped gardens and spoil piles of introduced materials. However the amount of native trees present within the property show that this is the least impacted area within survey unity 3 (Figure 12).

Figure 3: Houses on 57 Tallawong Road. Northeast aspect.

Figure 4: House on 51 Tallawong Road. East aspect.

Figure 5: Dams within 51 and 57 Tallawong Road. West aspect.

Figure 6: Introduced materials at rear of 57 Tallawong Road. South aspect.

Figure 7: Dam and shed located in 47 Tallawong Road. Southwest aspect.

Figure 8: Overgrown market garden area. West aspect.

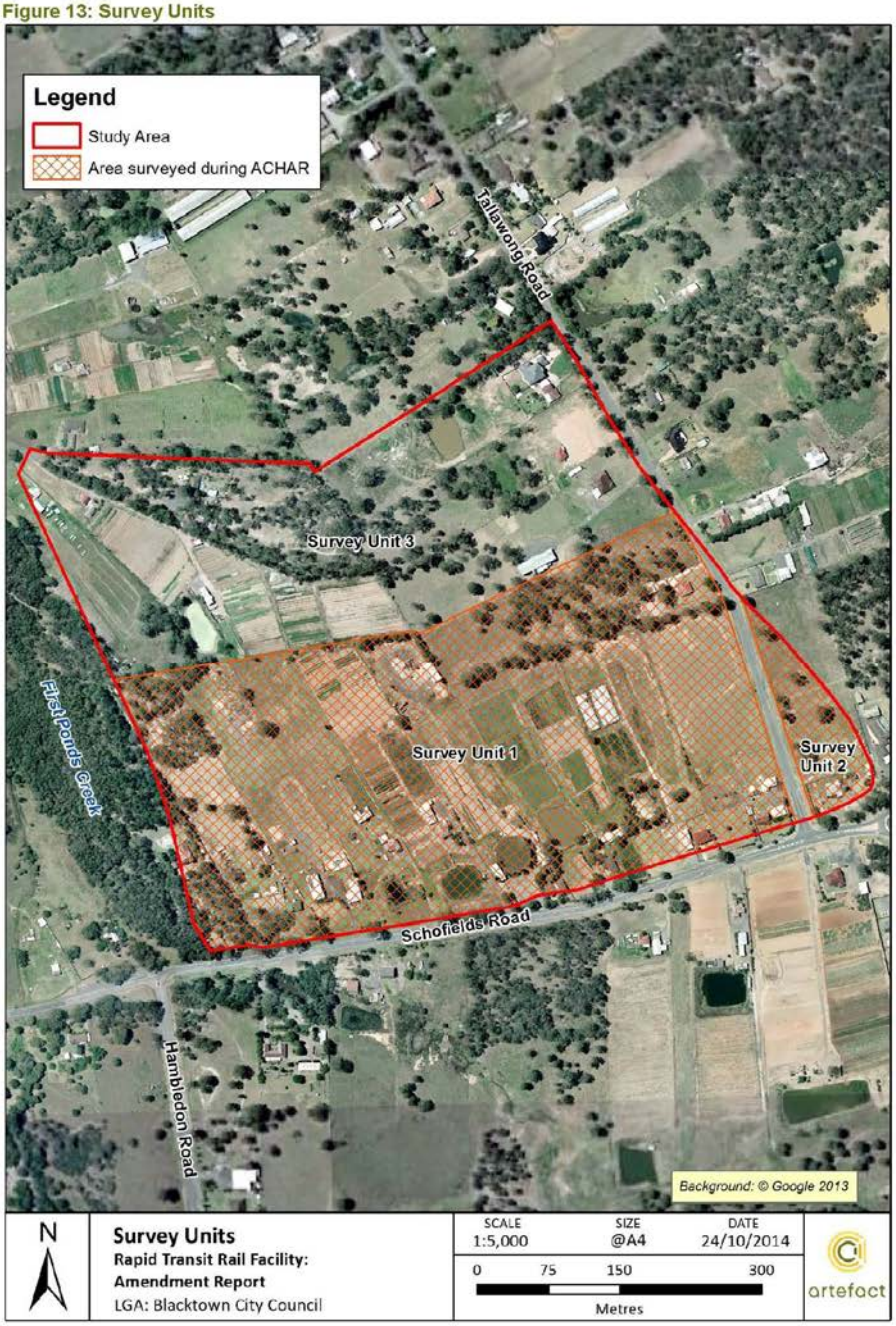
Figure 9: Dam within 5 Oak Street. West aspect.

Figure 10: Circular driveway at 2 Oak Street. East aspect.

Figure 11: Dwelling and shed in 2 5 Oak Street. West aspect.

Figure 12: Eucalyptus trees within 2 Oak Street. East aspect.

Figure 13: Survey Units



Conclusions and Recommendations

Levels of disturbance across the study area were generally high. Substantial disturbance was identified within each property associated with houses, sheds, dams and access tracks. Substantial disturbances were also associated with market gardening within 5 Oak Street and 68 Gordon Road.

Due to the high level of disturbance observed during the field investigation, the archaeological potential of the surveyed properties is low. No Aboriginal sites or areas where Aboriginal objects are likely to occur beneath the ground surface were identified within the proposed impact areas during the site inspection.

It is therefore recommended that there are no Aboriginal archaeological constraints on the northern portion of the study area. The results and recommendations for the southern portion of the study area are presented in the ACHAR (2013).

If changes are made to the development proposal that may result in impacts to areas not covered by this assessment, further archaeological assessment will be required.

Kind Regards,

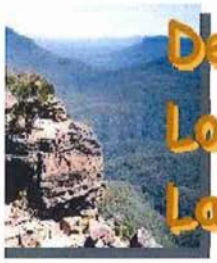
Alexander Timms
Archaeologist
Artefact Heritage

alex.timms@artefact.net.au
0447 911 127 183 079

References

Artefact Heritage 2013. *Rapid Transit Facility – Aboriginal Cultural Heritage Assessment Report*. Report for JBA Consulting.

Appendix A: Report from Deerubbin Local Aboriginal Land Council



Deerubbin Local Aboriginal Land Council

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John Holland

Our Ref: 2487

Level 3, 65 Pirrama Road

PYRMONT NSW 2009

13 November 2014

PROTECTION OF ABORIGINAL CULTURAL HERITAGE

Rapid Transit Rail Facility

Tallawong Road, Schofield

Attention: Cameron Newling, Environmental Planning & Approvals Manager

A representative of Deerubbin Local Aboriginal Land Council inspected the site of proposed Rapid Transit Rail Facility, Tallawong Road, Schofield on Thursday, 23 October 2014. An Aboriginal cultural heritage assessment was undertaken to evaluation the likely impact of the development has on the cultural heritage of the land.

The study area has disturbance of the soils from past land use, no Aboriginal cultural materials, (in the form of stone artefacts, for example) were found.

Deerubbin Local Aboriginal Land Council therefore, has no objection for the Rapid Transit Rail Facility, Tallawong Road, Schofields on the grounds of Aboriginal cultural heritage

Yours Faithfully,

S Randall

(Steven Randall

Aboriginal Cultural Heritage Officer)

C.c Miranda Firman – Office of Environment & Heritage

C.c. Alex Timms – Artefact Heritage

Annexure D Areas Cleared and Not Cleared of Aboriginal Heritage

Source: Sydney Metro Northwest, Archaeological Salvage Program, Western Section Early Works (Kelleher Nightingale Consulting, October 2015)

Annexure E – Shared Path Assessment

SYDNEY METRO NORTHWEST SHARED PATH
KELLYVILLE STATION TO ROUSE HILL STATION
CONSISTENCY ASSESSMENT AND ARCHAEOLOGICAL EXCAVATION

RH/CD9 (AHIMS 45-5-0933)
Aboriginal Archaeological Assessment

Prepared for Northwest Rapid Transit Infrastructure Joint Venture

The Hills Shire Local Government Area

February 2017

Ref. 1538

KELLEHER NIGHTINGALE CONSULTING PTY LTD
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ACN 120 187 671

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SYDNEY NSW 2000
Phone 02 9232 5373
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Document Information

Project Name	Sydney Metro Northwest Shared Path Kellyville Station to Rouse Hill Station Consistency Assessment and Archaeological Excavation RH/CD9 (AHIMS 45-5-0933) Aboriginal Archaeological Assessment
Project Number	1538
Version	Final
Client Name	Northwest Rapid Transit Infrastructure Joint Venture
Recipient	Cameron Newling, Environment Planning and Approvals Manager Chun Sun, Senior Project Engineer Andrew Knispel, Project Manager
Issue Date	February 2017
Prepared by	Dr Matthew Kelleher; Mark Rawson; Ben Anderson
Approved by	Dr Matthew Kelleher; Alison Nightingale

Kelleher Nightingale Consulting Pty Ltd

Executive Summary

Northwest Rapid Transit Infrastructure Joint Venture (NRTIJV) proposes to construct a concrete shared path between Kellyville Station and Rouse Hill Station as part of its works for the Sydney Metro Northwest. Sections of the shared path are outside of the project boundary. Works outside of the project boundary are required to be assessed for potential impact on Aboriginal heritage in accordance with state significant infrastructure Project Approval SSI-5100 and SSI-5414 and specifically in accordance with the Department of Planning and Environment (DP&E) approved archaeological salvage excavation methodology, *North West Rail Link Early Works Project, Indigenous heritage and archaeological consultancy – West Zone: Aboriginal cultural heritage assessment report and methodology for Phase 1 and Phase 2 salvage* (KNC 2013) and the findings of the *Sydney Metro Northwest Archaeological Salvage Program* (KNC 2015).

The majority of the shared path alignment has no impact on Aboriginal heritage as it traverses an existing urban environment: roadways, disturbed road verge or highly modified lands. No Aboriginal archaeological sites are impacted by the shared path in these urban areas.

In one section from Kellyville Station to Windsor Road an Aboriginal archaeological site, RH/CD9 (AHIMS #45-5-0933) exists along the alignment of the shared path as it follows Elizabeth Macarthur Creek and Caddies Creek and runs adjacent to Clovelly Circuit and along the cul-de-sacs of Fitzroy Place, Swann Place, Austen Place and Lycett Avenue.

Archaeological excavation of Aboriginal archaeological site RH/CD9 was undertaken in accordance with the Project Approval and DP&E approved archaeological methodology to determine if the impact from the proposed shared path was consistent with the findings of the *Sydney Metro Northwest Archaeological Salvage Program* (KNC 2015)

Results
Archaeological excavation of the shared path alignment at site RH/CD9 consisted of 30 1m^2 squares and recovered a total of 439 artefacts (15 artefacts/m^2). Much of the assessed area was highly disturbed with the majority of the artefacts emanating from a single test square (TS14) containing 276 artefacts. The high density TS14 archaeological deposit was 7x greater than any other deposit salvaged during the Sydney Metro archaeology program. Two other areas of moderate artefact density were identified around TS12 (38 artefacts) and TS1 (29 artefacts).

