

Westmead to The Bays and Sydney CBD

Environmental Impact Statement
Concept and Stage 1

Technical Paper 4
Aboriginal cultural heritage
assessment report

Sydney Metro West, Stage 1

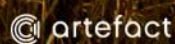
FINAL DRAFT

Technical Paper 4: Aboriginal Cultural
Heritage Assessment Report

Parramatta, Cumberland, Canada
Bay, Burwood, and Inner West Local
Government Areas

Report to Sydney Metro

April 2020



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EXECUTIVE SUMMARY

Sydney Metro West

Sydney Metro West is a critical step in the delivery of Future Transport Strategy 2056. It would provide fast, reliable and frequent rail service between Greater Parramatta and the Sydney CBD.

Sydney Metro (as 'the proponent') is seeking planning approvals as follows:

- Approval for the whole Sydney Metro West (at concept level) concurrent with Stage 1. Stage 1 involves the major civil construction works between Westmead and The Bays (and is the subject of this technical paper)
- Future stage(s) would include the remaining major civil construction works from The Bays to the Sydney CBD, rail systems fit-out, station fit-out and aboveground building construction, and operation of the metro line (future application(s)).

Sydney Metro is seeking a specific declaration for Sydney Metro West to be declared as State significant infrastructure and critical State significant infrastructure under sections 5.12(4) and 5.13 of the *Environmental Planning and Assessment Act 1979* (EP&A Act), respectively.

Stage 1

The Stage 1 would involve the major civil construction work for Sydney Metro West (Westmead to The Bays), including:

- Enabling works such as demolition, utility supply to construction sites, utility adjustments and modifications to the existing transport network
- Tunnel excavation including tunnel support activities
- Station excavation for new metro stations at Westmead, Parramatta, Sydney Olympic Park, North Strathfield, Burwood North, Five Dock and The Bays
- Shaft excavation for services facilities at Rosehill (within the Clyde stabling and maintenance facility construction site), Silverwater and between Five Dock Station and The Bays Station construction sites
- Civil work for the stabling and maintenance facility at Clyde including earthworks and structures for crossings of A'Becketts Creek and Duck Creek
- A concrete segment facility for use during construction located at the Clyde stabling and maintenance facility construction site
- Excavation of a tunnel dive structure and associated tunnels at Rosehill to support a connection between the Clyde stabling and maintenance facility and the mainline metro tunnels.

The location of the services facility between Five Dock Station and The Bays Station is currently being investigated, and is not assessed within this technical paper (refer to Chapter 9 (Stage 1 description) of the Environmental Impact Statement for further detail).

Purpose and scope of this report

This technical paper, Technical Paper 4: Aboriginal Cultural Heritage Assessment is one of a number of technical documents that form part of the Environmental Impact Statement. The purpose of this technical paper is to identify and assess the Aboriginal heritage impacts of Stage 1 and includes:

- Assessment of the Aboriginal cultural heritage values of Stage 1 and identification of any specific areas of cultural significance
- Assessment of archaeological potential for each construction site
- Details of Aboriginal stakeholder consultation
- A methodology for archaeological management including test excavation and salvage where required.

This technical paper has been undertaken in accordance with the following guidelines:

- Code of Practice for Archaeological Investigation of Aboriginal Objects in New South Wales 2010¹
- Guide to Investigating, Assessing and Reporting on Aboriginal Cultural Heritage in NSW²
- Aboriginal cultural heritage consultation requirements for proponents 2010³
- The Burra Charter 2013⁴.

Mitigation measures

The measures detailed in the mitigation measures table are proposed to address potential impacts on Aboriginal heritage sites and areas of archaeological potential during construction. They were developed following consideration of:

- The requirements of the National Parks and Wildlife Regulation 2009
- Results of background research, site survey and assessment.

The mitigation measures may be reviewed following consideration of comments from registered stakeholders on this draft report (refer to Section 5.0).

¹ Department of Environment Climate Change & Water [DECCW] 2010a

² Office of Environment & Heritage 2011

³ DECCW 2010b

⁴ Australia ICOMOS 2013.

Ref	Mitigation measure	Applicable site ¹
AH1	Aboriginal stakeholder consultation would be carried out in accordance with the NSW Office of Environment and Heritage's Aboriginal Cultural Heritage Consultation Requirements for Proponents 2010.	All
AH2	Archaeological test excavation (and salvage when required) would be carried out where intact natural profiles with the potential to contain significant archaeological deposits are encountered at the specified construction sites and the Parramatta power supply route. Excavations would be conducted in accordance with the methodology outlined in the Aboriginal cultural heritage assessment report.	PMS, CSMF, TBS and PSR
AH3	If Aboriginal archaeological remains are identified during Stage 1, archaeological results would be incorporated into Aboriginal heritage interpretation for the concept in consultation with registered Aboriginal parties	All
AH4	In the event that a potential burial site or potential human skeletal material is exposed during construction, the Sydney Metro Exhumation Management Plan would be implemented.	All

¹ WMS: Westmead metro station; PMS: Parramatta metro station; CSMF: Clyde stabling and maintenance facility; SSF: Silverwater services facility; SOPMS: Sydney Olympic Park metro station; NSMS: North Strathfield metro station; BNS: Burwood North Station; FDS: Five Dock Station; TBS: The Bays Station; Metro rail tunnels: Metro rail tunnels not related to other sites (eg tunnel boring machine works); PSR: Power supply routes.

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ABBREVIATIONS

AGD	Australian Geodetic Datum
AHIP	Aboriginal Heritage Impact Permit
AHIMS	Aboriginal Heritage Information Management System
Artefact Heritage	Artefact Heritage Services Pty Ltd
ACHAR	Aboriginal Cultural Heritage Assessment Report
Consultation Requirements	Aboriginal cultural heritage consultation requirements for proponents 2010
the Code of Practice	Code of Practice for Archaeological Investigation of Aboriginal Objects in New South Wales 2010
DCP	Development Control Plan
DECCW	Department of Environment, Climate Change and Water
EP&A Act	<i>Environmental Planning and Assessment Act 1979</i>
EPBC Act	<i>Environment Protection and Diversity Conservation Act 1999</i>
ESD	Ecological Sustainable Development
GDA	Geodetic datum
GPS	Global Positioning System
the Guide	Guide to Investigating, Assessing and Reporting on Aboriginal Cultural Heritage in NSW
ha	hectares
LALC	Local Aboriginal Land Council
LEP	Local Environmental Plan
LGA	Local Government Area
NPW Act	<i>National Parks and Wildlife Act 1974</i>
OEH	Office of Environment and Heritage
PAD	Potential archaeological deposit
the proponent	Sydney Metro
RAP	Registered Aboriginal Party

1.0 INTRODUCTION

1.1 Sydney Metro West

Sydney Metro West is a critical step in the delivery of Future Transport Strategy 2056. It would provide fast, reliable and frequent rail service between Greater Parramatta and the Sydney CBD.

Sydney Metro (as 'the proponent') is seeking planning approvals as follows:

- Approval for the whole Sydney Metro West (at concept level) concurrent with Stage 1. Stage 1 involves the major civil construction works between Westmead and The Bays (and is the subject of this technical paper)
- Future stage(s) would include the remaining major civil construction works from The Bays to the Sydney CBD, rail systems fit-out, station fit-out and aboveground building construction, and operation of the metro line (future application(s)).

Sydney Metro is seeking a specific declaration for Sydney Metro West to be declared as State significant infrastructure and critical State significant infrastructure under sections 5.12(4) and 5.13 of the *Environmental Planning and Assessment Act 1979* (EP&A Act), respectively.

1.1.1 Location

Sydney Metro West would mainly be located underground in twin tunnels. Stage 1, which is the subject of this assessment, extends from Westmead to The Bays (refer to Figure 1).

1.1.2 Overview of Stage 1

The Stage 1 would involve the major civil construction work for Sydney Metro West (Westmead to The Bays), including:

- Enabling works such as demolition, utility supply to construction sites, utility adjustments and modifications to the existing transport network
- Tunnel excavation including tunnel support activities
- Station excavation for new metro stations at Westmead, Parramatta, Sydney Olympic Park, North Strathfield, Burwood North, Five Dock and The Bays
- Shaft excavation for services facilities at Rosehill (within the Clyde stabling and maintenance facility construction site), Silverwater and between Five Dock Station and The Bays Station construction site
- Civil work for the stabling and maintenance facility at Clyde including earthworks and structures for crossings of A'Becketts Creek and Duck Creek
- A concrete segment facility for use during construction located at the Clyde stabling and maintenance facility construction site
- Excavation of a tunnel dive structure and associated tunnels at Rosehill to support a connection between the Clyde stabling and maintenance facility and the mainline metro tunnels.

Stage 1 is further described in Chapter 9 (Stage 1 description) of the Environmental Impact Statement.

The location of the services facility between Five Dock Station and The Bays Station is currently being investigated, and is not assessed within this technical paper. Further detail on the locational and design criteria that would be used as part of determining the preferred location is detailed in Chapter 9 (Stage 1 description) of the Environmental Impact Statement.

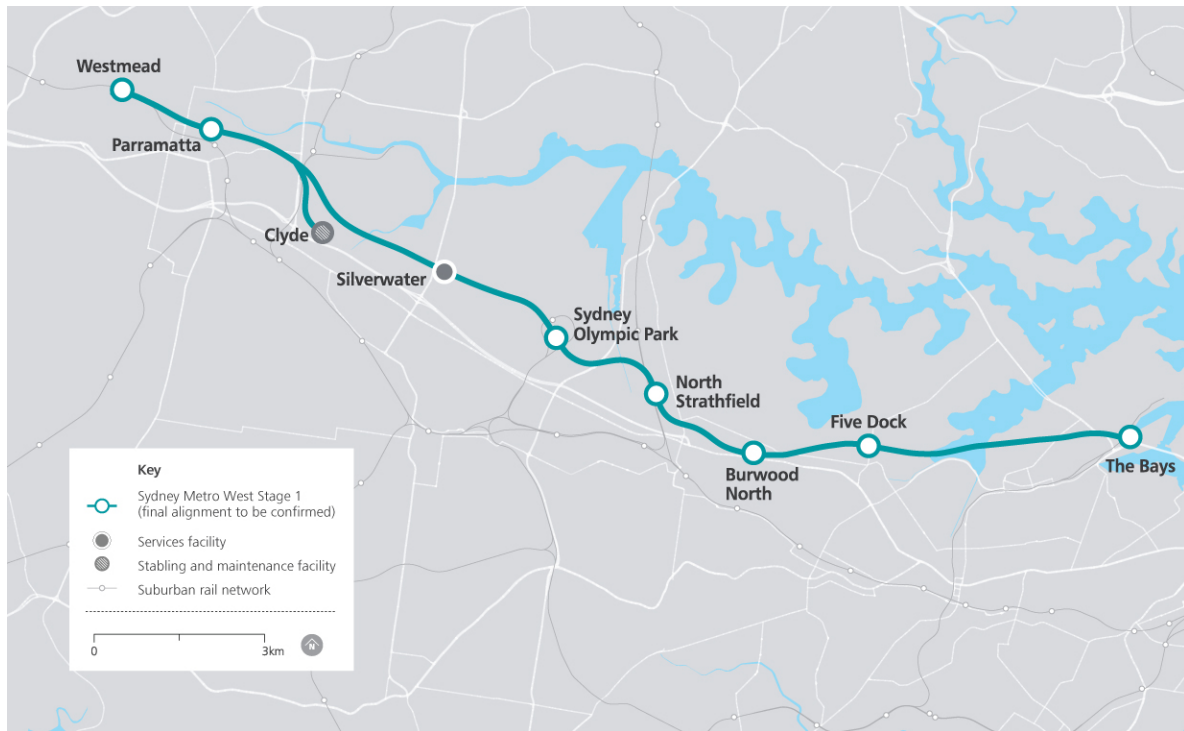


Figure 1: Sydney Metro West – Stage 1

1.1.3 Purpose and scope of this report

This technical paper, Technical Paper 4: Aboriginal Cultural Heritage Assessment is one of a number of technical documents that form part of the Environmental Impact Statement. The purpose of this technical paper is to identify and assess the Aboriginal heritage and archaeological impacts of Stage 1 during construction. It responds directly to the Secretary's Environmental Assessment Requirements outlined in Section 1.2.

This technical paper considers the construction impacts on Aboriginal cultural heritage and potential archaeological resources within the study area and includes:

- Assessment of the Aboriginal cultural heritage values of the study area and identification of any specific areas of cultural significance
- Assessment of archaeological potential for each construction site
- Aboriginal stakeholder consultation
- Preparation of a methodology for archaeological management including test excavation and salvage where required.

1.2 Secretary's Environmental Assessment Requirements

The Secretary's Environmental Assessment Requirements were issued for Stage 1 on 11 December 2019. The requirements specific to Aboriginal heritage, and where these requirements are addressed in this technical paper, are outlined in Table 1 below.

Table 1: Sydney Metro West Stage 1 Secretary's Environmental Assessment Requirements – Aboriginal heritage

Secretary's Environmental Assessment Requirements	Where addressed
1) Direct and/or indirect impacts (including cumulative impacts) associated with construction to the heritage significance of:	
a. Aboriginal places, objects and cultural heritage values, as defined under the <i>National Parks and Wildlife Act 1974</i> and in accordance with the principles and methods of assessment identified in the current guidelines; and	Section 3.2.4 Section 10.0
b. Aboriginal places of heritage significance, as defined in the Standard Instrument – Principal Local Environmental Plan.	Section 2.2
2) Where impacts to Aboriginal objects and/or places are proposed, consultation must be undertaken with Aboriginal people in accordance with the current guidelines.	Section 5.0
3) The assessment must consider requirements for:	Section 12.0
a. in-situ conservation of items and or/areas;	
b. the need for further archaeological testing and/or detailed archaeological investigations; and	
c. measures to avoid, minimise and/or mitigate potential impacts.	

In support of seeking the Secretary's Environmental Assessment Requirements, the *Sydney Metro West Scoping Report - Westmead to The Bays and Sydney CBD*.⁵ (Sydney Metro, 2019) identified a number of further investigations and assessments. How this technical paper addresses these matters is outlined in Table 2.

⁵ Sydney Metro 2019

Table 2: Further investigations and assessments – Aboriginal heritage

Scoping report requirements – Stage 1	Where addressed
The Aboriginal heritage assessment for Stage 1 will:	
1) Identify the potential for Stage 1 to disturb Aboriginal heritage (sites, objects, remains values, features or places) and, where this is the case, to:	Section 9.0
a. Determine, in consultation with relevant stakeholders, the significance of the heritage resource to the Aboriginal community	Section 10.0
b. Determine the extent and significance of impact to those resources	Section 12.0
2) Identify any requirements for in-situ conservation of items and/or areas (as appropriate), and the need for further archaeological testing and/or detailed archaeological investigations	Section 12.0
3) Identify appropriate measures to avoid, minimise and/or mitigate potential impacts	

1.3 Authors

This report was prepared by Alyce Haast (Senior Heritage Consultant) and Josh Symons (Principal). Management input and review was provided by Dr Sandra Wallace (Director).

The qualifications of the heritage consultants involved in the production of the report is included in Table 3.

Table 3: Qualifications

Name	Qualification	Years' Experience
Alyce Haast	Master of Professional Archaeology BSc Archaeology	5 years
Joshua Symons	BA Historic and Prehistoric Archaeology (Hons)	15 years
Sandra Wallace	PhD Archaeology BA Prehistoric and Historic Archaeology (Hons)	17 years

2.0 LEGISLATIVE CONTEXT

There are several items of legislation, heritage registers and heritage management guidelines that are relevant to Stage 1. This section provides a summary of these Acts and the potential implications for Stage 1.

2.1 NSW National Parks and Wildlife Act 1974

The *National Parks and Wildlife Act 1974* (NPW Act) provides statutory protection to all Aboriginal places and objects. An Aboriginal Place is declared by the Minister, under Section 84 of the NPW Act in recognition of its special significance with respect to Aboriginal culture. Under Section 86 of the NPW Act Aboriginal objects and Aboriginal places are protected. An Aboriginal object is defined as:

any deposit, object or material evidence (not being a handicraft made for sale) relating to the Aboriginal habitation of the area that comprises New South Wales, being habitation before or concurrent with (or both) the occupation of that area by persons of non-Aboriginal extraction and includes Aboriginal remains.

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.

There are no gazetted Aboriginal places in the study area. All Aboriginal objects, whether recorded or not are protected under the NPW Act.

Stage 1 is subject to assessment under Part 5, Division 5.2 of the *Environmental Planning and Assessment Act 1979* and therefore permits issued under the NPW Act are not required.

2.1.1 National Parks and Wildlife Regulation 2009

Under the authority of the NPW Act, The National Parks and Wildlife Regulation 2009 provides regulations for Aboriginal heritage assessment and consultation with registered Aboriginal parties.

Part 8A (80A) of the National Parks and Wildlife Regulation 2009 sets out the requirements of a due diligence assessment process, and provides requirements for more detailed assessment and consultation with registered Aboriginal parties for activities that may result in harm to Aboriginal objects. This includes:

- 80C – consultation process to be undertaken before application for Aboriginal heritage impact permit
- 80D – application for Aboriginal heritage impact permit to be accompanied by cultural heritage assessment report.

In order to comply with 80C and 80D of the National Parks and Wildlife Regulation 2009, preparation of the Aboriginal cultural heritage assessment report (ACHAR) and consultation with registered Aboriginal parties must be in accordance with the following guidelines:

- Code of Practice for Archaeological Investigation of Aboriginal Objects in New South Wales⁶
- Guide to investigating, assessing and reporting on Aboriginal cultural heritage in NSW⁷
- Aboriginal cultural heritage consultation requirements for proponents 2010⁸.

Assessment and consultation undertaken in accordance with Part 8A of the National Parks and Wildlife Regulation 2009 and associated guidelines would result in adequate supporting documentation to support an application(s) for approval for works that may result in harm to Aboriginal objects. The current assessment has been undertaken in accordance with the above guidelines in accordance with the Secretary's Environmental Assessment Requirements.

2.2 NSW Environmental Planning and Assessment Act 1979

The *Environmental Planning and Assessment Act 1979* (EP&A Act) provides planning controls and requirements for environmental assessment in the development approval process. The EP&A Act consists of three main parts of direct relevance to Aboriginal cultural heritage; Part 3 which governs the preparation of planning instruments, Part 4 which relates to development assessment processes for local government (consent) authorities, and Part 5 which relates to activity approvals by governing (determining) authorities.

Stage 1 is subject to assessment and approval by the NSW Minister for Planning and Public Spaces under Part 5, Division 5.2) of the EP&A Act, which establishes an assessment and approval regime for State Significant Infrastructure.

An Environmental Impact Statement supported by the current assessment has been prepared to assess the impacts of Stage 1, in accordance with Secretary's Environmental Assessment Requirements.

2.2.1 Local Environment Plans

Local Environmental Plans (LEPs) are prepared by councils in accordance with the EP&A Act to guide planning decisions for Local Government Areas (LGAs).

The aim of LEPs in relation to heritage is to conserve the heritage significance of heritage items and heritage conservation areas, including associated fabric, settings, views and archaeological sites.

Schedule 5 of each LEP lists items of heritage significance within each LGA. If agreement is reached with the Aboriginal community, items or Aboriginal places of heritage significance are also listed within this schedule.

⁶ Department of Environment Climate Change & Water [DECCW] 2010a, *Code of Practice for Archaeological Investigation of Aboriginal Objects in New South Wales*

⁷ Office of Environment & Heritage 2011, *Guide to investigating, assessing and reporting on Aboriginal cultural heritage in NSW*

⁸ DECCW 2010b, *Aboriginal cultural heritage consultation requirements for proponents 2010*

The study area falls within the boundaries of several Local Government Areas (LGAs), including Cumberland, Parramatta, City of Canada Bay, Burwood, and Inner West. The Stage 1 alignment also passes through the Strathfield LGA underground. The study area is therefore subject to the:

- Holroyd LEP 2011, which applies to part of the Cumberland LGA
- Parramatta LEP 2011
- Auburn LEP 2010, which applies to part of the Cumberland and Parramatta LGAs
- Canada Bay LEP 2013
- Burwood LEP 2012
- Ashfield LEP 2013, which applies to the Inner West LGA
- Leichardt LEP 2013, which applies to the Inner West LGA.

No Aboriginal places of heritage significance were identified on LEPs within the vicinity of Stage 1.

2.2.2 Parramatta Development Control Plan 2011

The Parramatta Development Control Plan (Parramatta DCP) 2011 includes Aboriginal heritage sensitivity mapping, with areas designated as either 'high sensitivity' or 'low sensitivity'. The sensitivity mapping is an indicative guide, and used by Parramatta Council to identify the level of Aboriginal heritage assessment required in support of a Development Application (DA) or similar. While Stage 1 is not subject to the requirements of the DCP, the sensitivity mapping is referenced in this ACHAR to inform assessment of Aboriginal heritage sensitivity within the Parramatta LGA.

2.3 NSW Aboriginal Land Rights Act 1983

The *Aboriginal Land Rights Act 1983* is administered by the NSW Department of Human Services - Aboriginal Affairs. This Act established Aboriginal Land Councils (at State and local levels). These bodies have a statutory obligation under the Act to:

- Take action to protect the culture and heritage of Aboriginal persons in the council's area, subject to any other law
- Promote awareness in the community of the culture and heritage of Aboriginal persons in the council's area.

Stage 1 is located within the Metropolitan LALC and Deerubbin LALC boundaries.

2.4 NSW Native Title Act 1994

The *Native Title Act 1994* was introduced to work in conjunction with the Commonwealth Native Title Act. Native Title claims, registers and Indigenous Land Use Agreements are administered under the Act.

No Native Title Claims within the study area were identified on the National Native Title Tribunal *Native Title Vision* mapping service.⁹

⁹ Accessed on 8 July 2016 http://www.ntv.nntt.gov.au/IntraMaps80/default.htm?project=NTV_NSW

2.5 Commonwealth *Environment Protection and Biodiversity Conservation Act 1999*

The *Environment and Heritage Legislation Amendment Act (No. 1) 2003* amends the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) to include 'national heritage' as a matter of National Environmental Significance and protects listed places to the fullest extent under the Constitution. It also establishes the National Heritage List and the Commonwealth Heritage List.

The *Australian Heritage Council Act 2003* establishes a new heritage advisory body – the Australian Heritage Council, to the Minister for the Environment and Energy and retains the Register of the National Estate.

The *Australian Heritage Council (Consequential and Transitional Provisions) Act 2003* repeals the *Australian Heritage Commission Act 1975*, amends various Acts as a consequence of this repeal and allows the transition to the current heritage system.

Together the above three Acts provide protection for Australia's natural, Indigenous and non-Indigenous heritage. The new framework includes:

- A new National Heritage List of places of national heritage significance
- A new Commonwealth Heritage List of heritage places owned or managed by the Commonwealth
- The creation of the Australian Heritage Council, an independent expert body to advise the Minister on the listing and protection of heritage places
- Continued management of the non-statutory Register of the National Estate.

2.5.1 National Heritage List

The National Heritage List is a list of places with outstanding heritage value to our nation, including places overseas. So important are the heritage values of these places that they are protected under the EPBC Act. This means that a person cannot take an action that has, will have, or is likely to have, a significant impact on the national heritage values of a national heritage place without the approval of the Australian Government Minister for the Environment.

There are no items listed on the National Heritage List located within the study area for this assessment.

2.5.2 Commonwealth Heritage List

The Commonwealth Heritage List is a list of places managed or owned by the Australian Government.

There are no items listed on the Commonwealth Heritage List located within the study area for this assessment.

3.0 ASSESSMENT METHODOLOGY

3.1 The study area

The indicative alignment for Stage 1 is shown in Figure 1. The Stage 1 alignment extends from Westmead in the west to The Bays in the east. The study area for the Stage 1 Aboriginal heritage assessment consists of the construction sites and power supply routes which extend beyond the immediate proximity of the construction site boundaries. The construction sites and additional power supply routes are outlined in Table 4 and Table 5 respectively.

The study area does not include the tunnel sections between construction sites, as they would generally be too deep to affect archaeological deposits.

Table 4: Construction site locations

Construction site	Site location
Westmead metro station	The block bounded by Hassall Street, Bailey Street and Hawkesbury Road, and extending across Alexandra Avenue and partly within the rail corridor, Westmead.
Parramatta metro station	Within the block bounded by George Street, Church Street, Macquarie Street, and Smith Street, Parramatta.
Clyde stabling and maintenance Facility	Within land bounded by James Ruse Drive, Unwin Street, Shirley Street, and the M4 Western Motorway, Clyde.
Silverwater services facility	On the south-eastern corner of Silverwater Road and Derby Street, Silverwater.
Sydney Olympic Park metro station	Between Herb Elliot Avenue and Figtree Drive, Sydney Olympic Park with a portion extending through to Dawn Fraser Avenue.
North Strathfield metro station	Generally within the rail corridor between the existing North Strathfield Station and Queen Street, North Strathfield.
Burwood North Station	Fronting Parramatta Road between Burwood Road and Loftus Street, Concord, with a portion extending to Burton Street, Concord; and on the south-eastern corner of Parramatta Road and Burwood Road, Burwood.
Five Dock Station	Between Great North Road and East Street to the north of Fred Kelly Place; and on the south-western corner to Waterview Street and Second Avenue, Five Dock.
The Bays Station	Adjacent to White Bay Power Station, Robert Street, Rozelle.

Table 5: Summary of location of power supply routes

Power supply route	Description of power supply route
Westmead power supply route	Park Parade, Pitt Street, Macquarie Street
Parramatta power supply route	George Street, O'Connell Street, Macquarie Street
Clyde power supply route	Unwin Street
The Bays power supply route	Manning Street, Callan Street, McClear Street, Moodie Street, Waterloo Street, Darling Street, Merton Street, Cross Street, Mansfield Street, Mullens Street, Robert Street

3.2 Archaeological survey

3.2.1 Aboriginal site definition

An Aboriginal site is generally defined as an Aboriginal object or place. An Aboriginal object is the material evidence of Aboriginal land use, such as stone tools, scarred trees or rock art. Some sites, or Aboriginal places can also be intangible and although they might not be visible, these places have cultural significance to Aboriginal people.

The Code of Practice for Archaeological Investigation of Aboriginal Objects in New South Wales¹⁰ states in regard to site definition that one or more of the following criteria must be used when recording material traces of Aboriginal land use:

- The spatial extent of the visible objects, or direct evidence of their location
- Obvious physical boundaries where present e.g. mound site and middens (if visibility is good), a ceremonial ground
- Identification by the Aboriginal community on the basis of cultural information.

For the purposes of this study an Aboriginal site, or potential Aboriginal site, was defined by recording the spatial extent of visible traces or the direct evidence of their location within the study area.

3.2.2 Archaeological survey methodology

Site inspections were undertaken on 23 - 24 January 2019, 25 March 2019, 26 – 27 June 2019 and 1 July 2019 by Alyce Haast (Senior Heritage Consultant, Artefact Heritage). An additional site inspection was undertaken with Steve Randall (Deerubbin Local Aboriginal Land Council) on 6 November 2019 and Selina Timothy and Cecil Heron (Metropolitan Local Aboriginal Land Council) on 7 November 2019. The aim of the site inspections was to assist in the assessment of archaeological potential for each construction site.

Each construction site was defined as a survey unit. All survey units were covered on foot. Areas of surface visibility within the study area were generally non-existent, with the majority of each survey unit covered by buildings, roads and concrete footpaths.

¹⁰ OEH 2011

The proposed power supply routes were assessed by desktop assessment only and were not subject to the site inspections.

The site inspection only included survey of publicly accessible areas. Private property was not accessed during the survey.

Aerial photographs and topographic maps were carried by the survey personnel. A photographic record was kept of all accessible portions of each survey unit. Photographs were taken to document the existing environment and landform context of each construction site.

A discussion of the survey results for the accessible portions of each construction site is included in Section 8.0.

3.2.3 Recorded Aboriginal sites and areas of archaeological potential

Information on any recorded Aboriginal sites, including type and location, is included in the discussion of each construction site, as well as an assessment of archaeological potential.

The assessment of archaeological potential incorporates available information on existing and past structures, including the location of basements and underground car parks that are likely to have removed archaeological deposits.

3.2.4 Impact assessment

The definition of harm under the NPW Act is limited to impact which ‘...destroys, defaces, damages an object or place or in relation to an object – moves the object from land on which it has been situated.’ (s5 NPW Act).

Direct harm may occur as a result of activities which disturb the ground surface including site preparation activities, and the installation of services and infrastructure. The direct impact associated with Stage 1 is assessed in Section 10.0.

Indirect harm for Aboriginal heritage refers to impacts that may affect sites or features located immediately beyond or within the area of the proposed works. Indirect harm may include impacts from vibration, increased visitation, increased erosion, or changing access to wild resources.

The majority of Stage 1 construction sites are located within heavily built environments which do not have registered Aboriginal sites within the vicinity. Registered Aboriginal sites which are within the vicinity of Stage 1 construction sites are comprised of artefact sites or areas of potential archaeological deposit which are located below existing development. Any buried Aboriginal objects would not be subject to impacts as a result of vibration. There are no Aboriginal places in the vicinity of the construction sites which may be subject to indirect impacts.

3.2.5 Geotechnical information

A short description of relevant geotechnical information is provided in the discussion of each construction site in Section 8.0.

4.0 PROJECT DESCRIPTION

The Stage 1 would involve the major civil construction work for Sydney Metro West (Westmead to The Bays), including:

- Enabling works
- Tunnel excavation including tunnel support activities
- Station excavation for new metro stations at Westmead, Parramatta, Sydney Olympic Park, North Strathfield, Burwood North, Five Dock and The Bays
- Shaft excavation for services facilities at Rosehill and Silverwater
- Civil works for the stabling and maintenance facility at Clyde including earthworks and structures for crossings of A'Becketts Creek and Duck Creek
- A concrete segment facility for use during construction located at the Clyde stabling and maintenance facility construction site
- Excavation of a tunnel dive structure and associated tunnels at Rosehill to support a connection between the Clyde stabling and maintenance facility and the mainline metro tunnels.

4.1 General construction and design elements

The following section describes common construction methodologies and elements of the construction works across Stage 1. The following discussion of construction elements is focussed on those construction activities that may result in impacts to heritage significant structures or archaeological remains. Complete details of demolition and construction methodologies for Stage 1 are provided in the Environmental Impact Statement.

4.1.1 Demolition and site establishment

Buildings and structures within the construction site would be demolished and the construction site would be cleared prior to the commencement of excavation works (except where a building is to be retained). Building demolition would be conducted in stages at each construction site by licensed demolition contractors. Hoarding and protection would be established prior to demolition activities commencing. Utility services within buildings to be removed would be isolated prior to demolition. Soft stripping of internal building materials would be conducted prior to the removal of building structure with machine plant with a top-down approach.

Existing services within each construction site would be diverted where necessary and protected, with new water and power supply provided for construction activities. Vegetation and hardstand surfaces not designated for retention within a construction site would be removed during site establishment. 'Rippable' materials (such as fills, residual soils and weathered rocks) would be excavated to a variable depth across parts of the construction sites.

4.1.2 Acoustic sheds

Acoustic sheds are proposed at a number of construction sites although alternative means of achieving the same noise outcome, such as acoustic panels over the station excavations, may be adopted. The size of acoustic sheds would vary across construction sites and would range up to about 15 metres in height, with the exception of the acoustic shed at the Westmead metro station construction site. Due to topography at this location, the eastern façade of the shed would range up to 25 metres.

4.1.3 Tunnelling excavation

Tunnel excavation is likely to be undertaken using tunnel boring machines with roadheaders used for caverns, stub tunnels and the connecting tunnels between the stabling and maintenance facility and the mainline tunnels.

Tunnelling would be supported by launch and retrieval support sites at the following construction sites: Westmead metro station construction site, Sydney Olympic Park metro station construction site and The Bays Station construction site.

4.1.4 Power supply routes

A number of new power supply routes would be required as part of Stage 1 which would connect the construction sites with existing electricity substations. These supply routes would generally be located within existing road reserves. Construction would generally involve the excavation of an open trench. Directional boring may be used when crossing major infrastructure or to avoid other major constraints.

4.2 Construction site methodologies

4.2.1 Westmead metro station construction site

The proposed Westmead metro station would be constructed as a cut-and-cover excavation station, located in the block bounded by Hawkesbury Road, Alexandra Avenue, Hassall Street, and Bailey Street. The majority of the site contains residential and commercial buildings, but also extends across Alexandra Avenue and the adjoining rail corridor.

The Westmead metro station construction site is illustrated in Figure 2. All existing structures would be removed from the site in order to clear the area for future excavation and construction. The excavation depth of the station would be around 32 metres in depth. An acoustic shed would be constructed at the construction site.

