

CHATSWOOD TO SYDENHAM
**ENVIRONMENTAL
IMPACT
STATEMENT**

MAY 2016

TECHNICAL PAPER 4:
NON-ABORIGINAL HERITAGE
IMPACT ASSESSMENT

Sydney Metro City & Southwest – Chatswood to Sydenham

Technical Paper 4

Non-Aboriginal Heritage Impact
Assessment

Report to Jacobs / Arcadis / RPS

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 artefact

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EXECUTIVE SUMMARY

Project overview

Sydney Metro is a new standalone rail network identified in Sydney's Rail Future. The Sydney Metro network consists of Sydney Metro City & Southwest and Sydney Metro Northwest.

The proposed Sydney Metro City & Southwest comprises two core components:

- The Chatswood to Sydenham project (the project), the subject of this technical paper, would involve construction and operation of an underground rail line between Chatswood and Sydenham
- The Sydenham to Bankstown upgrade would involve the conversion of the 13.5 kilometre Bankstown line to metro standards and upgrade of existing stations between Sydenham and Bankstown.

The Sydenham to Bankstown upgrade will be subject to a separate environmental impact assessment.

Investigations have also commenced on a potential extension of metro rail from Bankstown to Liverpool, which could cut travel times to the Sydney CBD by up to 15 minutes and reduce crowding on the existing T1 Western Line and T2 South Line.

The Sydney Metro Chatswood to Sydenham project (the project) involves the construction and operation of a metro rail line. The project would be mainly located underground in twin tunnels extending from Chatswood on Sydney's north shore, crossing under Sydney Harbour, and continue to Sydenham.

The key components of the project would include:

- About 15.5 kilometres of twin rail tunnels (that is, two tunnels located side-by-side) between Mowbray Road, Chatswood and north of Sydenham Station (near Bedwin Road, Marrickville)
- Realignment of the existing T1 North Shore Line surface track within the existing rail corridor between Chatswood Station and in the vicinity of Brand Street, Artarmon, including a new bridge for a section of the 'down' (northbound) track to pass over the proposed northern dive structure
- About 250 metres of aboveground metro tracks between Chatswood Station and the Chatswood dive structure
- A dive structure (about 400 metres long) and tunnel portal south of Chatswood Station and north of Mowbray Road, Chatswood (the Chatswood dive structure)
- A substation (for traction power supply) at Artarmon
- Metro stations at Crows Nest, Victoria Cross, Barangaroo, Martin Place, Pitt Street and Waterloo; and new underground platforms at Central Station
- A dive structure (about 400 metres long) and tunnel portal between Sydenham Station and Bedwin Road, Marrickville (the Marrickville dive structure)
- A services facility (for traction power supply and an operational water treatment plant) adjacent to the Marrickville dive structure.

The project would also include a number of ancillary components, including new overhead wiring and alterations to existing overhead wiring, signalling, access tracks / paths, rail corridor fencing, noise walls, fresh air ventilation equipment, temporary and permanent alterations to the road network, facilities for pedestrians, and other construction related works.

Approach to Non-Aboriginal heritage assessment

Artefact Heritage has been engaged to prepare a non-Aboriginal heritage assessment by the Jacobs / Arcadis / RPS team for inclusion in the EIS for the project.

This technical paper considers the construction and operational impacts on listed heritage items and potential archaeological resources within the study area and includes:

- Identification of items and areas of heritage significance that would be materially affected by the project during construction and operation, by field survey and research, including any buildings, works, relics, views, or places of heritage significance
- Consideration of the potential impacts on the values, settings and integrity of heritage areas and items and archaeological resources located within the project area. including items both above and below ground and, where such potential exists, the likely significance of those impacts
- An outline of the proposed mitigation and management measures (including measures to avoid significant impacts and an evaluation of the effectiveness of the mitigation measures) in accordance with relevant best practice guidelines.

Overview of potential impacts

The project has potential to have a moderate to major impact on 20 listed heritage items (being five state heritage listed sites and 15 sites of local heritage significance). The 20 listed heritage items are described, from north to south, in the table below.

Heritage item	Project site	Significance	Description of potential impact
Shop at 187 Miller Street	Victoria Cross station	Local	Direct impact: Major (complete demolition)
North Sydney bus stops	Victoria Cross Station Blues Point temporary site	Local	Direct impact: Moderate (removal and relocation)
Blues Point Waterfront Group	Blues Point temporary site	Local	Direct impact: Minor to moderate (shaft excavation) Archaeological impact – minor to major (shaft excavation) Temporarily indirect: Minor to moderate (views and vistas)
McMahons Point South Heritage Conservation Area	Blues Point temporary site	Local	Direct impact: Minor to moderate (shaft excavation) Archaeological impact – minor to major (shaft excavation) Temporarily indirect: Minor to moderate (views and vistas)
Millers Point & Dawes Point Village Precinct	Barangaroo station	State	Indirect impact: Minor to moderate (views and vistas) Archaeological impact – major (station box excavation)
Commonwealth Bank of Australia including interior	Martin Place station	State	Indirect impact: Moderate (views and vistas)

Heritage item	Project site	Significance	Description of potential impact
Flat building including interior	Martin Place station	Local	Direct impact: Major (complete demolition)
Martin Place	Martin Place station	Local	Direct impact: moderate (excavation) Archaeological impact –major (excavation) Indirect impact: Minor - moderate (views and vistas)
Martin Place Railway Station	Martin Place station	Local	Direct impact: Moderate (interchange)
Masonic Club	Pitt Street station	Local	Indirect impact: Minor to moderate (views and vistas)
Criterion Hotel including interior	Pitt Street station	Local	Indirect impact: Minor to moderate (views and vistas)
Former “Speedwell House” including interiors	Pitt Street station	Local	Indirect impact: Minor to moderate (views and vistas)
Edinburgh Castle Hotel	Pitt Street station	Local	Indirect impact: Minor to moderate (views and vistas)
Former Sydney Water Building	Pitt Street station	State	Indirect impact: Moderate to major (views and vistas)
Sydney Terminal and Central Railway Stations group	Central Station	State	Direct physical impacts: Moderate to major (excavation, demolition, construction, vibration) Archaeological impact –major (excavation) Indirect impact: Moderate to major (views and vistas)
Terrace Group including interior (99-105 Regent Street)	Central Station	Local	Indirect impact: Moderate (views and vistas)
Former Crown Hotel including interior	Central Station	Local	Indirect impact: Moderate (views and vistas)
Mortuary Railway Station	Central Station	State	Indirect impact: Moderate to major (views and vistas)
Former Co-Masonic Temple including interior	Central Station	Local	Indirect impact: Moderate to major (views and vistas)
Chippendale Heritage Conservation Area	Central Station	Local	Indirect impact: Moderate (views and vistas)

Nine sites are identified as having non-Aboriginal archaeological potential. Ground disturbance and excavation at these sites could impact on archaeological resources. The potential archaeological sites are:

Project site	Archaeological potential	Potential significance	Assessment of potential impact
Chatswood Dive Site (northern)	Study area has moderate potential to contain archaeological remains associated with mid to late 19th century residential and commercial development.	Local	Minor to moderate
Crows Nest station	Study area has low potential to contain archaeological remains associated with mid to late 19th century residential and commercial development.	Local	Major
Victoria Cross station	Study area has low to moderate potential to contain archaeological remains associated with mid to late 19th century residential and commercial development.	Local	Minor to major
Blues Point temporary site	Study area has low to moderate potential to contain archaeological evidence of pre-1850s foreshore development, mid to late 19th century shipbuilding industry and mid to late 19 th century development of the site.	Local-State	Minor to major
Barangaroo station	Study area has low to high potential to contain archaeological evidence of pre 1850s foreshore development (industry and seawalls / reclamation), and post-1850's wharfage and warehousing.	Local-State	Major
Martin Place station	Study area has low to moderate potential to contain archaeological evidence associated with pre-1850's to early 20th century commercial and residential development of the study area	Local-State	Major
Pitt Street station	Study area has low to moderate potential to contain archaeological evidence associated with pre-1850's to early 20th century commercial and residential development of the study area	Local-State	Major
Central Station	Study area has low to moderate potential to contain archaeological remains associated with the Devonshire Street cemetery and earlier phases of Central Station.	Local-State	Major
Waterloo station	Study area has low to moderate potential to encounter archaeological remains associated with the pre-1850s through to late 19th century residential and commercial development of the study area.	Local	Major

Summary of mitigation response

Mitigation measures identified in other technical papers and other chapters of the Environmental Impact Statement that are relevant to the management of potential heritage impacts include:

- Chapter 10 (Construction noise and vibration) with respect to management of potential vibration impacts (Technical paper 2 – Noise and vibration)
- Chapter 16 (Landscape character and visual amenity) with respect to management of potential visual impacts during construction and operation (Technical paper 6 – Landscape character and visual amenity).

The location(s) applicable to each mitigation measure are identified by using a unique identifier as follows:

- STW – Surface track works
- CDS – Chatswood dive site
- AS – Artarmon substation
- CN – Crows Nest Station
- VC – Victoria Cross Station
- BP – Blues Point temporary site
- GI – Ground improvement works
- BN – Barangaroo Station
- MP – Martin Place Station
- PS – Pitt Street Station
- CS – Central Station
- WS – Waterloo Station
- MDS – Marrickville dive site
- Metro rail tunnels – Metro rail tunnels not related to other sites (eg TBM works)
- PSR – Power supply routes.

ID	Mitigation measure	Applicable location (s) ¹
NAH1	<p>Archival recording and reporting of the following heritage items would be carried out in accordance with the NSW Heritage Office's <i>How to Prepare Archival Records of Heritage Items</i> (1998), and <i>Photographic Recording of Heritage Items Using Film or Digital Capture</i> (2006):</p> <ul style="list-style-type: none"> • The internal heritage fabric and any non-original elements removed from within the curtilage of Mowbray House, Chatswood • The interior, exterior and setting of the shop at 187 Miller Street, North Sydney • The fabric and setting of the North Sydney bus shelters requiring removal and temporary relocation at Victoria Cross Station and Blues Point temporary site 	CDS, VC, BP, MP, CS

ID	Mitigation measure	Applicable location (s) ¹
	<ul style="list-style-type: none"> • Any component of the Blues Point Waterfront Group and the McMahons Point South heritage conservation area to be directly affected or altered, including vegetation and significant landscape features • Hickson Road wall in the vicinity of proposed ventilation risers and skylights for Barangaroo Station • The interior, exterior and setting of the 'Flat Building' at 7 Elizabeth Street, Sydney • Martin Place, between Elizabeth and Castlereagh streets, Sydney • The heritage fabric of areas of the existing Martin Place Station affected by the project <p>The Rolling Stock Officers Garden, Rolling Stock Officers Building and Cleaners Amenities Building in Sydney Yard and any other component of the Sydney Terminal and Central Railway Stations group to be removed or altered.</p>	
NAH2	<p>An archaeological research designs would be prepared and implemented to identify the need for archaeological testing or monitoring. Archaeological mitigation measures recommended in the archaeological research design would be carried out in accordance with Heritage Council guidelines, and where identified in the archaeological research design, would be supervised by a suitably qualified Excavation Director with experience in managing State significant archaeology.</p>	CDS, CN, VC, BP, BN, MP, PS, CS, WS, PSR
NAH3	<p>An <i>Exhumation Policy and Guideline</i> would be prepared and implemented. It would be developed in accordance with the <i>Guidelines for Management of Human Skeletal Remains</i> (NSW Heritage Office, 1998b).</p>	All except metro rail tunnels
NAH4	<p>The method for the demolition of existing buildings and / or structures at Chatswood dive site, Victoria Cross Station, Martin Place Station, Pitt Street Station, Central Station and Waterloo Station would be developed to minimise direct and indirect impacts to adjacent and / or adjoining heritage items.</p>	CDS, VC, MP, PS, CS, WS
NAH5	<p>Prior to total or partial demolition of heritage items at Victoria Cross and Martin Place stations, heritage fabric for salvage would be identified and reuse opportunities for salvaged fabric considered. This would include salvage and reuse of heritage tiles to be impacted at Martin Place Station.</p>	VC, MP
NAH6	<p>An appropriately qualified and experienced heritage architect would form part of the Sydney Metro Design Review Panel and would provide independent review periodically throughout detailed design.</p>	All
NAH7	<p>The project design would be sympathetic to heritage items and, where reasonable and feasible, minimise impacts to the setting of heritage items. The detailed design for Martin Place Station and Central Station would be developed with input from a heritage architect.</p>	STW, CDS, CN, VC, BN, MP, PS, CS, WS, MDS

ID	Mitigation measure	Applicable location (s) ¹
NAH8	Appropriate heritage interpretation would be incorporated into the design for the project in accordance with the <i>NSW Heritage Manual</i> , the NSW Heritage Office's <i>Interpreting Heritage Places and Items: Guidelines</i> (August 2005), and the NSW Heritage Council's <i>Heritage Interpretation Policy</i> .	CDS, CN, VC, BP, BN, MP, PS, WS
NAH9	A Central Station heritage interpretation plan would be developed and implemented, consistent with the <i>Central Station Conservation Management Plan</i> (Rappoport and Government Architects Office, 2013) and in accordance with the guidelines identified in NAH8.	CS
NAH10	The design of the Sydney Yard Access Bridge would be sympathetic to surrounding heritage items and minimise impacts to sight lines, views and setting of surrounding heritage items, including to Mortuary Station and the Sydney Terminal and Central Railway Stations group. As a minimum the design would: <ul style="list-style-type: none"> • Incorporate materials and finishes sympathetic to the heritage context of the railway station • Minimise height and bulk of the structure. 	CS
NAH11	Except for heritage significant elements affected by the project, direct impact on other heritage significant elements forming part of the following items would be avoided: <ul style="list-style-type: none"> • The Blues Point Waterfront Group (including the former tram turning circle, stone retaining wall, bollards and steps) • The Millers Point and Dawes Point Village Precinct • The existing Martin Place Station • Sydney Terminal and Central Railway Stations group • Sydney Yard (including the Shunters Hut and Prince Alfred Sewer). 	BP, BN, MP, CS
NAH12	Power supply works would be designed and constructed to avoid impacts to the Tank Stream and Bennelong Stormwater Channel.	PSR
NAH13	The design and detailed construction planning of work at Central Station would consider the requirements of the <i>Central Station Conservation Management Plan</i> (Rappoport and Government Architects Office, 2013) and include consideration of opportunities for the retention, conservation and / or reuse of original and significant heritage fabric. Consultation would be carried out with Sydney Trains and the Heritage Council of NSW during design development.	CS

¹ STW: Surface track works; CDS: Chatswood dive site; AS: Artarmon substation; CN: Crows Nest Station; VC: Victoria Cross Station; BP: Blues Point temporary site; GI: Ground improvement works; BN: Barangaroo Station; MP: Martin Place Station; PS: Pitt Street Station; CS: Central Station; WS: Waterloo Station; MDS: Marrickville dive site; Metro rail tunnels: Metro rail tunnels not related to other sites (eg TBM works); PSR: Power supply routes.