Modification of Shared Path – Minimising Impact
NRTIJV recognised the particular heritage value of the high density TS14 archaeological deposit (part of the larger RH/CD9 site) and revised the shared path construction techniques to minimise impact to the deposit. The path design was modified to float over the ground surface where it intersected the TS14 deposit. Pavement plans were altered to ensure no excavation of the terrace, with an inert sand layer placed between the terrace and the pavement. The result is approximately 25m^2 of terrace (c.5% of the total area) is covered by the shared path, but the terrace itself will not be excavated during construction. In addition, the placement and design of drainage works was changed to avoid the TS14 deposit.

Despite efforts to minimise impact, the covering of the TS14 terrace is an archaeological impact: it restricts access to the deposit and over time the introduced soil layer will mix with the terrace soil. Covering the deposit produces an impact that is is less than what would occur from the excavation of shared path foundations, but the proposed works will constitute an impact to the high density RH/CD9 deposit at TS14 and to other moderate density deposits identified during the test excavation program (e.g. TS1 and TS12).

Summary and Recommendations
The construction of the proposed shared path will impact archaeological site RH/CD9. The increased overall physical impact to identified moderate to high density deposits at site RH/CD9 would increase the impact on archaeological significance and is therefore not consistent with the previous program. Outside of the section from Samantha Riley Drive to Windsor Road along chainage 300-820, the shared path does not impact Aboriginal archaeological sites/objects.

- *Impact Not Consistent*
  Further archaeological salvage will be required at RH/CD9 in accordance with the approved archaeological salvage excavation methodology as the impact would be not consistent with the findings contained in *Sydney Metro Northwest Archaeological Salvage Program* (KNC 2015). The impacted portion of the terrace would require Phase 2 archaeological salvage. The scope of the salvage would relate to the scope of the construction excavation.

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1 Introduction

1.1 Project Background

Northwest Rapid Transit Infrastructure Joint Venture (NRTIJV) proposes to construct a concrete shared path between Kellyville Station and Rouse Hill Station as part of its works for the Sydney Metro Northwest. Sections of the shared path are outside of the project boundary. Works outside of the project boundary are required to be assessed for potential impact on Aboriginal heritage in accordance with state significant infrastructure Project Approval SSI-5100 and SSI-5414 and specifically in accordance with the Department of Planning and Environment (DP&E) approved archaeological salvage excavation methodology, North West Rail Link Early Works Project, Indigenous heritage and archaeological consultancy – West Zone: Aboriginal cultural heritage assessment report and methodology for Phase 1 and Phase 2 salvage (KNC 2013) and the findings of the Sydney Metro Northwest Archaeological Salvage Program (KNC 2015).

Kelleher Nightingale Consulting Pty Ltd (KNC) was engaged by NRTIJV to prepare an Aboriginal heritage consistency assessment of the shared path from Kellyville Station to Rouse Hill Station.

1.2 Study Area

The shared path follows the general alignment of the Sydney Metro Northwest corridor from Samantha Riley Drive, Kellyville Station to White Hart Drive, Rouse Hill Station (Figure 1). An Aboriginal archaeological heritage assessment was undertaken for all areas of the shared path outside of the project boundary (Appendix A).

1.3 Results

The majority of the shared path alignment from Kellyville Station to Rouse Hill Station has no impact on Aboriginal heritage as it traverses an existing urban environment: roadways, disturbed road verge or highly modified lands. No Aboriginal archaeological sites were impacted by the shared path in these urban areas.

One Aboriginal archaeological site, RH/CD9, was impacted by the shared path along Caddies Creek and adjacent to Clovelly Circuit and along the cul-de-sacs of Fitzroy Place, Swann Place, Austen Place and Lycett Ave (Figure 2).

Archaeological excavation of the shared path alignment consisting of 30 1m^2 squares recovered a total of 439 artefacts (15 artefacts/m^2). Much of the assessed area was highly disturbed with the majority of the artefacts emanating from a single test square (TS14) containing 276 artefacts. The high density TS14 archaeological deposit was 7x greater than any other deposit salvaged during the Sydney Metro archaeology program. Two other areas of moderate artefact density were identified around TS12 (38 artefacts) and TS1 (29 artefacts).

Apart from the high and moderate density RH/CD9 archaeological deposit associated with these squares, all of the area within the shared path boundary was determined to be consistent with the results of the *Sydney Metro Northwest Archaeological Salvage Program* (KNC 2015).

Modification of Shared Path – Minimising Impact
NRTIJV recognised the value of the high density TS14 archaeological deposit and worked towards minimising the impact by revised construction techniques. The shared path design was modified to float over the ground surface where it intersected the TS14 deposit. Pavement plans were altered to ensure no excavation of the terrace, with an inert sand layer placed between the terrace and the pavement. The result is approximately 25m^2 of terrace (c.5% of the total area) is covered by the shared path, but the terrace itself will not be excavated during construction. In addition, the placement and design of drainage works was changed to avoid the TS14 deposit.

The covering of the TS14 terrace is an archaeological impact: it restricts access to the deposit and over time the introduced soil layer will mix with the terrace soil. Covering the deposit results in a reduced impact and is less than what would occur from the excavation of shared path foundations.

Despite the overall level of impact being reduced, the works would still constitute an impact on the deposit associated with RH/CD9.

1.4 Summary and Recommendations

Archaeological assessment of potential impact to Aboriginal heritage of the shared path from Kellyville Station to Rouse Hill Station identified impact to one archaeological site: RH/CD9. Outside of archaeological site RH/CD9 the shared path does not impact Aboriginal heritage.

Consistency Assessment

The majority of the shared path alignment at RH/CD9 exhibits no impact or a consistent impact on Aboriginal heritage when compared with the findings contained in the *Sydney Metro Northwest Archaeological Salvage Program* (KNC 2015).

The test excavation program identified significant high density archaeological deposit at TS14 (chainage 740-765) and two moderate density deposits at TS1 (chainage 400-420) and TS12 (chainage 715-730). Impact to these deposits within site RH/CD9 would be inconsistent with the findings contained in the *Sydney Metro Northwest Archaeological Salvage Program* (KNC 2015) as they would constitute an increased impact to the archaeological significance of the site.

As a result, NRTIJV modified construction techniques to minimise impact to the high density TS14 archaeological deposit within site RH/CD9. However the proposed works still constitute an impact to the TS14 deposit and to other moderate density deposits identified during the test excavation program at TS1 and TS12. Overall, this level of impact is not consistent with the level of impact contained in the *Sydney Metro Northwest Archaeological Salvage Program* (KNC 2015).

- *Impact is Not Consistent*
  Further archaeological salvage will be required of RH/CD9 in accordance with the approved archaeological salvage excavation methodology as the impact would not be consistent with the findings contained in *Sydney Metro Northwest Archaeological Salvage Program* (KNC 2015). The impacted portion of the terrace would require Phase 2 archaeological salvage conducted in accordance with the approved methodology (KNC 2013). The scope of the salvage would relate to the scope of the construction excavation.

General Recommendations

- The TS14 deposit located outside of the shared path construction footprint should be protected by temporary fencing. The fenced areas should be clearly identified as environmentally sensitive and a "no-go zone". The adequacy of the fencing should be assessed by an Environmental Manager prior to any construction activity in the vicinity.
- The TS14 deposit located outside of the shared path construction footprint should be identified in the construction environmental management plan (or similar document) and workers inducted as to appropriate protection measures (depending on the selected impact option).

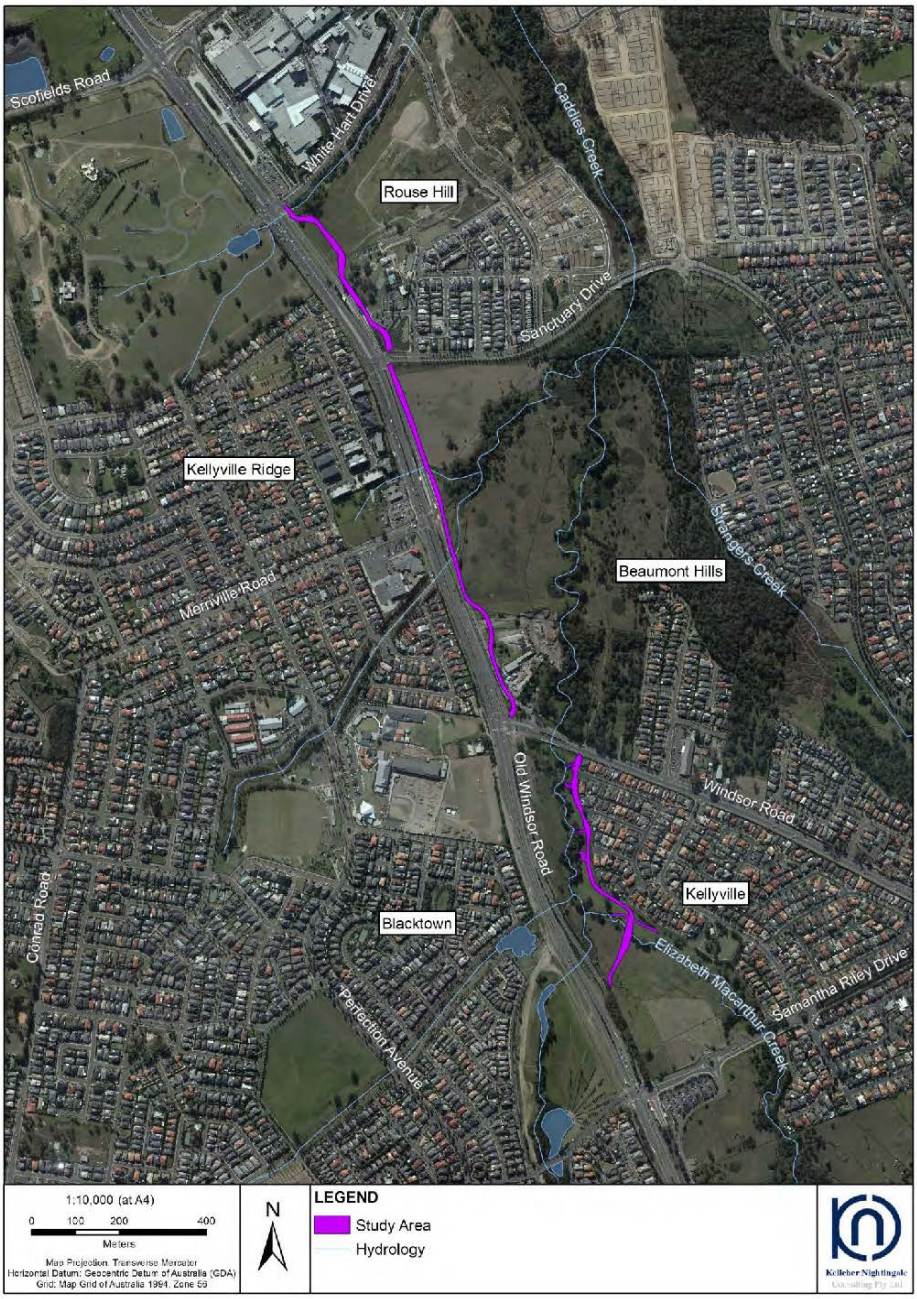

Figure 1. Study area

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Figure 2. Location of RH/CD9 in relation to study area

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2 Desktop and Visual Assessment

The first step of the consistency assessment identified the areas outside of the project boundary and undertook a land disturbance assessment. Three main sections were identified as Samantha Riley Drive to Windsor Road, Windsor Road to Sanctuary Drive and Sanctuary Drive to White Hart Drive. Within each section specific chainage designations were determined (Table 1) (Appendix A).