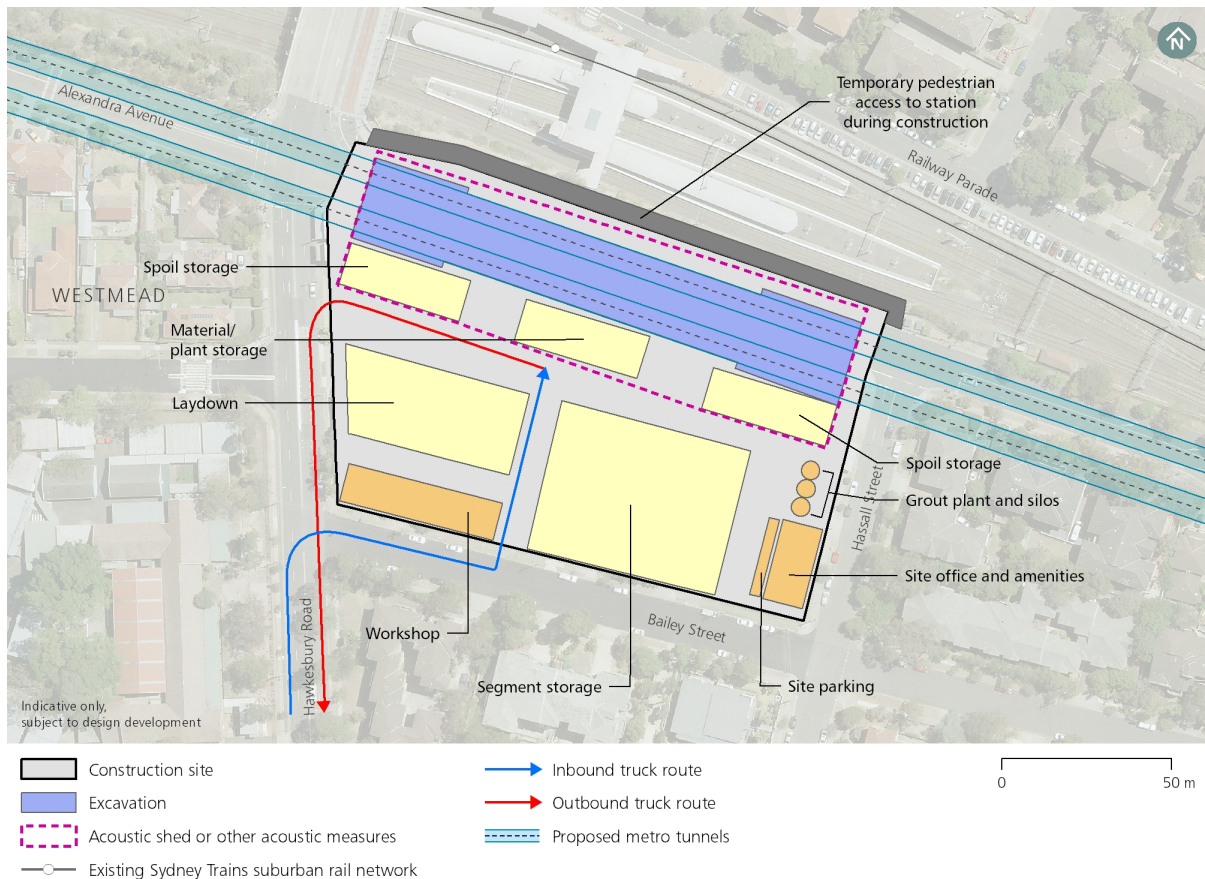


Figure 2: Westmead metro station construction site

4.2.2 Parramatta metro station construction site

The Parramatta metro station would be constructed as a cut-and-cover excavation station, located across Horwood Place in Parramatta. The site currently contains medium density commercial structures, public roads (Horwood Place and Macquarie Place), rear access carparking for commercial properties and a public multistorey carpark (City Centre carpark).

The Parramatta metro station construction site is illustrated in Figure 3. All existing structures, except two heritage listed buildings, would be removed from the site in order to clear the area for future excavation and construction. The two heritage listed buildings to be retained are the two-storey sandstone building at 41 – 59 George Street and 'Kia Ora' at 62 – 64 Macquarie Street.

The final excavation depth of this station would be around 25 metres in depth.

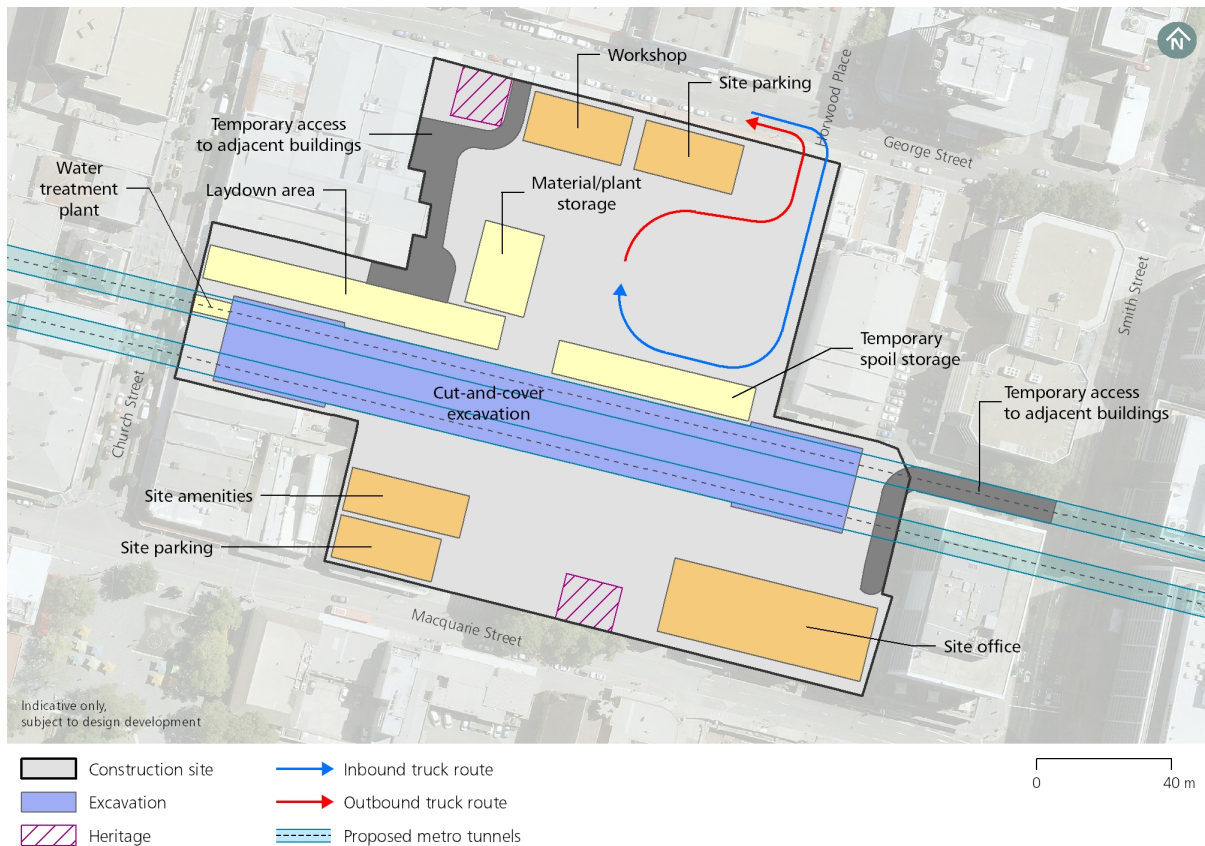


Figure 3: Parramatta metro station construction site

4.2.3 Clyde stabling and maintenance facility construction site

The Clyde stabling and maintenance facility would be constructed at ground level, at a site bounded by James Ruse Drive, Unwin Street, Shirley Street and the M4 Motorway in Clyde. This area is currently occupied by a variety of industrial facilities and the Sydney Speedway on NSW Government owned land. Works would involve the removal of all structures across the site to allow the construction of the proposed stabling and maintenance facility, with the exception of the façade of the RTA Depot 1B and 5 Unwin Street, Rosehill. The construction site would also include the excavation and construction of the dive structure and tunnel portal and a ventilation shaft at Rosehill. The construction site and areas of excavation are illustrated in Figure 4.

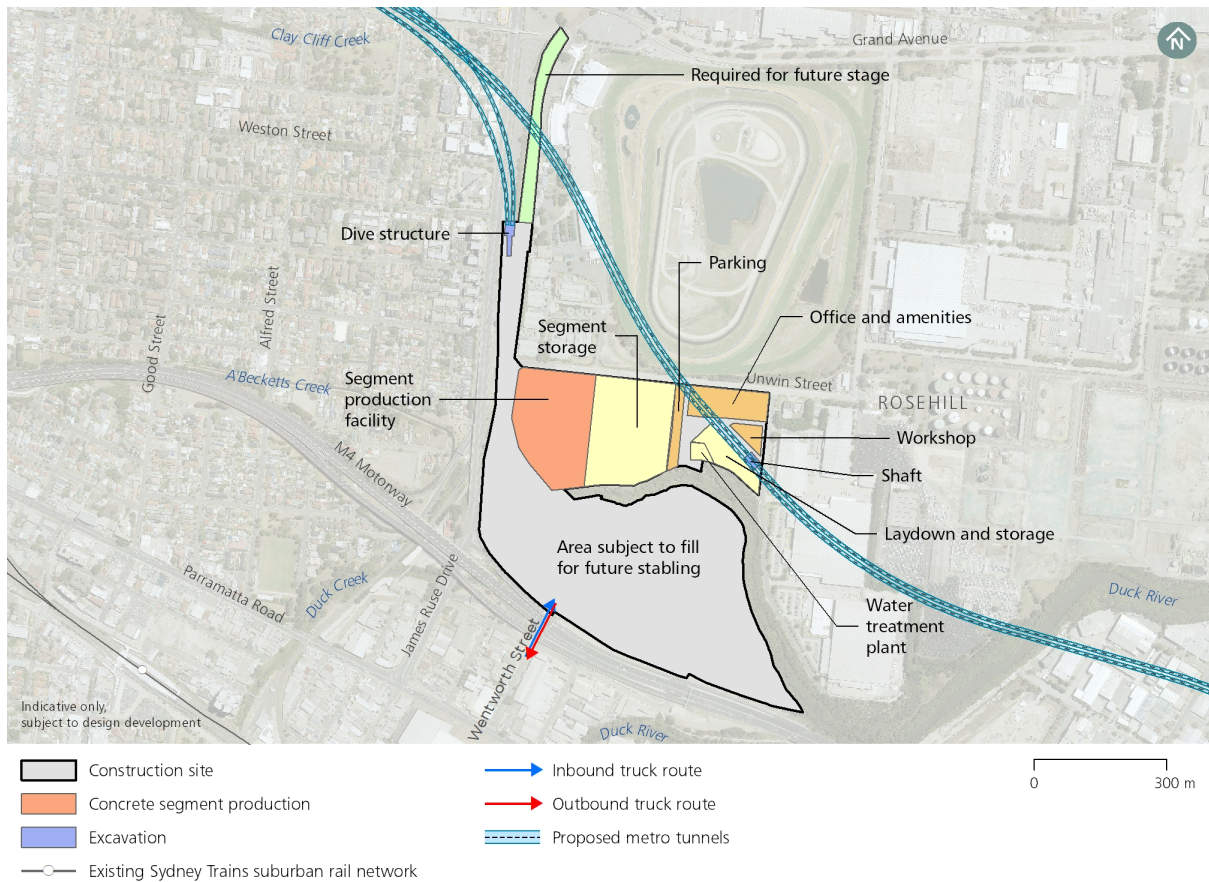


Figure 4: Clyde stabling and maintenance facility construction site

4.2.4 Silverwater services facility construction site

The Silverwater services facility would be constructed as a vertical shaft excavation, located on the corner of Silverwater Road and Derby Street in Silverwater. The site is currently a vacant lot. The construction site would include the excavation of and construction of a ventilation shaft to a depth of 46 metres. Construction offices and amenities for use during construction would also be constructed at the Silverwater services facility construction site. The construction site and area of excavation is illustrated in Figure 5.



Figure 5: Silverwater services facility construction site

4.2.5 Sydney Olympic Park metro station construction site

The Sydney Olympic Park metro station would be constructed as a cut-and-cover excavation station, located between Herb Elliott Avenue and Figtree Drive in Sydney Olympic Park. This site currently contains commercial buildings.

The Sydney Olympic Park metro station construction site is illustrated in Figure 6. All existing structures, except for the heritage-listed gatehouse in the northern portion of the construction site, would be removed from the site in order to clear the area for future excavation work and construction. The final excavation depth of this station would be around 25 metres. Acoustic sheds would be constructed at the Sydney Olympic Park metro station construction site.

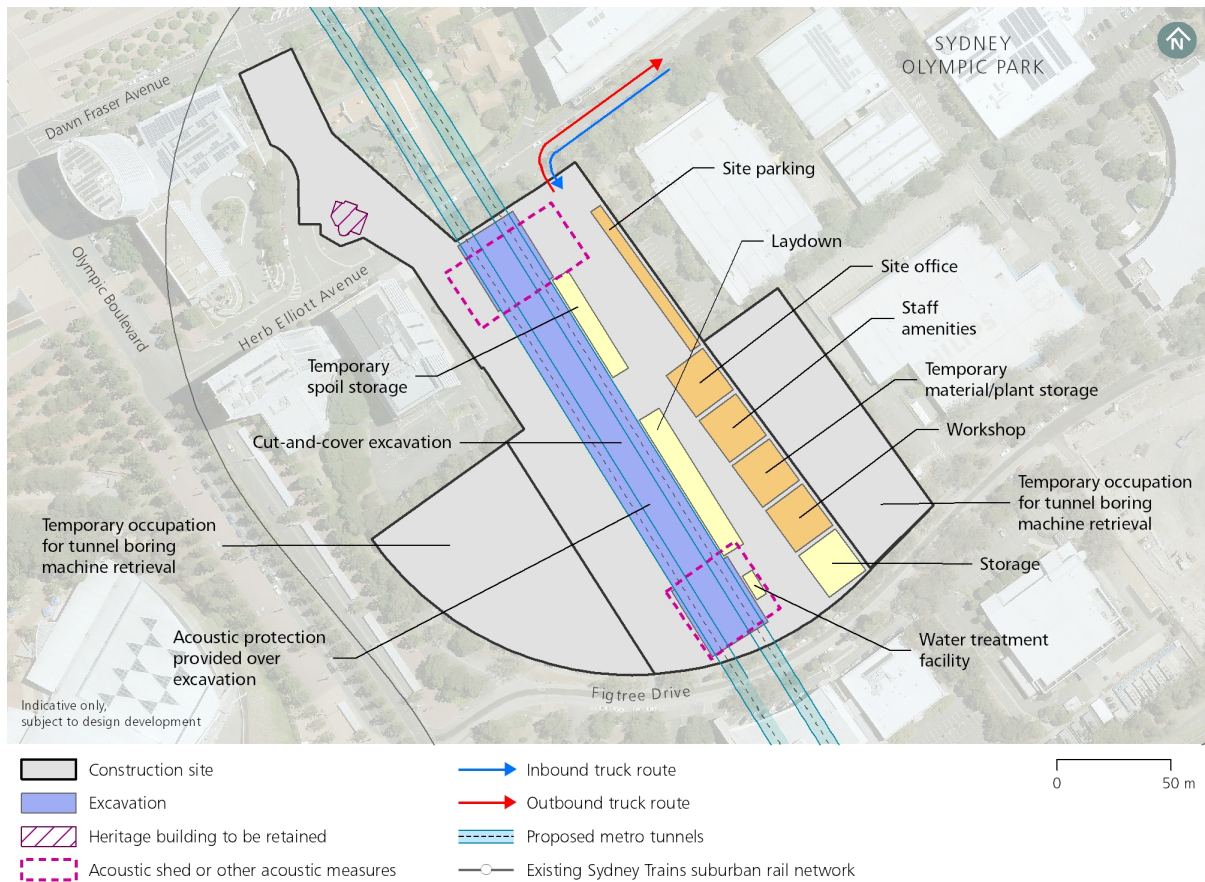


Figure 6: Sydney Olympic Park Station construction site

4.2.6 North Strathfield metro station construction site

Construction of the proposed North Strathfield metro station would require two sites:

- The North Strathfield metro station northern construction site would be located between the existing North Strathfield Station and Queen Street, bounded by Pomeroy Street to the north and the pedestrian entrance to the existing North Strathfield Station to the south. The site predominately comprises vacant land within the T9 Northern Line rail corridor, the northbound lane of Queen Street, and gardens at the eastern pedestrian entry to the existing North Strathfield Station
- The North Strathfield metro station southern construction site would occupy land between the existing North Strathfield Station and Queen Street, bounded by Shipley Avenue to the south and the pedestrian entrance to North Strathfield Station to the north. The site is currently used as a private car park and station facilities site for the existing North Strathfield Station. This site would be used for site offices, workers amenities and parking only.

The North Strathfield metro station would be constructed as a cut-and-cover excavation box.

The North Strathfield metro station construction site is illustrated in Figure 7. The final excavation depth of this station would be around 18 metres in depth.



Figure 7: North Strathfield metro station construction site

4.2.7 Burwood North Station construction site

Construction of the proposed Burwood North Station would require two sites:

- The Burwood North Station northern construction site would be located on Parramatta Road between Burwood Road and Loftus Street. This site currently contains commercial buildings and two residential properties fronting Burwood Road and Burton Road
- The Burwood North Station southern construction site would be located in an area bound by Burwood Road, Parramatta Road, Esher Lane and commercial properties west of Esher Street. The site currently contains commercial buildings.

The Burwood North Station would be constructed as a cut-and-cover excavation box on the Burwood North Station northern construction site. A shaft would be excavated on the Burwood North Station southern construction site for the southern station entrance, which would be connected to the station excavation via a mined adit.

The Burwood North Station construction site is illustrated in Figure 8. All existing structures would be removed from the site in order to clear the area for future excavation work and construction. The final excavation depth of this station would be around 32 metres in depth. Acoustic sheds would be constructed at the Burwood North Station construction sites.

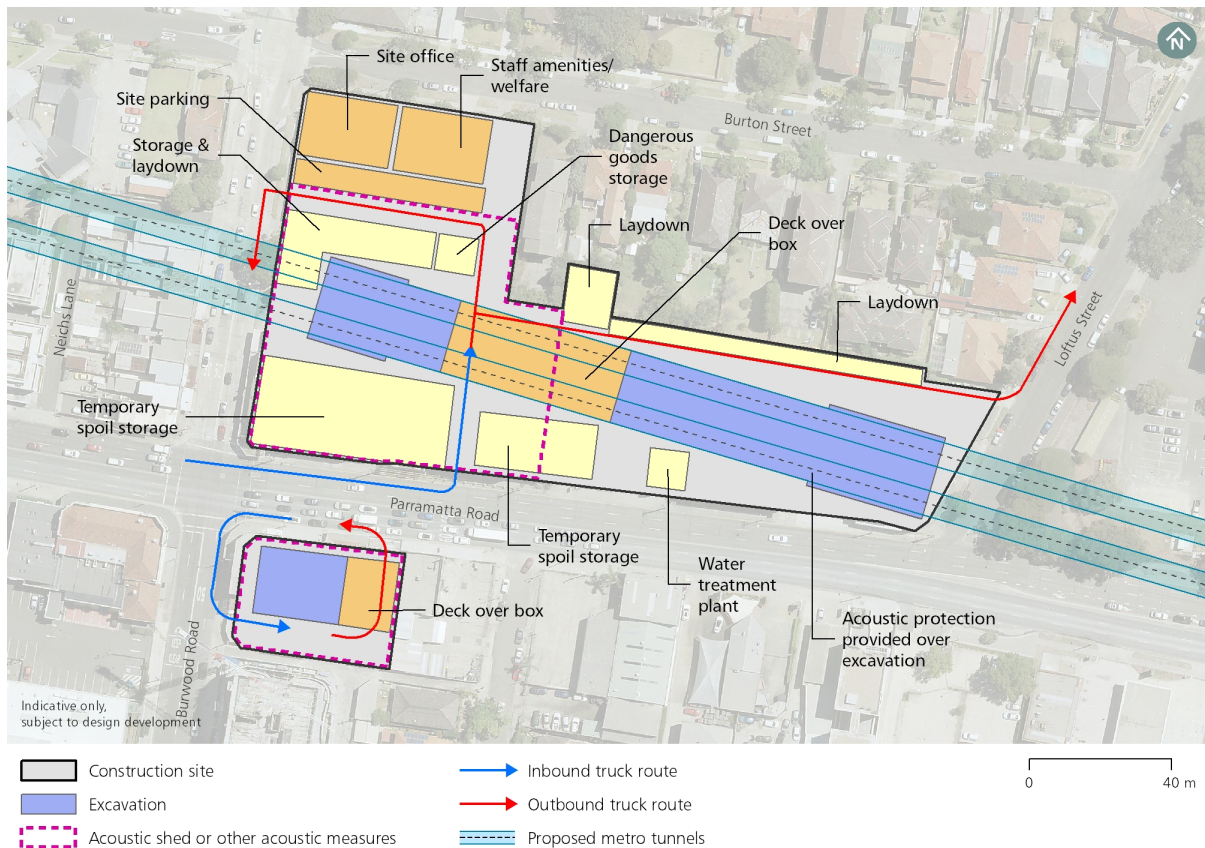


Figure 8: Burwood North Station construction site

4.2.8 Five Dock Station construction site

Construction of the proposed Five Dock Station would require two sites:

- The Five Dock Station western construction site would be located between Great North Road and East Street, to the north of Fred Kelly Place and south of St Albans Anglican Church. This site currently contains commercial buildings
- The Five Dock Station eastern site would occupy a site bounded by Second Avenue and Waterview Street. The site is currently occupied by residential buildings and a car park.

The Five Dock Station would be constructed as a mined station excavation with cut-and-cover shafts excavated at each construction site.

The Five Dock Station construction site is illustrated in Figure 9. All existing structures would be removed from the site in order to clear the area for future excavation work and construction. The final excavation depth of this station would be around 30 metres in depth. Acoustic sheds would be constructed at each construction site.

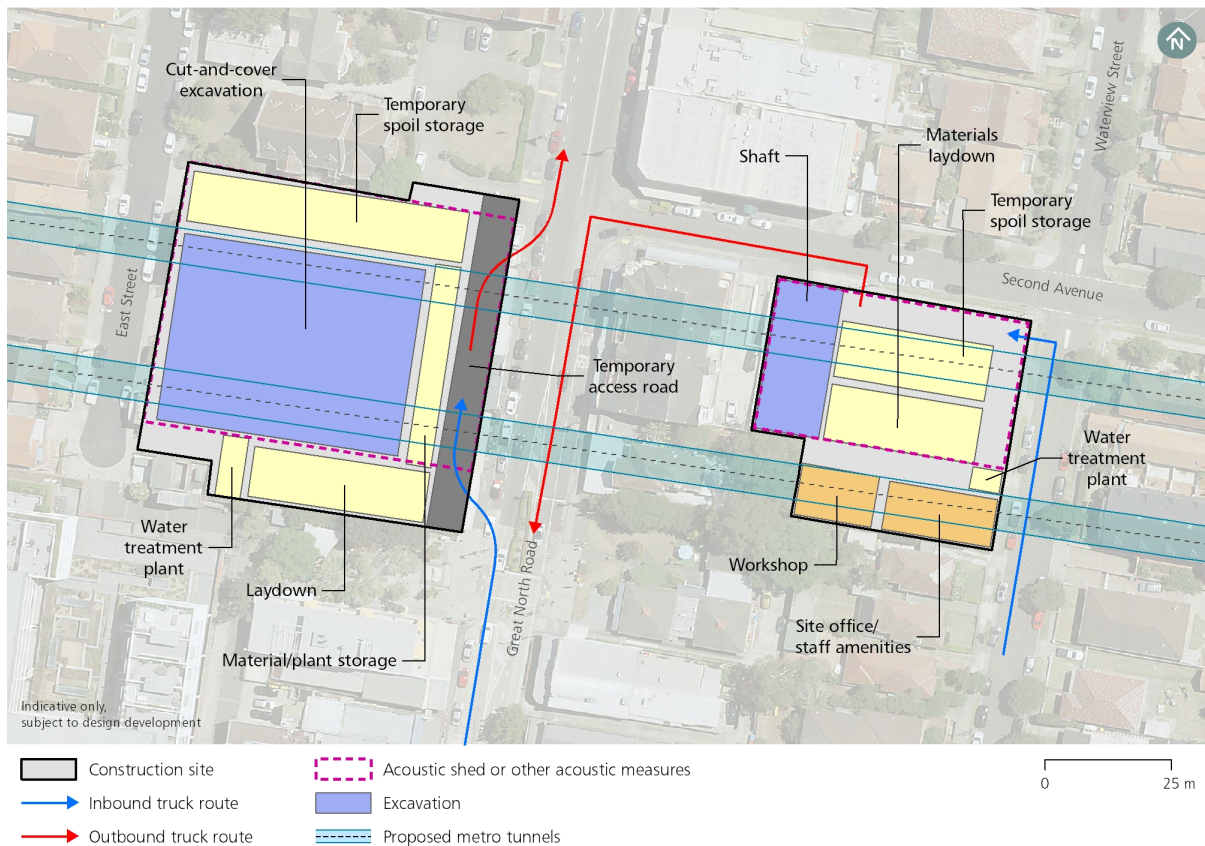


Figure 9: Five Dock Station construction site

4.2.9 The Bays Station construction site

The Bays Station would be constructed as a cut-and-cover excavation, along the foreshore of White Bay, near to the former White Bay Power Station in Rozelle. The currently contains open areas of hardstand and port with several small industrial buildings present.

The Bays Station construction site is illustrated in Figure 10. All existing structures would be removed from the site in order to clear the area for future excavation work and construction. The final excavation depth of this station would be around 32 metres in depth.

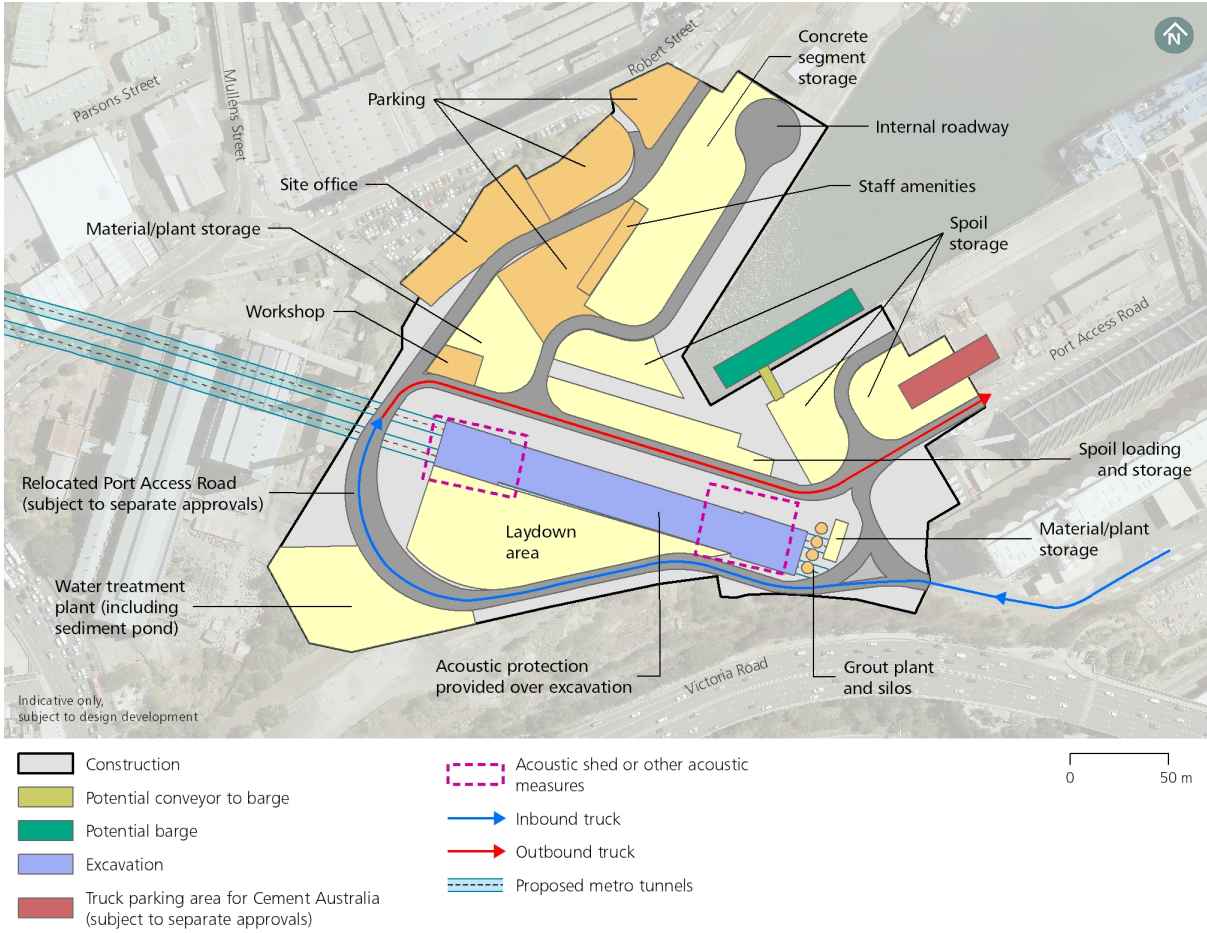


Figure 10: The Bays Station construction site

5.0 CONSULTATION

Aboriginal community consultation has been conducted in accordance with the Aboriginal cultural heritage consultation requirements for proponents 2010.¹¹ A consultation log has been maintained which details all correspondence with the registered Aboriginal parties for Metro West (see Appendix 1).

Identification of stakeholders and registrations of interest

In accordance with Stage 4.1.2 of the Aboriginal cultural heritage consultation requirements for proponents 2010, correspondence was sent to the following organisations on the 16th May 2019 requesting details of Aboriginal people who may hold cultural knowledge relevant to determining the Aboriginal significance of Aboriginal objects and/or places within the Stage 1 study area.

- The former Office of Environment and Heritage
- The Registrar, *Aboriginal Land Rights Act 1983*
- Deerubbin Local Aboriginal Land Council
- Metropolitan Local Aboriginal Land Council
- NTSCORP
- National Native Title Tribunal
- Cumberland Council
- City of Parramatta
- Strathfield Council
- City of Canada Bay
- Burwood Council
- Inner West Council
- City of Sydney
- Greater Sydney Local Land Services.

In accordance with Stage 4.1.3 of the Aboriginal cultural heritage consultation requirements for proponents 2010, Artefact placed an advertisement in the Koori Mail and the Sydney Morning Herald on 8 May 2019 and 6 May 2019 respectively. The advertisement invited all Aboriginal persons and organisations who hold cultural knowledge relevant to determining the significance of Aboriginal objects and places in the study area to register their interest. Responses to the advertisements were requested by 22 May 2019.

Also in accordance with Stage 4.1.3, letters and/or emails were sent on 23 July 2019 to all Aboriginal persons and organisations identified through responses from the agencies contacted during Step 4.1.2 as well as organisations which had previously been contacted during the development of Sydney Metro West. The letters provided details on the location and nature of Sydney Metro West, as well as an invitation to register as an Aboriginal stakeholder. Fourteen days were allowed for registrations.

¹¹ DECCW 2010b, Aboriginal cultural heritage consultation requirements for proponents 2010

Where initial stakeholder contact failed, secondary methods of contact were attempted for potential stakeholders. The registration of interest time period was extended to those groups who were contacted by secondary means with the final registration of interest period closing on 5 September 2019.

Following the completion of Steps 4.1.2 and 4.1.3, a total of 59 stakeholder groups had registered their interest in the consultation process. These groups include:

List of registered stakeholder groups removed for public display

In accordance with Step 4.1.6, a list of registered Aboriginal parties, a copy of the newspaper advertisement and a copy of the invitation to register were forwarded to the Department of Planning, Industry and Environment, Deerubbin LALC and Metropolitan LALC on 23 October 2020.

Review of assessment methodology

A copy of the proposed ACHAR methodology was distributed to Aboriginal stakeholders on 1 October 2019, with a 28 day period for review and comment. The document included project details and a summary of the proposed ACHAR assessment methodology. Comments were received from six stakeholder groups who were supportive of the methodology.

In their response to the ACHAR methodology Justine Coplin (Darug Custodian Aboriginal Corporation) identified that the Stage 1 area was significant to Darug people due to the evidence of continued occupation across the landscape noting that there is a complex of significant sites in close proximity to Stage 1.

Site inspection

Steve Randall (Deerubbin LALC) undertook a site survey of the construction sites between and inclusive of the Westmead metro station construction site and the Clyde stabling and maintenance facility construction site which fall within the boundaries of Deerubbin LALC. Steve Randall identified that further assessment should be undertaken within the Clyde stabling and maintenance facility construction site and within the Parramatta metro station construction site.

Selina Timothy and Cecil Heron (Metropolitan LALC) undertook a site survey of the construction sites between and inclusive of the Silverwater services facility and The Bays Station construction site which fall within the land boundaries of Metropolitan LALC. They identified construction sites within the vicinity of water sources as containing potential for archaeological remains given the importance of water as a resource. They also acknowledged that many of the construction sites had been heavily modified by current development.

Selina and Cecil recommended that the telling of Aboriginal stories through heritage interpretation within the future stations should be a priority of the future station areas within Sydney Metro West.

Next steps

This draft report will be circulated to registered stakeholders at the commencement of the public exhibition of the Environmental Impact Statement and stakeholders will be invited to provide comment on the draft report within 28 days.

The outcomes of this consultation will be incorporated into the final Aboriginal Cultural Assessment Report, which will be finalised alongside the Submissions Report (refer to Chapter 5 – Stakeholder and community engagement) of the Environmental Impact Statement for further detail).

6.0 ENVIRONMENTAL CONTEXT

An overview of the environmental context of the study area is outlined below. Specific geology, soil, landform and hydrology information for each construction site is provided in Section 8.0.

The study area is located within the Sydney Basin, a large depositional geological feature that spans from Batemans Bay to the south, Newcastle to the north and Lithgow to the west. The underlying geology of Stage 1 is Triassic and Quaternary period geological units. The higher elevation sections of the study area are generally underlain by Triassic bedrock, including Hawkesbury Sandstone and Ashfield Shale. The portions of the study area closest to foreshore areas tend to consist of Tertiary and Quaternary period sediments, such as alluvially deposited sands.