The following general mitigation measures apply to the management of the overall project.

Non-Aboriginal Archaeological Research Design

Where an archaeological research design is required, it would be prepared based on research information included in Technical Paper 4 (Non-Aboriginal heritage) and would be supplemented by additional detailed historical research of each site, with reference to the project design and proposed construction methods at each site. Based on the detailed literature review, the archaeological research designs would identify the need for, and provide a detailed methodology for undertaking:

- Archaeological test excavation or test and salvage excavation
- Archaeological monitoring.

Test excavation

Test excavation would not be undertaken prior to the preparation of an archaeological research design. For this project, it is likely that the archaeological research designs would recommend test excavation:

- In areas where access for excavation activities is not restricted by buildings or other structures, and
- Where additional information regarding the nature of subsurface deposits generated through test excavation could inform the assessment of archaeological potential and / or significance at that site.

Archaeological excavation can be undertaken prior to project approval as per the requirements of the Secretary's Environmental Assessment Requirements on the condition that archaeological relics are not removed.

Test and salvage excavation

Test and salvage excavation would not be undertaken prior to the preparation of an archaeological research design. For this project, it is likely that the archaeological research designs would recommend test and salvage:

- Where detailed archival research and understanding of modern disturbance (such as basement information) needs to be supplemented with more site-specific (on-ground) information to better define the archaeological potential and / or significance of the site
- In areas where access for excavation activities is restricted by buildings or other structures.

Test and salvage excavation would generally be recommended in areas where there is a moderate to high potential for relics of local or state significance to be present. It would involve locating and recording any relics found prior to their removal by construction. Test and salvage excavation could only be undertaken after project approval.

Archaeological monitoring

Archaeological monitoring involves the monitoring of construction phase excavation activities by a qualified archaeologist who would record any significant remains uncovered by excavation. Based on additional detailed historical research, the archaeological research design (see above) may identify areas where archaeological monitoring would be required. Examples of where archaeological monitoring may be required include:

- Low impact construction activities (such as narrow trenching) in areas of moderate to high potential for local or state significant relics
- Areas with low potential to contain remains of state significance.

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1.0 INTRODUCTION

1.1 Project background

Sydney Metro is a new standalone rail network identified in Sydney's Rail Future. The Sydney Metro network consists of Sydney Metro City & Southwest and Sydney Metro Northwest.

The proposed Sydney Metro City & Southwest comprises two core components:

- The Chatswood to Sydenham project (the project), the subject of this technical paper, would involve construction and operation of an underground rail line between Chatswood and Sydenham
- The Sydenham to Bankstown upgrade would involve the conversion of the 13.5 kilometre Bankstown line to metro standards and upgrade of existing stations between Sydenham and Bankstown.

Both components are subject to assessment and approval by the Minister for Planning under Part 5.1 of the NSW *Environmental Planning and Assessment Act 1979* (EP&A Act). The Sydenham to Bankstown upgrade will be subject to a separate environmental impact assessment.

Sydney Metro Northwest (formerly the North West Rail Link) is currently under construction, services will start in the first half of 2019. This includes a new metro rail line between Rouse Hill and Epping and conversion of the existing rail line between Epping and Chatswood to metro standards.

Investigations have started on the possible extension of Sydney Metro from Bankstown to Liverpool. The potential extension would support growth in Sydney's south west by connecting communities, businesses, jobs and services as well as improving access between the south west and Sydney's CBD. It would also reduce growth pressure on road infrastructure and the rail network, including the potential to relieve crowding on the T1 Western Line, T2 South Line and T2 Airport Line.

The Sydney Metro Delivery Office has been established as part of Transport for NSW to manage the planning, procurement and delivery of the Sydney Metro network. The Sydney Metro rail network is shown in Figure 1.

1.2 The Sydney Metro network

The customer experience underpins how Sydney Metro is being planned and designed. The customer experience incorporates all aspects of travel associated with the transport network, service and project including:

- The decision on how to travel
- The travel information available
- The speed and comfort of the journey
- The range and quantity of services available at stations, interchanges and within station precincts.

A high quality 'door to door' transport product is critical to attract and retain customers and also to meet broader transport and land use objectives. This includes providing a system that is inherently safe for customers on trains, at stations and at the interface with the public domain; providing direct, comfortable, legible and safe routes for customers between transport modes; and provide a clean, pleasant and comfortable environment for customers at stations and on trains.

Key features of the metro product include:

- Comfortable carriages with space for customers to sit or stand
- A ‘turn-up-and-go’ service, with high frequency trains Reduced journey times with faster trains, and new underground routes through the Sydney CBD
- Increased capacity to safely and reliably carry more customers per hour due to the increased frequency of trains
- Reduced dwell times at stations as each carriage would be single-deck with three doors, allowing customers to board and alight more quickly than they can with double-deck carriages.

The Chatswood to Sydenham project would have the capacity to run up to 30 trains per hour through the Sydney CBD in each direction, which would provide the foundation for delivering a 60 per cent increase in the number of trains operating in peak periods, and cater for an extra 100,000 customers per hour.

Figure 1: The Sydney Metro network.



1.3 Overview of the project

1.3.1 Location

The Sydney Metro Chatswood to Sydenham project (the project) involves the construction and operation of a metro rail line. The project would be mainly located underground in twin tunnels extending from Chatswood on Sydney’s north shore, crossing under Sydney Harbour, and continue to Sydenham.

1.3.2 Key features

The proposed alignment and key operational features of the project are shown in Figure 2 and would include:

- Realignment of T1 North Shore Line surface track within the existing rail corridor between Chatswood Station and Brand Street, Artarmon, including a new bridge for a section of the 'down' (northbound) track to pass over the proposed northern dive structure
- About 250 metres of aboveground metro tracks between Chatswood Station and the Chatswood dive structure
- A dive structure (about 400 metres long) and tunnel portal south of Chatswood Station and north of Mowbray Road, Chatswood (the Chatswood dive structure)
- About 15.5 kilometres of twin rail tunnels (that is, two tunnels located side-by-side) between Mowbray Road, Chatswood and Bedwin Road, Marrickville. The tunnel corridor would extend about 30 metres either side of each tunnel centre line and around all stations
- A substation (for traction power supply) in Artarmon, next to the Gore Hill Freeway, between the proposed Crows Nest Station and the Chatswood tunnel portal
- Metro stations at Crows Nest, Victoria Cross, Barangaroo, Martin Place, Pitt Street and Waterloo; and new underground platforms at Central Station
- A dive structure (about 400 metres long) and tunnel portal between Sydenham Station and Bedwin Road, Marrickville (the Marrickville dive structure)
- A services facility beside the Marrickville dive structure and tunnel portal, including a tunnel water treatment plant and a substation (for traction power supply).

The project would also include:

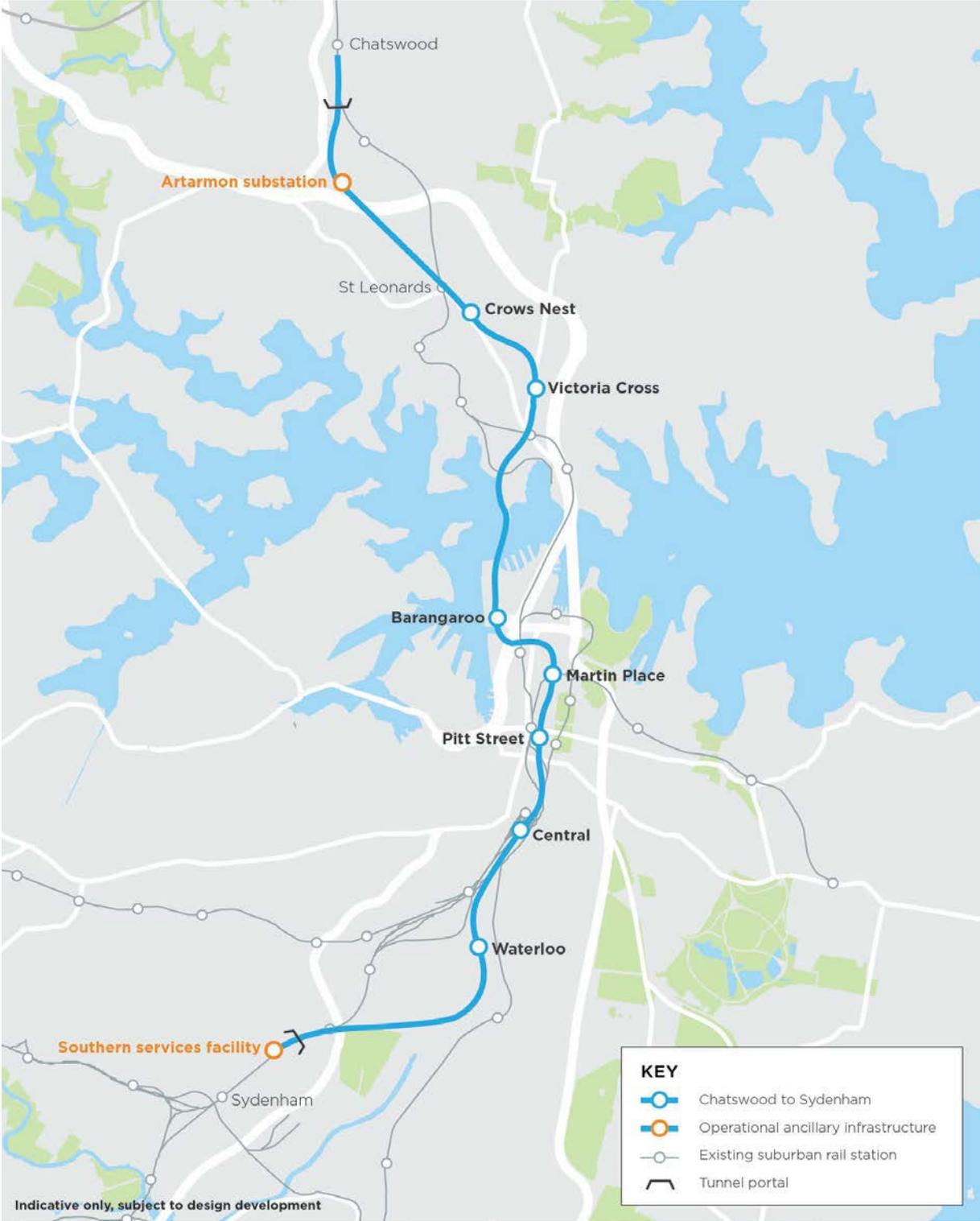
- Permanent closure of the road bridge at Nelson Street, Chatswood, and provision of an all-vehicle right turn movement from the Pacific Highway (southbound) into Mowbray Road (westbound)
- Changes to arrangements for maintenance access from Hopetoun Avenue and Albert Avenue, Chatswood as well as a new access point from Brand Street, Artarmon
- Underground pedestrian links at some stations and connections to other modes of transport (such as the existing suburban rail network) and surrounding land uses
- Alterations to pedestrian and traffic arrangements and public transport infrastructure (where required) around the new stations and surrounding Central Station
- Installation and modification of existing Sydney Trains rail systems including overhead wiring, signalling, rail corridor fencing and noise walls, within surface sections at the northern end of the project
- Noise barriers (where required) and other environmental protection measures.

The proposed construction activities for the project broadly include:

- Demolishing buildings and structures at the station sites and other construction sites
- Constructing tunnels, dive structures and tunnel portals
- Excavating, constructing and fitting out metro stations, fitting out tunnel rail systems and testing and commissioning of stations, tunnels, ancillary infrastructure, rail systems and trains
- Excavating shafts, carrying out structural work and fitting out ancillary infrastructure at Artarmon and Marrickville.

A number of construction sites would be required to construct the project. These include locations for tunnel equipment and tunnel boring machine support at Chatswood, Barangaroo and Marrickville as well as at station sites; a casting yard and segment storage facility at Marrickville and a temporary tunnel boring machine retrieval site at Blues Point.

Figure 2: Project overview



1.4 Purpose and scope of this report

The project has been declared state significant infrastructure and critical state significant infrastructure and is subject to assessment by the Department of Planning and Environment and approval by the Minister for Planning under Part 5.1 of the NSW *Environmental Planning and Assessment Act 1979* (EP&A Act).

This technical paper, *Technical Paper 4: Non-Aboriginal Heritage* is one of a number of technical documents that forms part of the EIS. The purpose of this technical paper is to identify and assess the non-Aboriginal heritage impacts of the project during both construction and operation. In doing so it responds directly to the Secretary's Environmental Assessment Requirements (SEARs) outlined in Section 1.5.