Desktop and visual inspection of the land was undertaken to determine, which sections of land may contain Aboriginal archaeological heritage.

Most sections displayed high levels of disturbance from the existing road development and exhibited no archaeological potential. In most instances it was evident that previous works had cut into the underlying clay and would have removed any cultural material.

One section from Samantha Riley Drive to Windsor Road, however, traversed Aboriginal archaeological site RH/CD9 (AHIMS #45-5-0933) (Figure 2). Construction of the shared path through this site would impact on Aboriginal heritage.

Interim Result
One section of the shared path between Samantha Riley Drive to Windsor Road will have an impact on Aboriginal heritage. All other sections of the shared path exhibited no potential to impact on Aboriginal heritage.

Salvage archaeological excavation of RH/CD9 within the project boundary was undertaken during the Sydney Metro Northwest Aboriginal archaeological program (KNC 2015). Additional impact to RH/CD9 is allowed in accordance with the DP&E Aboriginal archaeological salvage methodology (KNC 2013), provided that the increased physical impact does not increase the impact on archaeological significance.

To determine if the shared path would have an increased impact on the significance of RH/CD9 additional assessment and Aboriginal community consultation was required. The additional assessment is documented in the remaining sections of this report.

Table 1. Shared Path Impact Assessment for lands Outside of Project Boundary

Section	Chainage	Context	Additional Assessment Required
Samantha Riley Drive – Windsor Road	300-820	Adjacent to Elizabeth Macarthur Creek and Caddies Creek. Mixed disturbance levels from low to high. Portion of the works exist with archaeological site RH/CD9	Yes
Windsor Road to Sanctuary Drive	0-80	Within existing road easement exhibiting high levels of disturbance and no archaeological potential	No
	280-440	Within disturbed road easement adjacent to T-Way. Evidence of high levels of disturbance from previous road construction	No
	520-860	Within disturbed road easement adjacent to T-Way. Evidence of high levels of disturbance from previous road construction	No
Sanctuary Drive to White Hart Drive	0-160	Within disturbed road easement adjacent to T-Way. Evidence of high levels of disturbance from previous road construction	No
	400-440	Within disturbed road easement adjacent to T-Way. Evidence of high levels of disturbance from previous road construction	No

3 Aboriginal Community Consultation

The Aboriginal cultural heritage assessment process for the NRTIJV was conducted in accordance with the DP&E approved methodology: *North West Rail Link Early Works Project, Indigenous heritage and archaeological consultancy – West Zone: Aboriginal cultural heritage assessment report and methodology for Phase 1 and Phase 2 salvage* (KNC 2013).

Registered Aboriginal stakeholders (table below) were contacted to inform them of the consistency assessment and the methodological process.

A copy of the consistency assessment was sent to all registered stakeholders for comment. A 28 day review and comment period was provided.

Table 2. Registered Aboriginal stakeholder groups

Registered Aboriginal Stakeholder Group	Name of Aboriginal person and / or contact person
Metropolitan Local Aboriginal Land Council (MLALC)	Colin Davison
Deerubbin Local Aboriginal Land Council (DLALC)	Kevin Cavanagh
Parramatta City Council Aboriginal and Torres Strait Islander Advisory Committee	Maggie Kyle, Gil Saunders
Mr Tony Williams	Tony Williams
Darug Custodian Aboriginal Corporation (DCAC)	Leanne Watson
Darug Aboriginal Cultural Heritage Assessments (DACHA)	Gordon Morton, Celestine Everingham
Darug Aboriginal Land Care Inc (DALC)	Des Dyer
Darug Land Observations (DLO)	Gordon Workman
Yarrawalk/Tocomwall	Scott Franks
Darug Tribal Aboriginal Corporation (DTAC)	John Reilly
Gunjeewong Cultural Heritage Aboriginal Corporation	Cherie Carrol Turrise

Darug Land Observations (DLO) provided a written comment on the consistency assessment (email dated 10/01/2017; attached in full as Appendix B). DLO stated that they had reviewed the report and expressed support for the findings of the consistency assessment. DLO also expressed their preference for recovered artefacts to be reburied on Country (i.e. within the study area). It is KNC's position that the long-term storage of artefacts will be handled in accordance with the approved methodology (KNC 2013). DLO also expressed their interest in being involved with further works at the site.

4 Archaeological Background

Salvage excavation was undertaken at RH/CD9 (South) as part of an Archaeological Salvage Program for the Sydney Metro Northwest (KNC 2015: 95-104). The salvage area was situated on the lower slopes and flood plain adjacent to the western banks of Elizabeth Macarthur Creek and Caddies Creek approximately 40 metres west of the current study area. The salvage was conducted in two phases. Phase 1 comprised a total of 28 squares (1 x 1 metre) were excavated across the south western portion of the site. The Phase 1 excavation retrieved 181 artefacts and found that the soil profile was disturbed closer to Windsor Road, but deep deposits up to 50 centimetres were present closer to the creek.

The highest Phase 1 square densities were 34 and 36 artefacts while two other squares contained 15 and 20 artefacts each. The remaining squares produced less than ten artefacts each, with seven squares producing zero artefacts. The southern portion of the salvage area contained residual Blacktown soils formed from the underlying Ashfield Shale geology whilst the northern lower slopes and flood plain contained alluvial South Creek soils overlying quaternary alluvium geology.

The Phase 2 excavations at RH/CD9 were focussed on the three Phase 1 squares with the highest artefact densities. Open Area 1 was located approximately 30 metres east of Old Windsor Road and 120 metres west of the cul-de-sac at the western end of Swann Place. Open Area 2 was located approximately 40 metres east of Open Area 1 and 80 metres west of the cul-de-sac at the western end of Swann Place. Open Area 3 was located on the southern side of the junction of Elizabeth Macarthur Creek and Caddies Creek, approximately 70 metres south west of the intersection of Fitzroy Place and Clovelly Circuit.

The total excavated area of the three Phase 2 open areas was 77m^2 and a total of 1922 artefacts were recovered. The highest artefact densities were located at Open Area 1 (37m^2), where three Phase 2 squares contained in excess of 100 artefacts each and a total of 1243 artefacts were recovered. Open Area 2 contained 503 artefacts within an excavated area of 22 m^2 and Open Area 3 contained 176 within an excavated area of 18 m^2. The majority of lithics recovered from RH/CD9 South during Phase 1 and 2 were of silcrete (92%) followed by silicified tuff (4.5%) with lower numbers of chert, petrified wood, quartz, quartzite and igneous materials also found. Artefact types were predominantly flake fragment (51%). The majority of artefacts, were less than 20 millimetres in length (maximum dimension), with artefact numbers decreasing as artefact size increased. The largest flakes were made of silcrete (n=5) and quartzite (n=1) and were between 45 millimetres and 70 millimetres in length.

Cores represented 4% of the assemblage, with the vast majority made of silcrete. Only three (3) core fragments were present. Three (3) petrified wood cores and one quartz bipolar core were also recorded. A broad range reduction patterns were exhibited on the cores. The most common pattern on the silcrete cores was unifacial (n=33) or unifacial rotated (n=18). Alternating flaking was also observed on a number of silcrete cores (n=16), followed by multidirectional flaking (n=9). Modified artefacts represented 6% of the assemblage. A total of 41 backed artefacts and 13 geometric microliths were recovered. One backed artefact was made of silicified tuff, while the remainder were made of silcrete. Other modified artefacts consisted of flakes, flake fragments or angular fragments with retouch or usewear (n=46). Five of the retouched artefacts were made of silicified tuff and one was made of chert. Two fragments of a basalt axe were found in the same square during the Phase 1 excavation. Additional axe fragments were not recovered during the Phase 2 salvage.

Cortical artefacts made up 23% of the assemblage overall. A relatively high proportion of cortical artefacts were recorded for all raw material types. In the case of rarer raw material types, these figures are likely the result of the small sample sizes. However, for the silcrete assemblage, the high proportion of cortex might indicate primary reduction of cobbles on-site.

The spatial distribution of Phase 1 and Phase 2 results illustrates a widespread use of the area. The best evidence was found on slightly raised terraces in proximity to the creek, which provided both good access to resources and enabled artefacts to survive numerous flood events through time. Archaeological evidence was limited where substantial scouring or rilling had occurred due to erosion. Geomorphological assessment found that high energy flooding was generally limited to the primary channel at the creek junction, as once the water level increased during a flood low energy inundation replaced the erosive fluvial action. The artefact assemblage from the salvage excavation indicated that the site was used for the primary and secondary production of artefacts.

5 Landscape Context RH/CD9

RH/CD9 is located in the Cumberland Plain, a large and gently undulating physiographic region of the Sydney Basin. The Sydney Basin is a large geological feature that stretches from Batemans Bay in the south, Newcastle in the north and Lithgow in the west. The formation of the basin began between 250 to 300 million years ago when river deltas gradually replaced the ocean that had extended as far west as Lithgow. RH/CD9 is situated on a gentle west facing lower slope, floodplain and small terrace landforms on the eastern side of Caddies Creek and Elizabeth Macarthur Creek. The area is generally flat, with an elevation between 40 - 50 metres AHD.