6.1 Shale geology

Shale geology with overlying residual soils are the predominant geological and geomorphological features of the Cumberland Plain, an area that approximately extends from inner western Sydney to the Nepean River.¹² This landscape is characterised by generally gently undulating terrain incised by freshwater tributaries of Parramatta River, the Nepean River and the Hawkesbury River.

The Westmead metro station, Silverwater services facility, Sydney Olympic Park metro station, North Strathfield metro station, Burwood North Station and Five Dock Station construction sites are located across landform contexts with underlying shale geology.

The implication of generally shallow residual soils across these construction sites is a susceptibility to a high degree of impact from construction activities, such as residential and commercial development, construction of roads, and installation of underground services.

6.2 Foreshore areas

The foreshore areas of Sydney Harbour and the Parramatta River are generally characterised by Quaternary period sediments and outcropping Triassic period Hawkesbury Sandstone.¹³ Hawkesbury Sandstone outcrops in foreshore areas are associated with elevated and steep terrain bordering the foreshore contexts. Quaternary period sediments underlie tidally influenced flats and the margins of numerous tributaries that flow into Sydney Harbour and Parramatta River. The Clyde stabling and maintenance facility and The Bays Station are located across harbour foreshore contexts.

Portions of the foreshore area of Sydney Harbour and Parramatta River within the study area have been heavily modified for historical activities, such as for industrial purposes, formalisation of the foreshore using sea walls and embankments, and reclamation of tidally influenced estuarine areas for outdoor recreational spaces. Underlying material in these areas is likely to be a mixture of rubbish, dredged silt, and demolition rubble. In some areas the underlying natural landform context may have been extensively modified or, where there was outcropping bedrock, quarried prior to infilling reclamation activities. In other locations the tidal flats and other foreshore contexts may remain *in situ* beneath reclamation areas.

¹² Herbert C., 1983, Sydney 1:100 000 Geological Sheet 9130, 1st edition. Geological Survey of New South Wales, Sydney

¹³ Clark N.R. and Jones D.C., 1991, Penrith 1:100 000 Geological Sheet 9030, 1st edition. Geological Survey of New South Wales, Sydney.

6.3 Parramatta Sand Body

An alluvially deposited sand body dating to the Quaternary Period, called the Parramatta Sand Body, is located across portions of the Parramatta CBD and surrounding area (see Figure 11). Some portions of the Parramatta CBD on slightly higher elevation include a Pleistocene and Tertiary period alluvial clay and sand formation associated with the Parramatta Sand Body.

The Parramatta Sand Body is a significant archaeological resource with evidence of Aboriginal activities dating from the Holocene and Pleistocene epochs.¹⁴ The sand body is also relatively deep, increasing the possibility of portions of the sand body surviving beneath phases of historical development. Portions of the Parramatta metro station may contain the Parramatta Sand Body.



Figure 11: Mapped location of Parramatta Sand Body

6.4 Watercourses

The major watercourse associated with the study area is the Parramatta River. The Parramatta River extends eastwards from North Parramatta to the confluence with Lane Cove River between Balmain and Greenwich. The area east of the confluence of Parramatta River and Lane Cove River is Sydney Harbour.

A number of first and second order watercourses flow into Parramatta River and Sydney Harbour. Due to the tidally influenced nature of Parramatta River and Sydney Harbour, the mouth of each watercourse generally consists of tidally influenced flats that were likely to have been extensive areas

¹⁴ Jo McDonald Cultural Heritage Management, 2005

of mangrove. Many of these watercourses have been canalised and the tidal flats in-filled as areas of reclamation.

Three named watercourses are significant to the study area, being Duck River, Duck Creek and A'Becketts Creek (Clyde maintenance and stabling facility). These are significant due to the size of their catchment areas, and associated subsistence resources, including an overlap between freshwater and estuarine areas.

Other minor watercourses adjacent to the study have been in-filled and/or canalised. These watercourses are often unnamed, such as a canalised watercourse that runs north through St Lukes Park, to the east of the Burwood North Station construction site.

7.0 ARCHAEOLOGICAL CONTEXT

An overview of the Aboriginal histories of the area and archaeological context of the study area is outlined below. More specific information on the archaeological context of each construction site is provided in Section 8.

7.1 Aboriginal histories of the locality

Prior to the appropriation of their land by Europeans, Aboriginal people lived in small family or clan groups that were associated with particular territories or places. It seems that territorial boundaries were fairly fluid, although details are not known. The language group spoken across Sydney was known as Darug (Dharruk – alternate spelling). This term was used for the first time in 1900, as before the 1800s language groups or dialects were not discussed in the literature.¹⁵ The Darug language group is thought to have been spoken in the area south of Port Jackson, north of Botany Bay, and west to Parramatta.¹⁶

The eastern portion of the study was potentially located near the boundary between the Cadigal and the Wangal clans as described by Governor Philip and reproduced in Attenbrow:

From the entrance of the harbour, along the south shore, to the cove adjoining this settlement the district is called Cadi, and the tribe Cadigal; the women, Cadigalleon. The south side of the harbour from the above mentioned cove to Rose Hill, which the natives call Parramatta, the district is called Wann, and the tribe Wanngal¹⁷

In modern geographical terms, Governor Phillip stated that the Cadigal lands extend from the entrance of Sydney Harbour, eastwards along the south harbour shore, to Sydney Cove, which is 2.5 kilometres east of the study area. Phillip stated that the Wangal lands extend along the south side of the harbour shore from Sydney Cove to Parramatta.

Alternatively, Attenbrow also quotes Philip Gidley King who stated the Cadigal lands cover the south side of Port Jackson, extending eastwards from South Head to Long Cove (Iron Cove) which is 2.5 kilometres west of the study area. King stated that the district of the Wangal extended from Long Cove to Parramatta.¹⁸

¹⁵ Matthews and Everitt 1900; Attenbrow 2010:31

¹⁶ Attenbrow, V. 2010. Sydney's Aboriginal Past: Investigating the archaeological and historical records. UNSW Press. p:34

¹⁷ Ibid, p.22

¹⁸ Ibid, p.22



Figure 12: Aboriginal activities on the shore of Port Jackson in 1824. Source: Peron and Freycinet 1824.

The southern shore of the Parramatta River between Balmain and Parramatta was traditionally home to the Wangal people. John Hunter encountered the Wangal in 1788 at the current Breakfast Point (Canada Bay Heritage. The diary of Lieutenant William Bradly, RN noted.¹⁹

At daylight having a guard of marines proceeded to the upper part of the harbour again, passing several natives in the caves as we went up and on the shore near the place we left beads and some other things, who followed us along the rocks calling to us. We landed to cook our breakfast on the opposite shore to them. We made signs for them to come over and waved green boughs. Soon after seven of them came over in two canoes and landed near our boats. They left their spears in the canoes and came to us. We tied beads, etc., about them and left them our fire to dress mussels which they went about as soon as we put off.

Parramatta was a focal point for Aboriginal occupation as the natural landscape was rich in resources. In 1788, Governor Arthur Phillip reported that bark huts, fire places, collected fern root and shells, hunted animals for bones and the fur of a 'flying squirrel' or possum were seen at a campsite at Parramatta (then Rose Hill).²⁰ On another instance he also noted that,

*...these parts are frequented by the natives... undeniably proved by the temporary huts which were seen in several places. Near one of these huts, the bones of kangaroo were found...*²¹

The traditional land of the Barramatagal people was appropriated by colonists who claimed areas for settlement and agriculture. Natural resources such as water and timber were exploited by colonists, at the expense of the Barramatagal people. The introduction of diseases such as smallpox also devastated the local population. In 1789, over half of the Aboriginal population in the Sydney region

¹⁹ <https://canadabayheritage.asn.au/ccbhs-history/aborigines-original-occupants-of-the-area/>

²⁰ Attenbrow 2010

²¹ Stockdale, 1789. The Voyage of Governor Phillip to Botany Bay

are believed to have died of smallpox, which had spread across the Cumberland Plain and over the Blue Mountains.²²

The relationships between colonists and the Barramatagal people were mixed. There are instances where conflict arose, in particular as the settlement expanded and numerous incidents of theft were reported.²³ There are also examples of amicable interactions such as when soldiers at Parramatta exchanged their rations of salted meat for fish (Collins 1798: 139).

In January 1815, Governor Lachlan Macquarie opened the Native Institution at Parramatta, which aimed to prepare Aboriginal children for a British life. The children learnt Christian religion, reading, writing and arithmetic. The boys were also taught agricultural principles and practices, while the girls were taught needlework. The children demonstrated their new skills at the Annual Feast.²⁴

This annual 'Native Feast' was held by Governor Macquarie behind St Johns Church to encourage Aboriginal people to leave their children at the school. The first feast took place on 28 December 1816 and was attended by 179 Aboriginal people. Attendance rose each year, in 1818 reaching about 300, which included people who had travelled from beyond the Blue Mountains.²⁵ It was tradition that those who came from the west camped near Clay Cliff Creek for the duration of their stay.²⁶ At the annual feast, Governor Macquarie presented an engraved brass breastplate to 'chiefs', individuals who were not necessarily recognised as leaders in their own communities but who the Governor felt deserved this honour.

Aboriginal people continued and continue to live in Parramatta although historical records of their culture and customs are scarce after the Native Institution was closed in 1823 and the annual feast came to an end in 1835.

7.2 Archaeological context

7.2.1 Aboriginal material culture

The existing archaeological record is limited to certain materials and objects that were able to withstand degradation and decay. As a result, the most common type of Aboriginal objects remaining in the archaeological record are stone artefacts, followed by bone and shell. There is potential for Aboriginal objects to occur across the landscape. The nature of the underlying geology and proximity of water sources to portions of the study area indicates the potential for the occurrence of artefact sites and/or midden sites.

Stone artefacts are one of the most common types of Aboriginal objects remaining in the archaeological record. Archaeological analyses of these artefacts in their contexts have provided the basis for the interpretation of change in material culture over time. Technologies used for making tools changed, along with preference of raw material. Different types of tools appeared at certain times. It is argued that changes in material culture were an indication of changes in social organisation and behaviour.

²² Butlin, N.G., 1983. *Our Original Aggression: Aboriginal Populations of South-eastern Australia, 1788-1850*. Allen & Unwin, Sydney

²³ Collins, 1798, p.77, 178

²⁴ Attenbrow, 2010, p.84

²⁵ Ibid, p.22

²⁶ Kass *et al*, 1996, p.105

7.2.2 Registered Aboriginal sites

Three extensive searches of the Aboriginal Heritage Information System (AHIMS) database were conducted on 5 December 2019 (see Appendix 2). The aim of the AHIMS site register searches was to identify Aboriginal sites registered within, or in the vicinity of, the study area. Searches were undertaken using the following parameters:

Western portion of study area:

GDA 1994 MGA 56 [Coordinates removed for public display]
Number of sites 99
AHIMS Search ID 470203

Central portion of study area:

GDA 1994 MGA 56 [Coordinates removed for public display]
Number of sites 34
AHIMS Search ID 470207

Eastern portion of study area:

GDA 1994 MGA 56 [Coordinates removed for public display]
Number of sites 105
AHIMS Search ID 470218

The AHIMS extensive search areas with the distribution of recorded sites within the AHIMS search areas is shown in Figure 13, Figure 14 and Figure 15.

A total of 238 registered Aboriginal sites are located across the AHIMS extensive search areas. Of these, a total of 18 sites have been listed as destroyed, deleted or not a site. The frequency of site feature types is summarised in Table 6.

Table 6: Frequency and percentage of site features in extensive AHIMS search

Site Feature	Frequency	Percentage
Aboriginal Resource and Gathering	2	0.8
Aboriginal Resource and Gathering, Potential Archaeological Deposit (PAD)	1	0.4
Art (Pigment or Engraved)	19	8.3
Art (Pigment or Engraved) Artefact	1	0.4
Art (Pigment or Engraved), Shell	1	0.4
Art (Pigment or Engraved), Shell, Artefact	5	0.4
Art (Pigment or Engraved), Shell, Artefact, Burial	1	0.4
Artefact	56	23.5
Artefact, Hearth	1	0.4
Artefact, Modified Tree (Carved or Scarred)	1	0.4
Artefact, Potential Archaeological Deposit (PAD)	15	6.3

Site Feature	Frequency	Percentage
Artefact, Shell	47	19.7
Artefact, Shell, Aboriginal Ceremony and Dreaming	2	0.8
Burial, Aboriginal Ceremony and Dreaming, Artefact	1	0.4
Earth Mound	1	0.4
Grinding Groove	4	1.7
Habitation Structure	1	0.4
Hearth, Potential Archaeological Deposit (PAD), Artefact	1	
Modified Tree (Carved or Scarred)	3	1.3
Potential Archaeological Deposit (PAD)	62	26.1
Potential Archaeological Deposit (PAD), Shell	1	0.4
Shell	8	3.4
Shell, Artefact, Burial	1	0.4
Shell, Burial	1	0.4
Shell, Non-Human Bone and Organic Material	1	0.4
Waterhole	1	
<i>Total</i>	<i>238</i>	<i>100</i>

'Artefact' and 'potential archaeological deposit' are the most frequent site types recorded within the AHIMS extensive search areas. As shown in Figure 20, the majority of the recorded Aboriginal sites are located within the Parramatta CBD area and surrounds.

One recorded Aboriginal site, AHIMS ID 45-6-3582, is located within the Parramatta metro station construction site. That site is discussed further in Section 8.0.

Figure removed for public display

Figure 13: Distribution of AHIMS registered sites – western search area

Figure removed for public display

Figure 14: Distribution of AHIMS registered sites – central search area

Figure removed for public display

Figure 15: Distribution of AHIMS registered sites – eastern search area

7.3 Previous archaeological investigations

A presentation of the locations and findings of relevant previous archaeological investigations has been divided in geographic sections based on the construction site locations, as outlined in Table 7.

Table 7: Previous Archaeological Studies close to Metro West Stage 1

Author, title of study	Summary	Distance from closest construction site
RPS, 2015. <i>Aboriginal Heritage Impact Assessment, Westmead Hospital Redevelopment Project.</i>	RPS prepared an Aboriginal Heritage Impact Assessment in consultation with RAPs, who participated in the site inspection and shared their connections to Westmead. The area was identified as a culturally significant place to Aboriginal people. The soils within the RPS study area include the Blacktown soil landscape and the Parramatta Sand Body. Parts of the RPS study area were assessed as having high archaeological potential, however the areas to be impacted by the project had low potential. Therefore, no further investigation was recommended.	530 metres north-west of Westmead metro station
Artefact, 2015. <i>Stage 3 Works, The Paddocks Precinct, Parramatta Park Aboriginal Cultural Heritage Assessment Report</i> and Artefact, 2018. <i>Stage 3 Works: Paddocks Precinct Parramatta Park Archaeological Excavation Report.</i>	Artefact Heritage prepared an ACHAR for proposed upgrades to park amenities, paths, and landscaping in Parramatta Park. An Aboriginal Heritage Impact Permit (AHIP) was applied for and test excavation undertaken on the recommendations of the ACHAR. The results of the Stage 3 excavation showed that artefacts survived in a variety of soil types and also survived in 'considerably disturbed' contexts. Of the nine areas excavated, all were disturbed to some extent. The majority of artefacts were excavated from test trenches in alluvial soils, however test trenches in non-alluvial soils also contained high numbers of artefacts.	230 metres east of Westmead metro station
Haglund & Associates, 2007. <i>Parramatta Health Services Area, Parramatta Justice Precinct: Aboriginal Heritage Aspects.</i>	Haglund & Associates conducted an archaeological investigation within an area that was heavily disturbed by colonial construction activities. Their study area was located within the Blacktown soil landscape. Over 870 artefacts were excavated, most of which comprised of silcrete and tuff. The artefacts included flakes, cores, anvils and hammerstones and it was determined that the stone tools were processed on site. There was no evidence to suggest that the area was used as a campsite, rather it was used for manufacturing stone artefacts.	230 metres north west of Parramatta metro station
Jo McDonald Cultural Heritage Management, 2005. <i>Archaeological Salvage Excavation of Site RTA-G1 109-113 George Street Parramatta NSW.</i> Report to Landcom.	In 2005 Jo McDonald Cultural Heritage Management conducted salvage excavations prior to the construction of high-rise residential buildings and an underground carpark. The site was situated within the Parramatta Sand Body and the excavations uncovered evidence of prehistoric (Pleistocene) and Holocene era occupation. The excavated artefact assemblage comprised 4,775 artefacts, the dominant raw material of which is silcrete, followed by silicified tuff, quartz, and igneous materials. Seventy-five per cent of artefacts were recovered from the first 40 centimetres of the deposit, 16 per cent within the 40 to 60 centimetres, and 8 per cent between 60 and 80 centimetres. The site (RTA-G1) was assessed to be of high archaeological significance. At the time the report was written the site was the oldest site of Aboriginal occupation in Sydney and on the eastern coastline of Australia, with a date of 30,000 years before present.	425 metres east of Parramatta metro station

Author, title of study	Summary	Distance from closest construction site
	This date represented the maximum basal date for occupation and was taken from a sterile layer beneath the lowest artefacts. ²⁷	
Jo McDonald Cultural Heritage Management, 2004. <i>Archaeological Test Excavation for Indigenous Sites Civic Place, Parramatta</i> . Report prepared for Casey & Lowe on behalf of Parramatta City Council.	<p>Test excavations were undertaken at Civic Place in 2004. Despite a high level of disturbance within the Jo McDonald Cultural Heritage Management study area, areas that had an intact archaeological deposit were uncovered at depth. The site contained a low density of stone artefacts and finds were spread out across the excavated area. It was assumed that this pattern would also be found across areas of the site that had not been excavated.</p> <p>All six test trenches contained Aboriginal artefacts, however Trench 1 was the only test trench to show signs of an intact A1 soil horizon, identified below 70 centimetres of historical disturbance. No trenches contained evidence of the Parramatta Sand Body. Much of the Jo McDonald Cultural Heritage Management study area was found to have moderate to high archaeological potential, often correlating with low levels of disturbance. Jo McDonald Cultural Heritage Management recommended that further archaeological investigations occur under an AHIP.</p>	25 metres south of Parramatta metro station
Jo McDonald Cultural Heritage Management, 2004. <i>Archaeological Test Excavations for Indigenous Sites at 1 Smith Street, Parramatta</i> .	<p>In 2004 JMHCM conducted excavations at 1 Smith Street prior to construction works. The area forms part of the Blacktown Soil landscape, and evidence of a filled in river channel was located during geotechnical investigation, indicated by a clay-sand soil deposit. The Parramatta Sand Body was not evident.</p> <p>Seventy-nine test pits were excavated across the site, forty-nine of which contained artefacts. 198 artefacts were excavated in total, at a low site-density of two artefacts per square metre. Despite a high level of disturbance across the site, areas of intact archaeological deposits were found. It proved that other sites in Parramatta that have been subject to a high level of disturbance also have the potential to contain an intact archaeological deposit.</p>	165 metres south-east of Parramatta metro station
Cultural Resources Management (CRM), 2016. <i>Report of Archaeological Investigation: Church Street Mall Redevelopment Bicentennial Square Parramatta</i> .	<p>A Statement of Heritage Impact prepared by CRM identified the Bicentennial Square study area as having high potential to contain evidence of activities associated with the Native Institute's Annual Feast and archaeological investigation was recommended. Furthermore, the CRM study area is graded as having high sensitivity on the Parramatta Aboriginal Sensitivity Map found in the Parramatta Development Control Plan (DCP) of 2011.</p> <p>The study area featured the Birrong soil type, which included an alluvial floodplain overlaid by podzolic soils. Excavations showed that the A1 horizon (silty clay loam) had been reduced by 0.5 metres, disturbed by wall trenches dating to the early 1800s. Excavations did not occur to a depth that would have reached the B and C horizons, and the Parramatta Sand Body was not encountered.</p> <p>The focus on Aboriginal heritage noted in the archaeological research design was on potential contact archaeology associated with the 'annual feasts' arranged by Governor Macquarie within the Market Place. No Aboriginal objects, including contact archaeology, were identified during the excavation. CRM concluded that this was</p>	50 metres south of Parramatta metro station

²⁷ Jo McDonald Cultural Heritage Management, 2005: 135.

Author, title of study	Summary	Distance from closest construction site
	<p>most likely due to the extensive historic disturbance at the site, as very little soil was found intact.</p>	
<p>Peter Mitchell/Groundtruth Consulting, 2008. <i>Nature and Distribution of Parramatta Terrace Sand.</i></p>	<p>This report was prepared for the Parramatta City Council and summarised the nature and spread of the Parramatta Sand Body and analysed the implications for Aboriginal Archaeology. The report formulated a map to estimate the areas in which the Parramatta Sand Body may still be reasonably intact. The most intact and well-defined sand terrace was located along Clay Cliff Creek, between six to 10 metres above the river level. The Parramatta Sand Body is best known along George Street, as this is where most excavations investigating the Parramatta Sand Body have occurred. Moving south from the Parramatta River the sand appears to become finer with more clay apparent. Between Macquarie and Marsden Streets, which are at higher levels of elevation, the terrace appears to be underlain by alluvial clay-sand mixtures older than the main sand body.</p> <p>Mitchell's research suggests that the areas with the most potential to contain intact soils and therefore evidence of Aboriginal occupation were located in Parramatta Park and along the Parramatta River, as these areas contain the Parramatta Sand Body. The Parramatta Sand Body would have been an important and valuable resource, containing fresh water, food resources, shelter, woodlands and sandy soils suitable for campsites and burial. The core of the sand body is located within the Parramatta CBD and modern construction has impacted much of the original sand deposit. However, undisturbed sands are frequently found beneath 19th century buildings, roads and footpaths. The potential for archaeological deposits and artefacts appears to be increased by the presence of the Parramatta Sand Body, however other factors, such as natural landscape forms (eg. levees, ridgelines etc.), the presence of floodplains, and the level of disturbance should also be considered.</p>	<p>Multiple sites within the vicinity of the Parramatta metro station</p>
<p>Peter Mitchell/Groundtruth Consulting, 2011. <i>Sand body auger hole testing in the Parramatta Local Government Area.</i></p>	<p>Groundtruth Consulting was commissioned by the former Department of Planning to analyse the geomorphology and soil beneath several public reserves in Parramatta, focusing on the eastern portion of the Parramatta CBD between the Parramatta River and Clay Cliff Creek. The report analysed the geomorphology of Robin Thomas Reserve, James Ruse Reserve, and Hambledon Cottage Reserve. Of 28 auger holes tested, six encountered sand and four encountered marginal sand. No Aboriginal artefacts or archaeological remains were uncovered in any of the test holes. As the Parramatta Sand Body is considered to have a high level of archaeological potential for Aboriginal remains and the public reserves tested were undisturbed by modern construction works, the sites had experienced considerable backfill and did not contain any archaeological evidence despite being in an area of high potential and low disturbance.</p> <p>A lagoon feature that was previously located at Robin Thomas Reserve and was backfilled sometime post-1943 would have been an important resource for Aboriginal people and if well-drained, would have been a suitable camping spot. Archaeological deposits may be preserved at deeper levels and would require further investigation, and the backfill would be considered to further preserve and protect these deposits.</p>	<p>Multiple sites within the vicinity of the Parramatta metro station</p>

Author, title of study	Summary	Distance from closest construction site
Kelleher Nightingale Consultants (KNC), 2017. <i>Parramatta Light Rail Aboriginal Cultural Assessment Report</i> .	<p>KNC prepared an ACHAR to inform the Parramatta Light Rail Environmental Impact Statement. Parts of the KNC study area contained quaternary fluvial deposits associated with the Parramatta Sand Body. The topsoils of the Parramatta Sand Body are generally disturbed by post-colonial activity, however archaeological material within the Parramatta Sand Body can be preserved by later backfill. The initial survey undertaken by KNC identified seven Potential PADs with moderate archaeological potential.</p> <p>An archaeological test excavation was undertaken in April to May 2017. Despite the disturbance across much of the study area, intact soils were identified below modern and historical disturbance and these soils did contain artefactual deposits. Five of the seven PADs were concluded to not be PADs, and three artefacts were excavated from the two PADs. Further test excavation occurred at Robin Thomas Reserve, which located nine artefacts. The report also identified several areas of Aboriginal cultural value, including the ancestral association with the land, the known archaeological deposits within the Parramatta Sand Body, and the cultural connection to the Parramatta River.</p>	Multiple sites within the vicinity of the Parramatta metro station
Haglund & Associates, 2004. <i>Parramatta Children's Court Site</i> .	<p>Haglund & Associates carried out test excavations at the Parramatta Children's Court site in 2004. Geotechnical investigations identified alluvial deposits of sand and clay at significant depths of up to 12 metres, surviving beneath historic ground disturbance and fill. Between 40 and 60 centimetres in depth, a low density of artefacts were excavated, and primarily consisted of debitage from artefact manufacture along with fragments of broken or discarded flakes. Some formal stone artefacts were also present. It was suggested that the low density of artefacts was due to "low-level use prior to European arrival" or the close proximity of their site to the Parramatta River, which may have flooded periodically and disturbed sediments, removing artefactual deposits.</p> <p>Several phases of construction at the site had repercussions for the survival of artefacts, and it was suggested that earthworks, particularly excavation and levelling, had been responsible for the removal and redeposit of artefacts from their original contexts. The report suggests that while backfilling can protect intact archaeological soils including the Parramatta Sand Body, excavation of the sand prior to construction can heavily damage much of the soil and therefore its archaeological potential. Due to the age of many of Parramatta's buildings, it can be quite difficult to gauge whether excavation has occurred and to what extent.</p>	300 metres west of Parramatta metro station
Austral Archaeology, 2007. <i>Archaeological Salvage Excavations, 95-101 George Street Parramatta</i> . Report to Leighton Properties.	<p>Austral Archaeology carried out a salvage excavation at 95-101 George Street in 2007. The area had previously been identified as a PAD due to its location in proximity to the Parramatta River and the likelihood of encountering the Parramatta Sand Body within the study area.</p> <p>The salvage excavation encountered the intact Parramatta Sand Body and 601 artefacts were excavated. These artefacts were predominantly silicified tuff, which represented 50 per cent of the assemblage. Silcrete, chert, quartz, igneous and petrified wood artefacts were also excavated and the most common artefact types were flakes and flake fragments. Retouched artefacts and cores represented only two per cent of the artefacts each. Despite the ground within the study area being heavily disturbed, the majority of</p>	300 metres west of Parramatta metro station

Author, title of study	Summary	Distance from closest construction site
	the study area was found to be intact and in situ beneath the historic phases of occupation and was undisturbed by modern construction.	
Comber Consultants, 2010. <i>Preliminary Excavation Report, 140 Macquarie Street, Parramatta.</i>	<p>Comber Consultants excavated a series of 32 test trenches at 140 Macquarie Street, Parramatta in 2010. Two metres of backfill was excavated prior to any excavation from archaeologists, who excavated the test trenches to a depth of 1.2 metres. 55 artefacts were excavated, found in 17 of 32 trenches, most of which were flaked debitage. The Parramatta Sand Body was also identified throughout the western portion of the site, and geomorphology suggested that the area had been swampy in the past. The test excavations were interpreted to show that the area was used by the local Aboriginal people and was utilised for its natural resources, however it was not an appropriate area for camping. More appropriate campsites would be slightly north, closer to the Parramatta River where the Parramatta Sand Body was elevated. Thermoluminescence scans were undertaken to date undisturbed sand levels below the levels of Aboriginal occupation and were dated to between 50,000 to 58,000 years before present.</p> <p>This excavation clearly shows that despite extreme landscape modification, notably backfilling, and many years of construction, intact archaeologically sensitive soils can be present at considerable depths. Whether archaeological deposits including artefacts are present also depends on the natural landform of the study area. As this study area would have naturally been wetlands, it was not suitable for occupation and therefore no artefactual deposits were encountered, despite minimal disturbance and the intact nature of the Parramatta Sand Body.</p>	460 metres west of Parramatta metro station
Archaeological Heritage Management Solutions (AHMS), 2013. <i>189-191 Macquarie Street Aboriginal Cultural Heritage Assessment Report.</i>	<p>An ACHAR was prepared by AHMS in 2013 after a Due Diligence report by GML (2012) determined that the Parramatta Sand Body likely extended into the AHMS study area. The geology of the site formed part of the Birrong soil landscape, with alluvial floodplains overlying deep yellow podzolic soils to a minimum depth of 250 centimetres. Only the northern part of the AHMS study area contained the Parramatta Sand Body and no Aboriginal artefacts were excavated. The southern portion of the AHMS study area was located on a levee of Clay Cliff Creek and contained a low density of artefacts (four to seven per square metre). It was concluded that the elevated ground of the level would have been a favourable location for Aboriginal people in the region.</p> <p>The results of the excavation show that despite moderate disturbance and development, the archaeologically sensitive Parramatta Sand Body can be preserved and intact. However, while the sands are generally archaeologically sensitive, they do not always contain artefacts, and the absence of the Parramatta Sand Body does not necessarily mean the absence of artefacts or archaeological soils.</p>	440 metres south-east of Parramatta metro station

Author, title of study	Summary	Distance from closest construction site
AECOM, 2013. <i>Clyde Terminal Conversion Project Environmental Impact Statement</i> . Prepared for The Shell Company of Australia.	<p>AECOM prepared the non-Aboriginal and Aboriginal heritage and archaeological chapters of the Clyde Terminal Conservation Environmental Impact Statement for Shell in 2013. No Aboriginal sites were located during the site survey and the study area was determined to be highly disturbed, with much of the study area defined as artificially developed reclaimed land. The natural landform of the area as a wetland would not have been a suitable habitation area for Aboriginal people.</p> <p>The study area was located on the Duck River and in close proximity to the Parramatta River, both of which would have been important resource areas for Aboriginal people in the past, as they would have contained an abundance of marine life and vegetation for food sources. However, no specific cultural values or concerns were raised by Registered Aboriginal Parties (RAPs) who participated in the site inspection.</p>	200 metres east of Clyde stabling and maintenance facility
AECOM, 2018. <i>Viva Energy Clyde Western Area Remediation Project. Appendix K Technical Report: Aboriginal heritage</i> .	<p>AECOM was engaged to prepare an Aboriginal heritage assessment for Viva Energy focusing on a study area at Rosehill/Camellia Peninsula on the Duck River. The study area would have naturally been a low-lying estuary however it has been heavily modified throughout colonial history and is partially reclaimed land. The first soil unit is the reclaimed silt, clay and gravel fill (one to three metres in depth), underlain by estuarine sediments of silty clay (to a depth of four metres), beneath which is alluvial sediment which may have a maximum depth of 20 metres. The study area is heavily disturbed and altered through phases of reclamation, construction and industry.</p> <p>The natural landscape suggests that raw materials suitable for stone tool manufacture would not have been present in this area and it would not have been a suitable habitation area, as it was low-lying wetland naturally. However, wetland regions are rich in food resources and this area would have been utilised by Aboriginal people in the past. The report assessed the study area as having little to no archaeological potential, no potential Aboriginal places or archaeological deposits were located, and no further investigation was recommended. Impacts to Aboriginal cultural heritage were assessed as negligible.</p>	200 metres east of Clyde stabling and maintenance facility
Kelleher Nightingale Consultants (KNC), 2014. <i>Westconnex M4 Widening Pitt Street, Parramatta to Homebush Bay Drive, Homebush: Aboriginal Archaeology Survey Report</i>	<p>KNC prepared an Aboriginal Archaeological Survey Report in 2014 to inform the Environmental Impact Statement for the WestConnex M4 Widening. The study area of this report includes the M4 motorway from Homebush Bay Drive to Pitt Street, Parramatta. Geotechnical testing within the assessed area encountered a fill layer to a depth of 70 centimetres, beneath which was an underlying layer of clay alluvium two to three metres deep.</p> <p>No previously registered Aboriginal places were located within the KNC study area, however several sites were located within one kilometre of the WestConnex construction footprint. The most common registered site type was open artefact scatters, followed by Potential Archaeological Deposits (PADs, isolated finds, and modified trees). The low number of sites in the area was attributed to heavy disturbance. KNC determined that the study area exhibited no signs of undisturbed soils or landforms that may be archaeologically significant. It was assessed that there was no likely impact to Aboriginal archaeological or cultural remains and no further investigation was recommended.</p>	750 metres south of Sydney Olympic Park metro station; 440 metres south of the Silverwater services facility; Within the Clyde stabling and maintenance facility