This technical paper considers the construction and operational impacts on listed heritage items and potential archaeological resources within the study area and includes:

- Identification of items and areas of heritage significance that would be materially affected by the project during construction and operation, by field survey and research, including any buildings, works, relics, views, or places of heritage significance
- Consideration of the potential impacts on the values, settings and integrity of heritage areas and items and archaeological resources located near the project, including items both above and underground and, where such potential exists, the likely significance of those impacts
- Outlining the proposed mitigation and management measures (including measures to avoid significant impacts and an evaluation of the effectiveness of the mitigation measures) in accordance with relevant best practice guidelines.

1.5 Secretary's environmental assessment requirements

The SEARs relating to non-Aboriginal heritage, and where these requirements are addressed in this technical paper, are outlined in Table 1.

Table 1: SEARs – Non-Aboriginal heritage

Secretary's environmental assessment requirements	Where addressed
Where impacts to State or locally significant heritage items are identified, the assessment must:	
(a) include a statement of heritage impact for all heritage items (including significance assessment)	Section 6.0
(b) consider impacts to the item of significance caused by, but not limited to, vibration, demolition, archaeological disturbance, altered historical arrangements and access, visual amenity, landscape and vistas, curtilage, subsidence and architectural noise treatment (as relevant)	Section 6.0
(c) outline measures to avoid and minimise those impacts in accordance with the current guidelines; and	Section 7.0
(d) be undertaken by a suitably qualified heritage consultant(s) (note: where archaeological excavations are proposed the relevant consultant must meet the NSW Heritage Council's Excavation Director criteria).	Section 3.6

2.0 LEGISLATIVE CONTEXT

2.1 Heritage legislation

There are several items of legislation, heritage registers and heritage management guidelines that are relevant to the project. A summary of these Acts and the potential legislative implications for the project follow.

2.1.1 The World Heritage Convention

The *Convention Concerning the Protection of World Cultural and National Heritage* (the World Heritage Convention) was adopted by the General Conference of the United Nations Educational, Scientific and Cultural Organisation (UNESCO) on 16 November 1972, and came into force on 17 December 1975. The World Heritage Convention aims to promote international cooperation to protect heritage that is of such outstanding universal value that its conservation is important for current and future generations. It sets out the criteria that a site must meet to be inscribed on the World Heritage List (WHL) and the role of State Parties in the protection and preservation of world and their own national heritage.

The concept of a buffer zone was first included in the *Operational Guidelines for the Implementation of the World Heritage Convention* in 1977 and recognises the value of the environment that surrounds a site. The buffer zone acts as an additional layer of protection for World Heritage sites. It is a space that is itself not of outstanding universal value, but that influences the value of a World Heritage site.

2.1.1.1 World Heritage List

The World Heritage List contains sites that have been listed by UNESCO as being of special cultural or physical significance.

2.1.2 Environmental Protection and Biodiversity Conservation Act 1999

The *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) provides a legislative framework for the protection and management of matters of national environmental significance, that is, flora, fauna, ecological communities and heritage places of national and international importance. Heritage items are protected through their inclusion on the World Heritage List, Commonwealth Heritage List or the National Heritage List.

The EPBC Act stipulates that a person who has proposed an action that will, or is likely to, have a significant impact on a World, National or Commonwealth Heritage site must refer the action to the Department of the Environment and Minister for the Environment (hereafter Minister). The Minister will then determine if the action requires approval under the EPBC Act. If approval is required, an environmental assessment would need to be prepared. The Minister would approve or decline the action based on this assessment.

A significant impact is defined as “an impact which is important, notable, or of consequence, having regard to its context or intensity”. The significance of the action is based on the sensitivity, value and quality of the environment that is to be impacted, and the duration, magnitude and geographic extent of the impact. If the action is to be undertaken in accordance with an accredited management plan, approval is not needed and the matter not need be referred to the Minister.

2.1.2.1 Commonwealth Heritage List

The Commonwealth Heritage List has been established to list heritage places that are either entirely within a Commonwealth area, or outside the Australian jurisdiction and owned or leased by the Commonwealth or a Commonwealth Authority. The Commonwealth Heritage List includes natural,

Indigenous and historic heritage places which the Minister is satisfied have one or more Commonwealth Heritage values.

2.1.2.2 National Heritage List

The National Heritage List has been established to list places of outstanding heritage significance to Australia. It includes natural, historic and Indigenous places that are of outstanding national heritage value to the Australian nation.

2.1.3 New South Wales Heritage Act 1977

The NSW *Heritage Act 1977* (Heritage Act) provides protection for items of 'environmental heritage' in NSW. 'Environmental heritage' includes places, buildings, works, relics, movable objects or precincts considered significant based on historical, scientific, cultural, social, archaeological, architectural, natural or aesthetic values. Items considered to be significant to the state are listed on the State Heritage Register and cannot be demolished, altered, moved or damaged, or their significance altered without approval from the Heritage Council of NSW.

Archaeological relics

The Heritage Act also provides protection for 'relics', which includes archaeological material or deposits. Section 4 (1) of the Heritage Act (as amended in 2009) defines a relic as:

“...any deposit, artefact, object or material evidence that:

- (a) relates to the settlement of the area that comprises New South Wales, not being Aboriginal settlement, and*
- (b) is of State or local heritage significance”*

Sections 139 to 145 of the Heritage Act prevent the excavation or disturbance of land known or likely to contain relics, unless under an excavation permit. Section 139 (1) states:

A person must not disturb or excavate any land knowingly or having reasonable cause to suspect that the disturbance or excavation will or is likely to result in a relic being discovered, exposed, damaged or destroyed unless the disturbance is carried out in accordance with an excavation permit.

Excavation permits are issued by the Heritage Council of NSW, or its Delegate, under Section 140 of the Heritage Act for relics not listed on the State Heritage Register or under Section 60 for relics listed on the State Heritage Register. An application for an excavation permit must be supported by an Archaeological Research Design (ARD) and Archaeological Assessment prepared in accordance with the NSW Heritage Division archaeological guidelines. Minor works that would have a minimal impact on archaeological relics may be granted an exception under Section 139 (4) or an exemption under Section 57 (2) of the Heritage Act. However, the project is subject to Part 5.1 (State Significant Infrastructure) provisions of the EP&A Act, and therefore excavation or exception permits would not be required.

Definition of works

The Heritage Act defines ‘works’ as being in a separate category to archaeological ‘relics’. ‘Works’ refer to past evidence of infrastructure. ‘Works’ may be buried, and therefore archaeological in nature, however, exposure of a ‘work’ does not trigger reporting obligations under the Act. The following examples are commonly considered to be ‘works’: Former road surfaces or pavement, kerbing, evidence of former infrastructure (such as drains or drainage pits where there are no relics in association), tram and train tracks and ballast and evidence of former rail platforms and bridges.

2.1.3.1 State Heritage Register

The State Heritage Register was established under Section 22 of the Heritage Act and is a list of places and objects of particular importance to the people of NSW, including archaeological sites. The State Heritage Register is administered by the Heritage Division of the Office of Environment and Heritage (OEH) and includes a diverse range of over 1500 items, in both private and public ownership. To be listed, an item must be deemed to be of heritage significance for the whole of NSW.

2.1.3.2 Section 170 registers

Under the Heritage Act all government agencies are required to identify, conserve and manage heritage items in their ownership or control. Section 170 of the Heritage Act requires all government agencies to maintain a Heritage and Conservation Register that lists all heritage assets and an assessment of the significance of each asset. They must also ensure that all items inscribed on its list are maintained with due diligence in accordance with State Owned Heritage Management Principles approved by the Government on advice of the NSW Heritage Council. These principles serve to protect and conserve the heritage significance of items and are based on NSW heritage legislation and guidelines.

2.1.4 Environmental Planning and Assessment Act 1979

The EP&A Act establishes the framework for cultural heritage values to be formally assessed in the land use planning, development consent and environmental impact assessment processes. The EP&A Act requires that environmental impacts are considered prior to land development; this includes impacts on cultural heritage items and places as well as archaeological sites and deposits. The EP&A Act also requires that local governments prepare planning instruments (such as Local Environmental Plans [LEPs] and Development Control Plans [DCPs]) in accordance with the EP&A Act to provide guidance on the level of environmental assessment required.

The study area falls within the boundaries of the Willoughby Local Government Area (LGA), North Sydney LGA, City of Sydney LGA and Marrickville LGA. The study area is therefore subject to the North Sydney LEP 2013, Willoughby LEP 2012, Sydney LEP 2012 and Marrickville LEP 2011.

The aim of the LEP’s 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. The LEP’s list items of heritage significance within the LGA and specify aims and objectives to be addressed in any development application.

3.0 ASSESSMENT METHODOLOGY

3.1 The study area

The indicative alignment for the project is shown in Figure 2. The alignment diverts from the North Shore Line rail corridor in the St Leonards area in an underground stratum towards Crows Nest and North Sydney to the east. For the purposes of assessment, works extend from a northern dive site at Chatswood to a southern dive site at Sydenham. The alignment extends under Sydney Harbour on the western side of the Sydney Harbour Bridge towards the Sydney CBD, before resurfacing north of Sydenham Station.

For the purpose of this investigation, an ‘assessment boundary’ has been defined as a 25 metre buffer around each of the sites that incorporates the proposed design footprint and ancillary works, facilities and access ways to each area during construction.

The application of a buffer helps to identify heritage items potentially within the visual catchment of the project where potential visual impacts on that item may occur. It also supports assessment of other potential indirect impacts on heritage fabric (for example, as a result of vibration). Any reference to the ‘study area’ in this chapter includes reference to the 25-metre buffer, unless otherwise stated.

In specific instances where a heritage item is identified in *Technical Paper 2: Noise and Vibration*, they have also been included in this document. Similarly, in some locations heritage items outside the buffer zone, but directly visible from the project footprint, have been included.

As well as above ground construction sites, the project footprint includes any underground work associated with station construction, such as mined platforms and underground pedestrian connections. Tunnel sections between stations would generally be too deep to affect heritage items or archaeological deposits and (with the exception of the northern and southern tunnel dives) are not included in the study area (refer Section 3.4.1 for further detail).

3.2 Identification of heritage listed items

Heritage listed items within the study area and buffer of each site were identified through a search of relevant state and federal statutory and non-statutory heritage registers:

- World Heritage List
- Commonwealth Heritage List
- National Heritage List
- State Heritage Register
- City of Sydney LEP 2012
- North Sydney LEP 2013
- Willoughby LEP 2012
- Sydney LEP 2012
- Marrickville LEP 2011
- Section 170 Heritage and Conservation Registers for Sydney Water, Roads and Maritime, Railcorp, Ausgrid and Department of Housing.
- NSW State Heritage Inventory database.

Items listed on these registers have been previously assessed against the NSW Heritage Assessment guidelines (as outlined in section 3.3.1). Statements of heritage significance, based on the NSW Heritage Assessment guidelines, as they appear in relevant heritage inventory sheets and documents, are provided throughout this assessment.

Where relevant Conservation Management Plans (CMP's) and other heritage management documents and guidelines have been utilised to provide additional information regarding heritage significance. Where used, these have been cited.

3.3 Archaeological assessment

An overview approach to the identification of potential archaeological resources has been adopted in this Heritage Impact Assessment. Historical archaeological potential is defined as the potential of a site to contain historical archaeological relics, as classified under the NSW *Heritage Act 1977*. The assessment of historical archaeological potential is based on the identification of former land uses and evaluating whether subsequent actions (either natural or human) may have impacted on archaeological evidence for these former land uses. Knowledge of previous archaeological investigations, understanding of the types of archaeological remains likely to be associated with various land uses, and the results of site inspection are also taken into consideration when evaluating the potential of an area to contain archaeological remains.

The assessment of archaeological potential contained in this Heritage Impact Assessment is based on analysis of historical plans and readily available secondary sources, such as archaeological zoning plans (refer to section 3.3.3) and archaeological investigations undertaken in the vicinity of the study area.

Assessments of significance are preliminary in nature and where possible significance has been assessed against the NSW Heritage Assessment Criteria. The assessment is informed by the NSW Heritage Division's 2009 guidelines *Assessing Significance for Historical Archaeological Sites and Relics*.

3.3.1 NSW Heritage assessment guidelines

Determining the significance of heritage items or a potential archaeological resource is undertaken by utilising a system of assessment centred on the *Burra Charter* of Australia ICOMOS. The principles of the charter are relevant to the assessment, conservation and management of sites and relics. The assessment of heritage significance is outlined through legislation in the Heritage Act and implemented through the *NSW Heritage Manual* and the *Archaeological Assessment Guidelines*.¹

If an item meets one of the seven heritage criteria, and retains the integrity of its key attributes, it can be considered to have heritage significance. The significance of an item or potential archaeological site can then be assessed as being of local or state significance. If a potential archaeological resource does not reach the local or state significance threshold, then it is not classified as a relic under the Heritage Act.

'*State heritage significance*', in relation to a place, building, work, relic, moveable object or precinct, means significance to the State in relation to the historical, scientific, cultural, social, archaeological, architectural, natural or aesthetic value of the item.

'*Local heritage significance*', in relation to a place, building, work, relic, moveable object or precinct, means significance to an area in relation to the historical, scientific, cultural, social, archaeological, architectural, natural or aesthetic value of the item.²

¹ NSW Heritage Office 1996; 25-27

² This section is an extract based on the Heritage Office *Assessing Significance for Historical Archaeological Sites and Relics* 2009:6.