Underlying geology of RH/CD9 is Quaternary Alluvium. Quaternary Alluvium comprises fine-grained sand, silt and clay that were deposited in association with fluvial activity along the higher order areas of Caddies Creek and Elizabeth Macarthur Creek. Geologically, raw materials suitable for artefact manufacture occur widely across the Cumberland Plain, in the form of rock outcrops, large cobbles and various river gravels, with cobbles and clasts deposited across the landscape by the complex network of stream channels.

RH/CD9 is situated on alluvial South Creek soils. The South Creek soil landscape is characterised by flat landforms with incised channels that are subject to frequent episodes of inundation, erosion and aggradation. The landscape comprises deep structured loams and clays overlying bedrock or relict soils. The South Creek soil landscape is susceptible to erosion and frequent flooding (Bannerman and Hazelton 1990:68-69). The soils within RH/CD9 are susceptible to aggrading-deflationary cycles, which allow archaeological material to survive but also characteristically compress the cultural material into a single above-clay layer.

RH/CD9 has been extensively cleared of native vegetation and currently contains a mixture of isolated trees with large areas of exotic grasses whilst remnant River-Flat Eucalypt Forest has been retained adjacent to the creeks. Historical aerial photographs show that prior to residential development RH/CD9 was cleared of native vegetation and was used for cattle grazing. RH/CD9 is currently used as open parkland with residential development on the eastern boundary and Windsor Road to the north.

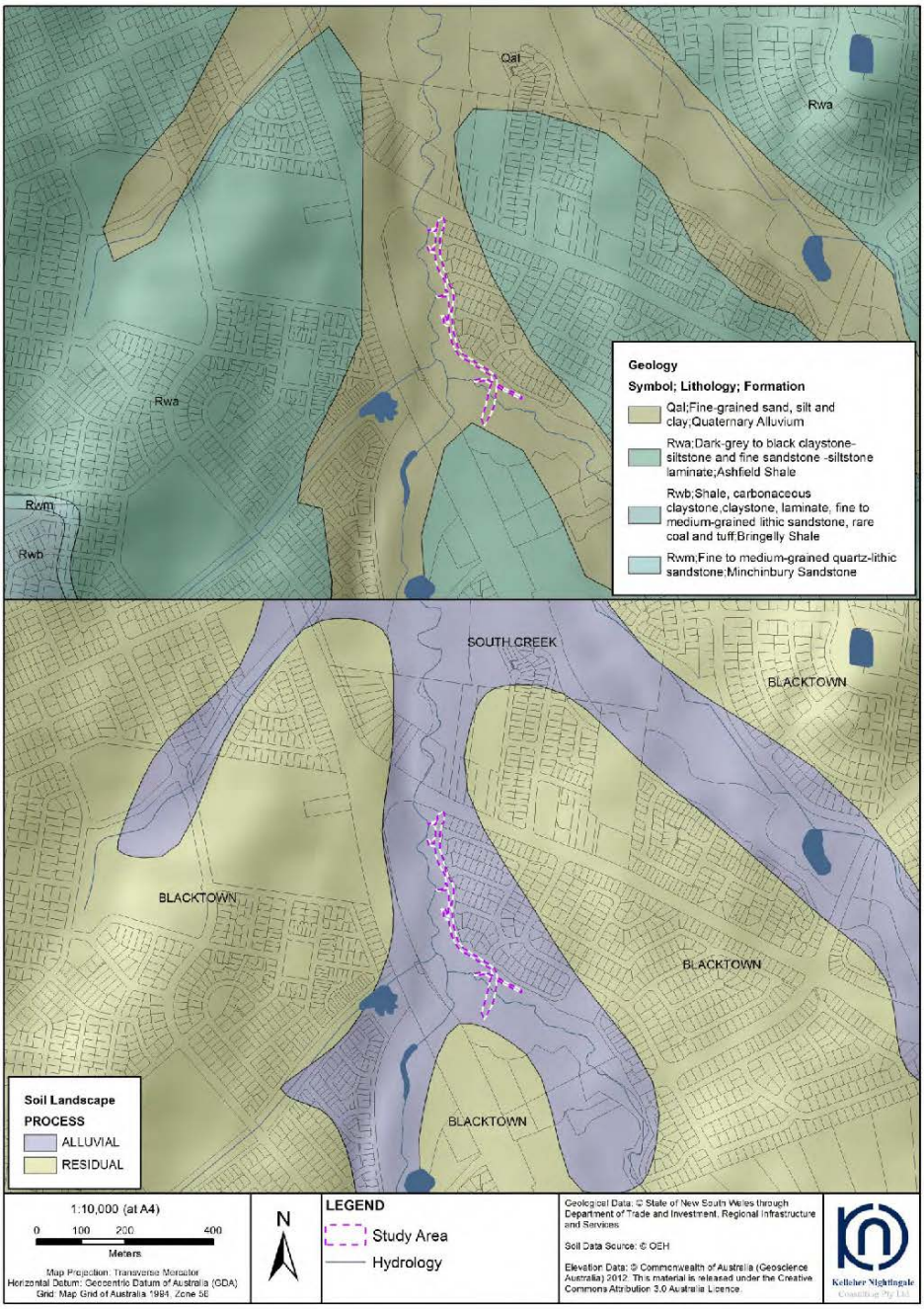

Figure 3. Geology and soil landscapes

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6 Archaeological Test Excavation Results

To determine the impact of the shared path on RH/CD9 a Phase 1 excavation was carried out in August 2016, in accordance with the DP&E methodology (KNC 2013).

A total of 30 Phase 1 excavation squares each measuring 1 x 1 metre were excavated along the alignment of the shared path (Figure 4) as it follows Elizabeth Macarthur Creek and Caddies Creek. Twenty four squares were excavated within the area of the proposed pathway and associated batters, while a further six squares were excavated within the areas of the proposed associated drainage works. Test excavation squares were placed to avoid areas of visible disturbance, including a buried sewer line between Elizabeth Macarthur Creek and Clovelly Circuit. Each Phase 1 excavation unit was designated a Test Square (TS) number (e.g. TS1, TS2, TS3).

6.1 Soils and stratigraphy

The excavation program found variable levels of disturbance across the area. Natural soil profiles were still intact along much of the proposed path route except where disturbance from adjacent housing and road construction had removed truncated or covered the natural soils. Disturbance was largely along the eastern margins of the reserve, close to a high retaining wall and on mounded ground projecting from the three cul-de-sacs. Fills comprised fragments of brick, concrete, and redeposited clay.

Plates 1 and 2 illustrate typical soil profiles from test squares displaying this mixture of redeposited soils and fill.

Plate 1. TS6, east facing section

0-5cm: Mid grey brown silty loam, humic, friable. Frequent fine root systems. Diffuse boundary to:

5cm-base: Disturbed deposit. Mid grey brown silty loam mixed with light grey and orange clay. Compact. Inclusions of brick, plastic, concrete rubble and blue metal.

Plate 2. TS29, east-facing section with cut fill left to show contrast

0-5cm: Light grey brown silty loam, humic, friable. Frequent fine root systems. Diffuse boundary to:

5-25cm/base: Disturbed deposit. Light grey brown silty loam mixed with yellow-orange clay. Compact. Inclusions of blue-metal and sandstone rubble throughout. Clear boundary sloping to north.

25/50-55cm: Dark yellow brown silty loam. Infrequent fine root systems. Oxidised ironstone gravels <1cm 20%. Diffuse boundary to:

55cm-Base: Orange brown clay.

Figure 4. RH/CD9 test square locations and artefact density

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The excavation program found complete natural soil profiles in 12 of the 30 test excavation squares (TS1, TS2, TS4, TS9, TS10, TS12, TS13, TS14, TS15, TS16, TS26 and TS27). The excavation squares on raised locations with complete natural soil profiles were characterised by an A1 unit of grey brown silty or fine sandy loam, grading to a yellowish brown A2 unit that overlay yellowish sandy clays and light clay subsoils. The test excavation squares on lower elevations in close proximity to Caddies Creek and Elizabeth Macarthur Creek contained a homogenous deposit characteristic of fluvial activity (Plate 5).

Plates 3, 4 and 5 illustrate typical soil profiles from the intact portions of the site.

Plate 3. TS14, west-facing section

0-5cm: Mid grey-brown sandy loam, humic, friable. Frequent fine root systems. Diffuse boundary to:

5-22cm: Mid grey brown sandy loam. Infrequent fine root systems. Oxidised ironstone gravels <1cm 5%. Clear boundary to:

22-45cm: Mid yellow brown sandy clay loam. Infrequent fine root systems. Oxidised ironstone gravels <1cm 15%. Diffuse boundary to:

45cm-base: Orange brown light clay. Oxidised ironstone gravels <1cm 15%

Plate 4. TS16, north-facing section

0-7cm: Dark grey-brown sandy loam, humic, friable. Frequent fine root systems. Diffuse boundary to:

7-22cm: Mid grey brown sandy loam. Infrequent fine root systems. Oxidised ironstone gravels <1cm 15%. Clear boundary to:

22-40cm: Light yellow brown sandy clay loam. Infrequent fine root systems. Oxidised ironstone gravels <1cm 15%. Diffuse boundary to:

40cm-base: Orange brown light clay. Oxidised ironstone gravels <1cm 15%

Plate 5. TS15, north-facing section

0-5cm: Mid grey-brown sandy loam, humic, friable. Frequent fine root systems. Diffuse boundary to:

5-58cm: Light yellow brown sandy loam. Infrequent fine root systems. Charcoal flecking <1cm 5%. Diffuse boundary to:

58cm-base: Dark yellow brown sandy clay. Oxidised ironstone gravels and charcoal flecking <1cm 5%.

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6.2 Artefact Distribution

A total of 439 artefacts were retrieved from 12 test squares excavated during the Phase 1 program. The majority of artefacts were from squares with intact soil profiles, except for the 13 artefacts recovered from TS23 which had been partially disturbed. Artefact densities for the test squares are shown in Table 3 and Figure 4.

Table 3. Test excavation artefact densities at site RH/CD9

Test Square	Total Artefacts	Test Square	Total Artefacts	Test Square	Total Artefacts
1	*29*	11	*0*	21	*0*
2	*4*	12	*38*	22	*0*
3	*0*	13	*4*	23	*13*
4	*18*	14	*279*	24	*0*
5	*0*	15	*0*	25	*0*
6	*0*	16	*0*	26	*15*
7	*0*	17	*0*	27	*24*
8	*0*	18	*0*	28	*1*
9	*2*	19	*0*	29	*0*
10	*15*	20	*0*	30	*0*

Artefact distribution across the test excavation area was characterised by several localised moderate density concentrations (particularly TS1 n=29 and TS12 n=38) and one high density concentration in TS14 (n=279). The mean artefact density across the test excavation area was 15 artefacts/m^2. The trimmed mean density (excluding outliers) was c.5.7 artefacts/m^2, which is consistent with the density recorded during the Sydney Metro Northwest salvage archaeology program (KNC 2015).