Author, title of study	Summary	Distance from closest construction site
Artefact Heritage, 2018. <i>1 & 2 Murray Rose Avenue, Sydney Olympic Park Archaeological Survey Report.</i>	<p>Artefact Heritage was engaged by Austino Property Group in 2018 to prepare an Archaeological Survey Report and ACHAR in order to identify any cultural heritage values, impacts and mitigation measures within Sydney Olympic Park. During the site inspection no Aboriginal archaeological sites or areas of potential archaeological deposits were located within the study area and no further Aboriginal archaeological investigations recommended.</p> <p>Geotechnical investigations were undertaken and determined that the subsurface deposits within the study area was a sandy clay fill overlying natural sediments of residual clay silt and bedrock to a depth of one to 3.3 metres. The report concluded that it is possible that archaeological material may be located within the fill layer, however it would be considered removed from its original stratigraphic context and would therefore hold limited research/scientific potential, although it would be culturally significant.</p>	650 metres north-east of Sydney Olympic Park metro station
Australian Museum Business Services (AMBS), 2012. <i>Newington Armament Depot & Nature Reserve, Sydney Olympic Park.</i> Report prepared for Tanner Architects Pty Ltd.	<p>AMBS undertook an Aboriginal Heritage Assessment at the Newington Armament Depot & Nature Reserve which aimed to verify the location of previously recorded sites and to inspect the area for new archaeological sites and potentially archaeologically sensitive areas. The eastern portion of the Newington study area was located on an Ettalong soil landscape which is typically represented in coastal swamps and the western portion was disturbed soil indicative of reclaimed land. Given the extent of disturbance to the original land surface within the study area, it was considered that only the woodland area of the Newington Nature Reserve has any archaeological potential for Aboriginal objects.</p> <p>There are five registered Aboriginal sites within the Newington Armament Depot & Nature Reserve study area registered by Paul Irish. These sites were not re-located during the survey for that assessment, and were assessed as being of low significance. No new Aboriginal sites or areas of Aboriginal heritage sensitivity were identified during the survey. This confirmed AMBS' prediction that European construction and use of the Armoury in the area has strongly impacted Aboriginal archaeological potential.</p>	1.5 kilometres north of Sydney Olympic Park metro station
Paul Irish, 2004. <i>Aboriginal Archaeological Assessment Report, Newington Armoury Adaptive Re-use and Rail Extension Project, Sydney Olympic Park.</i> Report to the Sydney Olympic Park Authority.	<p>Irish surveyed the woodland and nature reserve buffer zone of the Newington Armoury Precinct in 2003. He established that the trees within the woodland were of insufficient age to contain scars of Aboriginal cultural origin and he determined that the scarred trees identified in previous studies were not Aboriginal in origin. Surface visibility was generally low, but during the survey three isolated silcrete and chert artefacts and two PADs were identified. Possible silcrete manuports (stone material thought to have been transported to the area by Aboriginal people) were also identified. However, the Aboriginal origin of the presence of these silcrete pieces could not be confirmed.</p> <p>The soil types in the study area are Ettalong coastal swamps in the east, and disturbed reclaimed land in the west. Irish states that the lack of Aboriginal archaeological material is likely to be a reflection of the early urban development of the Parramatta River, which would have precluded the preservation of sites and the necessity for archaeological assessment, rather than an indication of less intense Aboriginal occupation of the area. Irish also identified two PADs during this assessment within a woodland conservation zone.</p>	1.5 kilometres north of the Sydney Olympic Park metro station

Author, title of study	Summary	Distance from closest construction site
Brayshaw, 1997. <i>Olympic Village Site, Newington, Homebush Bay. Aboriginal Archaeology</i> . Report to the Mirvac.	<p>Brayshaw surveyed the Olympic Village Site and Newington in 1997. No Aboriginal sites were located and previously identified artefacts were unable to be located. Some unmodified silcrete was identified in the area of sensitivity. A high level of disturbance was noted on the lower slopes west of Haslams Creek and near armament stores, with landfill seen on the flat adjacent to the creek. The soil landscape identified in that area was identified as the Birrong soil type, an alluvial floodplain which overlies deep (greater than 250 centimetres) podzolic soils and solodic soils,²⁸ which contrasts with the shallower residual soils across the underlying siltstone bedrock of the Olympic Park metro station construction site.</p> <p>Brayshaw stated that the lack of silcrete over the entire Olympic Village and Newington site suggests the material may have not been an accessible source to Aboriginal people occupying the area and has only been exposed by disturbance. Brayshaw concluded the area was not archaeological sensitive, as the disturbance was too great to allow any meaningful interpretation of Aboriginal use of the area, or to offer the possibility of further information being gained from subsurface investigation.</p>	1.5 kilometres north of Sydney Olympic Park metro station
Dominic Steele & Martin Carney Archaeological Management and Consulting Group, 1997. <i>Aboriginal Heritage, Australia Avenue, Fig Tree Circuit, 2000 Olympic Site, Homebush NSW</i> . Report to The Olympic Co-Ordination Authority.	<p>Steele and Carney surveyed the future Olympic Park site in 1997 prior to its construction. The site was at that time functioning as a truck parking area. No evidence for Aboriginal use of the site was identified during the field survey, however, archaeological visibility within the surveyed areas was poor. The investigations found the natural ground surface was likely to have survived within the surveyed areas obscured by introduced fills. It was recommended that any impact to these subsurface areas be monitored for the presence of Aboriginal artefacts.</p> <p>Subsequent development works on the site to construct the current buildings involved site clearance and preparation, cut and fill excavation, levelling and grading, and subsequent construction works and service installation. These works are likely to have disturbed or destroyed any natural ground surface.</p>	300 metres west of Sydney Olympic Park metro station
Umwelt, 2017. <i>Heritage Desktop Assessment Wave Park Group</i> .	<p>Umwelt were contracted to prepare a Heritage and Archaeological Assessment covering both Aboriginal and non-Aboriginal heritage as part of the proposal to develop URBNSURF Sydney, a sport and leisure centre at Sydney Olympic Park. The assessment determined that during the construction of Sydney Olympic Park in the late 1990s, deposits of fill between five to nine metres deep were deposited throughout the study area in order to create a stable and level surface. Geotechnical investigations found that beneath the fill, alluvial and estuarine deposits were present, preserved by the fill.</p> <p>The Umwelt study area had initially formed part of extensive mangrove flats along the Parramatta River and would have contained many valuable resources that would have been utilised by Aboriginal people, the swampy landscape would not have been suitable for living or retaining intact. The assessment did not recommend any further archaeological investigation.</p>	1.8 kilometres north of Sydney Olympic Park metro station

²⁸ Department of Environment, n.d. 'Birrong,' eSpade. Accessed online 3/5/2019 at: <https://www.environment.nsw.gov.au/Salis5app/resources/spade/reports/9130bg.pdf>

Author, title of study	Summary	Distance from closest construction site
Urbis, 2016. <i>Historic and Aboriginal Archaeological Assessment, 2 Figtree Drive Sydney Olympic Park.</i>	<p>Urbis were engaged in 2016 by Mirvac to prepare a Historic and Aboriginal Archaeological Assessment to accompany the Development Application at 2 Figtree Drive, Sydney Olympic Park. The Urbis study area was located on Wianammatta Group Shale and Quarternary alluvial deposits of sand, silt and clay, which are deposited along Haslams and Powells Creeks. The soil was identified to be Blacktown Soil, a red/brown podzolic soil with low fertility and poor drainage. Homebush Bay would have been an important resource centre for the Wangal Aboriginal People who lived in the area, as the estuarine landscape was abundant with marine life for food and timber for construction resources. Haslams and Powells Creeks would also have been a valuable and reliable freshwater source.</p> <p>Numerous shell middens were known to have been in the Homebush Bay area however they were destroyed in the eighteenth and nineteenth centuries through limekilns and reclamation of the land. This report concluded that due to the extensive disturbance of the study area it is considered to have no archaeological potential for Aboriginal archaeological deposits or artefacts. No further investigation was recommended.</p>	120 metres south-east of Sydney Olympic Park metro station
Niche, 2011. <i>Aboriginal Cultural Heritage Assessment, Australian Catholic University Campus, Strathfield.</i>	<p>In 2011 Niche was engaged to prepare an ACHAR for HASSELL who were contracted to prepare a Concept Plan Application for the Australian Catholic University (ACU). The ACU site was situated in a transitional soil landscape area between Ashfield Shale and Bringelly Shale, which is part of the Blacktown soil landscape. These soils were predicted to be generally a shallow podzolic soil overlying clay and shale bedrock. The report suggested that if Aboriginal artefacts were to be present, they would most likely be in the topsoil or the transition between the topsoil and underlying clay.</p> <p>The ground was moderately disturbed, with activities such as native vegetation clearance, landscaping, service installation, and construction of buildings, carparks and roads, footpaths, sports fields and swimming pool installation causing the ground disturbance. It was determined that there was no Aboriginal archaeological potential at the site and no further investigation was recommended.</p>	Two kilometres south of North Strathfield metro station
Biosis, 2018. <i>Concord Hospital Redevelopment: Aboriginal Cultural Heritage Due Diligence Assessment.</i>	<p>In 2018 Biosis was engaged by Johnstaff on behalf of Health Infrastructure to prepare a due diligence assessment for the redevelopment of Concord Hospital. The site contains parts of a Blacktown soil landscape along with a disturbed soil landscape in the south of the study area. Geotechnical investigations undertaken for the assessment identified fill material between depths of 200 to 500 millimetres and some sections to a depth of 1.4 metres. Beneath the fill was a layer of clay to a depth of 2.6 metres, beneath which was laminated shale. The fill layer was composed of an upper layer of medium grained sand with gravel inclusions, and the lower layer was fine grained gravel and clay.</p> <p>The report discussed the important role of the Parramatta floodplain as an area of valuable resources to Aboriginal people. Raw materials which may have been suitable for the construction of tools were also available in the area. Biosis determined that within the study area, there was high potential to encounter shell middens, moderate potential for artefacts and potential archaeological deposits, and there was low potential for quarries, modified trees, grinding grooves, burials, shelters, contact sites, or ceremony sites.</p>	2.25 kilometres north of North Strathfield metro station

Author, title of study	Summary	Distance from closest construction site
	Due to the high disturbance within the study area, it was assessed overall as having low archaeological potential and no further archaeological investigation was recommended.	
AECOM, 2007. WestConnex M4-M5 Link Environmental Impact Statement	The ACHAR section of the WestConnex M4-M5 link was prepared by AECOM, who analysed the potential impacts to Aboriginal Heritage. The study identified the soil through much of the project footprint to be Blacktown and Gympsea soils, however the assessment noted that much of the project footprint, particularly around Rozelle Bay, was highly disturbed terrain. It was argued that the high level of disturbance, notably landscape clearance and earthworks would have likely destroyed intact subsurface soils or Aboriginal archaeological remains. It was determined that the project was not likely to impact any areas of Aboriginal cultural heritage or potential archaeological deposits.	750 metres south-west of Five Dock Station. 550 metres west of The Bays Station
Mary Dallas Consulting Archaeologists, 2000. <i>Callan Point Aboriginal Heritage Management Plan</i> .	Mary Dallas Consulting Archaeologists prepared an Aboriginal Heritage Management Plan for Callan Park in 2000, which aimed to protect four registered shell midden sites in the area. ²⁹ Three of four sites at Callan Park are middens within shelters, and each of the sites are located in close proximity to the foreshore. The sites have been impacted by tidal action as well as erosion of the ground surface due to visitors in the park walking close by to the sites. The report provides insight on the preservation issues of many Indigenous sites and that seemingly low-impact activities can cause considerable damage. The sites were scientifically studied by Val Attenbrow in the late 1980s however no subsurface archaeological investigations were undertaken by Attenbrow.	1.2 kilometres west of The Bays Station
Artefact Heritage, 2013. <i>Rozelle Rail Yard, Preliminary Aboriginal Heritage Assessment</i> . Prepared for NSW Department of Planning and Infrastructure.	Artefact Heritage was engaged in 2013 to complete a preliminary Aboriginal heritage assessment of the Rozelle Rail Yards. The assessment identified areas of remnant sandstone and elevated locations such as ridge lines, and the possibility of these being remnant intact landforms was discussed. Areas containing ridgelines or remnant sandstone were assessed as having moderate archaeological potential, however much of the study area had been extensively disturbed and had low archaeological potential. The elevated landforms in the area would have been a suitable area for occupation and would have been useful for identifying resources in the area. While no geotechnical investigation occurred as part of the project, the underlying geology of the study area was Hawkesbury sandstone, and parts of the Rozelle/White Bay area have been subject to infill. The report recommended that if works were to impact the areas of remnant sandstone, further investigation should occur. Overall the assessment highlighted the importance of the sandstone ridge as an area of occupation based on the areas proximity to resources associated with surrounding bays, where it was a particularly suitable location for rock shelters. ³⁰	200 metres south-west of The Bays Station

²⁹ Mary Dallas Consulting Archaeologists, 2000. *Callan Point Aboriginal Heritage Management Plan*. Accessed online 26/4/2019 at: <http://callanparkyourplan.com.au/downloads/background/A-3.pdf?PHPSESSID=9e8295269de4bac128c719780585ea06>

³⁰ Artefact Heritage, 2013. *Rozelle Rail Yard, Preliminary Aboriginal Heritage Assessment*, NSW. Prepared for NSW Department of Planning and Infrastructure.

Author, title of study	Summary	Distance from closest construction site
Artefact Heritage, 2014. <i>Bays Precinct; Preliminary Aboriginal Heritage Assessment</i> . Prepared for Urban Growth NSW	<p>Artefact Heritage was engaged in 2014 to complete a preliminary Aboriginal heritage assessment of The Bays. The assessment included the Rozelle Rail Yards, Glebe Island and the land bordering White Bay, Rozelle Bay and Blackwattle Bay. The Bays Station construction site was assessed as part of the White Bay Power Station and Glebe Island Assessment areas.</p> <p>The majority of the White Bay Power Station area was identified as reclaimed land and introduced land. This portion of the White Bay Power Station was identified as containing no archaeological potential. The south-western portion of the White Bay Power Station was identified as the location of the original shoreline. This portion of the assessment area was considered unlikely to have been subject to deep subsurface disturbance and subsequently identified as containing moderate archaeological potential.</p>	Within The Bays Station
Comber Consultants, 2011. <i>Aboriginal Archaeological and Cultural Heritage Assessment – Johnstons Stormwater Canal: Shared Pathway Project</i> . Prepared for the City of Sydney.	<p>Comber Consultants (2011) were engaged by the City of Sydney to complete a due diligence assessment of a proposed shared pathway located adjacent to Johnstons Stormwater Canal. The study area is located between Wigram Road and Blackwattle Bay, approximately 500 metres south of The Bays Station construction site. The northern portion of their study area consisted of tidal wetlands and the wider study area had been crossed by major roadways, a railway viaduct, sewer viaducts, and four footbridges. The landscape was highly disturbed and had been levelled for both industrial, infrastructure, and residential uses. The construction of the stormwater canal also realigned parts of the natural alignment of Johnstons Creek.</p> <p>Comber confirmed that the study area was located within an area of reclaimed land, and while there was no geotechnical testing carried out for their report, eSpade confirms that the study area is 'disturbed terrain' that was previously swamps and estuaries.³¹ Comber suggested that the cut and fill and subsequent development would have destroyed any intact sites or subsurface deposits. No further archaeological investigation was recommended.</p>	500 metres south of The Bays Station

³¹ NSW Department of Environment, n.d.. 'Disturbed Terrain,' eSpade. Accessed online 3/5/2019 at: <https://www.environment.nsw.gov.au/Salis5app/resources/spade/reports/9130xx.pdf>

7.4 Archaeological implications

The presence of intact Aboriginal archaeological deposits within the study area is largely dependent on the nature and extent of disturbance associated with historical construction activities. Subsurface disturbance such as the removal of top soil and other bulk earthworks would substantially lower the potential for intact archaeological deposits in those areas. This is especially relevant in areas of relatively shallow residual soils, which includes the majority of the study area.

In summary, whilst the study area would have been a site of Aboriginal occupation in the past, the likelihood of evidence of this occupation surviving to the present is influenced by a range of factors. These factors include the durability of the material evidence and subsequent impacts such as bulk earthworks. The large-scale removal and modification of underlying Wianamatta Group geology and associated shallow residual soils within the study area is likely to have significantly impacted or removed many former natural landform contexts and associated archaeological potential in the study area.

7.5 Predictive model

Archaeological data has demonstrated the widespread and varying use of the area by Aboriginal people. The study area is located across a broad range of contexts, including areas within close proximity to marine and estuarine resources, fresh water, varying terrestrial subsistence resources, and areas where sandstone platforms and overhangs may have originally occurred.

Previous archaeological investigations of the greater Sydney area in general demonstrate the distribution of recorded Aboriginal sites as reflecting the use of the landscape by Aboriginal people, including movement between resources and activity areas. The distribution of recorded Aboriginal sites in particularly built environments, such as the Parramatta CBD area, is largely limited to areas that have been subject to archaeological excavation and/or not impacted by development.

The distribution of identified and recorded instances of overlapping and higher concentrations of stone artefacts in the region tends to be associated with high order watercourses and creek confluences, whilst lower density and more isolated activity areas in other parts of the landscape represented different and varying activities important to the understanding of overall landscape use.³²

The distribution of Aboriginal sites also demonstrates the association of recorded Aboriginal sites with sandstone outcrops similar landforms in the locality of Stage 1. These site types include sandstone platforms where engravings are typically identified, and sandstone overhangs that were utilised for art, subsistence activities and artefact manufacture.

The predictive statements for the study area are as follows:

- The survivability of Aboriginal objects would be largely dependent on the extent and nature of subsequent phases of historical construction activities
- Sub-surface artefact sites tend to consist of lower density isolated occurrences in areas away from major watercourses such as freshwater, marine and estuarine areas
- More frequent and higher concentrations of sub-surface artefact sites are likely to occur in the vicinity of major watercourses such as freshwater, marine and estuarine areas

³² White, E. & McDonald, J. 2010. Lithic Artefact Distribution in the Rouse Hill Development Area, Cumberland Plain, New South Wales. *Australian Archaeology*. 70: 29-38.

- Shell midden sites are more likely to be identified in close proximity to marine and estuarine areas. Due to land reclamation in many areas, former marine and estuarine areas may be set-back from contemporary shoreline areas
- Sandstone shelters suitable for archaeological deposit and outcrops suitable for engravings may be preserved in ridge crest and ridge slope landform contexts
- Surviving portions of deeper soil profiles within the study area, such as the Parramatta Sand Body, may provide stratified evidence of occupation.

8.0 SITE LOCATION CONTEXT AND ARCHAEOLOGICAL SURVEY

8.1 Introduction

This section presents an overview of the environmental and archaeological context for each construction site including the results of the archaeological survey and an assessment of archaeological potential.

A summary of the desktop assessment of each power supply route beyond the construction site boundaries is included in Section 8.11.

8.2 Westmead metro station construction site

8.2.1 Environmental context overview

The Westmead metro station construction site is located on the broad crest of a low-lying ridge, which is bordered to the north and east by Parramatta River. Large portions of the surface context of the Westmead metro station construction site have been modified through residential and commercial development, as well as road construction and installation of below ground services.

The closest watercourse is Domain Creek, approximately 350 metres to the east of the Westmead metro station construction site. Domain Creek is a first order watercourse that flows north through Parramatta Park to the Parramatta River. Finlaysons Creek, also mapped as a first order watercourse, is located approximately 1.1 kilometres west of the Westmead metro station construction site. At its closest point, Parramatta River is located approximately 660 metres from the study area.

The Westmead metro station construction site is located towards the centre of the ridge landform, with gradient generally descending west towards Finlaysons Creek from Hawkesbury Road, and descending east towards Domain Creek. It is likely that local watercourses in the vicinity of the Westmead metro station construction site prior to significant commercial and residential development would have consisted of ephemeral first order tributaries of both Domain Creek and Finlaysons Creek.

The underlying geology of the Westmead metro station construction site consists of Ashfield Shale, which is generally composed of black to dark-grey shale and laminate.³³ Ashfield Shale caps the underlying Hawkesbury Sandstone.³⁴ Soils associated with the typically gentler slopes of the Ashfield Shale formation tend to be residual soils developed *in situ*.³⁵ This includes the residual Blacktown soil landscape.

The residual Blacktown soil landscape within the construction site consists of a moderately deep (less than one metre) soil with limited erosion characteristics in areas with ground cover.³⁶ Unless removed or disturbed through commercial/road/infrastructure development or extreme erosion events, archaeological material is likely to remain relatively *in situ* (subject to bioturbation). However, the

³³ Clarke, N.R. and Jones, D.C., (eds), 1991.

³⁴ Ibid

³⁵ Chapman G.A., Murphy, C.L., Tille P.J., Atkinson G. and Morse R.J., 2009 Ed. 4, *Soil Landscapes of the Sydney 1:100,000 Sheet* map, Department of Environment, Climate Change and Water, Sydney

³⁶ Ibid pg. 22

Westmead metro station construction site has generally been subject to a high level of surface disturbance, which is likely to have removed or disturbed any remnant soil contexts.

Geotechnical investigations for the Westmead metro station construction site were located in the road corridor. In both locations road pavement and subgrade was identified to a depth of between 200 millimetres and 400 millimetres over residual clay.

8.2.2 AHIMS

No recorded Aboriginal sites are located within 100 metres of the Westmead metro station construction site (see Figure 20). The closest recorded Aboriginal site is AHIMS ID 45-5-4537, an artefact site recorded by Val Attenbrow within Parramatta Park 385 metres east of the construction site.

8.2.3 Archaeological context overview

A limited number of archaeological investigations have been undertaken in the immediate vicinity of the Westmead metro station construction site. The predictive model and assessment of the AHIMS site register search results indicate the correlation of the predominance of archaeological evidence relating to Aboriginal land use activities in the following areas:

- Adjacent to watercourses and foreshore areas, such as Parramatta River and the Paddocks, approximately 250 metres to the east
- In areas of exposed sandstone platforms and shelter formations, such as in slope landform contexts and at a break of slope
- Areas that have not been heavily developed and modified.

An Aboriginal heritage assessment at Westmead Hospital, approximately 250 metres north of the Westmead metro station construction site, was prepared by RPS in 2015.³⁷ RPS identified the soils across that area included residual Blacktown soils, correlating with the environmental context of the Westmead metro station construction site, and a portion of the Parramatta Sand Body. RPS identified the area of residual soils as demonstrating low archaeological sensitivity and that no further investigation was required.

Several archaeological investigations have been undertaken within The Paddocks portion of Parramatta Park.³⁸ Surface artefact sites have been identified across The Paddocks, and archaeological excavation with certain portions of The Paddocks identified artefacts in varying densities across both heavily disturbed and more intact alluvial soils. The environmental context of the Paddocks is substantially different to the Westmead metro station construction site. The Paddocks is situated on low-lying undulating land adjacent to Parramatta River that has not been significantly developed or impacted from historical land use activities.

Previous Aboriginal heritage assessments in the area have highlighted the significance of contexts closer to Parramatta River³⁹ and those areas associated with the Parramatta Sand Body (see Section 8.3.1). The generally shallow residual soils across the raised shale and sandstone landform context of the Westmead metro station construction site are likely to have been subject to significant disturbance

³⁷ RPS, 2015. *Aboriginal Heritage Impact Assessment, Westmead Hospital Redevelopment Project*.

³⁸ Artefact Heritage, 2016

³⁹ Artefact Heritage, 2018

from residential and commercial development, as well as construction of transport and service infrastructure.

8.2.4 Archaeological survey results

The Westmead metro station construction site is a built environment located adjacent to the existing rail corridor. No areas of surface visibility or intact ground surface were observed.



Figure 16: View south-west along Alexandra Avenue towards the Westmead metro station construction site



Figure 17: View north across Bailey Street showing gentle slope of crest landform context and residential development associated with the Westmead metro station construction site



Figure 18: Observed landform modification associated with residential construction within Westmead metro station construction site



Figure 19: Example of rail cutting located on northern boundary of the Westmead metro station construction site

8.2.5 Assessment of archaeological potential

Limited archaeological investigation has been undertaken in the vicinity of the Westmead metro station construction site, with the closest recorded Aboriginal sites to the east within The Paddocks portion of Parramatta Park and adjacent to Parramatta River.

The construction of commercial and residential buildings, and associated infrastructure across the Westmead metro station construction site is likely to have significantly impacted or removed the former ground surface context. These activities are likely to have significantly disturbed or resulted in the removal of natural A horizon contexts.

The Westmead metro station construction site is located on a crest landform context away from major watercourses. The combination of landform context and likely disturbance or removal of A horizon

contexts indicates that the overall archaeological potential of the Westmead metro station construction site is **low**.

Figure removed from public display

Figure 20: AHIMS site register search results; Westmead metro station construction site

8.3 Parramatta metro station construction site

8.3.1 Environmental context overview

The Parramatta metro station construction site is located across a flat landform context within the Parramatta CBD. Extensive commercial development has occurred across the construction site, which is intersected by Horwood Place and Macquarie Lane. The construction site fronts a portion of George Street to the north, Macquarie Street to the south, Church Street to the west, and Macquarie Lane to the east. Parramatta River is located approximately 290 metres to the north, and Clay Cliff Creek is located approximately 465 metres to the south-east. Clay Cliff Creek is a freshwater watercourse in the Parramatta CBD area, and a tributary of Parramatta River.

Portions of the Parramatta CBD are underlain by a significant geological feature, the Parramatta Sand Body. The Parramatta Sand Body is a significant archaeological resource with evidence of Aboriginal activities dating from the Holocene and Pleistocene epochs.⁴⁰ The sand body is also relatively deep, increasing the possibility of portions of the sand body surviving beneath phases of historical development.

A physical description of the Parramatta Sand Body from the State Heritage Register listing for the Ancient Aboriginal and Early Colonial Landscape item at Robin Thomas Reserve is outlined below (SHR # 01863):⁴¹

The geomorphic origin of the sand is still unclear but the present interpretation is that the sand body was deposited by the Parramatta River on a terrace 4 to 6 metres above normal water level, on either side of the river between Charles and Alfred Streets and in the eastern margin of Parramatta Park. The sand body was deposited as a terrace (abandoned floodplain) over time during floods.

The bulk of the sand body forms a levee located on the south side (right bank) of Parramatta River just above the 1:100 average recurrence interval flood level. The levee is thought to extend from Church Street to Arthur Street and south from the river to the eastern end of Macquarie Street along Hassall Street from Harris Street and on the north side of Oak Street to about Arthur Street where it must interface with the clay alluvium of Clay Cliff Creek.

The Sand Body has a well developed but varied soil profile. Topsoil materials are generally disturbed by European activities. Where the subsoils are intact they typically consist of yellow orange or yellow brown sandy clay with an earthy (porous) fabric that becomes paler and slightly mottled with depth. The upper parts of the soil profile are usually heavily mixed, especially by cicada larvae.

In places the sand is cut by deposits of mottled or gleyed clay that were probably deposited in swamps or waterholes on the terrace surface. The reasonably defined levee, 50 to 100 centimetres high, along the terrace edge between Charles and Alfred Streets, comprises cleaner and very slightly coarser sand than the sand found around the margins of the levee.

The profile of the sand suggests that the main body of sand is of late Pleistocene age and recent thermoluminescence dates obtained from an excavation

⁴⁰ Jo McDonald Cultural Heritage Management, 2005

⁴¹ Accessed on 7 May 2019:

<https://www.environment.nsw.gov.au/heritageapp/ViewHeritageItemDetails.aspx?ID=5061073>

undertaken at 140 Macquarie Street by Comber Consultants Pty Ltd in 2010, have shown that the top of the undisturbed sand (below the level of Aboriginal occupation) is between 50,000 to 58,000 years old. Deeper sand could be much older and may relate to a period of a higher sea level about 120,000 years ago.

Much of the original sand body is likely to have been destroyed by the construction of modern buildings but patches of the sand body are preserved beneath the foundations of some CBD buildings and on vacant land. The least disturbed section of the main body of the sand occurs as a 50-60 metre wide belt along the southern side of the George Street between Harris Street and Purchase Street. The subject listing includes the section of the levee between Harris Street and 153 George Street, Harris Park.

An assessment of the nature and distribution of the 'Parramatta Terrace Sand' prepared by Peter Mitchell for Parramatta City Council indicates the Parramatta Sand Body may overlap with the eastern portion of the Parramatta metro station construction site.⁴² The remainder of the Parramatta metro station construction site is situated across a slightly raised area described by Mitchell as:

'....an area of high ground (about 10m ASL) appears to be underlain by another body of alluvium that is a mixture of clay and sand that is probably older than the main sand body and may even be of Tertiary age and comparable to the know Tertiary clay at Rosehill'⁴³

Mitchell notes that the precise interface between the sand body and the sandy clay body remains uncertain.⁴⁴ The sandy clay body is also described as likely to contain Aboriginal objects, although not in the same density as the surrounding sand body.⁴⁵ Mitchell recommended that the potential sandy clay body should be archaeologically managed in the same method as the surrounding sand body.⁴⁶

8.3.2 AHIMS

8.3.2.1 AHIMS ID 45-6-3582

One Aboriginal site is recorded within the Parramatta metro station construction site, listed on the AHIMS site register as AHIMS ID 45-6-3582 by Comber Consultants. AHIMS ID 45-6-3582 was recorded in 2018 and is described as an area of PAD covering 48 Macquarie and 220-230 Church Street. The described extent of AHIMS ID 45-6-3582 is entirely within the Parramatta metro station construction site.

On the site recording form, Comber Consultants notes that AHIMS ID 45-6-3582 and the surrounding area are significant to Aboriginal people due to its association with evidence of occupation and passing history onto future generations. Comber Consultants recommend that consultation continues with RAPs, and that a program of archaeological testing and salvage excavation must be undertaken at AHIMS ID 45-6-3582 prior to works that may impact the natural ground surface beneath the existing built structures.

No further information on AHIMS ID 45-6-3582 was available at the time this report was prepared.

⁴² Groundtruth Consulting, 2008

⁴³ Ibid, p.11-12

⁴⁴ Ibid, p.12

⁴⁵ Ibid, p.12

⁴⁶ Ibid, p.12

8.3.3 Archaeological context overview

Numerous archaeological investigations have been undertaken within the Parramatta CBD area. Parramatta Square, on the southern side of Macquarie Street and adjacent to the proposed Parramatta metro station construction site, has been the site of archaeological test excavation in 2004,⁴⁷ excavation at 1 Smith Street at the south-east corner of Parramatta Square in 2004,⁴⁸ recent excavation at 153 Macquarie Street (AHIMS ID 45-6-2686), and recent excavation in the western portion of Parramatta Square.

Limited archaeological test excavation at Civic Place (now Parramatta Square) in 2004 identified intact archaeological deposit beneath highly disturbed layers. The test excavation identified a low density and wide distribution of stone artefacts across that investigation area. Following completion of the test excavation program, Jo McDonald Cultural Heritage Management generally identified moderate to high archaeological potential across the remainder of Parramatta Square, and recommended further archaeological investigation must occur across that area prior to future construction projects in that area.⁴⁹ The implications for the Parramatta metro station construction site is that all proposed works in the area should consider the possibility of identifying archaeological deposit beneath layers of disturbance.

Excavation of 79 archaeological test pits at 1 Smith Street in 2004 retrieved a total of 198 artefacts, representing a generally low artefact density. Although high levels of disturbance were identified across the 1 Smith Street site, Jo McDonald Cultural Heritage Management indicates the results demonstrate the potential for retrieval of Aboriginal objects from other sites in Parramatta CBD that have been subject to a high level of disturbance.⁵⁰

Archaeological excavation was undertaken by Cultural Resource Management at Bicentennial Square in 2016.⁵¹ That investigation area was on the southern side of Macquarie Street and approximately 50 metres south of the Parramatta metro station construction site. The purpose of the excavation was to investigate the site for potential contact archaeology associated with the Parramatta Native Institute's annual 'feast' between 1814 and the 1830s. The excavation identified an A horizon silty clay loam context that had been truncated by 500 millimetres, and disturbance to the archaeological record from wall construction trenches dating to the early 1800s. The excavation results do not mention the Parramatta Sand Body, and no evidence of contact archaeology was identified.⁵²

The results of recent archaeological excavation within Parramatta Square were not available when this draft report was prepared. This includes archaeological excavation at 153 Macquarie Street (AHIMS ID 45-6-2686), and recent archaeological excavation within the western portion of Parramatta Square.

Previous archaeological investigations demonstrate that the former natural ground surface in the Parramatta metro station construction site may remain *in situ*, with varying degrees of truncation and mixing from historical activities. Artefact density is likely to vary across the area. Mitchell's analysis of the Parramatta Sand Body indicates that the majority of the Parramatta metro station construction site is likely to consist of the Pleistocene or Tertiary alluvial clay and sand, with an uncertain interface in the eastern portion of the site to the Pleistocene terrace sands of the Parramatta Sand Body. There is also potential for contact archaeology.

⁴⁷ JMcD CHM 2004a

⁴⁸ JMcD CHM 2004b

⁴⁹ JMcD CHM 2004a

⁵⁰ JMcD CHM 2004b

⁵¹ Cultural Resources Management, 2016. *Report of Archaeological Investigation: Church Street Mall Redevelopment Bicentennial Square Parramatta*.

⁵² *Op. Cit.*

8.3.4 Archaeological survey results

The Parramatta metro station construction site is located across a built environment between George Street and Macquarie Street. The construction site is situated across flat terrain, with no areas of surface visibility observed.



Figure 21: View south along Horwood Place showing multi-storey car park and existing commercial structures



Figure 22: View south of Civic Arcade on corner of George Street and Horwood Place



Figure 23: View north across Church Street



Figure 24: View east along United Lane

8.3.5 Assessment of archaeological potential

The Parramatta Sand Body has the potential to contain a stratified deposit that documents long term Aboriginal occupation and changes in climatic and other environmental conditions. Jo McDonald Cultural Heritage Management noted:⁵³

"the depth of the sand on the terrace back plain (Parramatta Sand Body), the original deposition of which pre-dates human occupation of the Australian continent...provides an ideal matrix for the preservation of archaeological evidence from the earliest prehistoric occupation of the Sydney region"

The location of Parramatta, adjacent to a permanent watercourse, and with access to a wide range of natural resources, means that archaeological evidence of Aboriginal occupation could be extensive.