The overall aim of assessing archaeological significance is to identify whether an archaeological resource, deposit, site or feature is of cultural value. The assessment will result in a succinct statement of heritage significance that summarises the values of the place, site, resource, deposit or feature. The heritage significance assessment criteria are as follows:

Table 2: NSW heritage assessment criteria

Criteria	Description
A – Historical Significance	An item is important in the course or pattern of the local area’s cultural or natural history.
B – Associative Significance	An item has strong or special associations with the life or works of a person, or group of persons, of importance in the local area’s cultural or natural history.
C – Aesthetic Significance	An item is important in demonstrating aesthetic characteristics and/or a high degree of creative or technical achievement in the local area.
D – Social Significance	An item has strong or special association with a particular community or cultural group in the local area for social, cultural or spiritual reasons.
E – Research Potential	An item has potential to yield information that will contribute to an understanding of the local area’s cultural or natural history.
F – Rarity	An item possesses uncommon, rare or endangered aspects of the local area’s cultural or natural history.
G - Representativeness	An item is important in demonstrating the principal characteristics of a class of NSW’s cultural or natural places of cultural or natural environments (or the cultural or natural history of the local area).

3.3.2 Research potential

In 1984, Bickford and Sullivan examined the concept and assessment of archaeological research potential; that is, the extent to which archaeological resources can address research questions. They developed three questions which can be used to assess the research potential of an archaeological site:

- Can the site contribute knowledge that no other resource can?
- Can the site contribute knowledge that no other site can?
- Is this knowledge relevant to:
 - General questions about human history?
 - Other substantive questions relating to Australian history?
 - Other major research questions?

In the 2009 guidelines *Assessing Significance for Historical Archaeological Sites and ‘Relics’*, the NSW Heritage Division has since provided a broader approach to assessing the archaeological significance of sites, which includes consideration of a site’s intactness, rarity, representativeness, and whether many similar sites have already been recorded, as well as other factors. This document acknowledges the difficulty of assessing the significance of potential subsurface remains, because the assessment must rely on predicted rather than known attributes.³

A site can have high potential for archaeological remains, and yet still be of low research potential if those remains are unlikely to provide significant or useful information.

³ NSW Heritage Branch 2009

3.3.3 Archaeological studies

There have been several historical archaeological investigations undertaken within, or close to, the study area that provide evidence which assists in evaluating the potential historical archaeological resource of the study area. In addition, portions of the study area were evaluated in various archaeological zoning and management plans. These have been listed below.

3.3.3.1 Central Sydney Archaeological Zoning Plan

The Plan provides the City of Sydney with an interim framework for the assessment and conservation of the identified archaeological resource in the study area, and presents guidelines for its management on an overall and case by case basis. The Plan identifies areas within Central Sydney which contain archaeological potential, and assesses this according to criteria based on their perceived physical potential (dependant on the level of ground disturbance), resulting from site inspections. The document also provides a schedule of these areas / sites for Council planning purposes. Items in the zoning plan relevant to the study area have been covered under the listings described in Chapter 5, with the exception of those items appearing under the general designation assigned to roadways in the Plan. The Plan lists all roadways within Sydney as Areas of Archaeological Potential, in terms of previous roadways or surfaces. However, any surviving archaeological evidence for former road surfaces or construction techniques within the study area would be expected to be of low research significance.

3.3.3.2 The Rocks and Millers Point Archaeological Management Plan

'The Rocks and Millers Point Archaeological Management Plan' was prepared by Dr E Higginbotham in 1991. The management plan includes an inventory of potential archaeological sites located throughout The Rocks and Millers Point, based on assessment of existing impacts and archaeological investigations undertaken previously. A series of plans were produced showing the condition of subsurface archaeological remains on all sites included in the Inventory. Streets not included in the Inventory were assessed as being partially disturbed.

3.4 Assessment of heritage impact

This Heritage Impact Assessment has been prepared using the document *Statement of Heritage Impact 2002*, prepared by the NSW Heritage Office, contained within the *NSW Heritage Manual*, as a guideline.

Impacts on heritage are identified as either:

- Direct impacts, resulting in the demolition or alteration of fabric of heritage significance
- Indirect impacts, resulting in changes to the setting or curtilage of heritage items or places, historic streetscapes or views
- Potential direct impact, resulting in impacts from vibration and demolition of adjoining structures.

Specific terminology and corresponding definitions are used in this assessment to consistently identify the magnitude of the project's direct, indirect or potentially direct impacts on heritage items or archaeological remains. The terminology and definitions are based on those contained in guidelines produced by the International Council on Monuments and Sites (ICOMOS)⁴ and are shown in Table 3. It is assumed that all direct and potential direct impacts are a result of construction. Indirect impacts are assumed to be operational unless specified as temporary in which case they are related to construction.

⁴ Including the document *Guidance on Heritage Impact Assessments for Cultural World Heritage Properties*, ICOMOS, January 2011.

Table 3: Terminology for assessing the magnitude of heritage impact.

Magnitude	Definition
Major	<p>Actions that would have a long-term and substantial impact on the significance of a heritage item. Actions that would remove key historic building elements, key historic landscape features, or significant archaeological materials, thereby resulting in a change of historic character, or altering of a historical resource.</p> <p>These actions cannot be fully mitigated.</p>
Moderate	<p>This would include actions involving the modification of a heritage, including altering the setting of a heritage item or landscape, partially removing archaeological resources, or the alteration of significant elements of fabric from historic structures.</p> <p>The impacts arising from such actions may be able to be partially mitigated.</p>
Minor	<p>Actions that would results in the slight alteration of heritage buildings, archaeological resources, or the setting of an historical item.</p> <p>The impacts arising from such actions can usually be mitigated.</p>
Negligible	<p>Actions that would results in very minor changes to heritage items.</p>
Neutral	<p>Actions that would have no heritage impact.</p>

3.4.1 Assessment of vibration impacts

Vibration arising from construction or excavation work has the potential to impact on the fabric of heritage items, potentially causing subsidence, or affecting structural integrity.

In locations where heritage items would be located adjacent to demolition, construction or excavation works, an assessment of potential indirect impact through vibration has been undertaken.

A conservative vibration damage screening level of 7.5 millimetres per second peak particle velocity has been adopted for the project. This screening level has been established with reference to the minor cosmetic damage criteria in *British Standard BS 7385:2 – 1993*. The vibration levels specified in this standard are designed to minimise the risk of threshold or cosmetic surface cracks, and are set well below the levels that have potential to cause damage to the main structure.

The recommended screening level of 7.5 millimetres per second peak particle velocity is also applicable to heritage items unless it is known that the item is already structurally unsound – in which case, a lower screening level may be applicable.

During main tunnelling works, it is anticipated that ground-borne vibration associated with tunnel boring machine use would be much lower than the 7.5 millimetres per second peak particle velocity screening level. As such the study area for assessment of potential impacts to heritage items does not extend to areas above the tunnel alignment that are outside the nominated study area buffers for each construction site.

Vibration impacts to heritage items have been assessed based on a review of modelled vibration levels generated as part of the assessment in *Technical Paper 2: Noise and Vibration*.

Potential vibration impacts have been assessed by applying the following methodology:

- Where vibration levels are predicted to be below the relevant vibration screening level, potential vibration impacts are considered negligible and no further assessment of vibration-related impacts on that structure would be required.
- Where vibration levels are predicted to be at or above the vibration screening level, further investigation would be undertaken to ensure vibration levels remain below appropriate limits for that structure, including:
 - A more detailed assessment of the structure
 - Attended vibration monitoring would be undertaken from the structure's closest point to the vibration source
- Where the building is a heritage building, and the predicted vibration level is above the vibration screening level, the more detailed assessment of the structure would be undertaken that specifically considers the heritage values of the structure and sensitive heritage fabric would be identified in consultation with a heritage specialist to ensure it is adequately monitored and managed.

3.5 Limitations and constraints

This report provides an assessment of non-Aboriginal (historical) built heritage and potential archaeological resources only and does not provide a review of the potential for Aboriginal archaeological evidence in the area. The assessment of archaeological potential is preliminary only and based on broad assessments of potential significance for the project footprint.

Only those portions of the study area subject to proposed surface works and that are publically accessible were surveyed during preparation of this Heritage Impact Assessment.

As noted above, during main tunnelling works, it is anticipated that ground-borne vibration associated with tunnel boring machine use would be much lower than the 7.5 millimetres per second peak particle velocity screening level (the threshold at which cosmetic damage may occur). As such the study area for assessment of potential impacts to heritage items generally does not extend to areas above the tunnel alignment that are outside the nominated study area buffers for each construction site.

3.6 Investigator and contributors

This report was prepared by Jenny Winnett (Senior Heritage Consultant). Management input was provided by Dr Sandra Wallace (Director) and review by Dr Sandra Wallace and Abi Cryerhall (Principal).

Jenny Winnett has over 10 years' experience in archaeological and heritage management. Jenny is eligible to be nominated as an Excavation Director on permits from NSW Heritage Division for locally significant sites.

Abi Cryerhall has over 18 years' experience in archaeological and heritage management. She has directed numerous historical archaeological investigations in Sydney, including both local and State significant sites. Abi is eligible to be nominated as an Excavation Director on permits from NSW Heritage Division for local and State significant sites.

Sandra Wallace has over 13 years' experience in archaeology and cultural heritage management. Sandra has been nominated as heritage lead on a number of large infrastructure projects in the Sydney region.

4.0 CONSTRUCTION OF THE PROJECT

4.1 Tunnel construction

4.1.1 Tunnel elements

The project would involve the excavation of twin tunnels around 15 kilometres in length. The two bored tunnels would have a circular cross section with an internal lined diameter of about six metres and an excavated diameter of about seven metres.

In addition to the twin tunnels, the following underground features would also be excavated:

- Cross passages between the two tunnels would be provided at intervals of about 240 metres to allow for emergency access
- Stub tunnels from the twin tunnels near Victoria Cross Station and Sydenham to allow for future extensions to the metro network.

The depth of the twin tunnels, due to topography and the crossing of Sydney Harbour, would vary from about 20 metres to 60 metres deep. The shallower sections of the tunnel are generally approaching each tunnel portal.

4.1.2 Tunneling methods

Tunnel excavation is likely to be carried out using tunnel boring machines with roadheaders used for cross passages and stub tunnels.

Excavators with rock hammers would also be used to excavate cross passages and niches within the tunnels.

4.1.3 Ground improvement

Due to the expected ground conditions, ground improvement works may be required at specific locations underneath Sydney Harbour. Ground improvement works may be required at the rock-sediment transition zones to reduce construction risks associated with tunnel boring machine work.

For the purposes of assessment, ground improvement works involve jet grouting which comprises the injection of a cement grout into the harbour bed from barges on the harbour. The grout would be delivered to the barges from an on-shore grout facility and would be injected from the barge via a crane and drilling lead.

4.1.4 Tunnel boring machine launch and support sites

It is anticipated that the tunnel boring machine operations would occur from three sites. These sites are:

- A tunnel boring machine launch and support site in Chatswood (to the south of Chatswood Station and north of Mowbray Road), referred to as the Chatswood dive site
- A tunnel boring machine launch and support site north of Sydenham Station (south of Bedwin Road), referred to as the Marrickville dive site
- A tunnel boring machine launch and support site at the proposed Barangaroo Station construction site for the crossing of Sydney Harbour.

A temporary construction site would also be established at Blues Point for the retrieval of the cutter head and shields of the tunnel boring machine driven from the northern construction site and the Barangaroo Station construction site.

The three sites would require support services for the tunnel boring machines.

Additional information regarding tunnel construction work is provided in Chapter 7 of the EIS.

4.2 Station construction

New metro stations would be located at Crows Nest, Victoria Cross, Barangaroo, Martin Place, Pitt Street and Waterloo, with new metro platforms also included at Central Station. Table 4 outlines the methodology and approximate depth for the new stations.

The metro stations would be configured as either a large ‘single span’ cavern that accommodates tracks for both directions of travel and a central island platform or a ‘binocular cavern’ arrangement whereby each platform and track is housed in a single smaller cavern.

Single span cavern stations are proposed at Crows Nest, Victoria Cross, Barangaroo, Central and Waterloo. Binocular cavern stations are proposed at Martin Place and Pitt Street.

Table 4: Proposed stations and method of construction.

Proposed station	Methodology	Approximate depth (metres)
Crows Nest Station	Single span cut-and-cover	25
Victoria Cross Station	Single span mined	31
Barangaroo Station	Single span cut-and-cover	25
Martin Place Station	Binocular mined cavern	25-27
Pitt Street Station	Binocular mined cavern	17-20
Central Station	Single span cut-and-cover	18
Waterloo Station	Single span cut-and-cover	25

Further detail regarding station construction and the scope of construction activities at stations is provided in Chapter 7 of the EIS.

4.2.1 Construction sites

A number of construction sites would be required to construct the project. This includes locations for tunnel boring machine launch, support and retrieval, roadheader support, station construction, and operational ancillary facility construction. Generally, construction sites are located within the operational footprint to minimise impacts.

Site establishment activities would initially be carried out at each of the construction sites. These would include:

- Building demolition and clearing of landscaped vegetation, where required
- Protection and / or relocation of utilities
- Provision of services required for construction, eg power supply, water supply, sewer and communications

- Establishment of site compound and ancillary facilities such as offices, amenities and workshops
- Establishment of vehicle access and egress points
- Establishment of truck wheel wash or rumble grid
- Establishment of internal roads
- Establishment of hardstand areas for storage and car parking
- Establishment of site hoardings, noise barriers and / or fencing around the perimeter of the site.

4.2.2 Station elements

Above-ground buildings associated with station entry and exit points would generally be constructed following station structural works. Buildings would be constructed using conventional steel frame methods.

Each metro station would have a number of common elements or design features. These would include:

- Station service buildings – located to minimise the street frontage within important urban areas
- Signage and wayfinding within the station and the surrounding public domain
- Awnings for shade and shelter at street level station entries
- Retail space within the station building
- Landscaping and street furniture to maintain high quality urban design outcomes.

The architectural fit-out of the stations would occur on completion of the station structural works and involves the final finishes for the stations. The architectural fit-out would include elements such as glazing, wall and ceiling cladding, and floor finishes.