6.2.1. Lithics

The dominant raw material found in the test excavation assemblage was silcrete (n=414 or 94%). A low proportion of other raw materials were present, including quartz (n=13 or 3%) and silicified tuff (n=12 or 3%). Again the proportions are similar to the salvage program (KNC 2015), which found around 92% silcrete making raw materials consistent for both excavations.

Table 4. Artefact raw material and size at site RH/CD9

Raw Material	0-4mm	5-9mm	10-14mm	15-19mm	20-24mm	25-29mm	30-34mm	35-39mm	40-44mm	>44mm	Total Artefacts
Silcrete	0	136	133	57	41	28	8	6	2	3	*414*
Tuff	0	6	5	1	1	0	0	0	0	0	*13*
Quartz	0	4	3	3	2	0	0	0	0	0	*12*

Artefacts from the test excavation area were predominantly small in size with the most common size range being between 5-14mm, with 287 artefacts or 65.38% of the silcrete assemblage, 11 artefacts or 84.62% of the tuff assemblage and 7 artefacts or 58.33% of the quartz assemblage falling within this size range. Comparison of artefact size with the salvage program (KNC 2015) indicated the test program had smaller artefacts, however this result was skewed by the single TS14 knapping event. If the TS14 event is discarded, artefact sizes are consistent for both excavations.

The majority of the test excavation artefacts (68.79% n=302) were classified as flakes (34.17% n=150) or flake fragments (34.62% n=152), which was slightly lower than the proportion of these artefact types within the salvage excavation result (74%) (KNC 2015). Elsewhere, undiagnostic angular fragments accounted for 27.11% (n=119) of the assemblage (21% within the salvage excavation).

All test excavation cores were of silcrete and were predominantly multidirectional; however one unifacial core and one unifacial rotated core were also recovered. This result was different than the salvage excavation (KNC 2015) which displayed a broader variety of core reduction patterns. However, allowing for the differences in spatial area and the number of reduction events recorded during the salvage the single event (TS14) is consistent with the overall result. The result is skewed by TS14, which contained all 18 cores.

Table 5. Reduction types at site RH/CD9

	Core	Core Fragment	Flake	Proximal Fragment	Medial Fragment	Distal Fragment	Angular Fragment	Split Flake	*Total*
RH/CD9	18	0	150	40	70	38	119	4	*439*

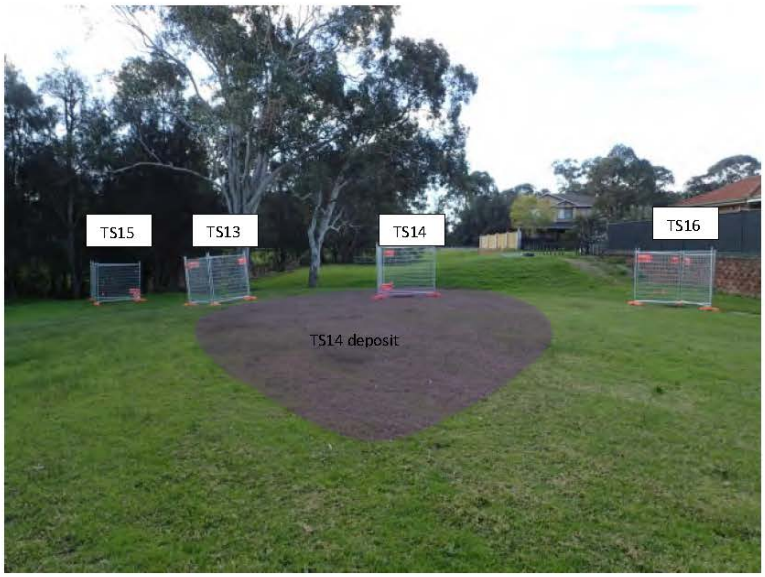


Plate 6. Location of TS14 deposit

The highest density square, TS14, was near the northern end of the study area on a terrace landform. Except for two quartz items, all artefacts were made of silcrete. The artefact assemblage from TS14 included 18 cores and knapping debitage of yellow red silcrete. The majority (62%) of the silcrete artefacts from TS14 had no remnant cortex (n=257) while 11 had <30% cortex and 6 had between 31-69% cortex. The TS14 deposit is different than the deposits previously recovered during the salvage program (KNC 2015). Artefact densities are approximately 7x higher within the TS14 deposit and the lithic assemblage was representative of a complete reduction event (characterised by the smaller than average artefact size). The TS14 deposit retains high level of archaeological integrity and information, beyond the results obtained during the salvage excavation program.

Plate 7. TS14, top of spit 2, 12-16cm depth showing silcrete layer

Two further intact moderate density deposits were identified at TS1 (n=29) and TS12 (n=38). These numbers are comparable to the highest Phase 1 square densities from the previous salvage program which were subsequently selected for Phase 2 salvage (34 and 36, KNC 2015). The deposit in TS1 and TS12 is thus at least equal in import to the most significant Phase 1 results from the salvage program.

6.3 Summary

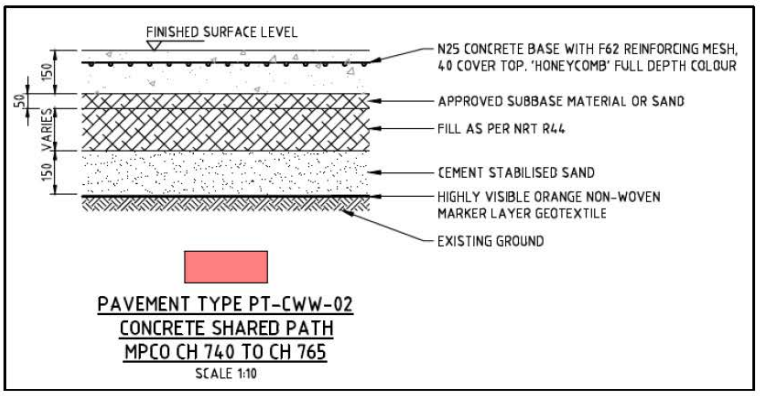
The Phase 1 test excavation program revealed a combination of intact subsurface archaeological deposit, and disturbed soils with rubble fill, possibly from construction of road, underground services and adjacent residential housing. Overall, the level of disturbance was more acute than the disturbance identified during the salvage of RH/CD9. Apart from the TS14 deposit, artefact distribution, density and characteristics were similar for the Phase 1 test area and the RH/CD9 salvage results, including the identification of intact moderate density deposits at TS1 and TS12 which exhibited archaeological characteristics similar to the most significant squares excavated during Phase 1 of the salvage program. The TS14 deposit, however, exhibited a density and information content greater than the retrieved assemblage recovered during the salvage excavation. High density knapping events like TS14, while not unique, are rare and important archaeological deposits because they offer detailed insights into specific – rather than generalised – past events.

7 Impact Avoidance

One area of particularly high density archaeological deposit, TS14, within Aboriginal site RH/CD9 was identified along the alignment of the shared path from Kellyville Station to Rouse Hill Station outside of the project boundary. The TS14 deposit was a knapping floor located on a terrace-like micro-topographic feature. Two further locations of intact moderate density subsurface archaeological deposit were also recorded at TS1 and TS12.

NRTIJV revised construction techniques to minimise impact to the TS14 archaeological deposit located at chainage 740-760, by eliminating the need for excavation and placement of an inert barrier to separate fill layers from the archaeological deposit (Figures 5 and 6). The shared path design was modified to float over the ground surface where it intersected the TS14 deposit utilising the following technique.

- No excavation of the ground surface from chainage 740-765
- Placement of a geogrid geotextile on the ground surface
- Placement of 150mm cement stabilised sand on geotextile
- Fill placed on top of sand layer
- Placement of 50mm subbase material (or sand)
- 150mm of concrete



The total area of the TS14 archaeological deposit covered during the construction of the shared path is approximately 25m^2 (c.5% of the total area).

NRTIJV also revised the location and construction method of drainage works to avoid the TS14 archaeological deposit (drain BO5/2 – BO5/3 Figure 6).

Despite these efforts, the proposed works constitute an impact to the high density RH/CD9 deposit at TS14 and to other moderate density deposits identified during the test excavation program (e.g. TS1 and TS12).

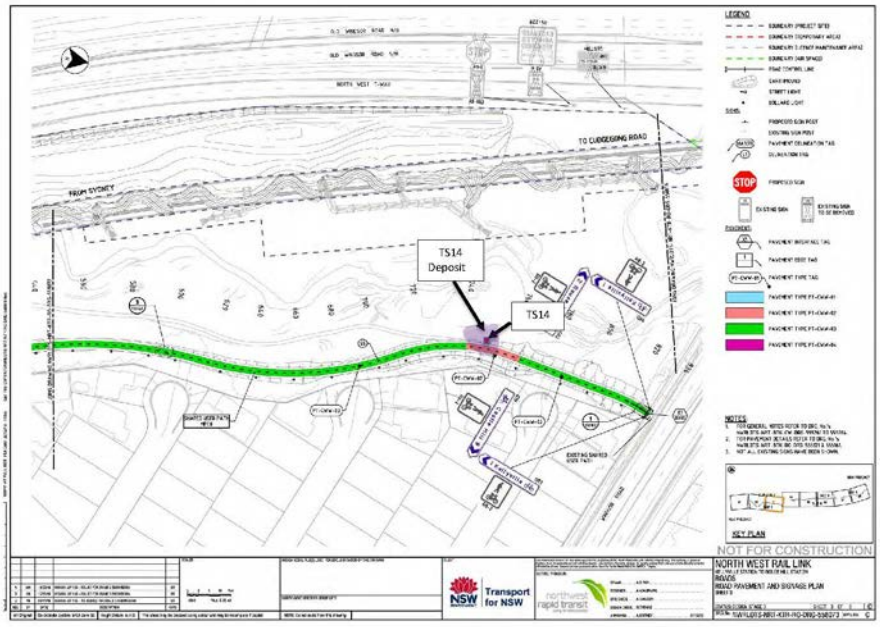


Figure 5. Pavement plan for TS14 archaeological deposit chainage 740-765 type PT-CWW-02 pavement