⁵³ Jo McDonald Cultural Heritage Management, 2005. *Archaeological Salvage Excavation of site RTA-G1: 109-113 George Street Parramatta, NSW*. Report prepared for Landcom, p.36

Jo McDonald Cultural Heritage Management also noted that the likelihood of archaeological material being found is determined by the soil profile, the landform and geomorphology of the area and the extent of previous land use disturbance. The Parramatta metro station construction site is likely to primarily be located across the Pleistocene or Tertiary alluvial clay and sand formation, with the eastern portion of the investigation potentially overlapping with the Parramatta Sand Body. Mitchell's geomorphological assessment of the Parramatta Sand Body and the results of archaeological excavation in the local area indicate that generally lower artefact densities may be expected across the alluvial clay and sand formation.⁵⁴

In summary, the results of previous archaeological excavations in the local area within the Parramatta CBD demonstrate that:

- Artefact density will vary, with some areas demonstrating average artefact density as low as 2.5 artefacts per square metre.⁵⁵ The artefact density from Jo McDonald Cultural Heritage Managements archaeological testing at Civic Place averaged at 2.6 artefacts per metre squared, with 37 lithic artefacts excavated in total.⁵⁶ This correlates with Mitchell's observation that artefacts will be present across the older sandy clay sediments of the Parramatta Sand Body, but in lower densities.⁵⁷
- Levels of disturbance will vary, with the integrity of the archaeological record dependent upon the nature of historical activities. Historical construction activities may have resulted in total removal of the archaeological record, for example through excavation of basements and deep wall cuts. Activities may have resulted in vertical and horizontal mixing of the archaeological record, for example back-filling a cut with excavated material.
- The nature of encountered natural soils and sediments will vary. According to Mitchell's mapping of the Parramatta Sand Body, the Parramatta metro station construction site is likely to consist mainly of older alluvial clay and sand, with the potential for a transition in the eastern margin of the site to the Pleistocene sands of the Parramatta Sand Body. The interface between the alluvial clay and sand, and the Parramatta Sand Body is uncertain.

The majority of the Parramatta metro station construction site is shown in the Parramatta DCP 2011 as an area of high sensitivity for Aboriginal heritage. The multi-storey car park and 41-59 George Street are shown as areas of low sensitivity, presumably due to potential ground disturbance from construction activities in those areas. However, there still remains potential for Aboriginal objects and truncated natural ground surface contexts to occur in those areas.

Overall, the archaeological potential of the Parramatta metro station construction site is **moderate-high**.

⁵⁴ Groundtruth Consulting, 2008. *Nature and Distribution of Parramatta Terrace Sand*.

⁵⁵ JMcD CHM 2004b

⁵⁶ JMcD CHM 2004a, p.19

⁵⁷ Groundtruth Consulting, 2008

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Figure 25: AHIMS site register search results; Parramatta metro station construction site

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**Figure 26: Identified area of archaeological potential, including AHIMS ID 45-6-3582;
Parramatta metro station construction site**

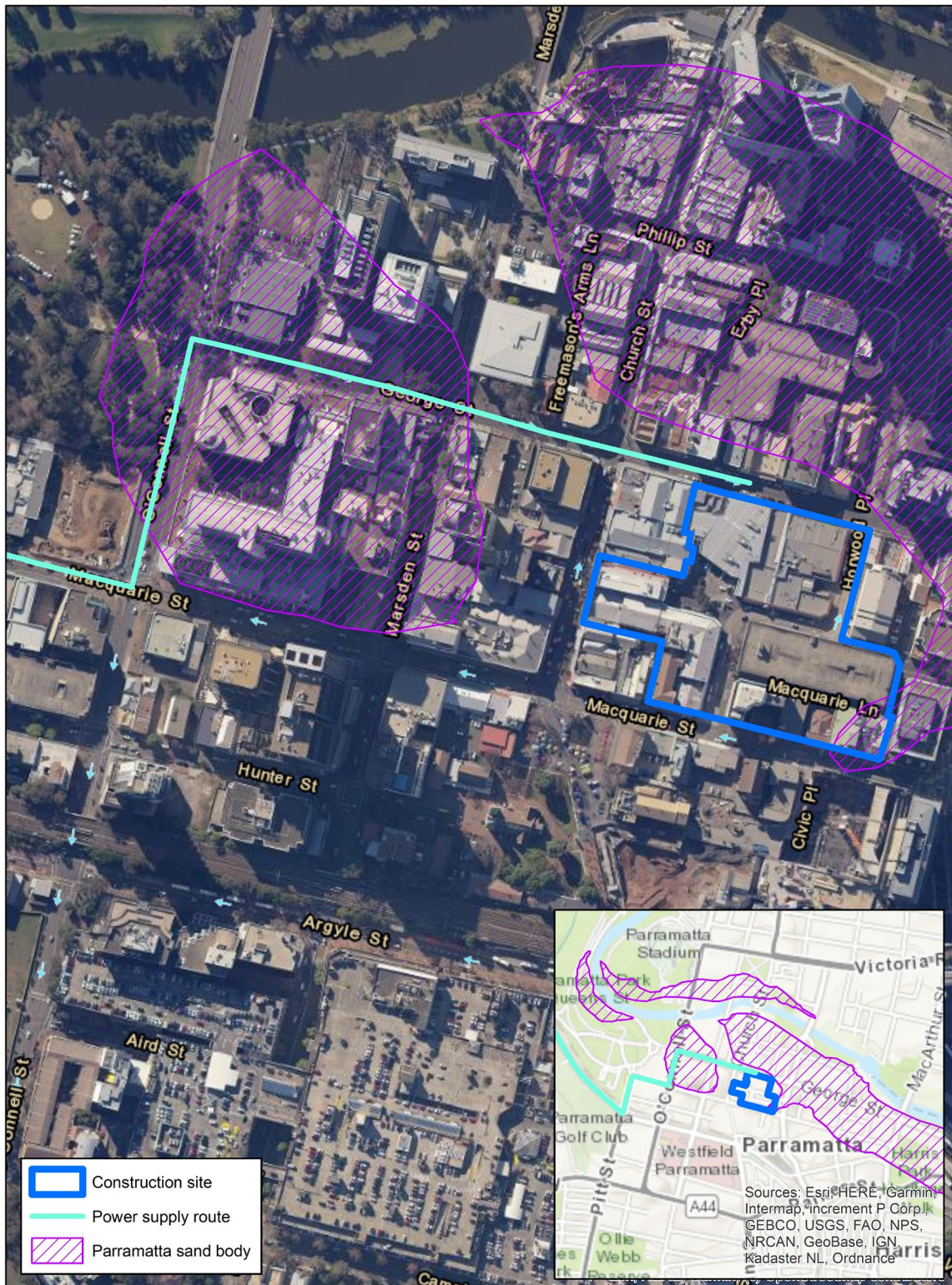


Figure 27: Parramatta metro station construction site in relation to the Parramatta Sand Body

8.4 Clyde stabling and maintenance facility construction site

8.4.1 Environmental context overview

The Clyde stabling and maintenance facility construction site is situated across flat terrain which is bisected by Duck Creek and A'Becketts Creek. The underlying geology in this area is likely to have originally consisted of Tertiary sediments and Quaternary alluvium associated with the creek flats and tidally influenced areas bordering Duck Creek. Soil landscape mapping suggests that the area is largely comprised of disturbed terrain associated with the infill of former estuarine lands. Further investigation of the historical distribution of mudflats, saltmarsh and estuarine landscapes by McLoughlin⁵⁸ within the Parramatta River and its tributaries did not identify extensive areas of estuarine land within the Clyde stabling and maintenance facility construction site suggesting that landform modification associated with reclamation may not have been substantial.

The Clyde stabling and maintenance facility construction site is currently comprised of mixed industrial and urban services uses. Although the site has generally been subject to extensive landform modification associated with development of these uses, historical aerials suggest that small portions of the Clyde stabling and maintenance facility construction site have not been subject to substantial disturbance. These areas of potentially less disturbance include the grassed area within the western portion of the Sydney Speedway.

Geotechnical investigation undertaken in Shirley Street located to the north of the Clyde stabling and maintenance facility construction site within a landscaped area identified 0.9 metres of fill over a silty clay alluvium context. Alluvial silty clay and clays extended to a depth of 13 metres.

8.4.2 AHIMS

No recorded Aboriginal sites are located within 100 metres of the Clyde stabling and maintenance facility construction site (see Figure 32). The closest recorded Aboriginal site is AHIMS ID 45-6-2554 an artefact site recorded 450 metres to the northwest.

8.4.3 Archaeological context overview

The predictive model and assessment of the AHIMS site register search results indicate the correlation of the predominance of archaeological evidence relating to Aboriginal land use activities in the following areas:

- Adjacent to watercourses and foreshore areas, such as Duck River and associated estuarine areas
- Areas that have not been heavily developed and modified.

An archaeological assessment was prepared for the Clyde Terminal remediation approximately 265 metres east of the Clyde stabling and maintenance facility construction site.⁵⁹ Assessment of the area by AECOM documented the area as 'grossly modified' by historical land use activities, primarily

⁵⁸ McLoughlin, Lynette 2000, Estuarine wetlands distribution along the Parramatta River, Sydney, 1788-1940: implications for planning and conservation, *Cunninghamia: A journal of plant ecology for eastern Australia*. Vol 6, Issue 3, pp 579-610

⁵⁹ AECOM, 2013. *Clyde Terminal Conversion Project Environmental Impact Statement*. Prepared for The Shell Company of Australia.

development of the 'Clyde Refinery'.⁶⁰ AECOM's assessment concluded that area was heavily disturbed and that potential impacts to Aboriginal objects was considered to be negligible.⁶¹

An Aboriginal heritage assessment prepared for an earlier proposed metro between the Sydney CBD and Westmead (West Metro) included an Aboriginal heritage assessment technical paper.⁶² The previously proposed Carnarvon Street Station site was located approximately 260 metres south-east of the Clyde stabling and maintenance facility construction site on the eastern side of Duck River. Comber notes of that area that due to the extent of previous disturbance from construction activities and associated infrastructure that 'it is not expected that sub-surface evidence would exist at any of these locations'.⁶³

While the majority of studies in the area have focused on the surrounding heavily modified landscapes, Aboriginal heritage assessment for the M4 East Environmental Impact Statement⁶⁴ identified the Duck River – Duck Creek Junction as containing some archaeological sensitivity.

8.4.4 Archaeological survey results

The Clyde stabling and maintenance facility construction site is located across a mixed industrial and urban services environment including the Sydney Speedway site. Survey identified that the majority of the site was comprised of a heavily disturbed industrial environment.



Figure 28: View north along Wentworth Street showing light industrial development



Figure 29: View west from Shirley Street showing existing landform modification associated with heavy industry

⁶⁰ Ibid, p. 22.

⁶¹ Ibid, p. 23.

⁶² Comber Consultants, 2009. *Sydney Metro Network Stage 2 Aboriginal Cultural Heritage Assessment*.

⁶³ Ibid, p. 25

⁶⁴ Kelleher Nightingale Consulting, 2013. *WestConnex M4 Widening: Aboriginal archaeological survey report*. Accessed online 3/5/2019 at: https://www.westconnex.com.au/sites/default/files/M4Widening_EIS_Appendix%20J_AboriginalHeritage.pdf



Figure 30: View east towards Sydney Speedway showing landform modification related to the speedway track



Figure 31: View east of Duck Creek from Kay Street Bridge showing industrial development bordering existing creek bank

8.4.5 Assessment of archaeological potential

The former natural landform context of the Clyde stabling and maintenance facility construction site would have been considered archaeologically sensitive based primarily on its proximity to Duck Creek and A'Becketts Creek. Extensive landform modification is considered likely to have limited this potential across the majority of the construction site, including the modified portions of the Sydney Speedway and surrounding industrial lands.

A small portion of the Sydney Speedway has been identified as relatively intact based on the lack of historical development. While it is considered likely that this portion of the Sydney Speedway has been subject to some level of fill it is considered likely that Aboriginal objects related to intact or redeposited soils may be present. In this area archaeological potential has been identified as **low-moderate**.

The remainder of the Clyde stabling and maintenance facility construction site has been assessed to have been substantially disturbed by former developed. The archaeological potential of this portion of the construction site is **low**.

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Figure 32: AHIMS site register search results; Clyde stabling and maintenance facility construction site

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Figure 33: Identified area of archaeological potential; Clyde stabling and maintenance facility construction site

8.5 Silverwater services facility construction site

8.5.1 Environmental context overview

The Silverwater services facility construction site is located on a gently sloped landform associated with a low-lying shale ridgeline. The construction site is located within the vicinity of several watercourses including Duck River located approximately 770 metres north west and Haslams Creek located approximately 960 metres south-east. Both of these watercourses are associated with tidally influenced estuarine lowlands which have since been infilled for a variety of industrial and recreational purposes.

The construction site is currently located within an industrial and commercial area with the construction site formerly used as a warehouse facility. Historical aerials indicate the former warehouse was demolished between 2007 and 2009. Following this, fill was introduced to the site with evidence of excavation related to pipe installation.

The underlying geology of the Silverwater services facility construction site consists of Ashfield Shale, which is generally composed of black to dark-grey shale and laminate.⁶⁵ Ashfield Shale caps the underlying Hawkesbury Sandstone.⁶⁶ Soils associated with the typically gentler slopes of the Ashfield Shale formation tend to be residual soils developed *in situ*.⁶⁷ This includes the residual Blacktown soil landscape.

Archaeological implications of the soil landscape within the construction site are that the residual Blacktown soils represent a moderately deep (less than one metre) soil with limited erosion characteristics in areas with ground cover.⁶⁸ Unless removed or disturbed through commercial/road/infrastructure development or extreme erosion events, archaeological material is likely to remain relatively *in situ* (subject to bioturbation).

8.5.2 AHIMS

No recorded Aboriginal sites are located within 100 metres of the Silverwater services facility construction site (see Figure 43). The closest recorded Aboriginal site is AHIMS ID 45-6-2786, a potential archaeological deposit approximately 1.5 kilometres to the north-east in the Millennium Parklands, Sydney Olympic Park.

8.5.3 Archaeological context overview

The predictive model and assessment of the AHIMS site register search results indicate the correlation of the predominance of archaeological evidence relating to Aboriginal land use activities in the following areas:

- Adjacent to watercourses and foreshore areas, such as unmodified portions of Haslams Creek and the Duck River
- Areas that have not been heavily developed and modified.

The Silverwater area has been subject to limited previous Aboriginal archaeological assessment.

⁶⁵ Clarke, N.R. and Jones, D.C., (eds), 1991.

⁶⁶ Ibid

⁶⁷ Chapman G.A., Murphy, C.L., Tille P.J., Atkinson G. and Morse R.J., 2009 Ed. 4, *Soil Landscapes of the Sydney 1:100,000 Sheet* map, Department of Environment, Climate Change and Water, Sydney

⁶⁸ Ibid pg. 22

Aboriginal heritage assessment was undertaken in a similar raised landform approximately 400 metres south west of the Silverwater services facility construction site for the M4 East Environmental Impact Statement.⁶⁹ No Aboriginal sites or areas of archaeological potential were identified within the entire M4 East footprint, or in inspection of nearby areas during the archaeological survey. The entire M4 East footprint was generally assessed as previously subject to significant disturbance, with low ground integrity.⁷⁰

The M4 East Aboriginal heritage assessment suggests that the generally shallow soils across raised shale and sandstone landforms in the area are susceptible to significant disturbance from residential development, and construction of transport and service infrastructure.

8.5.4 Archaeological survey results

The Silverwater services facility construction site is located within a modified industrial landscape. The construction site is located across a gentle slope located to the east of Silverwater Road and to the south of Derby Street.

The construction site is comprised of a vacant lot with evidence of earthworks including evidence of fill and construction material identified across the site.



Figure 34: View east of the Silverwater services facility construction site



Figure 35: View south of the Silverwater services facility construction site

⁶⁹ Kelleher Nightingale Consulting, 2013. *WestConnex M4 Widening: Aboriginal archaeological survey report*. Accessed online 3/5/2019 at:

https://www.westconnex.com.au/sites/default/files/M4Widening_EIS_Appendix%20J_AboriginalHeritage.pdf

⁷⁰ *Op. Cit.*, Table 7.1.



Figure 36: View east of existing structures within the Silverwater services facility construction site



Figure 37: View north of existing regrowth eucalypts within the Silverwater services facility construction site

8.5.5 Assessment of archaeological potential

Limited archaeological investigation has been undertaken in the immediate vicinity of the Silverwater services facility construction site with no recorded Aboriginal sites within one kilometre.

The relatively shallow residual soil associated with the underlying shale geology is susceptible to minor surface disturbance associated with development. The construction of warehouse facilities across the construction site, as well as recent demolition and pipeline works is likely to have significantly impacted or removed the former ground surface context.

The predictive model indicates that the landform contexts more likely to demonstrate evidence of repeated and overlapping activities are likely to include areas in close proximity to high order water courses, raw material resource, or prominent features in the landscape. The construction site is 770 metres away from its closest water source and does not exhibit other archaeologically sensitive landscape features. The combination of landform context and likely disturbance or removal of A horizon contexts indicates that the overall archaeological potential of the Silverwater services facility construction site is **low**.

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Figure 38: AHIMS site register search results; Silverwater services facility construction site

8.6 Sydney Olympic Park metro station construction site

8.6.1 Environmental context overview

The Sydney Olympic Park metro station construction site is located on broad and gently undulating ridge crest landform context. The ridge is bordered by Haslams Creek to the west, Powells Creek to the east, and Homebush Bay to the north. Both creek corridors were likely to have originally been associated with surrounding creek flats and tidally influenced mangrove areas. However, large portions of each watercourse south of Homebush Bay have been in-filled, canalised and modified. Mangrove areas and associated creek flats have been restored/recreated around Powells Creek as part of Sydney Olympic Park.

The Sydney Olympic Park metro station construction site has been heavily modified for commercial development. Portions of three large commercial offices and educational facilities are located within the Sydney Olympic Park construction site. Large-scale landform modification is evident around the periphery of these structures, with raised accessways and garden/car park set-backs from Herb Elliott Avenue and Figtree Drive for each building.

The underlying geology of the Sydney Olympic Park metro station construction site consists of Ashfield Shale, which is generally composed of black to dark-grey shale and laminate.⁷¹ Ashfield Shale caps the underlying Hawkesbury Sandstone.⁷² Soils associated with the typically gentler slopes of the Ashfield Shale formation tend to be residual soils developed *in situ*.⁷³ This includes the residual Blacktown soil landscape.

Archaeological implications of the soil landscape within the construction site are that the residual Blacktown soils represent a moderately deep (less than one metre) soil with limited erosion characteristics in areas with ground cover.⁷⁴ Unless removed or disturbed through commercial/road/infrastructure development or extreme erosion events, archaeological material is likely to remain relatively *in situ* (subject to bioturbation).

Four boreholes for geotechnical investigation were placed within, and in the vicinity of, the Sydney Olympic Park metro station construction site. These boreholes show:

- Concrete road surface to a depth of 50 millimetres over 'fill' silty sandy gravel and cobbles to a depth of 1.2 metres. Siltstone bedrock encountered at 1.2 metres
- Concrete road surface and base layer to a depth of 0.27 metres. 'Fill' clay and gravel to a depth of 2.1 metres, including concrete cobble identified at 1.1 metres and a brick fragment at 1.3 metres. Siltstone bedrock encountered at 2.1 metres
- Concrete to a depth of 180 millimetres, over 'fill' (gravel, clay, igneous rock, clay, gravelly clay) to a depth of 3.1 metres. Siltstone bedrock encountered at 3.1 metres
- Road surface to a depth of 50 millimetres over 'fill' gravel, clay, to a depth of 850 millimetres. 'Residual soil' gravelly clay to a depth of 950 millimetres. Siltstone bedrock encountered at 950 millimetres.

⁷¹ Clarke, N.R. and Jones, D.C., (eds), 1991.

⁷² Ibid

⁷³ Chapman G.A., Murphy, C.L., Tille P.J., Atkinson G. and Morse R.J., 2009 Ed. 4, *Soil Landscapes of the Sydney 1:100,000 Sheet* map, Department of Environment, Climate Change and Water, Sydney

⁷⁴ Ibid pg. 22

8.6.2 AHIMS

No recorded Aboriginal sites are located within 100 metres of the Sydney Olympic Park metro station construction site (see Figure 43). The closest recorded Aboriginal site is AHIMS ID 45-6-2339, an artefact site approximately 1.8 kilometres to the south-west in Phillips Park, Lidcombe.

8.6.3 Archaeological context overview

A number of archaeological investigations have been undertaken in the Sydney Olympic Park area. Assessments in a similar landform context to the Sydney Olympic Park metro station construction site include an assessment at Murray Rose Avenue by Artefact Heritage in 2018⁷⁵ and approximately 675 metres east of the Sydney Olympic Park metro station construction site. That assessment concluded that although the site was within an archaeologically sensitive landform, previous studies in the area and observations in the field indicate that all potential archaeological deposits would have been removed as a result of previous impacts to the area.⁷⁶

Urbis⁷⁷ assessed 2 Figtree Avenue in 2016 for Mirvac, approximately 120 metres south-east of the Sydney Olympic Park metro station construction site. Soils across that investigation area were described as residual Blacktown soils, similar to the likely original soil context across the Sydney Olympic Park metro station construction site. Urbis⁷⁸ concluded that investigation area demonstrated low archaeological potential due to extensive disturbance. Similarly, at Site 9 (south-eastern corner of Sarah Durack Avenue and Olympic Boulevard.) approximately 200 metres south of the Sydney Olympic Park metro station construction site was assessed as unlikely to contain archaeological deposits due to the highly disturbed nature of that area.⁷⁹

Archaeological assessment of the Fig Tree Circuit and Australia Avenue was undertaken in 1997 and prior to construction of the existing buildings across the Sydney Olympic Park metro station construction site.⁸⁰ That assessment concluded that although there was disturbance, including introduced fill, across the area, that original ground surface contexts were likely to remain *in situ*. However, the area has subsequently been subject to extensive landform modification for construction of the extent buildings across the construction site, which is likely to have resulted in significant disturbance to any remaining natural ground surface contexts.

Previous archaeological investigations in the area indicate the potential for generally high levels of surface disturbance to former natural ground surface contexts from historical land use activities, including extensive bulk earthworks and construction of built infrastructure.

⁷⁵ Artefact Heritage, 2018. *1 & 2 Murray Rose Avenue, Sydney Olympic Park Archaeological Survey Report*.

⁷⁶ Ibid, p. 30.

⁷⁷ Urbis 2016. *Historic and Aboriginal Archaeological Assessment, 2 Figtree Drive Sydney Olympic Park*.

Accessed online 2/5/2019 at:

https://majorprojects.accelo.com/public/8e2f72683b33b0446aa9596f58c75184/Appendix%20S_Archaeological%20Assessment.pdf

⁷⁸ *Op. Cit.*

⁷⁹ Artefact Heritage, 2018, p. 34.

⁸⁰ Dominic Steele & Martin Carney Archaeological Management and Consulting Group, 1997. *Aboriginal Heritage, Australia Avenue, Fig Tree Circuit, 2000 Olympic Site, Homebush NSW*. Report to The Olympic Co-Ordination Authority.

8.6.4 Archaeological survey results

The Sydney Olympic Park metro station construction site is located across a built environment between Dawn Fraser Avenue to the north and Figtree Drive to the south. The construction site is situated across a flat to gentle slope. Areas of surface visibility were observed within modified garden areas in the vicinity of commercial premises.



Figure 39: View across remaining abattoir structures, northern portion of the Sydney Olympic Park metro station construction site



Figure 40: View across commercial development within the Sydney Olympic Park metro station construction site



Figure 41: View north across modified landform associated with commercial development



Figure 42: View across modified landform associated with commercial development

8.6.5 Assessment of archaeological potential

Several previous archaeological investigations in the vicinity of the Sydney Olympic Park metro station construction site have identified extensive landform modification and disturbance to natural ground surface contexts. No recorded Aboriginal sites on the AHIMS site register are located within one kilometre of the Sydney Olympic Park metro station construction site.

The relatively shallow residual soils associated with the underlying shale and sandstone geology is susceptible to minor surface disturbance associated with building or road construction. The construction of commercial structures across the construction site, as well as associated road and underground services, is likely to have significantly impacted or removed the former ground surface context.

The Sydney Olympic Park metro station construction site is located on a crest landform context away from major watercourses. The combination of landform context and likely disturbance or removal of A horizon contexts indicates that the overall archaeological potential of the Sydney Olympic Park metro station construction site is **low**.

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Figure 43: AHIMS site register search results; Sydney Olympic Park metro station construction site

8.7 North Strathfield metro station construction site

8.7.1 Environmental context overview

The North Strathfield metro station construction site is located on a gently sloping landform context bordering a broad and low-lying sandstone ridge about 200 metres to the east. The North Strathfield metro station construction site is divided into two sites (the northern construction site and southern construction site) within the eastern margin of the rail corridor.

The northern construction site includes a portion of the garden bed and pedestrian access between Queen Street and the existing North Strathfield Station. The northern construction site consists predominantly of a raised artificial embankment and cleared landing created during construction of the North Strathfield underpass. The recent North Strathfield Station Transport Access Program upgrade works resulted in change to the entry to the station off Queen Street within the North Strathfield metro station construction site. This includes the modification of the entry garden beds and modification of the existing overbridge. The southern construction site is a paved facilities area also constructed for the North Strathfield underpass.

The closest creekline, Powells Creek, is canalised and situated approximately 365 metres west of the North Strathfield metro station construction site. Additional tidally influenced areas are located approximately 300m west of the North Strathfield metro station. This area has however been heavily modified and partially in-filled for industrial and residential development.

The underlying geology of the North Strathfield metro station construction site consists of Ashfield Shale, which is generally composed of black to dark-grey shale and laminate.⁸¹ Ashfield Shale caps the underlying Hawkesbury Sandstone.⁸² Soils associated with the typically gentler slopes of the Ashfield Shale formation tend to be residual soils developed *in situ*.⁸³ This includes the residual Blacktown soil landscape.

Archaeological implications of the soil landscape within the construction site are that the residual Blacktown soils represent a moderately deep (less than one metre) soil with limited erosion characteristics in areas with ground cover.⁸⁴ Unless removed or disturbed through commercial/road/infrastructure development or extreme erosion events, archaeological material is likely to remain relatively *in situ* (subject to bioturbation).

Two boreholes for geotechnical investigation were placed within road corridors near the North Strathfield metro station construction site. Both boreholes recovered road surface and fill to a depth of 300 millimetres. Residual gravelling clay soil was recovered to a depth of between 1-1.3 metres.

8.7.2 AHIMS

No recorded Aboriginal sites are located within 100 metres of the North Strathfield metro station construction sites (see Figure 48). The closest recorded Aboriginal site is AHIMS ID 45-6-2324, a shell site located approximately 2.2 kilometres to the north-east.

⁸¹ Clarke, N.R. and Jones, D.C., (eds), 1991.

⁸² Ibid

⁸³ Chapman G.A., Murphy, C.L., Tille P.J., Atkinson G. and Morse R.J., 2009 Ed. 4, *Soil Landscapes of the Sydney 1:100,000 Sheet* map, Department of Environment, Climate Change and Water, Sydney

⁸⁴ Ibid pg. 22

8.7.3 Archaeological context overview

A limited number of archaeological investigations have been undertaken in the vicinity of the North Strathfield metro station construction sites. The predictive model and assessment of the AHIMS site register search results indicate the correlation of the predominance of archaeological evidence relating to Aboriginal land use activities in the following areas:

- Adjacent to watercourses and foreshore areas, such as Homebush Bay and the tidally influenced area to the west and north-west of the North Strathfield metro station associated with Powells Creek
- Areas that have not been heavily developed and modified.

Niche⁸⁵ prepared an assessment of the Australian Catholic University Campus at Strathfield, approximately two kilometres south-west of the North Strathfield metro station construction sites. That assessment determined that the residual soils associated with the underlying Ashfield Shale bedrock were shallow and likely to be disturbed due to subsequent phases of historical activities across the construction sites. Niche determined that there was unlikely to be archaeological potential within the Strathfield Campus investigation area and no further investigation was recommended.

Biosis⁸⁶ prepared an assessment of proposed redevelopment works at Concord Hospital, approximately two kilometres north of the North Strathfield metro station construction sites. The assessment area included residual Blacktown soil context and shallow sandy soils associated with underlying sandstone. That investigation area also included sections of fill across reclaimed land. Biosis emphasise the archaeological sensitivity of the Parramatta foreshore area, particularly for shell midden and artefact sites. However, due to extensive disturbance identified across that investigation area, the area was assessed as demonstrating low archaeological potential and no further archaeological investigation was recommended.⁸⁷

Previous archaeological investigations in the area, including assessment for the Strathfield Campus of the Australian Catholic University and the Concord Hospital project, indicate the potential for significant disturbance to archaeologically sensitive areas from historical land use activities including reclamation and construction of built infrastructure.

8.7.4 Archaeological survey results

The majority of the North Strathfield metro station construction sites are located within the rail corridor. Observations made through the rail corridor fence indicate that the majority of the North Strathfield metro station construction sites consists of modified flat surfaces used for access to the rail corridor, car parking, and stockpiling.

⁸⁵ Niche, 2011. *Aboriginal Cultural Heritage Assessment, Australian Catholic University Campus, Strathfield*. Accessed online 2/5/2019 at: https://majorprojects.accelo.com/public/43e1c1d47e388a69169c47bdf4610f41/Appendix%20G_Aboriginal%20Cultural%20Heritage%20Assessment%20Dec11.pdf

⁸⁶ Biosis, 2018. *Concord Hospital Redevelopment: Aboriginal Cultural Heritage Due Diligence Assessment*.

⁸⁷ *Op. Cit.*



Figure 44: View north of rail corridor, southern construction site



Figure 45: View north along Queen Street on the eastern margin of the southern construction site



Figure 46: View north of rail corridor, northern construction site



Figure 47: View across the rail corridor, showing modified landform context

8.7.5 Assessment of archaeological potential

Limited archaeological investigation has been undertaken in the vicinity of the North Strathfield metro station construction sites. No recorded Aboriginal sites on the AHIMS site register are located within one kilometre of the North Strathfield metro station construction sites.

The construction of commercial structures across the construction sites, as well as associated road and underground services, is likely to have significantly impacted or removed the former ground surface context. The relatively shallow soils associated with the shallow A horizon soils associated with the underlying shale and sandstone geology is susceptible to minor surface disturbance associated with building or road construction. These activities are likely to have had a significant impact or have resulted in the removal of natural A horizon contexts.

The predictive model (Section 7.5) indicates that the landform contexts more likely to demonstrate evidence of repeated and overlapping activities are likely to include areas in close proximity to high order watercourses, raw material resources, or prominent features in the landscape. The North Strathfield metro station construction sites are located on a crest landform context away from major watercourses. The combination of landform context and likely disturbance or removal of A horizon contexts indicates that the overall archaeological potential of the North Strathfield metro station construction sites is **low**.

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Figure 48: AHIMS site register search results; North Strathfield metro station construction sites

8.8 Burwood North Station construction site

8.8.1 Environmental context overview

The Burwood North Station construction site is located at the eastern base of a low-lying sandstone and shale ridgeline. The Burwood North Station construction site is divided into two sites (northern construction site and southern construction site). The northern construction site is located immediately west of a low-lying area that would likely have consisted of tidally influenced estuarine lowlands prior to in-filling and levelling to create playing fields and open recreational space.

The tidally influenced watercourse through the low-lying area has been canalised, directing water north into Canada Bay from Parramatta Road near the intersection with Luke Avenue. The current 1:25,000 topographic map indicates Parramatta Road as the current tidal limit. It is possible that the tidal limit may have been further to the south of Parramatta Road prior to in-filling, road construction and residential development.

The underlying geology of Burwood North Station construction sites consist of Ashfield Shale, which is generally composed of black to dark-grey shale and laminate.⁸⁸ Ashfield Shale caps the underlying Hawkesbury Sandstone.⁸⁹ Soils associated with the typically gentler slopes of the Ashfield Shale formation tend to be residual soils developed *in situ*.⁹⁰ This includes the residual Blacktown soil landscape. The underlying geology of the low-lying area immediately to the east includes Quaternary sediments and overlying introduced fill.

Archaeological implications of the soil landscape within the construction sites are that the residual Blacktown soils represent a moderately deep (less than one metre) soil with limited erosion characteristics in areas with ground cover.⁹¹ Unless removed or disturbed through commercial/ road / infrastructure development or extreme erosion events, archaeological material is likely to remain relatively *in situ* (subject to bioturbation).

8.8.2 AHIMS

No recorded Aboriginal sites are located within 100 metres of the Burwood North Station construction sites (see Figure 53). The closest recorded Aboriginal site is AHIMS ID 45-6-2142, a midden site recorded by R. Taplin on the foreshore of Hen and Chicken Bay approximately 1.5 kilometres to the north-east.

⁸⁸ Clarke, N.R. and Jones, D.C., (eds), 1991.

⁸⁹ Ibid

⁹⁰ Chapman G.A., Murphy, C.L., Tille P.J., Atkinson G. and Morse R.J., 2009 Ed. 4, *Soil Landscapes of the Sydney 1:100,000 Sheet* map, Department of Environment, Climate Change and Water, Sydney

⁹¹ Ibid pg. 22

8.8.3 Archaeological context overview

A limited number of archaeological investigations have been undertaken in the vicinity of the Burwood North Station construction site. The predictive model and assessment of the AHIMS site register search results indicate the correlation of the predominance of archaeological evidence relating to Aboriginal land use activities in the following areas:

- Adjacent to watercourses and foreshore areas, such as Hen and Chicken Bay and the former tidally influenced area to the east and north-east of the Burwood North Station construction site prior to reclamation and creation of St Lukes Park
- Areas that have not been heavily developed and modified.

Aboriginal heritage assessment was undertaken in a similar raised landform approximately 250 metres to the south in St Lukes Park for the M4 East Environmental Impact Statement.⁹² No Aboriginal sites or areas of archaeological potential were identified within the M4 East footprint, or in inspection of St Lukes Park during the archaeological survey. The M4 East footprint was generally assessed as previously subject to significant disturbance, with low ground integrity.⁹³

Biosis⁹⁴ prepared an assessment of proposed redevelopment works at Concord Hospital, approximately 3.5 kilometres north of the Burwood North Station construction sites. The assessment area included residual Blacktown soil context and shallow sandy soils associated with underlying sandstone. That investigation area also included sections of fill across reclaimed land. Biosis emphasise the archaeological sensitivity of the Parramatta foreshore area, particularly for shell midden and artefact sites. However, due to extensive disturbance identified across that investigation area, the area was assessed as demonstrating low archaeological potential and no further archaeological investigation was recommended.⁹⁵

Previous archaeological investigations in the area, including assessment for the M4 East project and the Concord Hospital project, indicate significant disturbance to archaeologically sensitive areas from historical land use activities including reclamation and construction of built infrastructure.