4.2.3 Surface rail works

Surface works would involve the provision of metro tracks and associated rail systems from the southern end of Chatswood Station to the northern dive structure. Adjustments would also be carried out to the T1 North Shore Line from the southern end of Chatswood Station to Brand Street, Artarmon. Full details of these works have been provided in Chapter 8 of the EIS.

4.3 Ancillary sites

4.3.1 Artarmon substation

The Artarmon substation would be constructed in the following sequence:

- Excavation of a vertical shaft to the tunnels below. This is likely to be carried out using excavators and rock hammers; however, drill and blast or penetrating cone fracture techniques may also be used
- Lining and reinforcement of the shaft
- Building works for aboveground components
- Installation of electrical equipment.

4.3.2 Southern services facility

The southern services facility would be constructed adjacent to the southern construction site and would incorporate a tunnel water treatment plant and a traction substation.

5.0 HISTORICAL AND ENVIRONMENTAL CONTEXT

5.1 Introduction

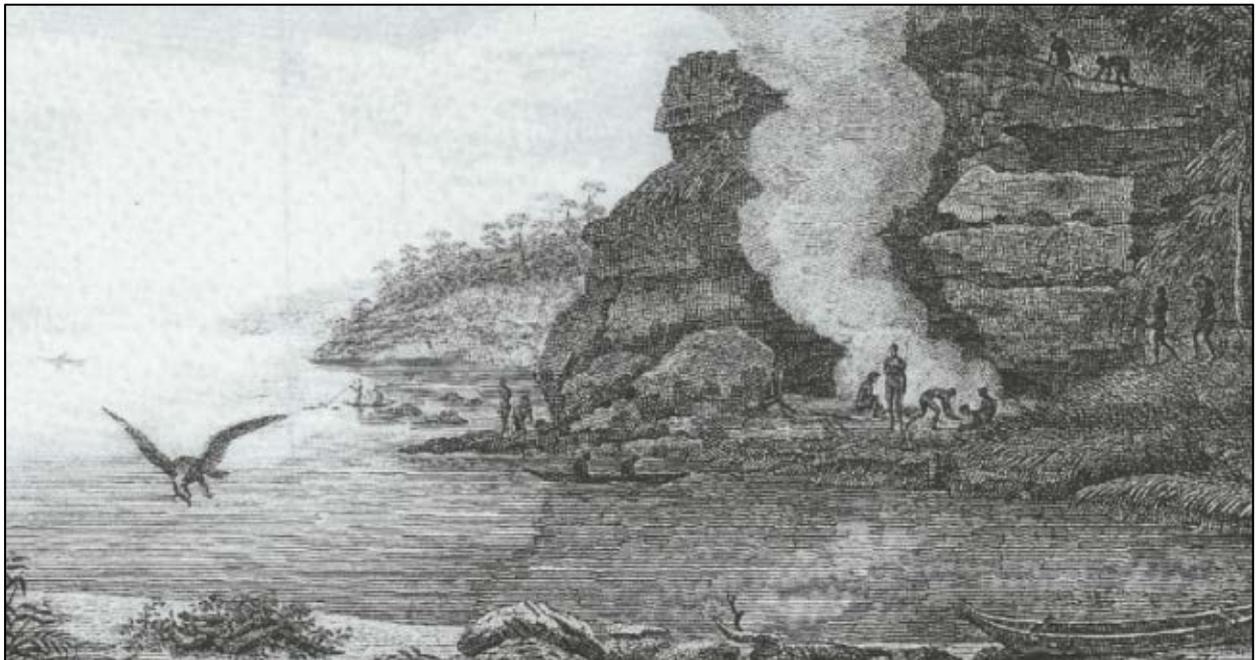
The following section provides the historical context for the early development of Sydney. Historical background specific to each of the study areas has been outlined in the relevant sub-sections of Section 5.0.

5.2 Aboriginal occupation and European contact

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.⁵ The Darug language group is thought to have covered the area south from Port Jackson, north from Botany Bay, and west from Parramatta.⁶

The name Gadigal and its alternative spellings (Cadigal, Cadi) was used in the earliest historical records of the European settlement in Sydney to describe the Aboriginal band or clan that lived on the southern shore of Port Jackson, from South Head west to the Darling Harbour area. The term Eora is also used as a name for the Aboriginal people south of Port Jackson. The term Eora was likely a word used by the Gadigal people to refer to an Aboriginal person, rather than a reference to a clan or band in particular. However, it became a widespread term for the Aboriginal people on the southern shore of Port Jackson and is currently used by Gadigal people to refer to the central Sydney area – referred to as 'Eora Country'.⁷

Figure 3: Aboriginal activities on the shore of Port Jackson in 1824. Source: Peron and Freycinet 1824.



⁵ Matthews and Everitt 1900; Attenbrow 2010:31

⁶ Attenbrow 2010:34

⁷ Attenbrow 2010:22, 35-36

The study area was located across a landscape of varying subsistence resources. The tidally influenced mud flats associated with the mouth of the Tank Stream were in the vicinity of present-day Circular Quay, while fresh water was available from the stream itself to the south-west in the vicinity of Pitt Street. Archaeological and historical records indicate that marine and estuarine resources formed an important part of the subsistence activities of the Aboriginal people that inhabited the Port Jackson area (Figure 3). Shellfish not only formed an important subsistence resource, but were also utilised as tools. Shell tools included fish-hooks, shell hafted onto spears in various forms, as a tool to repair spears, and as a cutting edge.⁸ Other locally available raw materials, including quartz, were also favoured for cutting edges, and in some areas bordering readily abundant shellfish in inner Sydney, quartz may have actually been favoured as a cutting edge.⁹

5.2.1 Initial interactions at Sydney Cove

The European colonisation of Australia began with the establishment of a colony at Sydney Cove by Captain Arthur Phillip in January 1788 on land inhabited by the Gadigal people. The subject site and immediately surrounding area were an integral part of the pre- and post-contact history of both the Gadigal people and the Aboriginal peoples across the surrounding region.

Many of the early interactions between the British and the Gadigal were amicable and inquisitive. Watkin Tench, Captain of the Marine with the First Fleet, documented his first meeting with the Gadigal people, when he and a landing party visited the south shore of Port Jackson. Tench noted that they were greeted by a dozen Aboriginal people, with the landing party and the Aboriginal people cautiously approaching each other before observing one another and exchanging items.¹⁰

Within days of the initial landing at Sydney Cove, visits by Aboriginal people to the settlers had dropped in frequency to the point where the colonists were aware that they were being deliberately avoided. In 1789, Watkin Tench noted that:¹¹

The Indians for a little while after our arrival paid us frequent visits, but in a few days they were observed to be more shy of our company. From what cause their distaste arose we never could trace..... No quarrel had happened, and we had flattered ourselves, from Governor Phillip's first reception among them, that such a connection might be established as would tend to the interest of both parties.

The reference to Governor Phillip seeking to establish a connection with the local Aboriginal inhabitants and treating them amicably stemmed from his instructions on setting out from England in 1787 to open a discourse with the 'Aborigines' and attempt to live in friendship without unnecessary interruption of their activities.¹²

⁸ Attenbrow 2010:118

⁹ Baker 2004:31

¹⁰ Tench 1789

¹¹ ibid

¹² McBryde 1989:5

Other historical records also note the avoidance of the colony by Aboriginal people. By November 1788, Phillip noted that:¹³

The natives now avoid us more than they did when we first landed, and which I impute to the robberies committed on them by the convicts, who steal their spears and fish – gigs which they frequently leave in their huts when they go out a fishing and which the people belonging to the transports purchase, though every possible precaution has been taken to prevent it.”

With the exception of the first days of the colony at Sydney Cove, the remainder of 1788 was marked by the general avoidance of the area by the Aboriginal people.

Overall, British colonisation had a profound effect on the Aboriginal population of the Sydney region. In the early days of the colony Aboriginal people were disenfranchised from their land as the British claimed areas for settlement and agriculture. The colonists, often at the expense of the local Aboriginal groups, also claimed resources such as grasses, timber, fishing grounds and water sources. Overall the devastation of the Aboriginal culture did not come about through war with the British, but instead through disease and forced removal from traditional lands. It is thought that during the 1789 smallpox epidemic, over half of the Aboriginal people of the Sydney region died.

5.2.2 Establishing a colony

The First Fleet arrived in Sydney Cove on 26 January 1788. Upon arrival, they anchored in the rocky peninsula of what is today known as Argyle Street. The colony was founded around the mouth of a freshwater source provided by the Tank Stream, which flowed into the cove at the northern end of present day Pitt Street.

Initially, land tenure was granted in the form of grants and leases, however the majority of land settlement was associated with unofficial occupancy.¹⁴ Even in the early years of the colony's growth geographical locations were soon becoming associated with class and social hierarchies. Therefore, the Governor and significant civil personnel lived to the east of the Tank Stream, and the convict population occupied the area further to the west of Sydney Cove. This part of Sydney Cove was characterised by a steep rocky climb to a north-south ridge line that ran like an arched spine along the sandstone peninsula. The contours of the landform would come to dictate the way people inhabited the area for the next century. This meant that structures occupied whatever appropriate land one could find with little thought set aside for street organisation or town planning. Soon, vehicle tracks were established on easy gradients that ran parallel to the ridge. These ridges included steps for pedestrians that made more direct ascents to the higher ground and created alleys and laneways that ran between the roughly parallel roads and cart tracks.

In the months following the first landing, First Government House was established on the corner of present-day Bridge and Phillip streets, with a government wharf built on the shoreline to the north of the house.¹⁵ As the colony grew, land close to the water was used for government purposes including the construction of a hospital, gaol, Government dockyard, and Commissariat Stores. The first private wharf was built by Robert Campbell in the early 1800s, and by the 1820s the expansion and consolidation of trade saw the construction of wharves and warehouses around Dawes Point to Millers Point and Cockle Bay.¹⁶

¹³ Governor Phillip 1788, quoted in McBryde 1989:7

¹⁴ The Rocks Heritage management Plan. Volume 1. Sydney Harbour Foreshore Authority, p. 9.

¹⁵ Thorp 1995

¹⁶ Kass 1987

The western side of Sydney Cove was initially the site of the first convict encampment and contained a military camp, bakehouse and hospital. Later, when wealthier individuals had moved out, the area was settled by the colony's convict population who built houses and other structures on any available land they could find. The area was quickly named the 'Rocks' due to the tenacious footholds their homes had been built on. Many of the first houses were wattle and daub cottages constructed using readily available materials such as timber. Later, the sandstone bedrock running along the cove quickly converted into a popular quarry for the harbour's new residents and stone became a regular construction material, characterising much of the area we see today. These residences were built and located haphazardly along the landscape now home to George Street and were clustered around early grog and salt provisions stores.¹⁷

The initial growth of the settlement was largely unplanned, with streets and laneways developing organically, shaped by the natural topography. When Governor Macquarie took office in 1810, he attempted to impose some order on the development of the city and a grid pattern was superimposed on the southern, eastern, and western sides of the expanding town. As the city grew throughout the 19th century, most of the CBD was developed with commercial buildings, while warehouses and wool stores were located on or near the waterfront, and worker's housing was located in The Rocks and Millers Point area.

To the south of the CBD, industrial land uses began to define the area of Chippendale and Darlington, with the Kent Brewery established on Parramatta Road in 1835, and the Eveleigh Railway Workshops and various factories established in the latter half of the 19th century. By the end of the 19th century, this area was entirely built over with working-class terraces, most of poor quality.¹⁸

5.2.3 Development of the North Shore¹⁹

¹⁷ Karskens, I. D. 1994. The Rocks: Historical Analysis. Report prepared by Godden Mackay and Logan, p. 9.

¹⁸ Fitzgerald 2008a and b

¹⁹ History taken from North Sydney Council 'At Home in North Sydney An Architectural History of a Locality' access via <http://www.athomeinnorthsydney.com.au/estates.html> 14/12/2015.

Along with the pressures of a growing population, North Sydney would be shifted more than ever before by the impact of two huge public works – the building of the Sydney Harbour Bridge from 1924 to 1932 and the construction of the Warringah Expressway from 1960 through to the 1970s. Between them these projects resulted in the demolition of as many as 1,000 buildings, most of them dwellings.

5.2.4 The development of water and sewerage services

Until the mid-19th century, town drainage in England and Australia was generally limited to surface drainage methods such as ditches and gutters, while sewage was usually managed using cesspits and ash middens. However, the increasing urban populations following the industrial revolution and a growing public expectation for improved sanitation resulted in the development of uniform drainage systems within cities.²⁰

In Sydney, there was growing concern over sanitation during the mid-19th century, with overcrowded and dirty conditions being linked to social degradation. In 1858, a government assayer wrote an article about The Rocks entitled 'The Social Cesspools of Sydney', in which he described the:

...utter absence of all means of drainage or of removing filthy matter... that in many cases the foul drainage of one cottage trickles down the hill till it encounters... the back or front wall of the house below; here it accumulates, soaking down into the foundation, or sometimes actually running in at the door.²¹

In 1842, the Sydney Municipal Council was formed, however the Council struggled to agree on a sewerage system to solve the city's sanitation problems. In 1852, the Council was dissolved and three Commissioners were appointed to be responsible for providing improved sanitation services. The Commission appointed W. B. Rider as City Engineer in 1854. Rider planned an underground sewerage system comprised of five main outfall sewers, which discharged into Blackwattle Bay, Sydney Cove, Darling Harbour, Bennelong Point, and Woolloomooloo Bay. The system used brick oviform drains and construction began in 1855 and was completed in 1857.²²

In 1852, the process of covering the Tank Stream began with the enclosure of a 152 metre section downstream from Bridge Street, which was diverted and used as a sewer. The Tank Stream had been officially abandoned as a source of water in 1826, when a rock cut tunnel named 'Busby's Bore' was constructed to carry water into Sydney from the Lachlan Swamps (now Centennial Park), and it rapidly degenerated into an open sewer. In 1860, the Sydney City Council enclosed the section of the stream between Hunter Street and Curtin Place in a masonry archway, followed in 1867 by the construction of a brick oviform sewer between Hunter and King Street. In 1878, the section from Bridge Street to Alfred Street was enclosed in a sandstone archway with a brick oviform base. During the 20th century, steel pipes and concrete box drains were used.