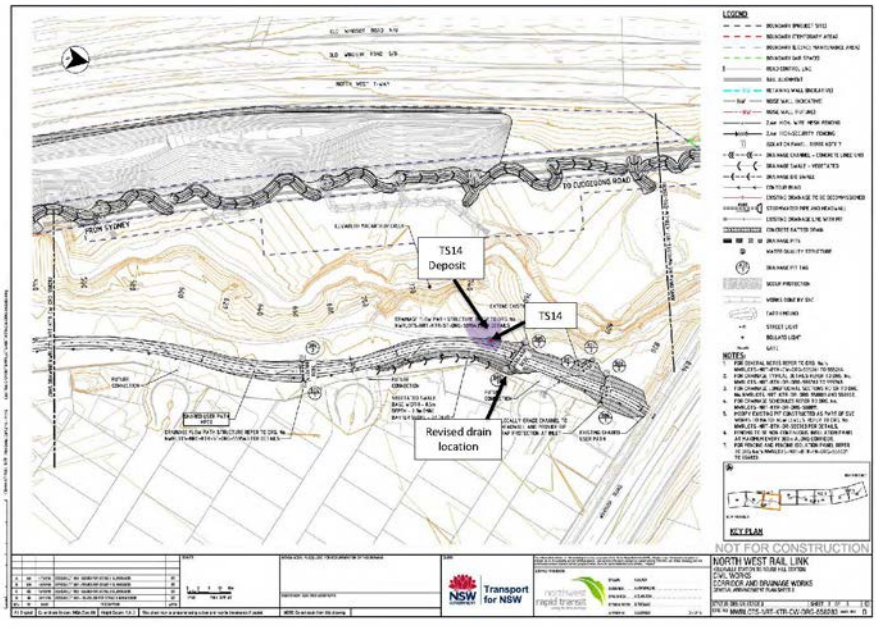


Figure 6. Civil works corridor showing alignment and drainage works

8 Impact Assessment

The majority of the shared path alignment from Kellyville Station to Rouse Hill Station has no impact on Aboriginal heritage as it traverses an existing urban environment: roadways, disturbed road verge or highly modified lands (Table 6) (Appendix A). No Aboriginal archaeological sites are impacted by the shared path in these urban areas.

In one section from Samantha Riley Drive to Windsor Road (chainage 300-820) along Caddies Creek an Aboriginal archaeological site, RH/CD9 (AHIMS #45-5-0933) exists along the alignment of the shared path. The shared path impacts this archaeological site.

Archaeological excavation of the shared path within RH/CD9 found that the impact would not be consistent with the findings contained in the *Sydney Metro Northwest Archaeological Salvage Program* (KNC 2015). One location within RH/CD9 identified as TS14 yielded artefact densities 7x higher than previously identified in the Sydney Metro Northwest archaeological program. Two other locations (TS1 and TS12) showed intact and moderate density subsurface archaeological deposit. Impact on these locations would not be consistent with the previous program.

NRTIJV revised the construction techniques to avoid directly impacting the high density TS14 archaeological deposit. Rather than excavate a foundation for the shared path, the path will now be floated over the TS14 deposit by placing a protective blanket layer of sand and geotextile between the path and ground surface. No ground penetration is required for the TS14 deposit. However, this would still constitute an archaeological impact to the deposit.

Table 6. Shared Path Impact Assessment Outside of Project Boundary – Post Excavation Result

Section	Chainage	Context	Impact Aboriginal heritage	Consistent
Samantha Riley Drive to Windsor Road	300-400	Within archaeological site RH/CD9	Yes	Yes
	400-420	Within archaeological site RH/CD9 and TS1	Yes	No
	420-715	Within archaeological site RH/CD9	Yes	Yes
	715-730	Within archaeological site RH/CD9 and TS12	Yes	No
	730-740	Within archaeological site RH/CD9	Yes	Yes
	740-765	Within archaeological site RH/CD9 and TS14	Yes	No
	765-820	Within archaeological site RH/CD9	Yes	Yes
Windsor Road to Sanctuary Drive	0-80	Existing disturbed roadway and easement	No	Yes
	280-440	Existing disturbed road easement	No	Yes
	520-860	Existing disturbed road easement	No	Yes
Sanctuary Drive to White Hart Drive	0-160	Existing disturbed roadway and easement	No	Yes
	400-440	Existing disturbed roadway and easement	No	Yes

8.1 Impacts from Shared Path

One section of the shared path impacts Aboriginal archaeological site RH/CD9. Archaeological excavation identified Aboriginal objects along the alignment of the shared path between chainage 300-820. The majority of the findings were generally consistent with the findings contained in the *Sydney Metro Northwest Archaeological Salvage Program* (KNC 2015). Both excavation programs yielded around 5.7 artefact m^2. One high density deposit identified as TS14 yielded artefact densities 7x higher than previously identified in the Sydney Metro Northwest archaeological program. Impact on this location would not be consistent with the previous program.

Despite efforts to minimise impact, the proposed construction of the shared path over the TS14 deposit constitutes an archaeological impact because it restricts access to the deposit and over time the introduced soil layer will mix with the terrace soil. The moderate densities identified at TS1 and TS12 would also be directly impacted by the shared path. The increased overall physical impact to site RH/CD9 would increase the impact on archaeological significance and is therefore not consistent with the previous program. Outside of the section from Samantha Riley Drive to Windsor Road along chainage 300-820, the shared path does not impact Aboriginal archaeological sites/objects.

9 Management

Archaeological assessment of potential impact to Aboriginal heritage of the shared path from Kellyville Station to Rouse Hill Station identified impact to one archaeological site: RH/CD9. Outside of archaeological site RH/CD9, the shared path does not impact Aboriginal heritage.

Archaeological excavation determined that the majority of the archaeology of the shared path traversing RH/CD9 was consistent with archaeology of the Sydney Metro Northwest. However, three locations of significant, intact archaeological deposit were identified. One of these, location TS14 (chainage 740-765), was found to contain artefact densities 7x greater than previously recorded. The two other deposits comprise moderate densities comparable to the more significant squares excavated as part of the Phase 1 salvage program.

9.1 Consistency Assessment

Apart from chainages 400-420, 715-730 and 740-765 (Samantha Riley Drive -Windsor Road section), all sections of the shared path exhibit no impact or a consistent impact on Aboriginal heritage when compared with the findings contained in the *Sydney Metro Northwest Archaeological Salvage Program* (KNC 2015).

Direct impact on the three archaeological deposits identified within site RH/CD9 at TS1, TS12 and TS14 would not be consistent with the findings contained in the *Sydney Metro Northwest Archaeological Salvage Program* (KNC 2015).

NRTIJV modified construction techniques to minimise impact to the TS14 archaeological deposit within site RH/CD9. However the proposed works still constitute an impact to the TS14 deposit and to other moderate density deposits identified during the test excavation program at TS1 and TS12.The increased physical impact to the site would increase the impact on archaeological significance and is therefore not consistent with the level of impact contained in the *Sydney Metro Northwest Archaeological Salvage Program* (KNC 2015).

- *Impact is Not Consistent*
  Further archaeological salvage will be required of RH/CD9 in accordance with the approved archaeological salvage excavation methodology as the impact would not be consistent with the findings contained in *Sydney Metro Northwest Archaeological Salvage Program* (KNC 2015). The impacted portion of the terrace would require Phase 2 archaeological salvage conducted in accordance with the approved methodology (KNC 2013). The scope of the salvage would relate to the scope of the construction excavation.

General Recommendations

- The TS14 deposit located outside of the shared path construction footprint should be protected by temporary fencing. The fenced areas should be clearly identified as environmentally sensitive and a "no-go zone". The adequacy of the fencing should be assessed by an Environmental Manager prior to any construction activity in the vicinity.
- The TS14 deposit located outside of the shared path construction footprint should be identified in the construction environmental management plan (or similar document) and workers inducted as to appropriate protection measures (depending on the selected impact option).

References

Bannerman, S.M. and Hazelton, P.A. 1989. *Soil Landscapes of Penrith 1:100 000 Sheet*. Soil Conservation Service of NSW, Sydney.

Clark N.R. and Jones D.C. 1991. *Penrith 1:100 000 Geological Sheet 9030, 1st edition*. Geological Survey of New South Wales, Sydney

Kelleher Nightingale Consulting Pty Ltd (KNC), 2013. *North West Rail Link Early Works Project, Indigenous heritage and archaeological consultancy – West Zone. Aboriginal cultural heritage assessment report and methodology for Phase 1 and Phase 2 salvage*. Prepared for Baulderstone Pty Ltd on behalf of Transport for NSW.

KNC, 2015. *Sydney Metro Northwest: Archaeological Salvage Excavation Program - Indigenous Heritage Services*. Report for Transport for NSW