8.8.4 Archaeological survey results

The Burwood North Station construction sites are located across a built environment on the northern and southern margins of Parramatta Road. The construction sites are situated on a gentle slope landform context. No areas of surface visibility or intact ground surface were observed.

⁹² Kelleher Nightingale Consulting, 2013. *WestConnex M4 Widening: Aboriginal archaeological survey report*. Accessed online 3/5/2019 at:

https://www.westconnex.com.au/sites/default/files/M4Widening_EIS_Appendix%20J_AboriginalHeritage.pdf

⁹³ Kelleher Nightingale Consulting, 2013. *WestConnex M4 Widening: Aboriginal Archaeological survey report*. Table 7.1.

⁹⁴ Biosis, 2012. *Concord Hospital Redevelopment: Aboriginal Cultural Heritage Due Diligence Assessment*.

⁹⁵ Ibid



Figure 49: South view, of southern construction site



Figure 50: View east along southern side of northern construction site



Figure 51: View north of the slope and existing structures along Neichs Lane within the northern construction site



Figure 52: View south of southern construction site showing modified landform and existing disturbance

8.8.5 Assessment of archaeological potential

Limited archaeological investigation has been undertaken in the immediate vicinity of the Burwood North Station construction sites, with no recorded Aboriginal sites within one kilometre.

The relatively shallow residual soils associated with the underlying shale geology are susceptible to minor surface disturbance associated with building or road construction. The construction of commercial structures across the construction sites, as well as associated road and underground services, is likely to have significantly impacted or removed the former ground surface context.

Prior to the current phase of commercial development across the northern and southern construction site, the area consisted of 20th century detached houses. Construction of early 20th century houses on detached blocks is not likely to have significantly modified the natural landform context, with disturbance generally limited to foundation excavation, drainage, and any rear yard landscaping activities. The subsequent phase of commercial development, including some terracing to flatten the gently sloping gradient, is likely to have significantly impacted and/or removed any remaining natural A horizon soil contexts.

An exception to this potential disturbance is the existing car park of the Pine Inn within the northern construction site. The rear car park extends across a former residential block to Burton Street. Although impacts to the natural ground surface from demolition of the former residential structure and ground preparation for construction of the car park is unknown, there is potential for the car park surface to be overly truncated natural ground surface.

However, the predictive model (Section 7.5) indicates that the landform contexts more likely to demonstrate evidence of repeated and overlapping activities are likely to include areas in close proximity to high order watercourses, raw material resources, or prominent features in the landscape. The portion of the Burwood North Station northern construction site with some potential for surviving natural ground surface is located approximately 400 metres west of the former natural watercourse that passes through St Lukes Park. The combination of landform context and likely disturbance or removal of A horizon contexts indicates that the overall archaeological potential of the Burwood North Station construction sites are **low**.

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Figure 53: AHIMS site register search results; Burwood North Station construction site

8.9 Five Dock Station construction site

8.9.1 Environmental context overview

The Five Dock Station construction site comprises of two sites located on the upper slope of a low-lying ridge (the western construction site and the eastern construction site). The ridge line extends to the north-west, forming the Drummoyne peninsula, and is bordered to the east by Iron Cove and the west by Canada Bay. Large portions of the surface context of the Five Dock Station western construction site have been modified through commercial development, road construction and installation of below ground services. The Five Dock Station eastern construction site has similar been modified through substantial residential development.

The closest watercourse is Iron Cove Creek, located approximately 615 metres to the south of the Five Dock Station construction sites. The tidal limit of Iron Cove Creek extends south towards Parramatta Road, and approximately 850 metres south of the Five Dock Station construction sites. An infilled estuarine area and canalised watercourse that flows north into Kings Bay is located approximately one kilometre to the west.

The Five Dock Station construction sites are generally located across the centre of the ridge landform, with the gradient generally descending east towards Iron Cove Creek, and west towards the unnamed canalised watercourse that flows into Kings Bay. It is likely that local watercourses in the vicinity of the Five Dock Station construction sites prior to significant commercial and residential development would have consisted of ephemeral first order tributaries of both Iron Cove Creek and watercourses to the west.

The underlying geology of the Five Dock Station construction sites consist of Ashfield Shale, which is generally composed of black to dark-grey shale and laminate.⁹⁶ Ashfield Shale caps the underlying Hawkesbury Sandstone.⁹⁷ Soils associated with the typically gentler slopes of the Ashfield Shale formation tend to be residual soils developed *in situ*.⁹⁸ This includes the residual Blacktown soil landscape.

Archaeological implications of the soil landscape within the construction site are that the residual Blacktown soils represent a moderately deep (less than one metre) soil with limited erosion characteristics in areas with ground cover.⁹⁹ Unless removed or disturbed through commercial / road / infrastructure development or extreme erosion events, archaeological material is likely to remain relatively *in situ* (subject to bioturbation).

8.9.2 AHIMS

No recorded Aboriginal sites are located within 100 metres of the Five Dock Station construction sites (see Figure 59). The closest recorded Aboriginal site is AHIMS ID 45-6-2142, a midden site recorded by R. Taplin on the foreshore of Hen and Chicken Bay approximately 770 metres to the north-west.

⁹⁶ Clarke, N.R. and Jones, D.C., (eds), 1991.

⁹⁷ Ibid

⁹⁸ Chapman G.A., Murphy, C.L., Tille P.J., Atkinson G. and Morse R.J., 2009 Ed. 4, *Soil Landscapes of the Sydney 1:100,000 Sheet* map, Department of Environment, Climate Change and Water, Sydney

⁹⁹ Ibid pg. 22

8.9.3 Archaeological context overview

A limited number of archaeological investigations have been undertaken in the vicinity of the Five Dock Station construction sites. The predictive model and assessment of the AHIMS site register search results indicate the correlation of the predominance of archaeological evidence relating to Aboriginal land use activities in the following areas:

- Adjacent to watercourses and foreshore areas, such as Iron Cove Creek, Kings Bay and Iron Cove
- In areas of exposed sandstone platforms and shelter formations, such as in slope landform contexts and at a break of slope
- Areas that have not been heavily developed and modified.

Aboriginal heritage assessment was undertaken in a similar raised landform approximately 800 metres to the south on Wattle Street for the M4 East Environmental Impact Statement.¹⁰⁰ No Aboriginal sites or areas of archaeological potential were identified within the M4 East footprint, or during inspection of nearby areas during the archaeological survey. The M4 East footprint was generally assessed as previously subject to significant disturbance, with low ground integrity.¹⁰¹

The M4 East Aboriginal heritage assessment suggests that the generally shallow soils across raised shale and sandstone landforms in the area are susceptible to significant disturbance from residential development, and construction of transport and service infrastructure.

8.9.4 Archaeological survey results

The Five Dock Station construction sites are located across a built environment associated with the Great North Road. The construction site areas are situated across a flat to gentle slope context.



Figure 54: View north-west within Fred Kelly Place, adjacent to the Five Dock Station western construction site



Figure 55: View north-west across Great North Road towards existing commercial development within Five Dock Station western construction site

¹⁰⁰ Kelleher Nightingale Consulting, 2013. *WestConnex M4 Widening: Aboriginal archaeological survey report*. Accessed online 3/5/2019 at:

https://www.westconnex.com.au/sites/default/files/M4Widening_EIS_Appendix%20J_AboriginalHeritage.pdf

¹⁰¹ *Op. Cit.*, Table 7.1.



Figure 56: View west across Great North Road towards existing commercial development within the Five Dock Station western construction site



Figure 57: View north along Waterview Street towards the Five Dock Station eastern construction site



Figure 58: View south across existing carpark within the Five Dock Station eastern construction site

8.9.5 Assessment of archaeological potential

Limited archaeological investigation has been undertaken in the vicinity of the Five Dock Station construction sites with the closest recorded Aboriginal site AHIMS ID 45-6-2142, a midden site recorded by R. Taplin on the foreshore of Hen and Chicken Bay, approximately 770 metres to the north-west. Nearby Aboriginal heritage assessment in a similar landform context for the M4 East project identified low ground surface integrity and no Aboriginal sites or areas of archaeological potential.¹⁰²

The relatively shallow residual soils associated with the underlying shale and sandstone geology is susceptible to minor surface disturbance associated with building or road construction. The construction of commercial and residential structures across the construction site, as well as associated road and underground services, is likely to have significantly impacted or removed the former ground surface context.

¹⁰² Kelleher Nightingale Consulting, 2013. *WestConnex M4 Widening: Aboriginal archaeological survey report*. Accessed online 3/5/2019 at: https://www.westconnex.com.au/sites/default/files/M4Widening_EIS_Appendix%20J_AboriginalHeritage.pdf

The predictive model (Section 7.5) indicates that the landform contexts more likely to demonstrate evidence of repeated and overlapping activities are likely to include areas in close proximity to high order watercourses, raw material resources, or prominent features in the landscape. The Five Dock Station construction sites are located on an upper slope landform context away from major watercourses. The combination of landform context and likely disturbance or removal of A horizon contexts indicates that the overall archaeological potential of the Five Dock Station construction sites is **low**.

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Figure 59: AHIMS site register search results; Five Dock Station construction site

8.10 The Bays Station construction site

8.10.1 Environmental context overview

White Bay is located within the wider Sydney Basin, which formed between 300 and 250 million years ago. The formation was characterised by river deltas gradually replacing the ocean that once extended as far west as Lithgow.¹⁰³ By the Triassic Period (251-199 million years before present) the geology of Sydney had formed in three distinct groups: The Narrabeen Group, the Wianamatta Group, and Hawkesbury Sandstone.¹⁰⁴ Port Jackson was formed at the end of the last ice age when eustatic sea level rise inundated the dry riparian valley of the harbour floor. White Bay, situated between Glebe Island and the Balmain peninsula, was formed during this time.

At the time of European colonisation, the construction site was likely formed of estuarine mudflats which were mostly inundated at high tide. Maps from the 1850s and earlier describe much of the natural edge of White Bay as 'marsh covered at spring tide.' The southern area of the construction site, occupied by Glebe Island, had a rocky foreshore. The Balmain peninsula is formed of Hawkesbury Sandstone and was typically characterised by stepped ridges of leading away from the foreshore.¹⁰⁵ Hawkesbury Sandstone areas, such as the Balmain Peninsula, are valuable resources for flaked stone artefacts, as conglomerate quartz pebbles are frequent. Silcrete and basalt, which are widely used for the construction of stone tools, are also frequently available in coastal areas.¹⁰⁶

The Bays Station construction site, as well as the entirety of the Balmain peninsula, was part of the 1801 land grant given to William Balmain, and throughout the next 50 years land clearance may have occurred. The natural vegetation of the Balmain region featured open forests and woodlands, characterised by the Smooth-barked Apple (*Angophora Costata*), Sydney Peppermint (*Eucalyptus Piperita*), Blackwattles (*Acacia mearnsii*), and Red Bloodwoods (*Corymbia gummifera*).¹⁰⁷

Marine resources formed an important part of the daily life and food sources of Aboriginal people living near the coast. In Port Jackson, fish was the primary source of food for Indigenous people, along with shellfish and crustaceans. When describing the lifestyles of the Indigenous people around Port Jackson, many early colonists stated that much of the day was spent fishing and that fish formed much of the food eaten.¹⁰⁸ The harbour was well stocked with estimates of almost 600 fish species, and rock platforms around Sydney provided natural habitats for large quantities and varieties of shellfish, making Port Jackson, including White Bay, an area rich in natural resources.¹⁰⁹

From 1851, the Balmain peninsula was subdivided and extensive development occurred. Prior to the subdivision much of the land would have been cleared. Simultaneously, maritime and noxious industries began along White Bay and Glebe Island. In 1912, the Mullens Street resumption area was resumed by the government, and White Bay foreshore was developed in the area. Extensive land reclaiming occurred, with the former White Bay Power Station, ports, and a rail line constructed primarily on reclaimed land. The foreshore outline was heavily modified during this time. Large portions of the sandstone headland of Glebe Island's northern side were quarried and the ground was levelled across the area to become only slightly above sea level. At the western side of the construction site however, successive phases of foreshore reclamation involved significant infilling to create a level surface on top of largely intertidal land. Overlays of historical maps which show the

¹⁰³ Pickett and Alder, 1997.

¹⁰⁴ Clark and Jones, 1997.; Pickett and Alder, 1997.

¹⁰⁵ Thorp, W. for Cultural Resources Management, 2003. *Historical Analysis: Clifton Villa 73 Ballast Point Road*, p.5.

¹⁰⁶ Attenbrow, 2010, p. 43-44.

¹⁰⁷ Thorp, W. for Cultural Resources Management, 2003. *Historical Analysis: Clifton Villa 73 Ballast Point Road*, p. 5.

¹⁰⁸ Attenbrow, 2010, p. 63.

¹⁰⁹ Ibid, p. 63-64

natural foreshore line compared to the plan of the former White Bay Power Station and other portions of reclaimed land in the area show that much of the land within the construction site has been entirely reclaimed. Minor portions of land located at the southern extent of the construction site, accounting for approximately 15 per cent of the construction site, were part of the natural shoreline however these areas would have also been heavily impacted by the land reclamation practices, with the marshy estuarine areas in the south-west infilled for the construction of the power station. Geotechnical investigations have shown that when infilling has occurred, the natural foreshore soils can be preserved at considerable depths of up to 2.8 metres below current ground level.

Within areas of reclaimed land, the natural soil has typically been removed, buried, or greatly disturbed.¹¹⁰ The geology is typically comprised of dredged estuarine sand and mud, demolition rubble, industrial and household waste, and rocks and local soils.¹¹¹ The dominant soils include a loose black sandy loam, followed by a compacted mottled clay, which overlies various fill layers. The lowest stratigraphic layer is typically dark dredged muds and sand subsoils, including sandy loams and silty clay loams.¹¹²

8.10.2 AHIMS

No recorded Aboriginal sites are located within 100 metres of The Bays Station construction site (see Figure 66). The closest recorded Aboriginal site is AHIMS ID 45-6-2278, a PAD site located approximately 650 metres to the east.

8.10.3 Archaeological context overview

No Aboriginal sites are recorded on the AHIMS site register on the foreshore of Johnstons Bay and White Bay. Numerous Aboriginal sites are recorded around the less disturbed sandstone foreshores of Sydney Harbour, including the northern margin of the Balmain Peninsula, Balls Head, and the foreshore of Cremorne and Mosman. Site types include shell midden in both open and closed (shelter) contexts, and art (pigment or engraved) features.

The lack of recorded Aboriginal sites associated with the White Bay and Johnstons Bay foreshores may be a result of the heavily modified nature of the shoreline in this area, and the subsequent lack of natural ground surface exposures. The survivability of Aboriginal archaeological remains in an environmental context that have been subject to significant landform modification depends largely on the extent and nature of subsequent historical activities. Subsequent phases of historical land use, particularly where there has been large-scale modification of the foreshore area, has the potential to have removed, mixed, or buried archaeological remains beneath layers of fill.

The White Bay area has been subject to significant landform modification, including the almost complete reduction of Glebe Island and a large program of reclamation to modify the shoreline and create new level ground for the Glebe Island Container Terminal and the White Bay Power Station. Previous archaeological assessments in the area demonstrate the potential effects on the archaeological record from these historical landform modification activities.

Approximately 500 metres south of The Bays Station construction site, Comber prepared an Aboriginal heritage due diligence assessment of a proposed shared pathway at Johnstons Stormwater Canal.¹¹³ Comber assessed the area as reclaimed land and suggested that cut and fill

¹¹⁰ NSW Department of Environment, n.d. 'Disturbed Terrain.' *eSpade*. Accessed online 8/5/2019 at: <https://www.environment.nsw.gov.au/Salis5app/resources/spade/reports/9130xx.pdf>

¹¹¹ *Op. Cit.*

¹¹² *Op. Cit.*

¹¹³ Comber Consultants, 2011. *Aboriginal Archaeological and Cultural Heritage Assessment – Johnstons Stormwater Canal: Shared Pathway Project*. Prepared for the City of Sydney. Accessed online 3/5/2019 at:

activities associated with subsequent phases of historical occupation would have destroyed any intact sites or subsurface deposits. For the Westconnex M4-M5 Link Environmental Impact Statement, AECOM assessed the portions of Rozelle Railyard within that construction site as highly disturbed, noting that landscape clearance and earthworks would have impacted and likely destroyed any intact subsurface soils and Aboriginal archaeological remains.¹¹⁴

Artefact conducted a preliminary assessment approximately 200 metres south-west of The Bays Station construction site at the Rozelle Rail Yards area in 2013 which also identified large portions of that area had been subject to extensive land reclamation. Artefact noted that although the area would have been utilised by Aboriginal people for resource gathering, it is unlikely that there would be archaeological evidence of long-term occupation sites on land that was swampy and subsequent to frequent inundation. Artefact concluded that the reclaimed land over former tidal-influenced estuarine areas has low potential to yield Aboriginal archaeological material.

8.10.4 Archaeological survey results

The Bays Station construction site is largely located within a modified flat landform adjacent to the White Bay foreshore. The majority of the construction site is currently comprised of hardstand and grassed areas. A large earth stockpile is located in the southern portion of the construction site.



Figure 60: View south across The Bays Station construction site showing modified landform and existing earth stockpiles



Figure 61: View looking north across The Bays Station construction site showing the former White Bay Power Station



Figure 62: View north-east showing existing hardstand and overgrown vegetation within The Bays Station construction site



Figure 63: View south-east across The Bays Station construction site showing Glebe Island and existing silos

https://meetings.cityofsydney.nsw.gov.au/Data/Corporate,%20Finance,%20Properties%20and%20Tenders%20Committee/20110815/Agenda/110815_cfptc_item17_attachmentd.pdf

¹¹⁴ Department of Planning & Environment. Accessed online 2/5/2019 at:

https://majorprojects.accelo.com/public/dbe8c691f2084e7fdc5ee67a2eafe077/026.%20M4-M5%20EIS_Vol%201C_Ch21%20Aboriginal%20heritage.pdf



Figure 64: View south-west towards approximate location of former foreshore within The Bays Station construction site



Figure 65: View of existing sandstone cuttings adjacent to the former White Bay Power Station to the west of The Bays Station construction site

8.10.5 Assessment of archaeological potential

The White Bay area provided a range of subsistence resources that may have been utilised as subsistence resources by Aboriginal people. These resources include valuable marine and plant resources, close to reliable water sources, near ridges and cliffs, and close to raw materials suitable for the construction of stone tools.

Despite these environmental landscape factors that could suggest high potential, the preservation of *in situ* artefactual deposits associated with Aboriginal occupation is dependent on the degree of ground disturbance in the area since European colonisation. Archaeological research has demonstrated that particular soils, particularly alluvial deposits and sand bodies are more likely to retain archaeological and artefactual deposits when found intact. While there is still potential for Aboriginal archaeological remains to be found out of context in disturbed areas and retain their cultural value, their scientific research potential is diminished.

Extensive historical occupation after European colonisation of Sydney has occurred in The Bays Station construction site. Phases of demolition, construction, and land clearance and modification in the post-colonisation period can have significant impacts for Aboriginal cultural heritage and archaeological remains.

Between 1800 and 1851 some land clearance may have occurred in this area. These land clearance activities may have impacted Aboriginal sites, however much of the foreshore area was tidally influenced and marshy. Whilst marshy wetlands were sources of abundant material resources utilised by Aboriginal people, the foreshore area above the tidal limit is more likely (than a regularly inundated tidal flat) to be the location of Aboriginal sites such as shell midden and/or stone artefacts.

The far western portion of The Bays Station construction site was above the tidal limit and was the site of the original White Bay Hotel constructed in 1860. The White Bay Hotel was constructed prior to known substantial land reclamation in the area and is likely to have been built on natural land. The rear yard structures may have included accommodation, stables, toilets, and wells. While these buildings were demolished during the resumption of White Bay, infill would have been placed on top of these remains, possibly preserving them and the associated foreshore context.

The construction of wells, cisterns and cesspits for the White Bay Hotel occurred on the natural foreshore just beyond the marshy areas. This area itself may have formed an important part of subsistence land-use strategies, as it would have been close to Sydney Harbour and various creeks, the ridge lines and cliff faces of the Balmain Peninsula and Glebe Island, the resource-rich wetland

areas of White Bay, and the natural stone resources of the Balmain Peninsula. Certain activities associated with construction of the White Bay Hotel such as excavation required for cisterns, wells, and cesspits are likely to have resulted in discrete areas of impact to any Aboriginal sites in those areas.

However, the infilling phases along the eastern foreshore in the early 20th century are likely to have preserved any intact archaeological deposits or Aboriginal artefacts and could preserve both pre-contact and contact era remains. There is **low-moderate** archaeological potential for Aboriginal archaeological remains to be preserved in the south-western portion of The Bays Station construction site. The remainder of the Bays Station construction site is considered to contain **low** archaeological potential.

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Figure 66: AHIMS site register search results; The Bays Station construction site

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Figure 67: Identified area of archaeological potential; The Bays Station construction site

8.11 Power supply routes

The majority of the power supply routes would be constructed by trenching within the road reserve. Where major roads are crossed by the route, alternative construction methods would be used such as under boring in order to avoid impacts to the road network. Alternative construction methods such as under boring may also be used to avoid other constraints such as services, major road crossings or areas of environmental sensitivity.

Trenches are expected to be around one metre wide and 1.5 – two metres deep. It is therefore likely any intact archaeological deposits to this depth below the road treatment and pavement would be impacted.

A desktop assessment of each power supply route has been completed to assess the potential for archaeological remains to be present below the existing road surface.

A summary of the desktop assessments are provided in Table 8 - Table 11.

Table 8: Summary of Westmead power supply route

Westmead power supply route	
Construction site:	Westmead metro station
Location:	Hawkesbury Road, Great Western Highway
Environmental factors	<ul style="list-style-type: none"> Power supply route is located across a sloped landform within the shallow residual Blacktown soil landscape. Soils within the power supply route are underlain by shale. The route crosses Domain Creek (which passes under Park Parade). Northern portion of the power supply route is located within 300 metres of Parramatta River
Known disturbances	<ul style="list-style-type: none"> Major disturbances include road construction and existing services. Disturbances considered likely to have removed intact natural soil deposits.
AHIMS sites	Several AHIMS sites are located within 100 metres of the power supply route including AHIMS ID 45-5-4942, AHIMS ID 45-5-4530 and AHIMS ID 45-5-4536
Archaeological potential	Low

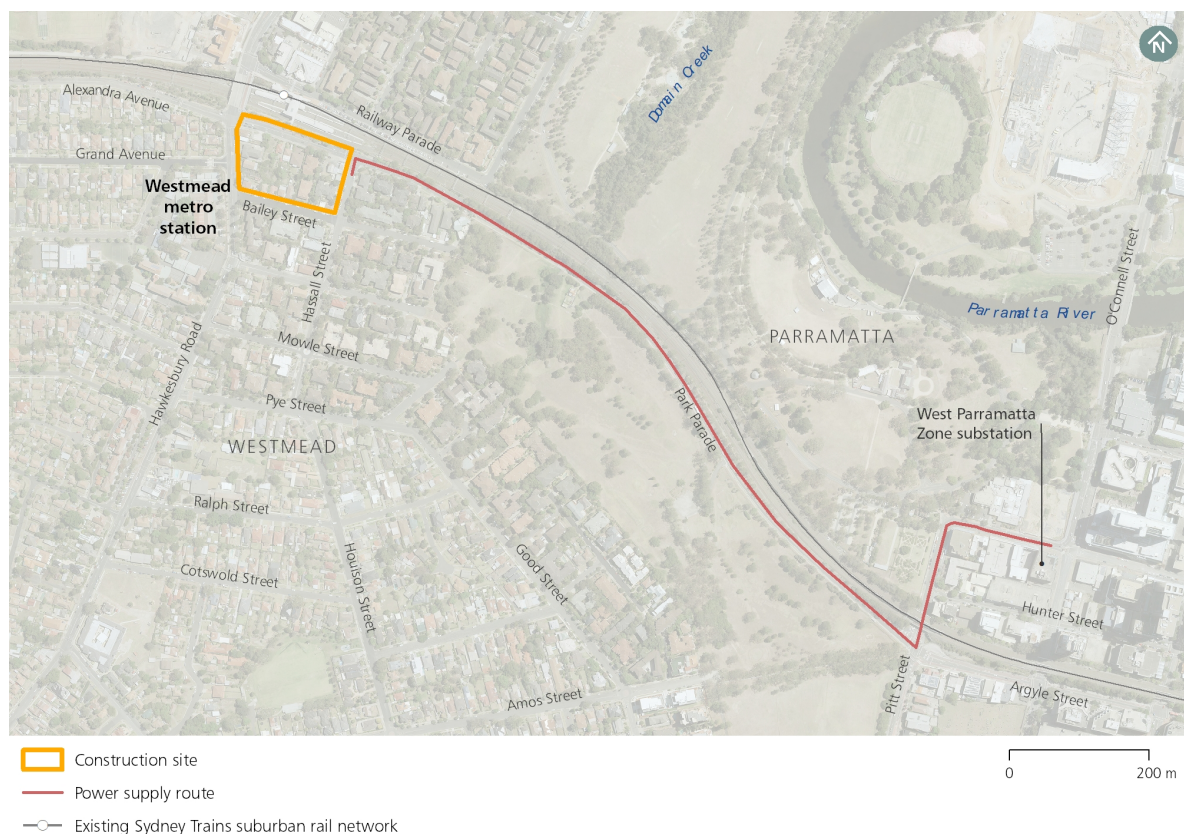


Figure 68: Proposed location of Westmead power supply route

Table 9: Summary of Parramatta power supply route

Parramatta power supply route	
Construction site:	Parramatta metro station
Location:	George Street, O'Connell Street, Macquarie Street
Environmental factors	<ul style="list-style-type: none"> Power supply route crosses a flat landform. Portions of the power supply route located within the mapped extent of the Parramatta Sand Body Western portion of power supply route located within 150m of the Parramatta River
Known disturbances	<ul style="list-style-type: none"> Major disturbances include road construction and existing services.
AHIMS sites	An area of PAD (AHIMS ID 45-5-4097) is located within power supply route corridor along O'Connell Street and the western portion of George Street
Archaeological potential	Moderate

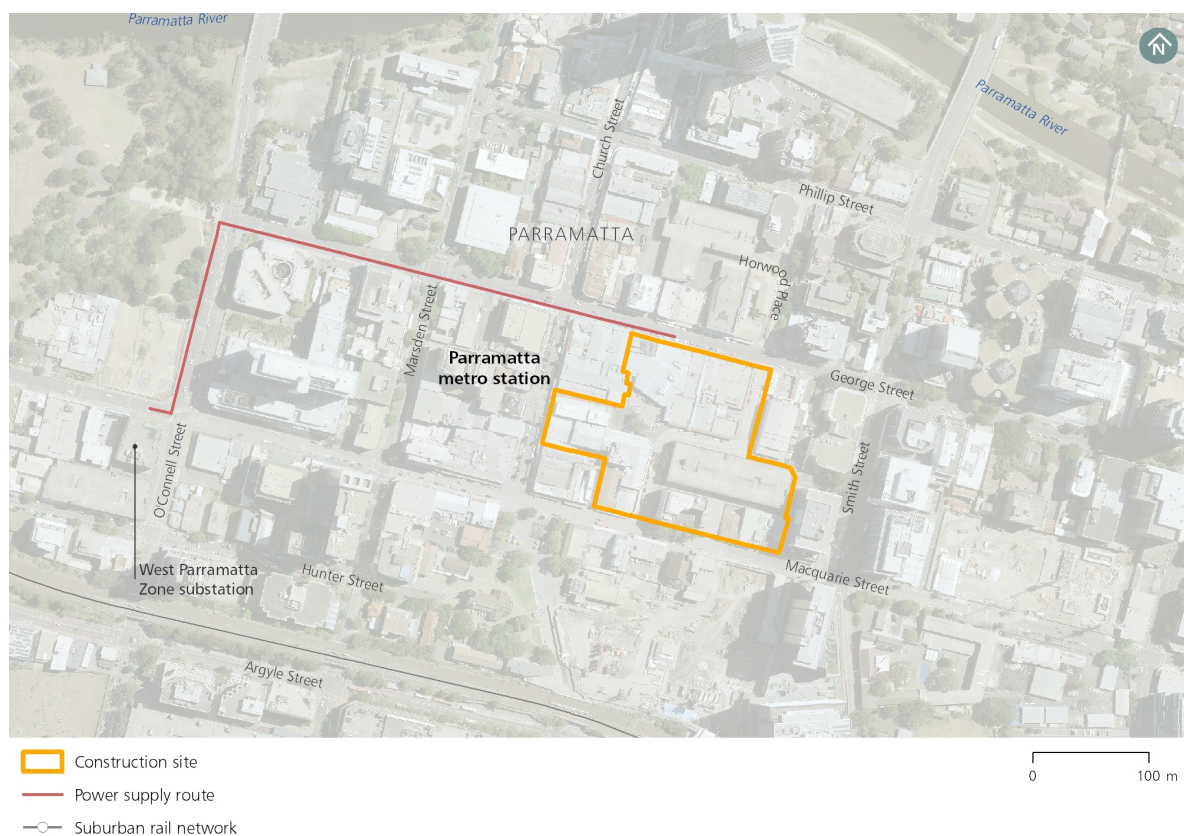


Figure 69: Proposed location of Parramatta power supply route

Table 10: Summary of Clyde power supply route desktop assessment

Clyde power supply route	
Construction site:	Clyde stabling and maintenance facility
Location:	Unwin Street
Environmental factors	<ul style="list-style-type: none"> Power supply route crosses a flat landform. Soils potentially comprised of Tertiary sediments and Quaternary alluvium associated with the creek flats and tidally influenced areas bordering Duck Creek. Power supply route subject to varied levels of historic in-filling. Southern portion of power supply route located 250 metres north of Duck Creek
Known disturbances	<ul style="list-style-type: none"> Major disturbances include import of fill, road construction and existing services. Level of fill considered likely to extend to full depth of proposed works

Clyde power supply route

AHIMS sites None

Archaeological potential Low



Figure 70: Proposed location of the Clyde power supply route

Table 11: Summary of The Bays power supply route desktop assessment

The Bays power supply route

Construction site: The Bays Station construction site

Location: Manning Street, Callan Street, McClear Street, Moodie Street, Waterloo Street, Darling Street, Merton Street, Cross Street, Mansfield Street, Mullens Street, Robert Street

Environmental factors

- Power supply route located on steeply sloped landform located within the sandy soils of the GyMEA soil landscape. Soils underlain by Hawkesbury sandstone.
- North western portion of power supply route located 250 metres south of Iron Cove.

The Bays power supply route

Known disturbances

- Major disturbances include road construction including landform modification and existing services.
- Road construction is considered to have impacted intact natural soils and exposed sandstone platforms across power supply route

AHIMS sites

None

Archaeological potential

Low

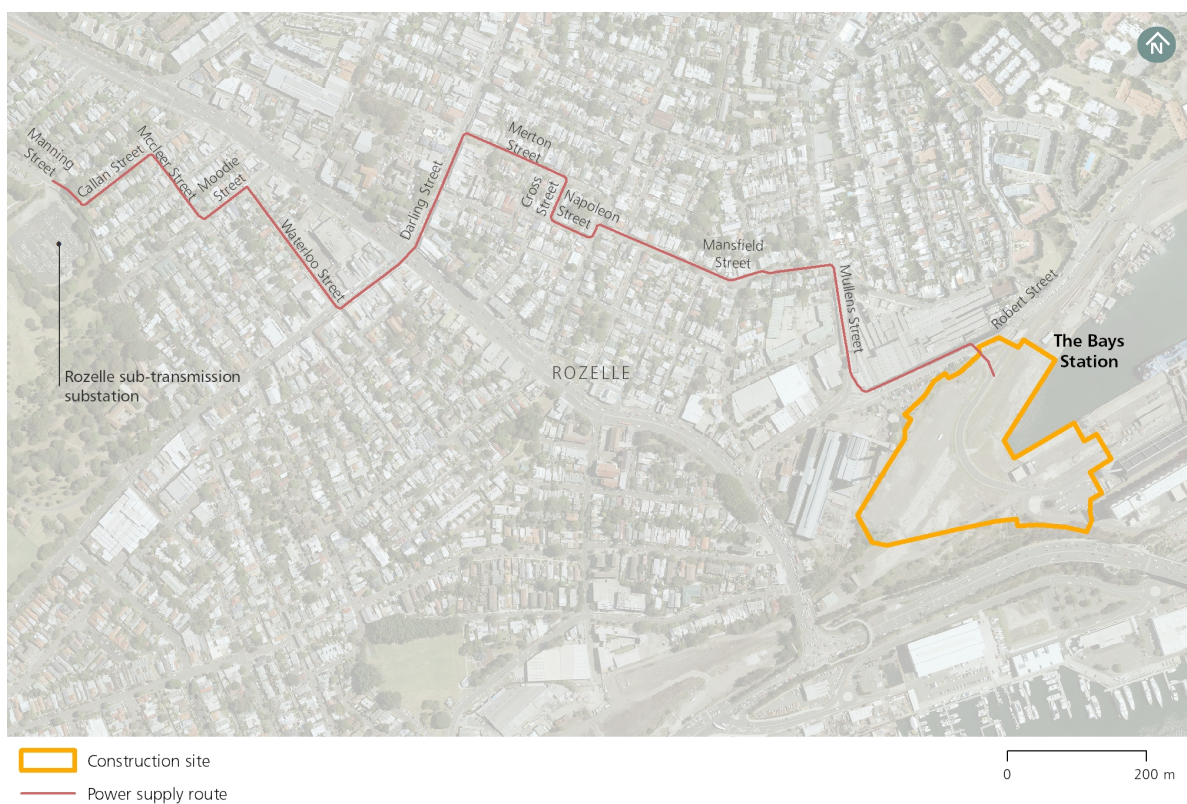


Figure 71: Proposed location of The Bays power supply route

9.0 Significance Assessment

This section presents a significance assessment for the archaeological potential of each construction site. The significance of any identified area of archaeological potential would not be known with certainty until after archaeological excavation is completed and the significance of archaeological deposits can be assessed.