²⁰ Wong 1999:58

²¹ W. S. Jevons in The Sydney Morning Herald 7 October 1858:2

²² Wong 1999:62

6.0 HERITAGE IMPACT ASSESSMENT

6.1 Introduction

The following sections discuss the study area as it relates to the project. A list of the heritage items located wholly, or partially, within the study area at each key project location is provided, as is an overview of archaeological potential, and an assessment of potential heritage impacts as a result of the project is also included.

6.2 Chatswood dive site (northern)

The Chatswood dive site would be about 24,000 square metres in area and located adjacent to the T1 North Shore Line in Chatswood (see Figure 4). The site is currently occupied by an Ausgrid depot and a number of commercial and retail buildings.

The Chatswood dive site would be used to:

- Support surface metro track works and adjustment to the T1 North Shore Line between Chatswood Station and Brand Street, Artarmon including track slewing and construction of the T1 North Shore Line 'Down' (northbound) track viaduct
- Excavate and construct the tunnel dive structure and portal
- Launch and support two tunnel boring machines for the major tunnelling works
- Support tunnel rail systems fit out works

Figure 4: Chatswood dive site (northern) layout.



The southern portion of the site would be used for offices, workshops and car parking; spoil storage and handling would be located at the northern end of the site adjacent to the existing rail line, with segment storage adjacent to the Pacific Highway. The dive structure would be constructed in the eastern portion of the site. The location and indicative layout of the Chatswood dive site, including vehicle access / egress is illustrated in Figure 4.

6.2.1 History of the study area

Chatswood, as it exists today, was largely created after WWII. In 1948 it was decided that the suburb would be developed as a district centre. The western side of the railway line was designated for commercial development and in the 1960s the first major retail stores were opened on the eastern side of the railway.

The original focus of Chatswood was centred on the intersection with Mowbray Road and Lane Cove Road, where the Bush Mission Society had constructed a small chapel and John Bryson established a timber yard and 'school of arts' hall by the 1870s. The Great Northern Hotel was opened by Henry Russell on this intersection in 1870. Following this a handful of general stores and Chatswood's first police station was established in the vicinity.

North Shore landowner Richard Hayes Harnett had acquired 900 acres from the King Plains Estate originally owned by Isaac Nicholls, and in 1876 he opened up a sub-division of the land called the Chatswood Estate. By this time the majority of the Blue Gum Forest had been cleared for farming and grazing. Harnett sold a portion of his estate to the government for the formation of the North Shore Railway, some 1200 yards to the north of the established town centre on Mowbray Road.

The North Shore Railway line was formally opened on the 1st of January 1890. As it had been constructed to serve the landholding of prominent North Shore citizens the railway traversed rugged terrain that required sharp curves and steep grades. The consequent expense of the railway line and subsidence of the economic boom of the 1880s resulted in the construction of simple timber station buildings (Figure 5).

Figure 5: Chatswood Railway Station in 1910. Image accessed online via Picture Willoughby, Willoughby City Council.



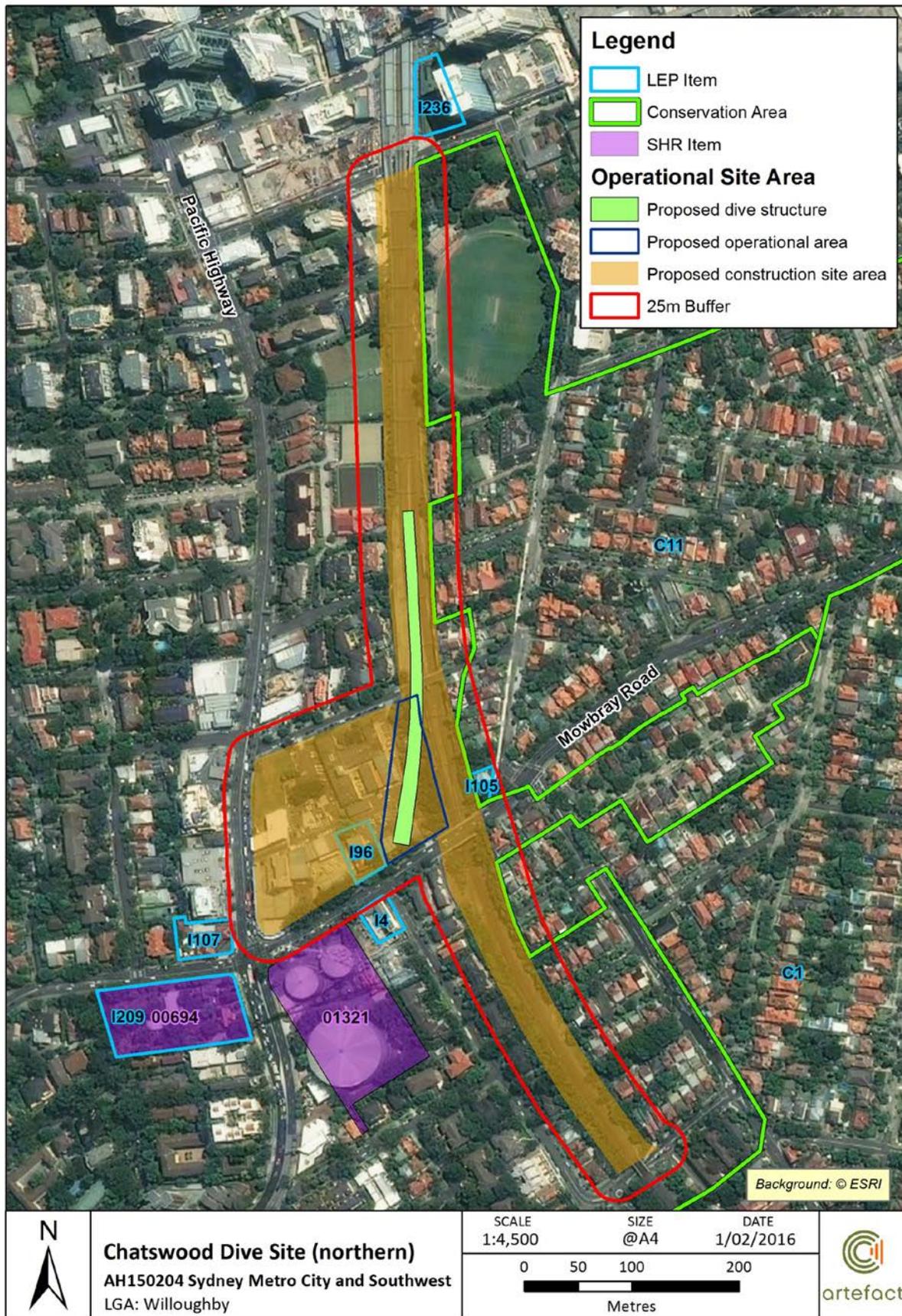
6.2.2 Heritage listed items

The following table outlines the heritage listed items within the study area which are shown on Figure 6.

Table 5: Heritage items within the Chatswood dive site (northern) study area and buffer.

Heritage item	Register listings	Significance	Relationship to the study area
Mowbray House	Willoughby LEP 2012 I96 Sydney Electricity S170 register	Local	Within construction site.
Great Northern Hotel	Willoughby LEP 2012 I107	Local	Partially within buffer zone, west of construction site and intersection works.
Chatswood South Uniting Church and Cemetery	SHR no. 00694 Willoughby LEP 2012 I209	State	Outside buffer zone, west of construction site and intersection works.
Garden of Remembrance	Willoughby LEP 2012 I236	Local	Partially within buffer zone, north of construction site.
South Chatswood Conservation Area	Willoughby LEP 2012 C11	Local	Partially within buffer zone, east of T1 North Shore Line works.
Artarmon Conservation Area	Willoughby LEP 2012 C1	Local	Partially within buffer zone, east of T1 North Shore Line works.
Chatswood Zone substation No 80 (building only)	Willoughby LEP 2012 I4 Ausgrid S170 register	Local	Partially within buffer zone, south of construction site.
Chatswood Reservoirs No. 1 and No. 2 (and associated curtilage)	SHR no. 01321 Willoughby LEP 2012 I5 Sydney Water S170 register	State	Partially within buffer zone, south of construction site.

Figure 6: Heritage items within the Chatswood Dive Site (northern).



6.2.3 Detailed heritage impact assessments

Heritage items

Table 6: Mowbray House and 10m curtilage heritage impact assessment

Mowbray House and 10m curtilage²³

Figure 7: Mowbray House from Mowbray Road. Artefact Heritage 2015.



Figure 8: Mowbray House with c.1957 first floor addition. SHI 'Mowbray House'

Image



Significance Local

²³ Description and Statement of significance extracted from State Heritage inventory sheet "Mowbray House" last accessed via <http://www.environment.nsw.gov.au/heritageapp/ViewHeritageltemDetails.aspx?ID=3430474> on 22/10/2015.

Mowbray House and 10m curtilage²³

Description 'Mowbray House' is a two storey tuck pointed face brick school building with a hipped tile roof and cream cement render on first floor level. It is designed in the Interwar Georgian Revival style evidenced by the regular multi paned windows and symmetrical form. Decorative elements include timber eaves brackets and unusual corner chimneys. It is located within the Artarmon Urban Conservation Area.

Statement of significance Mowbray House is a modified but still recognisable example of an early 20th century Federation Arts and Crafts school building. Initially opened in 1906 as Chatswood Preparatory School, it operated as a school until 1954 and has been used as a part of an electricity depot since 1957. The site had been the location of previous schools (now demolished or relocated) since the 1870s. While the remainder of the site is heavily modified, Mowbray House remains reasonably intact and makes an important contribution to the streetscape.

Impact type Direct impact: adaptive re-use
Potential direct impact: vibration
Indirect impact: views and vistas

Heritage impact assessment Mowbray House is located within the proposed Chatswood dive site, immediately adjacent to the tunnel portal/dive structure. T1 North Shore Line works would not impact on this heritage item. Mowbray House, which has itself undergone numerous modifications and amalgamations throughout the 20th century, would be retained within the proposed construction site.

Physical impacts would include the demolition of non-original outbuildings constructed in the later 20th century. Surrounding trees would also require removal. It is possible that temporary protective measures would need to be established internally to protect the retained structure and enable it to be used for potential site, or other purposes.

It is assumed that the façade of the building would not be impacted by the proposed works, and that on finalisation of the works, any interior modifications would be reversible.

Direct impact: Minor

Tunnelling works and the dive structure would be excavated immediately east of the heritage item. Modelling indicates that the closest façade of this item would experience vibration levels above the screening level for cosmetic damage.

Potential direct impact: Minor

It is likely that a number of surrounding structures would need to be demolished in order to excavate and construct the dive structure, and establish the northern dive construction site. All trees within the construction site would also require removal. Visually, the surrounding buildings do not contribute to the heritage setting of Mowbray House, and represent a substantial modification of the original streetscape. The demolition of these buildings, if required, would have a minor impact on the heritage item. Following establishment of the northern dive site, the spoil facility and storage would be established to the north, and to behind/to the rear, of the heritage item. This would have a negligible visual impact on the heritage item and its significance as an important contributor to the streetscape.

Indirect impact: Minor

Table 7: Great Northern Hotel heritage impact assessment

Great Northern Hotel

Figure 9: Great Northern Hotel.



Image

Significance

Local

Description

Opened in 1870 The Great Northern was the first hotel in the Willoughby Municipality. It was built by Henry Russell, an Alderman of Willoughby Council. The hotel was used as a staging stop and was briefly called the Artarmon Hotel around 1915, before being renamed The Great Northern once again. It was rebuilt in the 1930s.²⁴

Impact type

Indirect impact: Views and vistas

Heritage impact assessment

The heritage item is located west of the construction site. In addition, works at the Pacific Highway and Mowbray Road intersection would occur immediately east of the curtilage of the heritage item. The works would involve minor modification and widening of a portion of Mowbray Road. Visually, these works would have a negligible impact on the heritage item.
Indirect impact: Negligible

²⁴ Information obtained from 'Heritage Plaques' page on the Willoughby City Council website. Last access via <http://www.willoughby.nsw.gov.au/your-neighbourhood/heritage/Place/heritage-plaques/7/> on 28/01/2016.

Table 8: Chatswood South Uniting Church and Cemetery

Chatswood South Uniting Church and Cemetery²⁵

Figure 10: Chatswood Uniting Church.

Image



Significance	State
Description	<p>The site is on a corner of a busy intersection with the Pacific Highway. The 0.8 hectare site slopes down gently from east to west and contains a scattering of large turpentine trees, possibly remnant specimens. The property boundary has been intact since purchase in 1871. A small sandstone church in simple Victorian Gothic style occupies the north-east corner of the site. A 1960s fellowship centre lies further west, adjacent to the Sunday school. A cemetery lies to the north-west. The south-west is used as a car park shaded by trees; the south-east contains the parsonage.</p> <p>A small graveyard lies to the west of the church, with burials dating from 1871 to 1924, with the majority being before 1910. Most monuments are of sandstone or marble and simple in design. The cemetery is not enclosed.</p>
Statement of significance	<p>This church group is of historic, aesthetic and social significance as a fine, intact rural church, graveyard and landscaped grounds indicative of the early rural settlement of Lane Cove in the eighteen seventies. It is the oldest remaining (the third built) Methodist church on Sydney's North Shore, and the first church to be built in Lane Cove. The graveyard contains the remains of early pioneer families such as the Forsythe, Bryson and French families). It is also of aesthetic significance as a landmark on the Pacific Highway.</p>
Impact type	Indirect impact: Views and vistas
Heritage impact assessment	<p>The heritage item is located south-west of the construction site. In addition, works at the Pacific Highway and Mowbray Road intersection would occur immediately east of the curtilage of the heritage item. The works would involve minor modification and widening of a portion of Mowbray Road. Visually, these works would have a negligible impact on the historic, aesthetic and social significance of the heritage item.</p> <p>Indirect impact: Negligible</p>

²⁵ Description and Statement of significance extracted from State Heritage Register inventory sheet "Chatswood South Uniting Church and Cemetery" last accessed via <http://www.environment.nsw.gov.au/heritageapp/ViewHeritageItemDetails.aspx?id=5045420> on 28/10/2016.