Kelleher Nightingale Consulting Pty Ltd

Appendix A Civil Works Plans

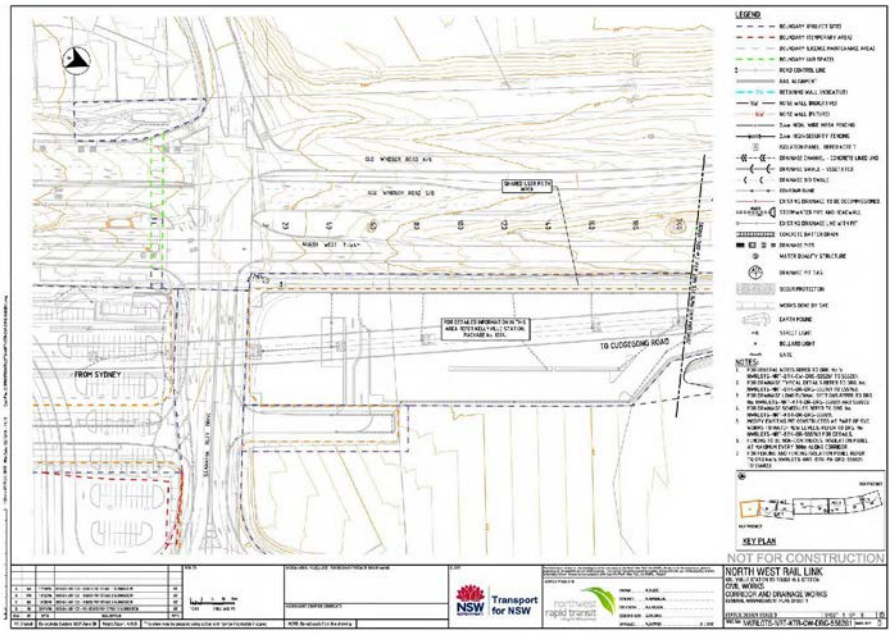


Figure 7. Civil works corridor – Samantha Riley Drive to Windsor Road

Kelleher Nightingale Consulting Pty Ltd

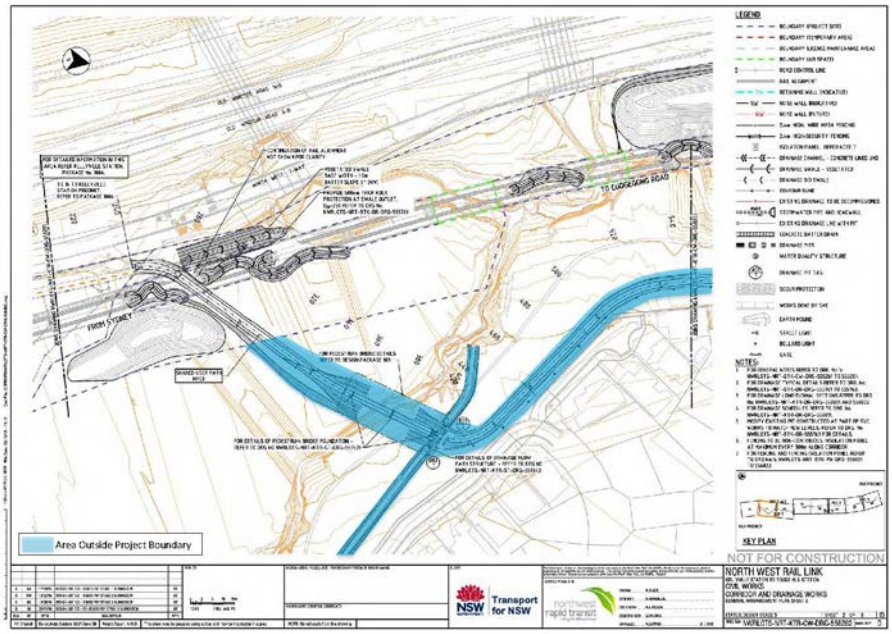


Figure 8. Civil works corridor – Samantha Riley Drive to Windsor Road

Kelleher Nightingale Consulting Pty Ltd

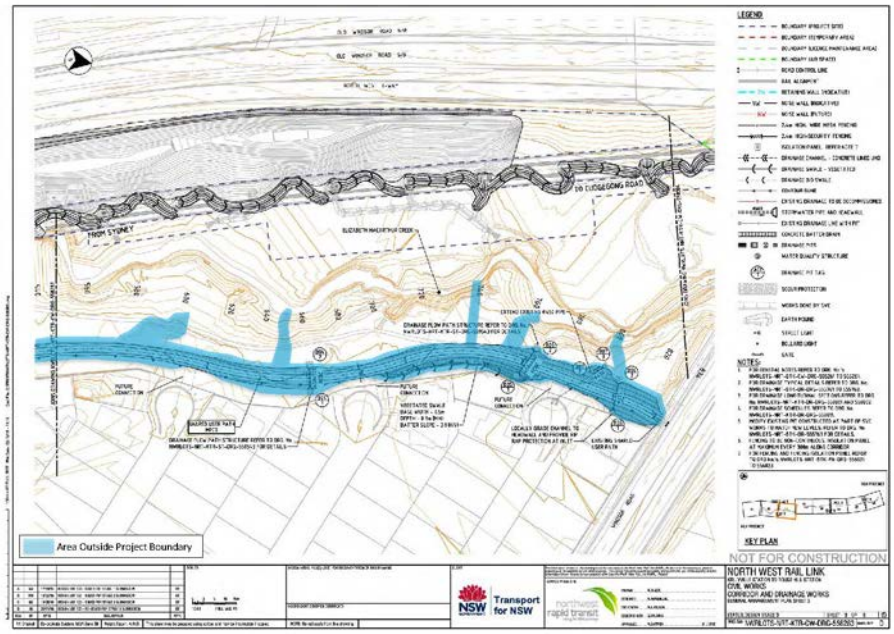


Figure 9. Civil works corridor – Samantha Riley Drive to Windsor Road

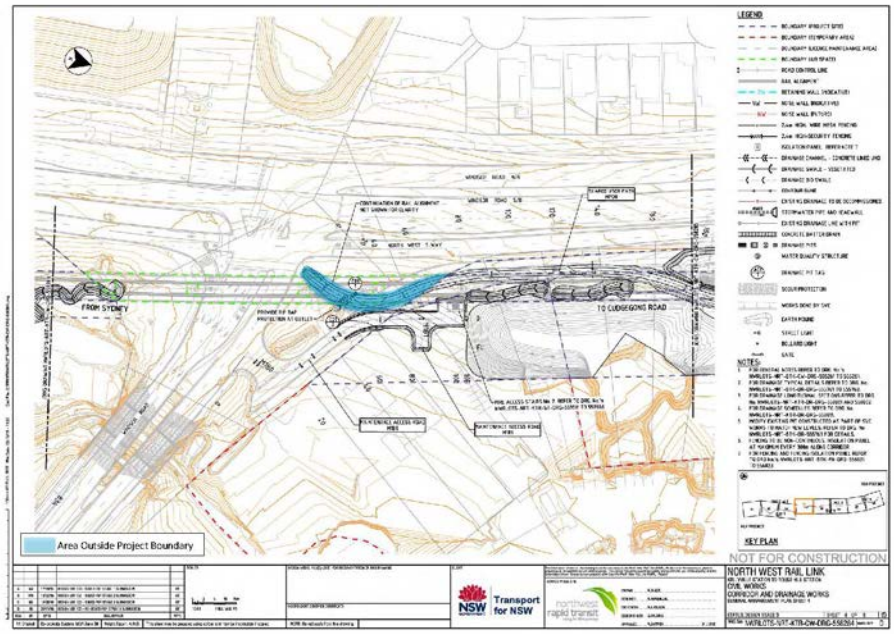


Figure 10. Civil works corridor – Windsor Road to Sanctuary Drive

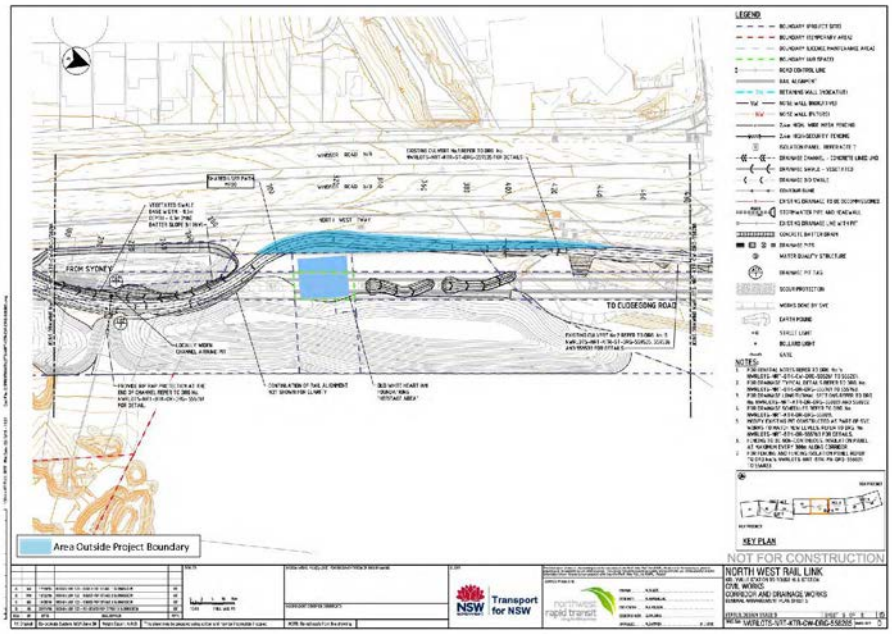


Figure 11. Civil works corridor – Windsor Road to Sanctuary Drive

Kelleher Nightingale Consulting Pty Ltd

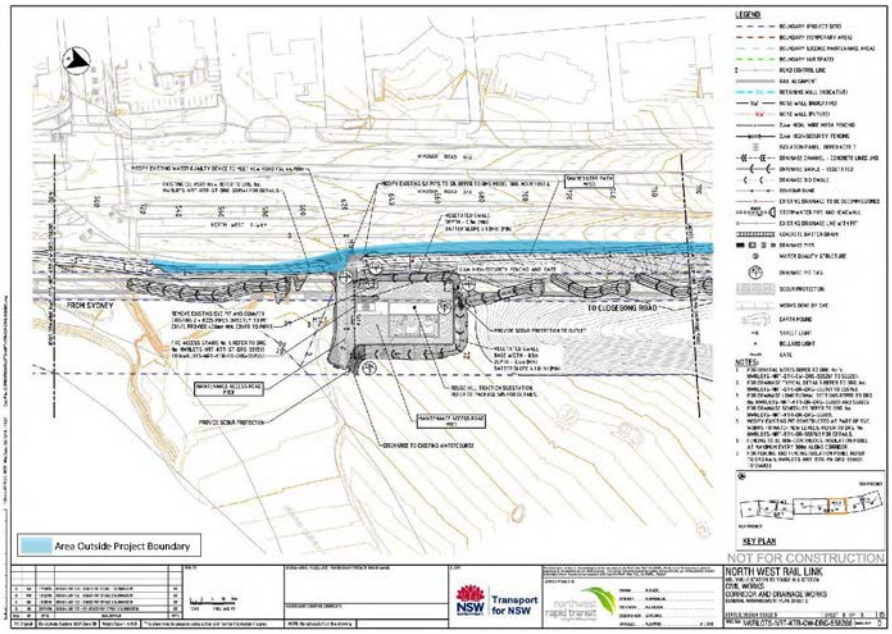


Figure 12. Civil works corridor – Windsor Road to Sanctuary Drive

Kelleher Nightingale Consulting Pty Ltd

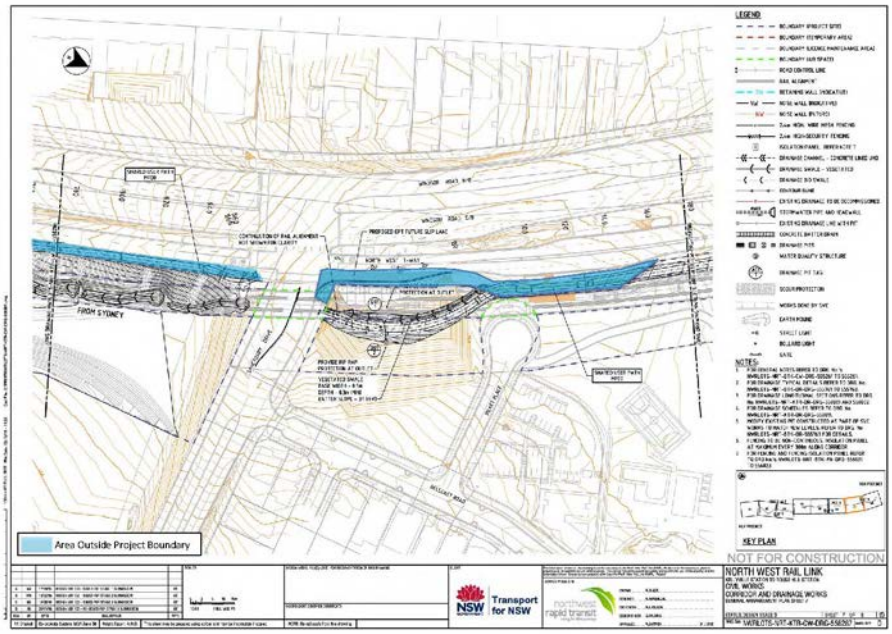


Figure 13. Civil works corridor – Sanctuary Drive to White Hart Drive

Kelleher Nightingale Consulting Pty Ltd

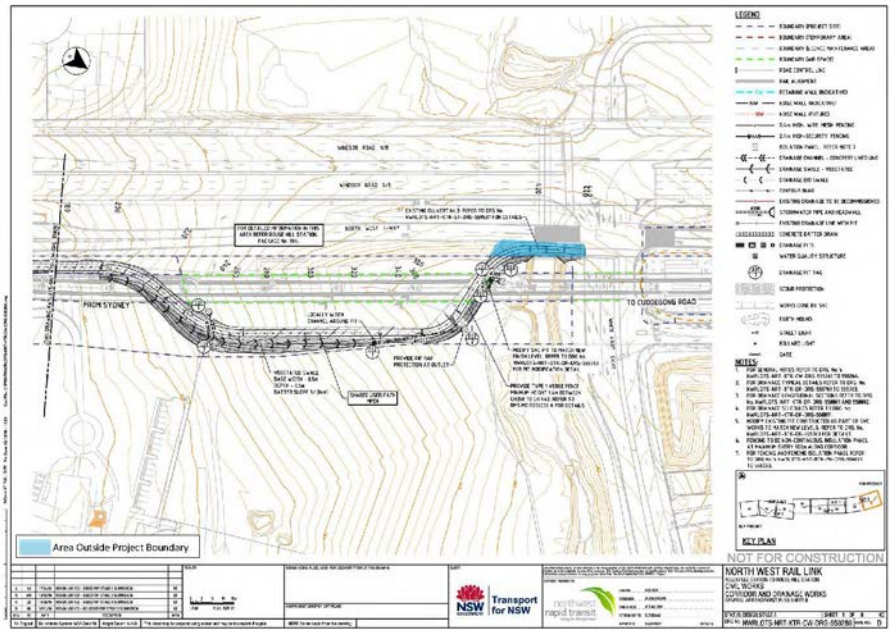


Figure 14. Civil works corridor – Sanctuary Drive to White Hart Drive

Kelleher Nightingale Consulting Pty Ltd

Appendix B Aboriginal Community Comments

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ABN 27 602 765 453

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Mobile: 0420 591 138 / 0413 687 279

10th January 2017

Matthew Kelleher
Kelleher Nightingale Consulting Pty Ltd
Level 10, 25 Bligh Street
SYDNEY NSW 2000

Dear Matthew,

RE: SYDNEY METRO NORTHWEST SHARED PATH - KELLYVILLE STATION TO ROUSE HILL STATION

Consistency Assessment and Archaeological Excavation

RH/CD9 (AHIMS 45-5-0933)
Aboriginal Archeological Assessment

Darug Land Observations Pty Ltd (DLO) has reviewed the consistency assessment and archaeological excavation report, and supports the methodology for the proposed construction of a concrete path between Kellyville Station and Rouse Hill Station, as part of its works for the Sydney Metro Northwest.

In relation to the long-term storage of recovered artefacts, if any, Darug Land Observations Pty Ltd strongly believes that recovered artefacts should be re-buried on Country (the study area).

Furthermore, Darug Land Observations Pty Ltd would be involved in the monitoring of the topsoil removal and all other form of works to be carried out on the site.

Yours sincerely,

Jamie Workman
Darug Land Observations Pty Ltd

Uncle Gordon Workman
Darug Elder

Kelleher Nightingale Consulting Pty Ltd

Annexure F Glossary

Term	Definition
AEC	Areas of Environmental Concern
AHIMS	Aboriginal Heritage Information Management System
AMS	Activity Method Statement
ANZECC	Australian and New Zealand Environment Conservation Council
ARI	Average Recurrence Interval
ARMCANZ	Agriculture and Resources Management Council of Australia and New Zealand
ASS	Acid Sulfate Soil
Blue Book	Managing Urban Stormwater: Soils and Construction (Landcom 2004)
BOM	Bureau of Meteorology
CAQMP	Construction Air Quality Management Plan
CBD	Central Business District
CCAMP	Construction Compounds and Ancillary Facilities Management Plan
CEEC	Critically Endangered Ecological Community
CEMF	Construction Environmental Management Framework
CEMP	Construction Environmental Management Plan
CFFMP	Construction Flora and Fauna Management Plan
CHMP	Construction Heritage Management Plan
CNVIS	Construction Noise and Vibration Impact Statement
CNVMP	Construction Noise and Vibration Management Plan
CoA	Condition of Approval
CoPC	Contaminants of Potential Concern
CPESC	Certified Professional in Erosion and Sediment Control
CSWMP	Construction Soil and Water Management Plan
DACHA	Darug Aboriginal Cultural Heritage Assessments
DACHi	Darug Aboriginal Land Care Inc.
DCAC	Darug Custodian Aboriginal Corporation
DECC	Department of Environment and Climate Change (now OEH and EPA)
DECCW	Department of Environment, Climate Change and Water (now OEH and EPA)

Term	Definition
DLALC	Darkinjung Local Aboriginal Land Council
DLO	Darug Land Observations
DLWC	Department of Land and Water Conservation (now NSW Office of Water)