9.1 Significance assessment criteria

An assessment of the cultural heritage significance of an item or place is required in order to form the basis of its management. The Guide to Investigating, Assessing and Reporting on Aboriginal Cultural Heritage in NSW¹¹⁵ in accordance with the Burra Charter¹¹⁶ provides guidelines for significance assessment with assessments being required to consider the criteria described in Table 12.

Table 12: Heritage criteria

Criterion	Description
Social values	The spiritual, traditional, historical or contemporary associations and attachments the place or area has for Aboriginal people. Social or cultural value is how people express their connection with a place and the meaning that place has for them. Does the subject area have strong or special association with the Aboriginal community for social, cultural or spiritual reasons?
Historic values	Historic value refers to the associations of a place with a historically important person, event, phase or activity in an Aboriginal community. Is the subject area important to the cultural or natural history of the local area and/or region and/or state?
Scientific values	This refers to the importance of a landscape, area, place or object because of its rarity, representativeness and the extent to which it may contribute to further understanding and information. Information about scientific values will be gathered through any archaeological investigation undertaken. Does the subject area have potential to yield information that will contribute to an understanding of the cultural or natural history of the local area and/or region and/or state?
Aesthetic values	This refers to the sensory, scenic, architectural and creative aspects of the place. It is often linked with the social values. It may consider form, scale, colour, texture and material of the fabric or landscape, and the smell and sounds associated with the place and its use. Is the subject area important in demonstrating aesthetic characteristics in the local area and/or region and/or state?

Scientific values should be considered in light of the following criteria:

- Research potential – does the evidence suggest any potential to contribute to an understanding of the area and/or region and/or state's natural and cultural history?
- Representativeness – how much variability (outside and/or inside the subject area) exists, what is already conserved, how much connectivity is there?

¹¹⁵ OEH 2011¹¹⁶ Australia ICOMOS 2013

¹¹⁶ Australia ICOMOS 2013

- Rarity – is the subject area important in demonstrating a distinctive way of life, custom, process, land use, function or design no longer practised? Is it in danger of being lost or of exceptional interest?
- Education potential – does the subject area contain teaching sites or sites that might have teaching potential?

The heritage significance of a place or object is a dynamic value which can change over time. Places and objects of significance to Aboriginal people and their reason for significance may change as Aboriginal traditions evolve. The current assessment of significance is based on information derived from background research and Aboriginal community consultation undertaken for Sydney Metro West which may not accurately reflect the future values of these places or objects to Aboriginal people.

9.2 Social significance

9.2.1 Cultural landscape

The World Heritage Convention of United Nations Educational, Scientific and Cultural Organisation (UNESCO) defines a cultural landscape as one which has 'powerful religious, artistic or cultural associations of the natural element rather than material cultural evidence, which may be insignificant or even absent' (UNESCO 1991). The relationship between Aboriginal Australians and the land is conceived in spiritual terms rather than primarily in material terms (Andrews et al 2006). Aboriginal cultural knowledge has been defined as:

Accumulated knowledge which encompasses spiritual relationships, relationships with the natural environment and the sustainable use of natural resources, and relationships between people, which are reflected in language, narratives, social organisation, values, beliefs and cultural laws and custom (Andrews et al 2006).

Aboriginal cultural knowledge was traditionally bequeathed through oral traditions from generation to generation. Within all Aboriginal communities there was a time of dislocation and upheaval associated with the arrival of colonial settlers. This widespread disruption resulted in much of the detailed knowledge and understanding of many of the elements of the cultural landscape being lost from the Aboriginal community, nonetheless many Aboriginal people maintain a strong connection to the land of their ancestors and collectively possess a wealth of knowledge passed down through the generations.

9.2.2 Aboriginal cultural heritage values

Consultation has shown that the study area is part of a wider cultural landscape of high cultural significance to many of the registered Aboriginal parties.

Consultation undertaken by Sydney Metro during development of Sydney Metro West identified the following key people, event and themes related to cultural values within the study area (refer to Table 13). This will be confirmed in consultation with registered stakeholders through their review of this draft report (refer to Section 5.0 for further detail).

Table 13: Identified cultural values within the study area

Theme	Description	Relevant construction sites ¹
Resistance – Pemulwuy & Tedbury	<p>Pemulwuy was a prominent Bedjigal warrior who became the leader of a resistance movement across the Cumberland Plain</p> <p>Tedbury was Pemulwuy's son who continued his resistance campaign following his death</p>	PMS
Bennelong	Influential Wangal man who acted as an envoy between the colonial administration and the Sydney Aboriginal community	PMS
Parramatta Sand Body	Provides a tangible cultural link to the past environment of Parramatta and pre-colonial use of the site. The known Pleistocene deposits provide the opportunity to investigate change in use over time	PMS
Parramatta Road	Originally a Wangal walking track	PMS, BNS
Maria Lock	<p>Member of the Boorooberongal admitted to the Parramatta Native Institute on 28 December 1814. Married Robert Lock in the first sanctioned marriage between a convict and an Aboriginal woman.</p> <p>Ancestral connection to many Aboriginal families in New South Wales</p>	PMS
Native Institute, Parramatta	<p>Institutional system established by Governor Macquarie following the recommendation of William Shelley.</p> <p>Aboriginal children were removed from their parents to study at the institution</p>	PMS
Native Feasts	A meeting between Governor Macquarie and the local Aboriginal people occurring regularly until 1835.	PMS
Parramatta Park	Contains several scarred trees and believed to be a major camping place for the Burramatta	PMS
Duck River	Known as the border between the Wangal and the Burramattagal.	CSMF

Note 1: WMS: Westmead metro station; PMS: Parramatta metro station; CSMF: Clyde stabling and maintenance facility; SSF: Silverwater services facility; SOPMS: Sydney Olympic Park metro station; NSMS: North Strathfield metro station; BNS: Burwood North Station; FDS: Five Dock Station; TBS: The Bays Station; Metro rail tunnels: Metro rail tunnels not related to other sites (eg tunnel boring machine works); PSR: Power supply routes.

9.3 Historic significance

Sydney Metro will seek comment from registered stakeholders with respect to the historic cultural values identified the study area when seeking comment on this draft report (refer to Section 5.0 for further detail). The outcomes of this will be documented within this section of the final report.

9.4 Indicative archaeological (scientific) significance

Archaeological values refer to the archaeological or scientific attributes of a landscape or area. These are characterised using archaeological criteria such as archaeological potential, rarity or the archaeological resource and disturbance.

A summary of the assessed archaeological values is provided in Table 14.

Table 14: Summary of indicative scientific significance of each construction site and power supply routes, including AHIMS ID 45-6-3582

Construction site	Research potential	Scientific value	Representative value	Rarity value	Overall indicative significance assessment
Westmead metro station	Low	Low	Low	Low	Low
Parramatta metro station (including AHIMS ID 45-6-3582)	Moderate-high	Moderate-high	Moderate	Moderate	Moderate-high
Clyde stabling and maintenance facility	Low-moderate	Moderate	Moderate	Moderate-high	Moderate
Silverwater services facility	Low	Low	Low	Low	Low
Sydney Olympic Park metro station	Low	Low	Low	Low	Low
North Strathfield metro station	Low	Low	Low	Low	Low
Burwood North Station	Low	Low	Low	Low	Low
Five Dock Station	Low	Low	Low	Low	Low
The Bays Station	Low-moderate	Moderate	Moderate	Moderate-high	Moderate
Westmead power supply route, Clyde power supply route, The Bays power supply route	Low	Low	Low	Low	Low

Construction site	Research potential	Scientific value	Representative value	Rarity value	Overall indicative significance assessment
Parramatta power supply route (including AHIMS ID 45-5-4097)	Moderate	Moderate	Moderate	Moderate	Moderate

9.5 Aesthetic significance

Aesthetic value refers to the 'sensory' value of a place, and can include aspects such as form, texture and colour, and can also include the smell and sound elements associated with use or experience of a site (Australian ICOMOS 2000). Aesthetic significance can be closely linked to the social value of a site.

The study area is largely comprised of a heavily modified residential landscape which has been heavily altered from its former landscape features. While significance landscape elements such as the Parramatta River and Iron Cove are located within close proximity of several portions of the study area these areas are not considered to maintain a direct connection with this feature.

The study area is considered to contain low aesthetic significance.

This will be confirmed in consultation with registered stakeholders through their review of this draft report (refer to Section 5.0 for further detail)

9.6 Statement of significance

This will be completed following consultation with registered stakeholders through their review of this draft report (refer to Section 5.0 for further detail). The outcomes of this will be documented within this section of the final report.

10.0 AVOIDING AND MINIMISING HARM

Based on the outcomes of consultation with registered stakeholders on this draft report (refer to Section 5.0), the summary of avoidance and minimising harm may be revised in the final report.

10.1 Impact assessment

10.1.1 Westmead metro station construction site

No identified Aboriginal sites would be impacted by the proposed works at Westmead metro station construction site.

Due to the landscape context and largely modified nature of the Westmead metro station construction site and surrounding area, the likelihood of intact artefact bearing archaeological deposits is considered to be low. There is low potential for impact to Aboriginal objects, and any Aboriginal objects that might be located within the impact area are likely to be within a disturbed context and would therefore be considered to be of low archaeological significance.

10.1.2 Parramatta metro station construction site

There is moderate-high potential that an intact former ground surface(s) is located within the Parramatta metro station construction site. The archaeological deposit may consist of the Parramatta Sand Body and associated Pleistocene or Tertiary clay and sand formation. One recorded area of archaeological potential is located within the construction site, which is recorded on the AHIMS site register as AHIMS ID 45-6-3582. The works at the Parramatta metro station construction site are within an area of moderate-high archaeological potential and significance, and are therefore likely to impact Aboriginal objects.

10.1.3 Clyde stabling and maintenance facility construction site

There is low-moderate potential that an intact former ground surface context is located within a portion of the Clyde stabling and maintenance facility construction site. The archaeological deposit may consist of an intact former ground surface located in close proximity to a significant local watercourse, Duck Creek. Aboriginal sites may be associated with this area of archaeological potential. The works at Clyde stabling and maintenance facility construction site are likely to impact areas of low-moderate archaeological potential and moderate archaeological significance. Works may therefore impact Aboriginal objects.

10.1.4 Silverwater services facility construction site

No identified Aboriginal sites would be impacted by the proposed works at the Silverwater services facility construction site.

Due to the landscape context and largely modified nature of the Silverwater services facility construction site and surrounding area, the likelihood of intact artefact bearing archaeological deposits is considered to be low. There is low potential for impact to Aboriginal objects, and any Aboriginal objects that might be located within the impact area are likely to be within a disturbed context and would therefore be considered to be of low archaeological significance.

10.1.5 Sydney Olympic Park metro station construction site

No identified Aboriginal sites would be impacted by the proposed works at Sydney Olympic Park metro station construction site.

Due to the landscape context and largely modified nature of Sydney Olympic Park metro station construction site and surrounding area, the likelihood of intact artefact bearing archaeological deposits is considered to be low. There is low potential for impact to Aboriginal objects, and any Aboriginal objects that might be located within the impact area are likely to be within a disturbed context and would therefore be considered to be of low archaeological significance.

10.1.6 North Strathfield metro station construction site

No identified Aboriginal sites would be impacted by the proposed works at North Strathfield metro station construction site.

Due to the landscape context and largely modified nature of North Strathfield metro station construction site and surrounding area, the likelihood of intact artefact bearing archaeological deposits is considered to be low. There is low potential for impact to Aboriginal objects, and any Aboriginal objects that might be located within the impact area are likely to be within a disturbed context and would therefore be considered to be of low archaeological significance.

10.1.7 Burwood North Station construction site

No identified Aboriginal sites would be impacted by the proposed works at Burwood North Station construction site.

Due to the landscape context and largely modified nature of Burwood North Station construction site and surrounding area, the likelihood of intact artefact bearing archaeological deposits is considered to be low. There is low potential for impact to Aboriginal objects, and any Aboriginal objects that might be located within the impact area are likely to be within a disturbed context and would therefore be considered to be of low archaeological significance.

10.1.8 Five Dock Station construction site

No identified Aboriginal sites would be impacted by the proposed works at Five Dock Station construction site.

Due to the landscape context and largely modified nature of Five Dock Station construction site and surrounding area, the likelihood of intact artefact bearing archaeological deposits is considered to be low. There is low potential for impact to Aboriginal objects, and any Aboriginal objects that might be located within the impact area are likely to be within a disturbed context and would therefore be considered to be of low archaeological significance.

10.1.9 The Bays Station construction site

There is low-moderate potential that an intact former ground surface context is located within the south-western portion of The Bays Station construction site. The archaeological deposit may consist of soil contexts associated with the former foreshore of White Bay. Aboriginal sites may be associated with this area of archaeological potential. The works at The Bay Station construction site include an identified area of low-moderate archaeological potential and moderate significance. Works may therefore impact Aboriginal objects.

10.1.10 Power supply routes

The power supply routes are largely located within existing road reserves. These areas have generally undergone a high degree of disturbance or modification as a result on landform modification, road development and installation of existing services. In the majority of these cases the level of identified disturbance is considered to have removed intact natural soil deposits reducing the archaeological potential of these areas.

Portions of the Parramatta power supply route is located within the identified extent of the Parramatta Sand Body as well as the registered site extent of AHIMS ID 45-5-4097. While substantial disturbances are considered likely to have occurred within proposed power supply route, it is considered possible that areas of intact natural soils are present. Intact sands across the power supply route are considered to be archaeologically sensitive.

The Westmead power supply route, Clyde power supply route and The Bays power supply route have been assessed as demonstrating low archaeological potential. The Parramatta power supply route has been assessed as demonstrating moderate archaeological potential.

10.2 Summary of impacts

The assessed archaeological potential and significance at each construction site where there is potential to impact Aboriginal objects is summarised in Table 15 below.

Table 15: Impact assessment where there is potential to be impact to Aboriginal objects

Construction site	Archaeological potential	Archaeological significance	Type of Harm	Degree of Harm	Consequence of Harm
Parramatta metro station (including AHIMS ID 45-6-3582)	Moderate – High	Moderate – High	Direct	Total	Total loss of value
Clyde stabling and maintenance facility	Low-Moderate	Moderate (indicative significance)	Direct	Total	Total loss of value
The Bays Station	Low – Moderate	Moderate (indicative significance)	Direct	Total	Total loss of value
Parramatta power supply route	Moderate	Moderate (indicative significance)	Direct	Partial	Partial loss of value

Archaeological significance values for the Clyde stabling and maintenance facility, The Bays Station construction sites and the Parramatta power supply route are indicative only. A detailed assessment of significance would be prepared following archaeological excavation and/or assessment of unexpected finds.

10.3 Consideration of alternatives and justification of impacts

Sydney Metro West has been developed as a solution to improve transport capacity and amenity between Parramatta and the Sydney CBD and support population growth.

The reliability and capacity of Sydney's rail network, particularly in the Greater Parramatta to Sydney CBD Corridor, is currently constrained by a number of factors, which include:

- The large number of lines which converge in the western rail corridor between Greater Parramatta and the Sydney CBD including the T1 Western Line, T9 Northern Line and T2 Inner West and Leppington Line. This limits the capacity to increase rail services between Parramatta and the Sydney CBD
- Train timetables that require trains with different service patterns to share the same track which can result in slower trains delaying all services (including fast and express trains) and requires customer journey trade-offs or further investment in the track network
- Crowded trains with two doors, double decks and 3 + 2 seating arrangements, which are slow to load and unload, resulting in long 'dwell times' (the time a train needs to stop in a station for passengers to board and alight). Longer dwell times limit on-time running of services, and leads to fewer services operating in a given time period
- Crowded CBD stations that rely on stairs instead of escalators as the principal means of accessing platforms and concourse levels
- Sharing of rail infrastructure with freight services, which impacts passenger rail services.

Additionally, access to public transport is limited at key precincts in Sydney which are forecast to have significant employment and housing growth, including:

- Sydney Olympic Park is currently serviced by the T7 Olympic Park Line. Customers on the T7 Olympic Park Line are required to transfer at Lidcombe to travel to or from the Parramatta or Sydney CBDs
- The Bays, which is set to undergo urban transformation and become a major employment hub and destination. There is no rail connection to White Bay, and capacity constraints on Victoria Road and the Anzac Bridge limit the opportunity to increase bus services. A mass transit solution is required to accommodate growth at The Bays.

If the additional mass transit capacity offered by Sydney Metro West does not proceed, it is expected that:

- The T1 Western Line, T9 Northern Line and T2 Inner West and Leppington Line would continue to operate at capacity at or near capacity at peak times, with very limited capacity for new growth in the corridor
- The road network in the corridor would continue to operate at capacity in peak times, creating congested roads and increased travel times for motorists and bus customers
- The lack of transport connectivity at key precincts such as Sydney Olympic Park and The Bays would not be adequately addressed
- The long-term public transport capacity requirements for the projected population and employment growth between Parramatta and Sydney CBD would not be met
- Growth would more likely be accommodated on Sydney's urban fringe in areas with more limited access to public transport, which would contribute to ongoing urban sprawl and congestion. Alternatively, growth may occur in an unplanned manner within existing communities, potentially impacting local character and amenity

- There would be reduced potential for development of precincts and new housing stock
- There would be reduced productivity and international competitiveness due to congestion and reduced clustering of businesses in economic centres within the Greater Parramatta to Sydney CBD corridor.

Investigation of alternatives including investigation of the potential for:

- Regulatory, governance and better-use reforms
- Transport mode alternatives including further investment in road, bus and light rail as a strategic alternative to Sydney Metro West, including new motorways, suburban rail connections, bus rapid transit services, and increased ferry services
- Rail network alternatives to improve the suburban rail network

These alternatives have been assessed as containing the ability to compliment and support the role of Sydney Metro West but unlikely to be able to meet transport requirements as an alternative.

The design development of Stage 1 has included a focus on avoiding or minimising impact to a number of environmental considerations including Aboriginal heritage. This has been achieved through:

- Avoiding direct impacts to previously recorded Aboriginal sites where possible
- Locating the majority of the Parramatta metro station construction site outside of the known extent of the Parramatta Sand Body, which is known to contain a higher level of archaeological potential.
- Development of a tunnel alignment that avoids potential impacts to Aboriginal archaeological remains through excavation below potential archaeological resources.

10.4 Ecologically Sustainable Development principles

In accordance with the 'Guide to investigating, assessing and reporting on Aboriginal cultural heritage in NSW'¹¹⁷, Ecologically Sustainable Development (ESD) principles have been considered in the preparation of this ACHAR, including options to avoid impacts to Aboriginal cultural heritage, assessment of unavoidable impacts, identification of mitigation and management measures, and taking into account Aboriginal community views.

The principles of ESD are detailed in the NSW *Protection of the Environment Administration Act 1991*. Chapter 29 of the Environmental Impact Statement discusses the ESD principles in regards to the Stage 1 as a whole. The ESD principles relevant to the assessment of Stage 1 as it relates to Aboriginal cultural heritage are considered below.

10.4.1 The precautionary principle

If there are threats of serious or irreversible environmental damage, lack of full scientific confidence should not be used as a reason for postponing measures to prevent environmental degradation (the 'precautionary principle').

¹¹⁷ OEH 2011

Stage 1 is likely to impact areas of low-moderate, moderate, and moderate-high archaeological potential and significance. Where these impacts are unavoidable this ACHAR identifies mitigation measures so that that full scientific confidence is achieved prior to irreversible impacts occurring.

10.4.2 The principle of intergenerational equity

The present generation should ensure that the health, diversity and productivity of the environment is maintained or enhanced for the benefit of future generations (the 'principle of intergenerational equity').

Stage 1 is likely to impact areas of low-moderate, moderate, and moderate-high archaeological potential and significance. Where these impacts are unavoidable this ACHAR identifies mitigation measures so that full scientific confidence is achieved prior to irreversible impacts occurring. The aim of these measures is to mitigate impacts and provide a written record for future generations.

10.4.3 Conservation of biodiversity and ecological integrity

Cultural values of biodiversity are intertwined with the lives of Aboriginal people and their use of the landscape. Biodiversity impacts of Stage 1 are considered as part of the Environmental Impact Statement and in Technical Paper 10 (Biodiversity Development Assessment Report).¹¹⁸

10.4.4 Improved valuation, pricing and incentive mechanisms

Sydney Metro is committed to the assessment and protection of cultural heritage as a key component of project development. The costs and time required to ensure this assessment is completed to a high standard is incorporated into wider development of Sydney Metro West both prior to and during the associated with these assessments are built into the Environmental Impact Statement. Sydney Metro aims to comprehensively assess impacts, avoid impacts (where feasible), work with the community, and implement management and mitigation measures which strike a balance between meeting New South Wales infrastructure needs and protecting Aboriginal heritage values.

¹¹⁸ Jacobs 2020, Sydney Metro West: Technical Paper 10 (Biodiversity Development Assessment Report), report to Sydney Metro

11.0 CUMULATIVE IMPACT ASSESSMENT

11.1 Introduction

Cumulative impacts represent the incremental loss of, or modifications to, a historical or environmental resource over time. These can result from individually minor, but collectively significant, actions and must therefore be considered in the wider developmental context to minimise impacts.¹¹⁹

The following sections summarise the heritage impacts of major rail and road infrastructure projects and other relevant project in the vicinity of Stage 1 construction sites and associated power supply routes. Cumulative impacts of these projects and Stage 1 are then described in Section 11.2.

11.2 Related projects

The following section summarises the Aboriginal heritage impacts of projects in the vicinity of the construction sites. Projects which do not have publicly accessible Aboriginal heritage assessments have not been included within this section.

11.2.1 Westmead metro station construction site and power supply route

A summary of Aboriginal heritage impacts of relevant projects within the vicinity of the Westmead metro station construction site has been provided in Table 16.

Table 16: Summary of relevant projects within the vicinity of the Westmead metro station construction site and power supply routes

Project	Description	Heritage impacts
Parramatta Light Rail – Stage 1	Transport for New South Wales is developing the Parramatta Light Rail to deliver a light rail network from Westmead to Carlingford via Parramatta CBD and Camellia	<ul style="list-style-type: none"> The Westmead portion of this project did not identify any Aboriginal objects or areas of archaeological potential during assessment. There are no impacts to Aboriginal objects or areas of archaeological potential associated with the Westmead portion of the project

11.2.1.1 Discussion of cumulative impacts for Westmead metro station construction site and power supply route

The construction of the Westmead metro station would involve the demolition of all existing structures within the construction site footprint as well as excavation for the proposed power supply route. No Aboriginal objects or areas of archaeological potential have been identified within the Stage 1 works area.

The existing environment around the Westmead metro station construction site is predominantly suburban, comprising low density Inter-War residential dwellings and low to medium density modern apartments set on relatively quiet streets off Hawkesbury Road, and nearby the historic Westmead Public School along Hawkesbury Road. The portion of the study area encompassing Alexandra

¹¹⁹ Washington State Department of Transportation 2008. Guidance on Preparing Cumulative Impact Analyses, p. 3.

Avenue includes a number of commercial developments and a small portion of the T1 Western Line rail corridor.

The area surrounding the existing Westmead Station is undergoing moderate development, which has the potential to impact intact landforms which may contain Aboriginal archaeological remains. No impacts to Aboriginal objects or areas of archaeological potential have been identified within the Westmead portion of the Parramatta Light Rail project with remaining projects in the region not subject to Aboriginal archaeological assessment. As no other projects have identified impacts to Aboriginal objects within the vicinity of the proposed works, no cumulative impacts have been identified.

11.2.2 Parramatta metro station construction site and power supply route

A summary of Aboriginal heritage impacts of relevant projects within the vicinity of the Parramatta metro station construction site has been provided in Table 17.

Table 17: Summary of relevant projects within the vicinity of the Parramatta metro station construction site and power supply route

Project	Description	Heritage impacts
Parramatta Light Rail – Stage 1	Transport for New South Wales is developing the Parramatta Light Rail to deliver a light rail network from Westmead to Carlingford via Parramatta CBD and Camellia	<ul style="list-style-type: none"> The project would include partial – total impact to five Aboriginal sites within the Parramatta area (AHIMS ID 45-6-3195, AHIMS ID 45-6-3157/ 45-6-3158, AHIMS ID 45-6-3312, AHIMS ID 45-6-3313, AHIMS ID 45-6-2559) Four of the sites were identified as containing moderate – high significance values associated the sites assessment as moderately intact and associations with the archaeologically significant Parramatta Sand Body.
Parramatta Leagues Club Hotel	The proposal involves the demolition of existing buildings and the construction of a 17-storey hotel building (plus a single level basement for services).	<ul style="list-style-type: none"> Project area subject to test excavation as part of adjacent carpark project Based on the presence of heavily truncated soils it is considered that the project area did not contain soils capable of bearing an archaeological deposit No impacts to Aboriginal heritage were identified
89 George Street, Parramatta	Demolition of existing buildings; development of a commercial building	<ul style="list-style-type: none"> No previously known Aboriginal archaeological sites or objects identified within project area Located within the known extent of the Parramatta sand sheet Assessment considered it likely that undocumented Aboriginal archaeological features remain buried under current hardstand surfaces Assessment identified that project will have a significant impact on the potential archaeological resource Assessment recommended a test excavation program be undertaken prior to works.
Macquarie Street residential development (142-154 Macquarie Street, Parramatta)	Demolition of all existing structures; construction of a 60 storey residential development and two towers of 35 and 25 storeys	<ul style="list-style-type: none"> The development within the vicinity of the State Significant 'Ancient Aboriginal and Early Colonial Landscape' (SHR 01863) Assessment of the project area identified Aboriginal archaeological potential within the project area with recommendations for targeted salvage excavation to be undertaken.

Project	Description	Heritage impacts
99 – 119 Macquarie Street, Parramatta	Demolition of existing structures. Development of a 13 storey and a 14 storey mixed use development as well as 2-6 storey basement area	<ul style="list-style-type: none"> Assessment considered it likely that subsurface Aboriginal archaeological deposits would be located across the assessment area Project area was identified as containing significance associated with the Parramatta Missions. Salvage excavation was recommended prior to works
6-7 Parramatta Square, Parramatta	Construction of a 56 storey commercial tower. Demolition and archaeological works were undertaken under a former Development Application.	<ul style="list-style-type: none"> Aboriginal heritage investigation undertaken under earlier Development Application approvals Former development works associated with the project had salvaged the Aboriginal archaeological resource.
116 Macquarie Street and 7 Charles Street Parramatta (Panel reference: 2017SWC087DA)	Demolition of all existing structures; development of a 48 storey mixed use tower	<ul style="list-style-type: none"> The development site has been assessed as having potential for Aboriginal objects, including contact archaeology, which would be directly impacted by the proposed works Development would result in removal of potential Aboriginal archaeological resource.
Western Sydney University Innovation Hub (2B-6 Hassall Street, Parramatta)	Proposed development includes the following construction of a 19 storey building, landscaping and public domain works	<ul style="list-style-type: none"> Site is located on the boundary of the Parramatta Sand sheet Aboriginal objects are predicted to be within project area Proposed development is considered likely to result in total impact to the potential archaeological resource within the development area Test excavation proposed to confirm the presence of Aboriginal objects within the development area

11.2.2.1 Discussion of cumulative impacts for Parramatta metro station construction site and power supply route

Previous archaeological investigation has been substantial within the Parramatta region largely triggered by the archaeological potential associated with the Parramatta Sand Body and early interaction between Aboriginal people and European settlers. A large proportion of the Parramatta LGA however is subject to current and former disturbances reducing the archaeological potential of the region. The impact of former development on this archaeological potential is demonstrated broadly by Aboriginal potential mapping outlined in the Parramatta DCP which identifies that approximately 90 per cent of the Parramatta LGA as containing low archaeological potential. While this sensitivity is in part related to areas which are not considered to be sensitive landforms generally, a portion of the assessment is also related to the highly developed nature of the Parramatta LGA.

Areas of high potential within the Parramatta LGA are largely associated with areas within close proximity to watercourses and the mapped extent of the Parramatta Sand Body. A large area of high potential is located with the Parramatta CBD approximately bound by the Parramatta River in the north and Hunter Street in the south.

The Parramatta and North Parramatta commercial areas are undergoing significant development residential, commercial and infrastructure developments including Parramatta Square, Parramatta RSL and Parramatta Light Rail (Stage 1) (Table 17). These projects have resulted (or will result) in the continued reduction of the potential archaeological resource. Further proposed development

including 89 George Street, 116 Macquarie Street and 7 Charles Street Parramatta if undertaken would result in further erosion of this resource.

Construction of the Parramatta metro station construction site and proposed power supply route would result in a further reduction in the archaeological potential of the region and subsequently result in a cumulative impact. The nature of the cumulative impact would be dependent on the scientific and cultural significance of the Aboriginal objects identified.

11.2.3 Clyde stabling and maintenance facility construction site and power supply route

A summary of Aboriginal heritage impacts of relevant projects within the vicinity of the Clyde stabling and maintenance facility construction site has been provided in Table 18.

Table 18: Summary of relevant projects within the vicinity of the Clyde stabling and maintenance facility construction site and power supply route

Project	Description	Heritage impacts
Viva Energy Clyde Western Area Remediation Project	The proposal involves the remediation of contaminated soils associated with former oil refinery activities to facilitate future development of the land for other purposes permissible under the existing land use zoning	<ul style="list-style-type: none"> Site area identified as being heavily disturbed No impact to known or potential Aboriginal archaeological resources identified.
Clyde Terminal Conversion Project	Demolition of existing processing units; conversion of part of the existing Clyde Refinery assets to receive, store, blend and distribute finished products	<ul style="list-style-type: none"> Site area identified as being heavily disturbed No impact to known or potential Aboriginal archaeological resources identified.

11.2.3.1 Discussion of cumulative impacts for Clyde stabling and maintenance facility construction site and power supply route

The development of the Clyde stabling and maintenance facility construction site would involve the removal of all structures across the site, with the exception of the façade of the locally heritage listed RTA Depot (PLEP Item No. I576). The construction site would also include the excavation and construction of the dive structure and shaft at Rosehill and trenching for a proposed power supply route.

The existing environment surrounding the Clyde stabling and maintenance facility construction site is industrial. The study area is set within the RTA Depot, a heavily modified industrial landscape north of the Duck River; and the Sydney Speedway and surrounding industrial streetscape, south of the Duck River. The wider context surrounding the Clyde stabling and maintenance facility site construction site is predominantly industrial which is likely to have substantially reduced the Aboriginal archaeological resource of the area.

Clyde industrial area is undergoing a number of developments, as seen above in Table 18, including the Viva Energy Clyde Western Area Remediation Project and the Clyde Terminal Conversion Project which have not been identified as resulting in impacts to Aboriginal archaeological or cultural values. As no other projects have identified impacts to Aboriginal objects or areas of archaeological potential within the vicinity of the construction site, no cumulative impacts have been identified.

11.2.4 Silverwater services facility construction site

11.2.4.1 Discussion of cumulative impacts for Silverwater services facility construction site

There are no registered Aboriginal objects or areas of archaeological potential within the Silverwater services facility construction site, or within its direct vicinity. The existing environment surrounding the Silverwater services facility construction site is industrial; a heavily modified landscape. The study area is set within an existing vacant industrial lot, at the corner of Silverwater Road and Derby Street. Construction activities at the construction site would include shaft excavation at the corner of Silverwater Road and Derby Street. No potential Aboriginal heritage impacts have been identified at this construction site, or in those within the vicinity. As no other projects have identified impacts to Aboriginal objects or areas of archaeological potential within the vicinity of the construction site, no cumulative impacts have been identified.

11.2.5 Sydney Olympic Park metro station construction site

A summary of the Aboriginal heritage impacts of relevant projects within the vicinity of the Sydney Olympic Park metro station construction site has been provided in Table 19.

Table 19: Summary of relevant projects within the vicinity of the Sydney Olympic Park metro station construction site

Project	Description	Heritage impacts
Stadium Australia Redevelopment	The proposal involves the redevelopment of Stadium Australia	<ul style="list-style-type: none"> Based on the extensive nature of earthworks during the original stadium development it is considered that all natural soil profiles would have been removed No potential for Aboriginal archaeological remains were identified.
Residential development, 1 and 2 Murray Rose Avenue, Sydney Olympic Park	The proposal involves the construction of two residential buildings between 12-15 storeys high as well as three basement levels.	<ul style="list-style-type: none"> No potential or known Aboriginal archaeological remains were identified No impact to known or potential Aboriginal archaeological resources identified.
Site 9 Sydney Olympic Park Mixed-Use Residential building (Corner of Sarah Durack Avenue and Olympic Boulevard)	Development of a 39 storey mixed use development including basement car parking facilities	<ul style="list-style-type: none"> No potential or known Aboriginal archaeological remains were identified No impact to known or potential Aboriginal archaeological resources identified.
2A and 2B Australia Avenue mixed-use towers, Sydney Olympic Park	Development of a 31 storey mixed use development including basement car parking facilities	<ul style="list-style-type: none"> No potential or known Aboriginal archaeological remains were identified No impact to known or potential Aboriginal archaeological resources identified.