Table 9: Garden of Remembrance heritage impact assessment

Garden of Remembrance²⁶

Figure 11: Garden of Remembrance, with Chatswood Railway Station in the background. Artefact Heritage 2014.

Image



Significance	Local
Description	The Garden of Remembrance features roses with plaques inscribed with the names of Willoughby service personnel who lost their lives as the result of wars, Picardy Roses grown from budwood obtained from Villiers-Brettonneux and Delville-Wood War Cemeteries in the Somme area of France, and rosemary plants grown from a cutting brought back from Gallipoli by an injured serviceman in 1915. The garden is landscaped with formalised paths terminating at the northern end with a view towards the Boer War memorial, originally located in Chatswood Park, and focuses on a central memorial on a raised grassed mound. The setting of the Garden of Remembrance was subject to modification as part of the Epping to Chatswood Rail Link works and ongoing upgrades to Chatswood Railway Station.
Impact type	Indirect impact: Views and vistas
Heritage impact assessment	The heritage item is located within the buffer zone to the north of the T1 North Shore Line works study area. Visual connection between the heritage item and the current rail corridor is limited (the rail corridor is elevated in this location). The track viaduct and trackworks would therefore have a negligible and temporary visual impact on the heritage item. Indirect impact: Negligible

²⁶ Description and Statement of significance extracted from State Heritage inventory sheet “St Leonards Centre” last accessed via <http://www.environment.nsw.gov.au/heritageapp/ViewHeritageItemDetails.aspx?ID=2181335> on 22/10/2015.

Table 10: Chatswood Zone substation No.80 heritage impact assessment

Chatswood Zone substation No.80²⁷

Figure 12: Chatswood Zone substation No.80. Artefact Heritage 2015.

Image



significance	Local
Description	Constructed in 1923, the substation consists of a large two storey tuck pointed brick building designed in the Interwar Art Nouveau style.
Statement of significance	The Chatswood Zone substation is a substantial and externally intact Interwar industrial building, which is a representative example of its type and one of only a few similar Interwar industrial buildings of its type remaining in the Willoughby area. It is an important link with the introduction of electricity to the North shore.
Impact type	Indirect impact: Views and vistas
Heritage impact assessment	<p>The substation building would be located above the tunnel alignment and approximately 50 metres to the south of the tunnel portal. Vibration levels would be under the cosmetic damage screening level.</p> <p>Potential direct impact: Neutral</p> <p>The retention of Mowbray House to the north would maintain surviving elements of heritage significance within the streetscape. The retention of street trees in this location would also screen the dive site from the substation. The demolition of existing warehousing and commercial buildings to the north of Mowbray Road would therefore have a negligible impact on views towards the dive site from the substation.</p> <p>Indirect impact: Negligible</p>

²⁷ Description and Statement of significance extracted from State Heritage inventory sheet “Electricity Substation No.80” last accessed via <http://www.environment.nsw.gov.au/heritageapp/ViewHeritageItemDetails.aspx?ID=3430473> on 08/12/2015.

Table 11: Chatswood Reservoirs No. 1 and No.2 (and associated curtilage) heritage impact assessment

Chatswood Reservoirs No. 1 and No. 2²⁸

Figure 13: View of the Chatswood reservoirs No.1 and No.2. Artefact Heritage 2015.

Image



Significance	State
Statement of significance	Chatswood Reservoir No.1 (WS 24) and Chatswood Reservoir No.2 (WS 25) are a pair of identical riveted steel reservoirs, built at Chatswood in 1888. Riveted steel reservoirs are rare in the Sydney Supply Area, this being one of the finest and earliest groups.
Impact type	Indirect impact: Views and vistas
Heritage impact assessment	<p>The reservoirs are located above the tunnel alignment and approximately 100 metres to the south of the tunnel portal. Vibration levels would be under the cosmetic damage screening level.</p> <p>Potential direct impact: Neutral</p> <p>The retention of Mowbray House to the north-east would maintain surviving elements of heritage significance within the streetscape. The demolition of existing warehousing and commercial buildings within the Chatswood dive site would therefore have a negligible impact on the setting of the reservoirs.</p> <p>Indirect impact: Negligible</p>

²⁸ Description and Statement of significance extracted from State Heritage inventory sheet “Chatswood Reservoirs No. 1 and No.2” last accessed via <http://www.environment.nsw.gov.au/heritageapp/ViewHeritageItemDetails.aspx?ID=5051422> on 08/12/2015.

Conservation Area

Table 12: South Chatswood Conservation Area heritage impact assessment

South Chatswood Conservation Area²⁹

Figure 14: Overview of the South Chatswood Conservation Area.



- Heritage Conservation Area
- Heritage Items - General
- Archaeological Site
- Heritage Items - Landscape

Image

Figure 15: View to the north, towards Chatswood, from Mowbray Road, with conservation area on the right. Artefact Heritage 2015.



²⁹ Willoughby City Council “South Chatswood Heritage Conservation Area: C11” accessed via <http://www.willoughby.nsw.gov.au/Development/Heritage---Conservation/conservation-areas/south-chatswood-heritage-conservation-area/> on 22/10/2015.

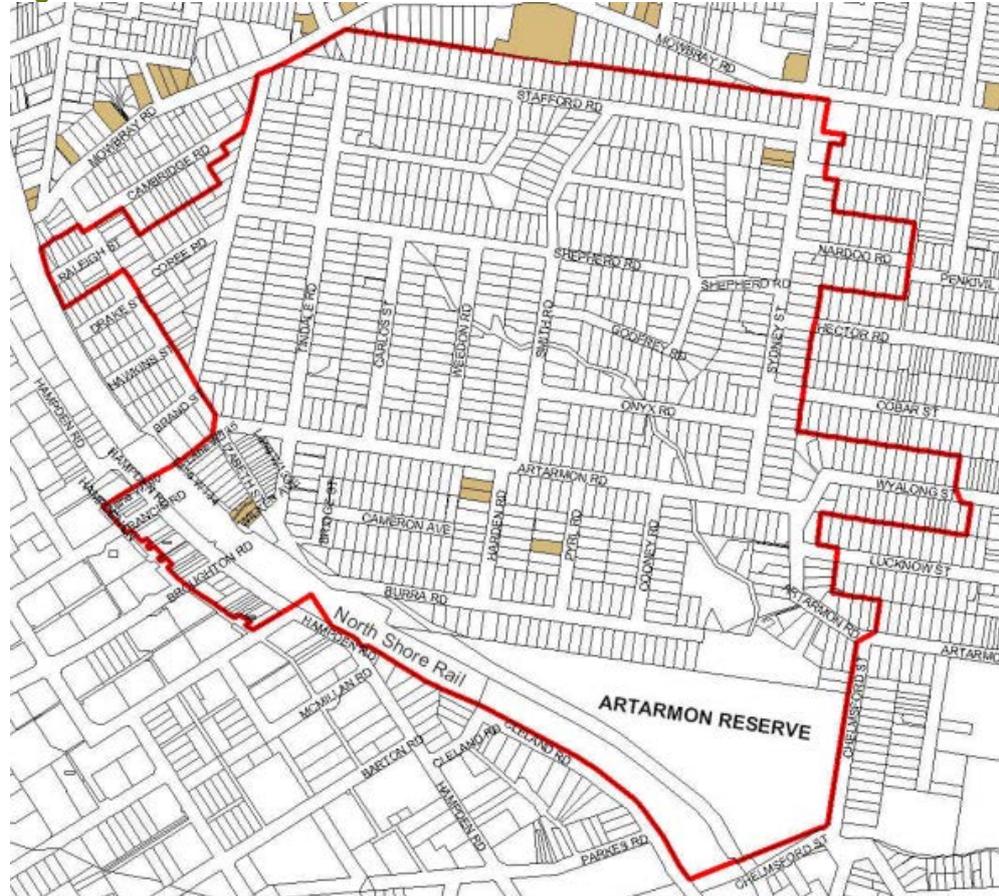
South Chatswood Conservation Area²⁹

Significance	Local
Description	<p>As a whole, South Chatswood has a mixed character: styles range from California and Interwar bungalows, which are interwoven among the dominant Federation and late Victorian era buildings through the progressive resubdivision of what were often originally generous and gracious early estates. Victorian era house I105, shown in Figure 6 is an example of the late Victorian era buildings within the South Chatswood Conservation Area.</p> <p>As well as a few modest Victorian cottages, South Chatswood is remarkable for its concentration of imposing late Victorian mansions. Along Mowbray Road, their location on a prominent ridgeline and their well established gardens (including tall, highly visible exotic species), add to the landmark qualities of the more palatial buildings.</p> <p>These typically two storey mansions and many later Federation grand villas, are usually listed as individual Heritage Items. They also have considerable significance in their own right in addition to the distinctive qualities they impart to the streetscapes.</p> <p>There is great variety in the predominant Federation style from single storey semi detached cottages to rambling grand villas and rare two storey architect-designed mansions. Some streetscapes, as in Robinson and Neridah Streets, display a highly consistent Federation character, even where the scale and siting of buildings varies.</p> <p>The streetscapes of South Chatswood are unified by the generous landscaped settings of both the modest cottages and mansions. These gardens are characterised by mature exotic shrubbery and lawns, and low fencing allowing leafy vistas to and from the houses.</p>
Statement of significance	<p>South Chatswood Heritage Conservation Area is a good example of early North Shore residential development. Much of the dwelling stock retains its original detailing and distinctive architectural features. Most retain the original scale and basic form, which, apart from the two storey mansions, is predominantly single storey. The Mowbray Road streetscape is significant as one of Willoughby's earliest streets and most important routes, and because of this significance it displays a range of substantial and high quality residences from the early phase of development of the area, complemented by later development of the Interwar Period. The Heritage Conservation Area displays a high level of amenity and originality in its development as an early residential suburb up to the Second World War.</p>
Impact type	Indirect impact: Views and vistas
Heritage impact assessment	<p>The development of the northern construction site and T1 North Shore line works would result in negligible visual impacts to the Heritage Conservation Area as a result of the construction of the dive structure in the eastern portion of the site and track viaducts within the rail corridor. Intersection works at the Pacific Highway and Mowbray Road intersection would occur immediately south-west of the curtilage of the conservation area. The works would include minor intersection works, resulting in the modification and widening of a portion of Mowbray Road. Visually, these works would have a negligible impact on the heritage item.</p> <p>Indirect impact: Negligible</p>

Table 13: Artarmon Conservation Area heritage impact assessment

Artarmon Conservation Area³⁰

Figure 16: The Artarmon Conservation Area.



Image

Figure 17: View to the south, towards Artarmon, from Mowbray Road, with the Artarmon Conservation Area to the left. Artefact Heritage 2015.



³⁰ Controls for Heritage Items and Heritage Conservation Areas Part H Willoughby LEP 2012; H3-2.

Artarmon Conservation Area³⁰

Significance	Local
Description	<p>A rectilinear subdivision pattern has been superimposed on a hilly area of moderate slopes. The regularity of the lot layout is interrupted by several well vegetated drainage reserves flowing across to the remnant bushland of Artarmon Reserve. The original subdivision pattern of narrow carriageways and wide grassy verges (usually planted with mature street trees, such as brush box and jacaranda) prevails, except for Artarmon and Sydney Roads, which have wider carriageways taking the main traffic volumes to and from Artarmon Station and shopping centre.</p> <p>The denser pattern of settlement near Artarmon Station is a good example of Interwar flat development providing comfortable housing that is well integrated with nearby public transport and commercial opportunities. The well-proportioned flat buildings form a cohesive residential precinct of generally consistent two storey scale, of similar materials and with shared modest embellishments, including decorative brickwork. Such characteristics enhance their unity with the earlier group of Edwardian commercial buildings at Wilkes Plaza.</p>
Statement of significance	<p>The Heritage Conservation Area is outstanding for its intactness, with few unsympathetic intrusions occurring. The wide range of largely intact California and Interwar bungalows as well as Federation housing in generally good condition, occur in either groupings of consistent styles or subtle blends of successive periods to produce a mix of interesting and varied streetscapes. The area is significant as a harmonious and unified 1910 – 1920's lower North Shore residential area whose development relates to the development of the railway.</p>
Impact type	Indirect impact: Views and vistas
Heritage impact assessment	<p>The T1 North Shore Line metro track works and adjustments would result in negligible visual impact to the Heritage Conservation Area. The construction of the dive structure in the eastern portion of the site, and the track viaduct would have a negligible visual impact through the introduction of additional infrastructure into the existing rail corridor, including the track viaduct.</p> <p>Indirect impact: Negligible</p>

6.2.4 Archaeological assessment

6.2.4.1 Site inspection results

The Chatswood dive site consists of built environment intersected by Mowbray Road and the North Shore Line. The area is covered either by hard surfaces, such as concrete and bitumen, or built structures. Exotic plantings are located along road verges and associated with built structures.

The existing rail corridor is located within a cutting beneath Mowbray Road, and raised on an embankment and viaduct structure across the low-lying terrain north of Nelson Street. The proposed tunnel entrance and work site area between Mowbray Road, Pacific Highway and Nelson Road includes built structures and a large hardstand car park.