DP&E	Department of Planning and Environment
DPI	Department of Primary Industries
DTAC	Darug Tribal Aboriginal Corporation
EM	Environment Manager
EC	Environmental Coordinator
ECRL	Epping to Chatswood Rail Link
EEC	Ecologically Endangered Community
EIA	Environmental Impact Assessment
EIL	Ecological Investigation Levels
EIS	Environmental Impact Statement
EIS 1	EIS for SSI-5100 – NWRL Early Works and Major Civil Construction Works (Incorporating Staged Infrastructure Modification Assessment)
EIS 2	EIS for SSI-5414 – NWRL works associated with the construction and operation of stations and wider precincts, service facilities, rail infrastructure and systems
EMS	Environmental Management System
EP&A Act	*Environmental Planning and Assessment Act 1979*
EP&A Regulation	Environmental Planning and Assessment Regulation 2000
EPA	Environment Protection Authority
EPBC Act	*Environmental Protection and Biodiversity Conservation Act 1999 (Cth)*
EPL	Environment Protection Licence
EPM	Environmental Planning and Approvals Manager
ER	Environmental Representative
ERP	Emergency Response Plan
ESCP	Erosion and Sediment Control Plan
GDE	Groundwater Dependant Ecosystems
IC	Independent Certifier
IFD	Intensity-Frequency-Duration

Term	Definition
IJV	Infrastructure Joint Venture (of NRT)
ITP	Inspection and Test Plan
JHET	John Holland Event Tracking
JHPL	John Holland Propriety Limited
LCPL	Leighton Contractors Propriety Limited
LOR	Limits of Reporting
MLALC	Metropolitan Local Aboriginal Land Council
NEPM	National Environment Protection Measure
NHMRC	National Health and Medical Research Council
NOW	NSW Office of Water
NPW Act	*National Parks and Wildlife Act 1974*
NPWS	National Parks and Wildlife Service
NRT	Northwest Rapid Transit
NTU	Nephelometric Turbidity Units
NWRL	North West Rail Link (now Sydney Metro Northwest)
OEH	Office of Environment and Heritage
OpCo	OTS Operating Company
OTS	Operations, Trains and Systems
PAD	Potential Archaeological Deposit
PASS	Potential Acid Sulfate Soil
PIMS	Project Integrated Management System
PIRMP	Pollution Incident Response Management Plan
PMF	Probable Maximum Flood
POEO Act	*Protection of the Environment Operations Act 1997*
PPP	Public Private Partnership
Project	Sydney Metro Northwest OTS Project
Project Approval	Minister for Planning and Infrastructure's Approval for SSI-5414, SSI-5931 and TfNSW's Approval for the ECRL Conversion Works
RAP	Registered Aboriginal Parties
REF	Review of Environmental Factors

Term	Definition
REMM	Revised Environmental Mitigation Measures
RFP	Request for Proposal
RFT	Request for Tender
RMS	Roads and Maritime Services
RTRF	Rapid Transit Rail Facility (now Sydney Metro Trains Facility)
RTRF EIS	EIS for SSI-5931 – Rapid Transit Rail Facility
SDS	Safety Data Sheet
SEP	Site Environment Plan
SEPP	State Environmental Planning Policy
SES	State Emergency Service
SEWPaC	Department of Sustainability, Environment, Water, Population and Communities (now Department of the Environment)
SM	OTS Sustainability Manager
SMP	Spoil Management Plan
SMTF	Sydney Metro Trains Facility (formerly the Rapid Transit Rail Facility)
Spoil	Material generated by excavation into the ground
SPR	Scope and Performance Requirements
SQERM	Safety, Quality and Environment Risk Management
SSI	State Significant Infrastructure
SVC	Surface and Viaduct Civil Works
SWTC	Scope of Works and Technical Criteria
TBM	Tunnel Boring Machine
TDS	Total Dissolved Solids
TfNSW	Transport for New South Wales
TRA	Task Risk Assessment
TSC	Tunnels and Station Civil Works
TSC Act	*Threatened Species Conservation Act 1995*
TSS	Total Suspended Solids
VAMP	Visual Amenity Management Plan

Term	Definition
VENM	Virgin Excavated Natural Material – natural material (such as clay, gravel, sand, soil and rock) that is not mixed with any other type of waste and/or has been excavated from areas of land that are not contaminated
WAD	Works Authorisation Deed
WBNM	Watershed Bound Network Model
WM Act	*Water Management Act 2000*
WMRP	Waste Management and Recycling Plan
WRA	Workplace Risk Assessment
WRAPP	Waste Reduction and Purchasing Policy
WTP	Water Treatment Plant