Project	Description	Heritage impacts
Site 53 Sydney Olympic Park (2 Figtree Drive)	Development of a mixed use development comprised of four residential towers of up to 31 stories	<ul style="list-style-type: none"> No potential or known Aboriginal archaeological remains were identified No impact to known or potential Aboriginal archaeological resources identified.

11.2.5.1 Discussion of cumulative impacts for Sydney Olympic Park metro station construction site

The construction of the Sydney Olympic Park metro station would involve the demolition of all extant structures within the construction site.

The Sydney Olympic Park metro station construction site is within the vicinity (directly adjacent) to a number of developments, including the proposed route of the planned Parramatta Light Rail Stage 2 project, as seen above in Table 19. The Parramatta Light Rail Stage 2 route is expected to run directly adjacent to the State Abattoirs along Dawn Fraser Avenue Aboriginal heritage assessment of the route has not yet been completed.

Several additional developments are proposed within the vicinity of the Sydney Olympic Park construction site, however these have not included Aboriginal archaeological assessment. Those developments which have been subject to assessment (Table 20) have not identified impacts to Aboriginal archaeological remains within their project areas. As no other projects have identified impacts to Aboriginal objects or areas of archaeological potential within the vicinity of the construction site, no cumulative impacts have been identified.

11.2.6 North Strathfield metro station construction site

A summary of the Aboriginal heritage impacts of relevant projects within the vicinity of the North Strathfield metro station construction site has been provided in Table 20.

Table 20: Summary of relevant projects within the vicinity of the North Strathfield metro Station construction site

Project	Description	Heritage impacts
North Strathfield Station Upgrade (Transport Access Program)	Installation of three elevators, accessible on-street parking space, updated kiss-and-ride area on Queen Street; Family accessible toilet and ambulant toilet; updates to security and CCTV	<ul style="list-style-type: none"> No impact to known or potential Aboriginal archaeological resources identified.

11.2.6.1 Discussion of cumulative impacts for North Strathfield metro station construction site

The North Strathfield metro station construction site is alongside the existing North Strathfield Station to the west that is serviced by the T9 Northern Line. The existing environment comprises an open setting located between early 20th century commercial and residential development to the east and the existing rail corridor to the west. A freight line track is located west of the construction site below ground level, beneath the existing track surface. Upgrades associated with the North Strathfield Station Upgrade were undertaken immediately west of the North Strathfield metro station construction site. These works are largely located within the existing rail cutting which has been heavily disturbed.

As no other projects have identified impacts to Aboriginal objects or areas of archaeological potential within the vicinity of the construction site, no cumulative impacts have been identified.

11.2.7 Burwood North Station construction site

11.2.7.1 Discussion of cumulative impacts for Burwood North Station construction site

While there are several proposed developments in the vicinity of the Burwood North construction site, these have not been subject to Aboriginal archaeological assessment. The existing environment around the Burwood North Station construction site includes low to medium density early to mid 20th century commercial development; and low density mid to late 20th century residential development. The proposed works would include cut and cover excavation at a total depth of 32 metres. No Aboriginal heritage impacts have been identified within projects in the vicinity of the Burwood North Station construction site. As no other projects have identified impacts to Aboriginal objects or areas of archaeological potential within the vicinity of the construction site, no cumulative impacts have been identified.

11.2.8 Five Dock Station construction site

A summary of the Aboriginal heritage impacts of relevant projects within the vicinity of the Five Dock Station construction site has been provided in Table 21.

Table 21: Summary of relevant projects within the vicinity of the Five Dock Station construction site

Project	Description	Heritage impacts
M4-M5 Link – Rozelle Interchange and ventilation facilities, Iron Cove Link surface works and ventilation facility	Construction of the M4-M5 Link which would comprise a new, tolled multi lane road linked between the M4 East at Haberfield and the New M5 at St Peters	<ul style="list-style-type: none"> No known Aboriginal objects or areas of archaeological potential identified within the project area

11.2.8.1 Discussion of cumulative impacts for Five Dock Station construction site

The existing environment within the proposed Five Dock Station construction site mainly comprises mid to late twentieth century low to medium density commercial development along the Great North Road, within the town centre of the suburb; the Second Avenue Car Park; and low density residential buildings. The proposed works would include demolition of existing structures within the construction site footprint. While additional projects including the Five Dock Streetscape Upgrade project are being undertaken within the vicinity of the study area, no heritage assessment is publicly available for these works. As no other projects have identified impacts to Aboriginal objects or areas of archaeological potential within the vicinity of the proposed works, no cumulative impacts have been identified.

11.2.9 The Bays Station construction site and power supply route

A summary of Aboriginal heritage impacts of major infrastructure projects within the vicinity of The Bays Station construction site has been provided in Table 22.

Table 22: Summary of relevant projects within the vicinity of The Bays Station construction site and power supply route

Project	Description	Heritage impacts
M4-M5 Link – Rozelle Interchange and ventilation facilities, Iron Cove Link surface works and ventilation facility	Construction of the M4-M5 Link which would comprise a new, tolled multi lane road linked between the M4 East at Haberfield and the New M5 at St Peters	<ul style="list-style-type: none"> No known Aboriginal objects or areas of archaeological potential identified within the project area.
Western Harbour Tunnel and Warringah Freeway Upgrade	Development of a new tolled motorway tunnel connection across Sydney Harbour, and an upgrade of the Warringah Freeway to integrate the new motorway infrastructure with the existing road network connecting to the Beaches Link and Gore Hill Freeway Connection project. Construction activities would take place at the Rozelle Rail Yards and at White Bay	<ul style="list-style-type: none"> No known Aboriginal objects within White Bay portion of project area Moderate to high potential for Aboriginal objects associated with marine uses or the underlying sandstone geology noted within the White Bay project area. Potential Aboriginal objects included rock shelters, grinding grooves, middens and/or stone artefact scatters, fish traps Impacts to submerged landscapes within White Bay project area are limited to piling and assessed as unlikely to penetrate sub-bed of the harbour containing Aboriginal archaeological remains. Any impacts would be negligible – minor due to their localised nature.
Glebe Island Multi-User Facility	Construction and operation of a ship off-loading, storage and dispatch facility for bulk construction materials such as sand, aggregates and other dry bulk construction materials. The site is located within land owned by the Port Authority of the eastern site of Glebe	<ul style="list-style-type: none"> No Aboriginal sites were identified within 200 metres of project area Assessment identified that the site had been subject to extensive disturbance including land reclamation and considered it highly unlikely that previously undisturbed Aboriginal objects would be present beneath the ground surface
Sydney Metro City & Southwest (Chatswood to Sydenham)	Construction and operation of a 15.5 km metro line from Chatswood, under Sydney Harbour and through Sydney's CBD out to Sydenham. Works would include the installation of a truck marshalling yard at White Bay	<ul style="list-style-type: none"> No known Aboriginal objects within White Bay portion of project area
The Bays Precinct Urban Transformation Plan	A 20-30 year plan to redevelop The Bays including cultural, maritime, recreational, retail and commercial use	<ul style="list-style-type: none"> Preliminary Aboriginal heritage investigation identified moderate Aboriginal archaeological potential associated with the south-western portion of the White Bay Power Station.
The Bays road relocation works REF	Modification of the existing port road network and carpark facilities within the Bays	<ul style="list-style-type: none"> Preliminary Aboriginal heritage investigation identified an area of archaeological sensitivity within the western portion of The Bays Station construction site. The area of archaeological sensitivity was identified as being located below reclamation fill and the project was considered unlikely to impact the area of sensitivity.

11.2.9.1 Discussion of cumulative impacts for The Bays Station construction site and power supply route

The construction site includes a small area of archaeological potential associated with the potential for buried remains of the original foreshore environment. Proposed works within The Bays Station construction site include cut and cover excavation along the foreshore of White Bay, and the demolition of all existing structures (several small industrial buildings) within the construction site in preparation for excavation work. Excavation would also include trenching for the establishment of a power supply route.

The Bays area is undergoing significant development, including transport links and industrial development. The existing environment surrounding the construction site comprises a combination of industrial and maritime development with much of the land within the construction site of The Bays Station comprising reclaimed foreshore.

There are a number of projects within the vicinity of The Bays construction site. While the majority of these assessments have not identified Aboriginal heritage within their assessment areas, assessments for the Western Harbour Tunnel and Warringah Freeway Upgrade and the Bays Precinct Urban Transformation have identified areas of Aboriginal archaeological potential.

If Aboriginal objects are identified during further investigations for The Bays Station construction site and either the Western Harbour Tunnel and Warringah Freeway Upgrade or The Bays Precinct Urban Transformation then there would be a cumulative impact associated with works at The Bays Station construction site. The nature of the cumulative impact would be dependent on the scientific and cultural significance of the Aboriginal objects identified.

11.3 Summary of cumulative impacts

A summary of cumulative impacts for the project are included in Table 23.

Table 23: Summary of cumulative impacts

Construction site	Summary of cumulative impacts
Westmead metro station and power supply routes	None identified
Parramatta metro station and power supply route (including AHIMS ID 45-6-3582)	Further reduction of archaeological resource. Significance of the cumulative impact would depend on the nature of the Aboriginal objects if identified
Clyde stabling and maintenance facility and power supply route	None identified
Silverwater services facility	None identified
Sydney Olympic Park metro station	None identified
North Strathfield metro station	None identified
Burwood North Station	None identified
Five Dock Station	None identified

Construction site	Summary of cumulative impacts
The Bays Station and power supply route	Potential reduction of archaeological resource. Significance of the cumulative impact would depend on the nature of the Aboriginal objects if identified and the confirmed impact to Aboriginal objects related to either the Western Harbour Tunnel and Warringah Freeway Upgrade or The Bays Precinct Urban Transformation.

12.0 MITIGATION AND MANAGEMENT MEASURES

12.1 Guiding principles

The overall guiding principle for cultural heritage management is that where possible Aboriginal sites should be conserved. If conservation is not practical, measures would be taken to mitigate impacts to Aboriginal sites.

The nature of mitigation measures is primarily based on an assessment of archaeological potential and significance. The mitigation measures are also informed by cultural significance, which would be discussed with the registered Aboriginal parties during their review of this report.

12.2 Test/salvage excavation

The study area includes areas that are archaeologically sensitive, such as settings associated with the Parramatta Sand Body (Parramatta metro station construction site) and foreshore settings (The Bays Station).

The background context provided in this report indicates that the survivability of archaeological contexts at these locations depends largely on the extent and nature of subsequent phases of building construction and infrastructure installation. Where there are Aboriginal objects remaining in natural contexts, the significance of those contexts archaeologically and to the Aboriginal community is potentially very high.

Archaeological investigation provides a unique opportunity to investigate the intactness and significance of archaeological contexts within Stage 1. Key overarching themes for the investigation include:

- The opportunity to investigate a linear transect across varying landforms between Westmead and The Bays
- The opportunity to investigate contact period archaeology, including any evidence of interaction between the local Aboriginal community and British colonists, and the nature and extent of Aboriginal objects in historical archaeological contexts, particularly within the Parramatta metro station construction site and The Bays Station construction site.

A flexible test/salvage excavation methodology has been prepared and included in Section 12.3.

12.3 Archaeological excavation methodology

The urban setting of each construction site presents a series of challenges for both the survivability of archaeology and the timing and nature of archaeological excavation. This methodology seeks to provide a practical approach to excavation in a variety of different environmental and construction site settings.

This section provides a methodology for archaeological excavation within the study area, including preliminary test excavation, and more extensive salvage excavation where certain triggers are identified.

12.3.1 Research questions

Key research questions for the excavation program include:

- Intactness – investigate the intactness of Aboriginal archaeological contexts in urban contexts.
- Nature and extent – establish the nature and extent of investigated Aboriginal archaeological contexts.
- Significance – assess the archaeological and cultural significance of identified Aboriginal sites in consultation with RAPs.
- Comparative – compare the results and significance of identified Aboriginal sites with previous archaeological investigations in the area.

12.3.2 Archaeological Method Statement

The methodology provided in this document is a guiding methodology for Stage 1. A detailed and site specific methodology called an archaeological method statement would be prepared where archaeological excavation is required for each activity or site specific work stage. In some cases it may be practical to update an existing archaeological method statement for additional work stages. The archaeological method statement would adhere to the excavation methodology outlined in this document and provide detailed information on site-specific and/or activity specific archaeological management requirements.

It is anticipated that the Aboriginal archaeological Excavation Director would oversee preparation of the archaeological method statement, with contributions from a geomorphology specialist where required. It is anticipated that site inspections would be conducted where possible during preparation of the archaeological method statement.

12.3.3 Participation in archaeological investigations

RAP representatives would participate in all Aboriginal archaeological excavations. The archaeological method statement prepared for each work stage would be provided to the RAPs prior to archaeological work commencing. RAP sign off on individual archaeological method statement would not be required as the archaeological method statement would be prepared in adherence to the approved ACHAR.

12.3.4 Method Areas

To assist with implementation of the archaeological excavation and unexpected finds, the study area has been divided into three method areas, including MA1, MA2 and MA3 (Figure 72 to Figure 74). The core archaeological methodology and any Method Area specific considerations would be addressed in the archaeological method statement for each work stage. As the tunnel alignment section of the route would be excavated through bedrock and there is no potential for Aboriginal objects, these sections have not been included in this methodology.

MA1 includes Westmead metro station, Silverwater services facility, Sydney Olympic Park metro station, North Strathfield metro station, Burwood North Station, Five Dock Station, Westmead power supply route, Clyde power supply route and The Bays power supply route. These construction sites are either located across ridge crest landform contexts with generally shallow residual soils and a low archaeological potential, or in foreshores areas that have been significantly disturbed by historical land-use activities.

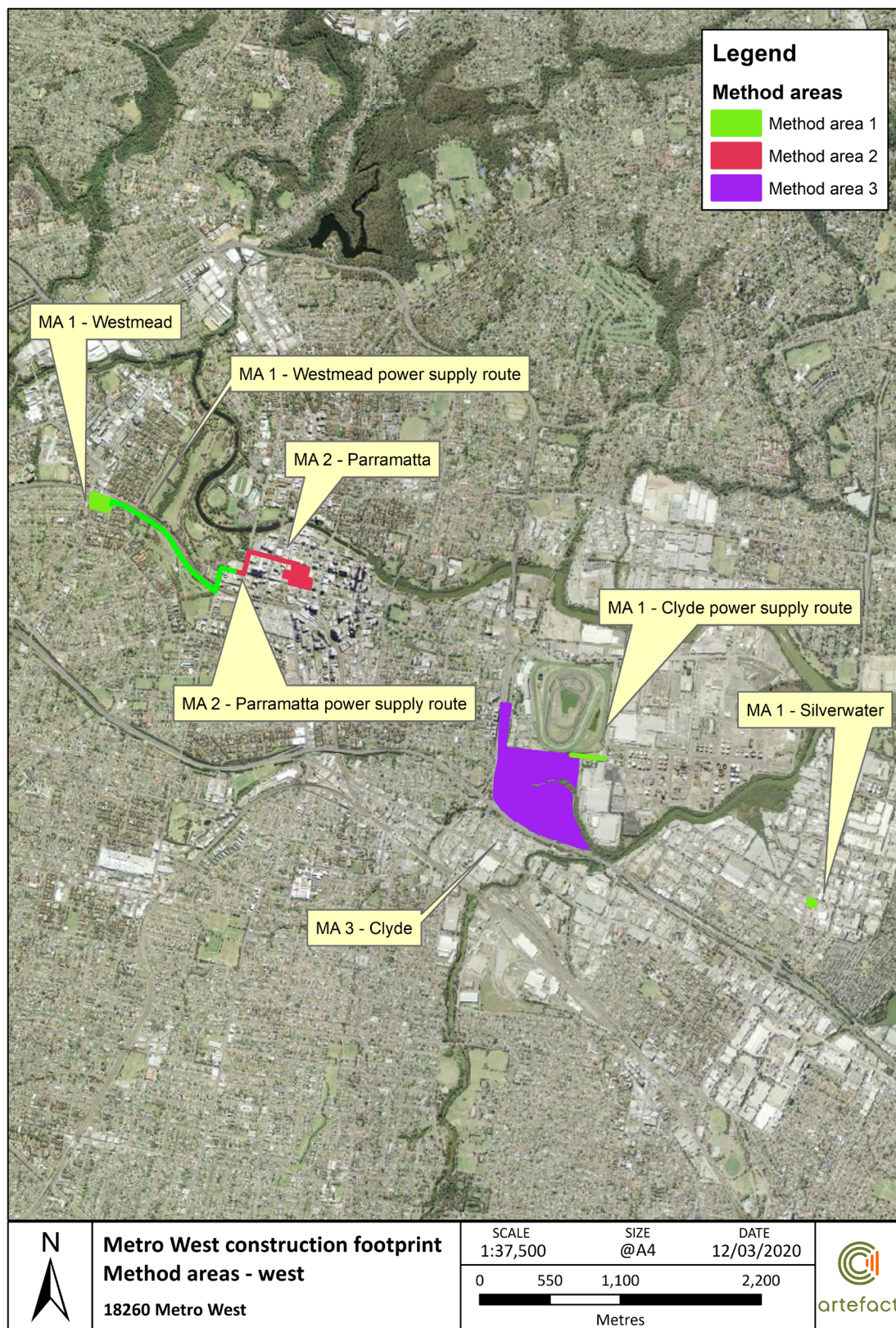
MA2 includes Parramatta metro station, Parramatta power supply route and The Bays Station construction sites. The main common archaeological attributes of these construction sites are:

- They would be subject to historical archaeology investigations
- The survivability of natural contexts may be limited by multiple phases of construction and landform modification at each location.

MA3 includes Clyde stabling and maintenance facility construction sites. The main common archaeological attributes of these construction sites are:

- Archaeological investigation can occur at these locations prior to demolition works and bulk earthworks
- They would not be subject to historical archaeology investigation.

The approach to archaeological excavation methodology would differ between MA1, MA2 and MA3 based on the likely nature and extent of the archaeological resource.



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Figure 72: Method areas – west



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Figure 73: Method areas – central



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Figure 74: Method areas – east

12.3.5 Test excavation triggers

Triggers for test excavation differ across the method areas.

Triggers for potential test excavation within **MA1** would include:

- Aboriginal object(s) identified as an unexpected find.

Triggers for potential test excavation within **MA2** would include:

- Subsurface impacts at Parramatta metro station construction site
- Subsurface impacts to portions of the Parramatta power supply route identified in the archaeological method statement as containing potential for intact areas of the Parramatta Sand Body
- Subsurface impacts within the area assessed as demonstrating archaeological sensitivity at The Bays Station construction site
- Notification by the Historical Excavation Director that potential intact soil profiles, or Aboriginal objects, have been identified during historical archaeological investigations. Confirmation by the Aboriginal archaeological Excavation Director that the finds are intact soil profiles or Aboriginal objects
- Aboriginal object(s) identified as an unexpected find.

Triggers for test excavation within **MA3** would include:

- Subsurface impacts within the area assessed as demonstrating archaeological potential at the Clyde stabling and maintenance facility construction site
- Aboriginal object(s) identified as an unexpected find.

The Aboriginal archaeological Excavation Director would then assess the need for test excavations given the nature and context of the find and the extent of proposed impacts.

Once the need for test excavation has been confirmed, a work stage based or site based archaeological method statement would be prepared which would adhere to the core methodology and any method areas specific considerations as presented in this ACHAR.

12.3.6 Salvage triggers

The archaeological method statement prepared prior to test excavation would specify triggers for salvage excavation at each construction site/work stage. Triggers for salvage excavation differ across the method areas.

Triggers for potential salvage excavation within **MA1** would include:

- Identification of more than 15 artefacts per excavation unit during test excavation
- Identification of rare or significant artefacts, features or site type.

Triggers for potential salvage excavation within **MA2** would include:

- Identification of Aboriginal artefact(s) during test excavation. Minimum number not set due to potential high significance of sites in MA2
- Identification of rare or significant artefacts, features or site type
- Identification by the Aboriginal archaeological Excavation Director and/or the geomorphologist of Aboriginal artefacts in contexts that may provide significant information on site formation, including the potential extracting samples suitable for dating.

Triggers for potential salvage excavation within **MA3** would include:

- Identification of more than five artefacts per excavation unit during test excavation
- Identification of rare or significant artefacts, features or site type
- Identification by the Aboriginal archaeological Excavation Director and/or the geomorphologist of Aboriginal artefacts in contexts that may provide significant information on site formation, including the potential extracting samples suitable for dating.

The Aboriginal archaeological Excavation Director would then assess the need for salvage excavations given the nature and context of the find and the extent of proposed impacts. Salvage excavation would proceed under the methodology discussed in the archaeological method statement and in adherence to the core methodology and method area consideration presented in the ACHAR.

12.3.7 Core excavation methodology

A core excavation methodology would be the basis for test and salvage excavation at all construction sites/work stages. As archaeological contexts are different within the different method areas, methodology variances to the core methodology are also discussed below. These should be considered over and above the core methodology.

12.3.7.1 Test excavation

The methodology of test excavation would be influenced by:

- The extent of the potential archaeological resource available to test. The extent of test excavation would depend upon constructability, potential depth of the archaeological resource, and the area extent of any remaining potential archaeological resource.
- Proposed impacts. Where impacts would be limited to a certain depth or width, such as underground service routes, excavation would not extend outside the proposed impact area unless required for safety reasons.

Test excavation would require hand excavation of test pits in controlled excavation units. Excavation units would comprise of one square metre test pits excavated in either arbitrary 100 millimetre spits or stratigraphic units where applicable. Excavation units can be joined together to form a two square metre test pit or larger, if required for work health and safety reasons in loose or deep contexts. In some instances, where very small portions of intact natural soil profile remain, the Excavation Unit size would be smaller than one square metre.

Excavation units would be excavated until archaeologically sterile deposit has been reached, or enough information has been retrieved to trigger salvage excavation, or a depth of 1.5 metres (or safe working depth) has been reached, whichever is the shallowest. If archaeological deposit extends

below a safe depth (1.5 metres) deeper archaeological excavation should be considered such as shoring or stepping.

Where there is sufficient space, a grid of test pits would be established across the area to be tested. The archaeological method statement would include the grid layout and spacing of test pits. Where there are constraints on the grid layout, such as disturbed areas or services, test pits may be offset to an adjacent location within the area of proposed impact.

Machine excavation would be used where required to remove introduced fill layers overlying areas to be hand excavated. The Aboriginal archaeological Excavation Director would determine bucket size and areal extent of machine excavation. Where machine excavation is used for removal of fill, there is no need for constraints on excavation size, with the main consideration being the provision of an area large enough to safely and satisfactorily undertake hand excavation of underlying natural contexts.

Due to the potentially deep extent of the archaeological resource in some portions of the study area, the archaeological method statement may determine it is more practical to conduct some test excavation by machine, such as at The Bays Station construction site. The archaeological method statement would determine the areal size, spit depth and spacing between mechanical excavation pits based on a site inspection and input from a geomorphology specialist.

Dependent on depth of excavation, contamination, water table considerations, etc., the archaeological method statement may give consideration to using push tubes for test excavation.

12.3.7.2 Salvage excavation

Should a test excavation trigger the need to undertake archaeological salvage excavation, a salvage excavation methodology generally in accordance with that outlined below would be followed. Salvage excavation would involve the continuation of hand excavation in one square metre Excavation Units. Salvage would cease once the excavation has retrieved a sufficient sample to describe the intactness, nature, extent, significance and is a statistically comparable quantity.

Work health and safety considerations would need to be taken into account in the archaeological method statement for 'stepping' of excavation in areas of deeper deposit.

Machine excavation would be used to remove introduced fill layers where required, or to excavate below a safe depth where archaeological sterile deposits have not been reached.

12.3.7.3 Non-Aboriginal (Historic) archaeological contexts

It is likely that historical (non-Aboriginal) archaeological excavation would be conducted at some construction sites contemporaneously with the Aboriginal heritage excavation program.

Although the archaeological research design for historical archaeology has not yet been prepared, it is likely that key processes for historical archaeological excavation would include:

- Single context excavation
- Machine scrapes to remove layers of introduced fill and expose historical features.

Single context excavation

Historical excavation of features would generally involve single context excavation to retrieve material from the feature for recording purposes. The removed material may not be sieved. It is anticipated that where Aboriginal objects are identified during single context excavation, that further material removed from the feature would be sieved to determine if further Aboriginal objects are present. Depending on the size and nature of the feature, sieving may cease at the direction of the historical

archaeology Excavation Director where it is clear that no further Aboriginal objects are likely to occur within the feature. RAPs would be involved in excavation of identified Aboriginal objects within historical archaeological contexts.

Where historical features are identified during Aboriginal heritage salvage excavation, such as within a test Excavation Unit, or within open area salvage excavation, the Historical archaeology Excavation Director would be notified. Single context excavation would continue under the direction of the historical archaeology Excavation Director and in accordance with the archaeological research design to the extent of the feature(s) within the excavation area. Whether historical archaeology is contained to within the test excavation or salvage excavation pit, or widened over a broader area, would be at the discretion of the historical archaeology Excavation Director.

Machine scrapes to remove layers of fill and expose historical features

It is likely that non-Aboriginal archaeological excavation would involve the use of machines to remove overburden covering historical features and that this activity would be monitored by a Historical Archaeologist. Where natural contexts are encountered, machine excavation would cease, and the Aboriginal archaeology Excavation Director would be notified and excavation would revert to test and salvage excavation methodology as outlined in Section 12.3.7, unless the construction site has been cleared by the Aboriginal archaeology Excavation Director (see 'Cease Aboriginal heritage excavation' below).

Cease Aboriginal heritage excavation

Once test and salvage Aboriginal archaeological excavations have ceased in accordance with this methodology and the conditions of approval, Sydney Metro and the Department of Planning, Industry and Environment would be notified in writing. Any remaining non-Aboriginal excavation that requires impact to natural contexts could then proceed in accordance with the archaeological research design and conditions of approval.

12.3.7.4 Geomorphology

Geomorphology would form an integral part of the archaeological investigative process. This is due to the potentially fragmented, deep and complex natural contexts that may be encountered. It is anticipated that a geomorphologist would be involved, where required, in all aspects of the investigative process, including contribution to preparation of the archaeological method statement, site inspections, excavation and reporting.

It is also possible that geomorphological testing and sampling may occur in separation from the excavation process, such as retrieving deep samples that are beyond the scope of archaeological investigation. The potential scope and outline of geomorphological investigation at each construction site would be outlined in the archaeological method statement.

12.3.7.5 Collection of paleo-environmental data and dating samples

Soil samples would be collected where possible for particle size analysis, pollen analysis and Optically Stimulated Luminescence dating. Particle size samples would be collected from intact sections at up to 50 millimetre intervals by a qualified geomorphologist on site. Soil from buried humic layers would be collected where possible for palynological analysis. The number of samples collected from the site would be contingent on the degree of stratigraphic intactness, local sub-surface sedimentary conditions, and the relationship of stratigraphic units with artefactual deposits. Soil samples may also be retrieved by augur or push tube (or similar) methodologies.

Samples for Optically Stimulated Luminescence dating would be collected by using PVC piping tubes, sealed at one end, inserted horizontally into controlled stratigraphic deposits. The number of samples

recovered would be contingent on the degree of stratigraphic intactness and the relationship between stratigraphic units with artefactual deposits. It would be expected that a minimum of two section profiles would be vertically sampled with PVC tubing. Optically Stimulated Luminescence samples may also be retrieved by push tube (or similar) excavation methodology.

Once Optically Stimulated Luminescence samples are collected, they would be submitted to a laboratory with the ability to undertake the analysis. Due to the expense of Optically Stimulated Luminescence dating, it is expected that not all collected Optically Stimulated Luminescence samples would be submitted for analysis.

12.3.7.6 Full extent of the resource

Where the areal extent of the remaining archaeological resource is very limited, or where Aboriginal objects are identified in historical archaeology contexts, it is anticipated that salvage excavation would continue to the full extent of the archaeological resource and would not trigger salvage excavation.

12.3.7.7 Sieving

All retrieved material from hand excavation would be sieved through nested 5 millimetre and 3 millimetre sieve mesh. It is likely that all material would be wet sieved, however dry sieving may be more appropriate in certain contexts.

The amount of fill material retrieved by machine that is sieved would depend upon the nature of the fill and the decision of the supervising archaeologist on site at the time.

12.3.7.8 Identification of rare site types

Where the following site types are encountered, a more detailed approach to excavation, sampling and recording would be required:

- Hearths
- Middens

Sites with detail linked to the provenance of each artefact. Once entered into the database, the data can be readily supplied with associated reporting to RAPs and the proponent in either electronic or hard-copy form. An archaeologist experienced in stone artefact recording would conduct the attribute recording and analysis.

All artefacts would be given a unique number and stored in double re-sealable snap lock bags. A permanent marker would be used to record the provenance and unique number of artefacts in each bag in writing on the outside of the bag and on an archival grade tag such as Dupont TM Tyvek [®] paper.

12.3.8 Temporary and long-term care and management of retrieved Aboriginal objects

The temporary repository of any retrieved artefacts would be a locked cupboard on the premises of the archaeological consultant.

If recovered, further consultation with RAPs would be required to determine the preferred long-term care and management of any retrieved Aboriginal artefacts.

12.4 Unexpected finds

An unexpected find procedure would be prepared as part of a heritage management plan for construction works. The unexpected finds procedure would provide a method to manage potential heritage constraints and unexpected finds during construction works.

Unexpected finds would include Aboriginal objects and intact areas of the Parramatta Sand Body which may be identified during excavation of the Parramatta power supply route.

This document would include information on any requirements during construction for:

- Protecting any identified Aboriginal heritage sites in the immediate area during construction activities
- A procedure to manage reporting and investigation when unexpected finds are encountered. This includes consideration of the archaeological excavation methodology, as identification of certain unexpected finds may trigger archaeological excavation

The unexpected finds procedure would also incorporate measures and controls to be applied during construction, including but not limited to contractor training in general Aboriginal cultural heritage awareness, and any on-going opportunities for Aboriginal community engagement.

12.4.1 Discovery of human remains

If suspected human skeletal remains are uncovered at any time during the proposed works, procedures outlined in the heritage management plan unexpected finds procedure would be implemented.

12.5 Summary of recommended mitigation and management measures

The following summary is an indication of management approach only (Table 24). The archaeological excavation methodology included in this ACHAR is flexible and allows responses to changing construction methodologies and site conditions.

Table 24: Preliminary management approach

Construction site	Preliminary archaeological management approach ¹
Westmead metro station	Unexpected finds procedure
Parramatta metro station	Test/salvage excavations of identified area of archaeological potential and AHIMS ID 45-6-3582
Clyde stabling and maintenance facility	Test/salvage of area of archaeological potential
Silverwater services facility	Unexpected finds procedure

Construction site	Preliminary archaeological management approach ¹
Sydney Olympic Park metro station	Unexpected finds procedure
North Strathfield metro station	Unexpected finds procedure
Burwood North Station	Unexpected finds procedure
Five Dock Station	Unexpected finds procedure
The Bays Station	Test/salvage of area of archaeological potential Test/salvage excavation required if intact remnant soil profiles are located during historical excavations.
Westmead power supply route, Clyde power supply route, The Bays power supply route	Unexpected finds procedure
Parramatta power supply route	Test/salvage excavation required if intact remnant soil profiles are located

13.0 CONCLUSION

Key management plans/documentation relating to Aboriginal heritage required prior to construction which relate to the ACHAR would likely include:

- Construction Environmental Management Plan
- Heritage Management Plan (refer to Appendix D of the Environmental Impact Statement)
- Archaeological Method Statements during early works construction.

Refer to Appendix D (Construction Environmental Management Framework) of the Environmental Impact Statement for further information on these management plans.

The mitigation measures detailed in Table 25 are proposed to address potential impacts on Aboriginal heritage sites and areas of archaeological potential during construction. They were developed following consideration of:

- Requirements under the *National Parks and Wildlife Act 1974* as amended, including compliance with Part 8A of the National Parks and Wildlife Regulation 2009
- The results of the background research, site survey and assessment.

The mitigation measures may be reviewed following consideration of comments from registered stakeholders on this draft report (refer to Section 5.0).

Table 25: Aboriginal heritage mitigation measures

Ref	Mitigation measure	Applicable site ¹
AH1	Aboriginal stakeholder consultation would be carried out in accordance with the NSW Office of Environment and Heritage's <i>Aboriginal Cultural Heritage Consultation Requirements for Proponents 2010</i> .	All
AH2	Archaeological test excavation (and salvage when required) would be carried out where intact natural profiles with the potential to contain significant archaeological deposits are encountered at the specified construction sites and the Parramatta power supply route. Excavations would be conducted in accordance with the methodology outlined in the Aboriginal cultural heritage assessment report.	PMS, CSMF, TBS, and PSR
AH3	If Aboriginal archaeological remains are identified during Stage 1, results would be incorporated into Aboriginal heritage interpretation for the Concept All in consultation with registered Aboriginal parties	All
AH4	In the event that a potential burial site or potential human skeletal material is exposed during construction, the Sydney Metro Exhumation Management Plan would be implemented.	All

¹ WMS: Westmead metro station; PMS: Parramatta metro station; CSMF: Clyde stabling and maintenance facility; SSF: Silverwater services facility; SOPMS: Sydney Olympic Park metro station; NSMS: North Strathfield metro station; BNS: Burwood North Station; FDS: Five Dock Station; TBS: The Bays Station; Metro rail tunnels: Metro rail tunnels not related to other sites (eg tunnel boring machine works); PSR: Power supply routes.

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15.0 APPENDICES

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Appendix 1 Stakeholder consultation

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Appendix 2 AHIMS search results and site cards

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