Discussion and analysis of site inspection results

Observations of the rail corridor during the survey indicate that any natural landform associated with the rail corridor is likely to have either been removed for the cutting or built over for the embankment and viaduct structure.

The area between Mowbray Road, Pacific Highway and Nelson Road consists of one – two storey built structures and a large hardstand car park. No evidence of basements or below ground car parks associated with any of those structures were observed.

Figure 18: View north along North Shore line towards Chatswood CBD



Figure 19: View north across hardstand car park bordering the Pacific Highway



6.2.4.2 Discussion of archaeological potential

Analysis of historic plans suggests that the northern construction site was occupied as early as 1836. During the early to mid-1800s the study area appears to have been occupied by at least one tenant farmer, a C. Webb (Figure 20). The main house associated with the farmer may have originally been located within the footprint of Mowbray Road, which was constructed in the later 1800s. A number of outbuildings may have been associated with this early property.

In the late nineteenth and early twentieth century the study area was on the eastern edge of Chatswood, and contained a number of commercial buildings including a cottage and store (1899; Figure 21), a residence and the council chambers/school of arts hall (1898) and a livery and stables (1905).

As the study area currently contains low-rise commercial development and open space (carparking), and appears to have done so throughout much of the twentieth century (according to historical aerial photographs of the study area), it can be assumed that the northern construction site study area would have some archaeological potential to contain remains associated with early nineteenth to early twentieth century occupation.

Figure 20: C. Webb's farm. Cottage within Mowbray Road corridor and the original fenceline is shown as being partially within the Pacific Highway road corridor. Source: MLNSW Copy of E.J.H. Knapp's Plan of Mr. Nichol's Estate at Hunters Hill. Z/M3 811.141/1936/1.

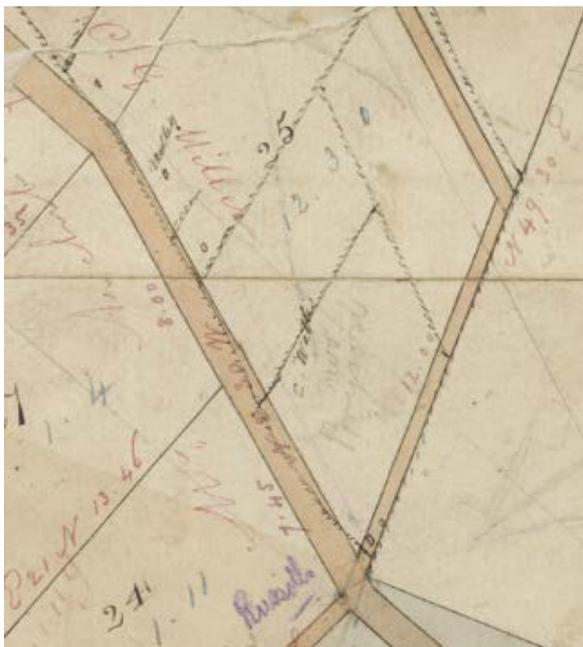


Figure 21: Cottage and store on Mowbray Road in 1899. Source: MLNSW C. A. Owen's plan of the North Shore Railway Estate. Z/SP/C15/11.



6.2.4.3 Assessment of significance

The following is a preliminary assessment of significance, informed by the NSW Heritage Criteria for *Assessing Significance related to Archaeological Sites and 'Relics'* (2009).

Archaeological research potential (NSW Heritage Criterion E):

- Archaeological remains associated with early residential and agricultural development of the study area may have some research potential dependant on the nature and extent of any remains.

Association with individuals, events, or groups of historical importance (NSW Heritage Criteria A, B & D):

- It is possible that evidence of early residential development of the study area may have associations with former residents and known local historical figures. Specific associations have not been identified at this stage.

Aesthetic or technical significance (NSW Heritage Criterion C):

- It is not possible at this stage to identify whether archaeological remains within the study area have potential to demonstrate aesthetic or technical values.

Ability to demonstrate the past through archaeological remains (NSW Heritage Criterion A, C, F & G):

- There is low to moderate potential, due to low intensity building that has occurred throughout the site, that the study area has the potential to demonstrate the past through archaeological remains.

Overall, the site may contain archaeological remains with potential to reach the local significance threshold.

6.2.4.4 Overview archaeological potential

Table 14 includes a summary of archaeological potential and significance and outlines recommendations.

Table 14: Summary of archaeological potential within study area

Potential archaeological resource	Potential	Significance	Heritage impact assessment
Mid-19th century occupation (C. Webb's property) – evidence of land clearance and cultivation, outbuildings, drains, cesspits, wells.	Low	Local	Excavation works within the study area have low potential to impact on archaeological remains.
Mid to late 19th century residential and commercial development	Low-moderate	Local	Excavation works within the study area have low-moderate potential to impact on archaeological remains
20th century residential and commercial development	Moderate	Unlikely to reach the local significance threshold.	Excavation works within the study area have moderate potential to impact on archaeological remains.

6.2.4.5 Archaeological impact assessment

Proposed works within the Chatswood dive site (northern) with the potential to impact on archaeological remains include:

- Excavation works associated with the removal of existing structures and the Nelson Street bridge
- Excavation required in the construction of the dive site
- Excavation to upgrade or install in-ground services required for the establishment of the water treatment plant, site offices, staff amenities and the spoil and dive works facilities
- Foundation works for the establishment of site amenities and facilities

Works with the potential to impact archaeological resources within the Chatswood dive site, excepting excavation for the dive structure (contained largely within the existing rail corridor), are likely to be limited to discrete locations and associated with minor activities.

Therefore, works are likely to have a minor to moderate impact on potential archaeological resources, dependant on the location and extent of the proposed excavation works.

6.2.5 Overview of constraints

The following table outlines the potential heritage constraints within the study area.

Table 15: Overview of constraints on heritage items and areas of archaeological potential

Heritage item	Potential heritage impacts		
	Direct impact	Archaeological impact	Indirect impact
Mowbray House	Direct impact: Minor (tree removal, demolition non-original outbuildings, internal modifications) Potential direct impact: Minor (vibration)	Neutral	Minor – views and vistas
Great Northern Hotel	Neutral	Neutral	Negligible – views and vistas
Chatswood South Uniting Church and Cemetery	Neutral	Neutral	Negligible – views and vistas
Garden of Remembrance	Neutral	Neutral	Negligible – views and vistas
Chatswood Zone Substation No.80	Neutral	Neutral	Negligible – views and vistas
Chatswood Reservoirs No. 1 and No. 2	Neutral	Neutral	Negligible – views and vistas
South Chatswood Conservation Area	Neutral	Neutral	Negligible – views and vistas
Artarmon Conservation Area	Neutral	Neutral	Negligible – views and vistas
Archaeological resource within the study area	N/A	Minor to moderate impact - moderate potential for locally significant archaeological remains	N/A

6.3 Artarmon station

A traction substation is required between Chatswood and Crows Nest to support operation of the project. The proposed site is adjacent to the Gore Hill Freeway. The site is elevated above freeway level, with a retaining wall immediately below the site.

The Artarmon substation would be constructed in the following sequence:

- Excavation of a vertical shaft to the tunnels below
- Lining and reinforcement of the shaft
- Building works for aboveground components
- Installation of electrical equipment.

The location and indicative layout of the Artarmon substation construction site, including vehicle access / egress is illustrated in Figure 22 and Figure 23.

Figure 22: Artarmon substation construction site layout.

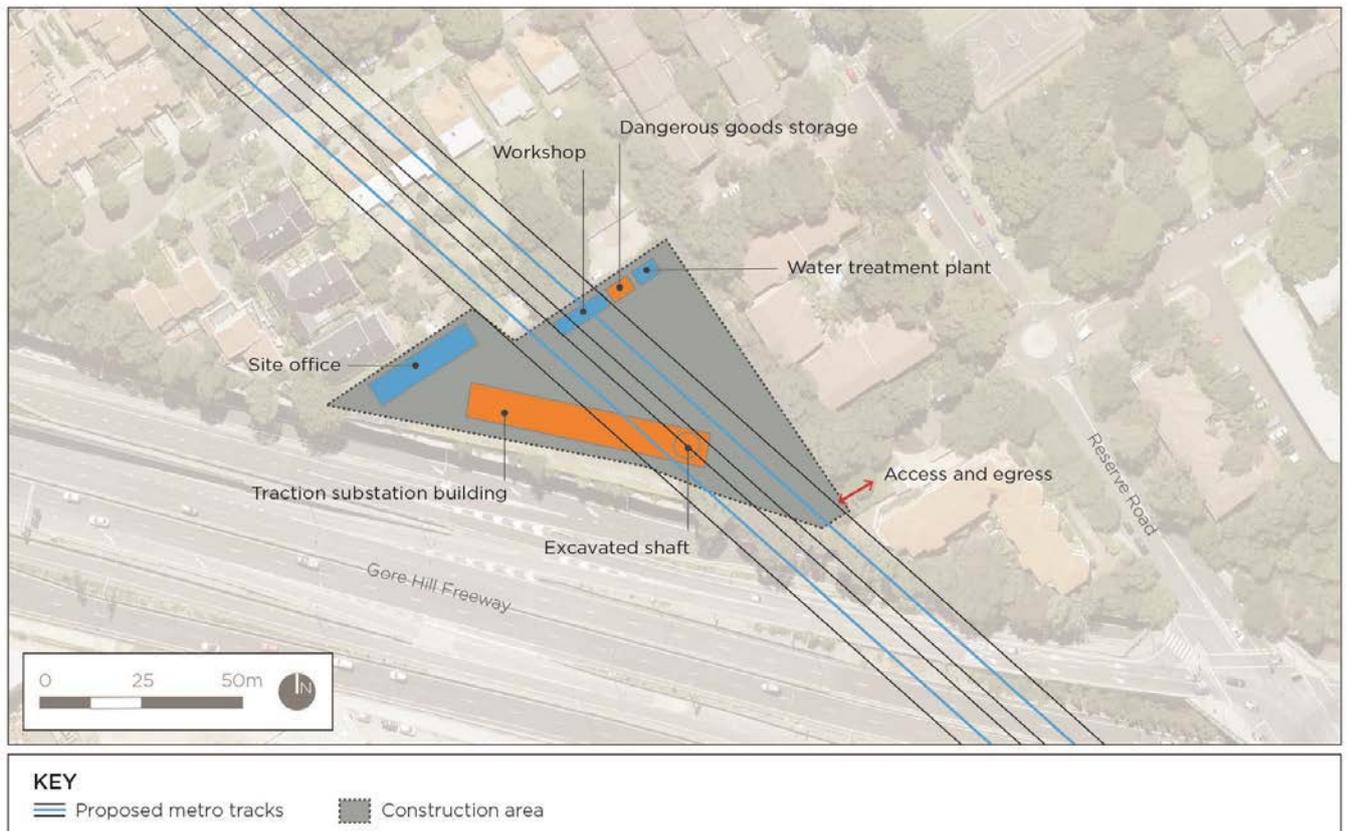


Figure 23: Location of the Artarmon Substation



6.3.1 History of the study area

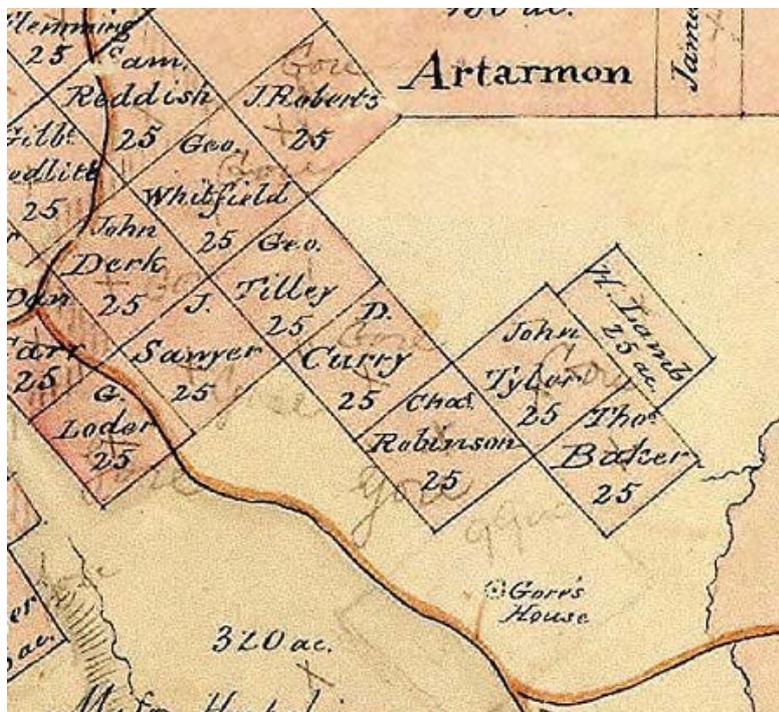
In 1794 the first land grants were made in the area that was to become known as Artarmon, although few of these were ever occupied and those that were occupied were generally not held for long. The landscape was a difficult one to utilise prior to the clearing of the land.³¹ The present-day Pacific Highway, that demarcates the westernmost boundary of Artarmon and traverses the higher ground, was an original timber-getters route.

The suburb of Artarmon is believed to have been named for a 150 acre land grant made to Provost Marshal William Gore in 1810 by Governor Macquarie. Gore's family home was Ardthelmon Castle, in Ireland, the name of which was adopted by Gore as the Artarmon Estate. Gore was initially successful and acquired several farms in the area surrounding his original grant.³² However, in 1818, Gore defaulted on his mortgage and was forced to sell most of his land, with the exception of a small portion on which he built a small cottage named Artarmon House (Figure 24).

Artarmon House was acquired by Richard Harnett who built a grand residence adjacent to the cottage in 1869. George Whiting later owned the estate, and called it Valetta. In 1922, on Whiting's death, the estate was purchased by the North Sydney Brick and Tile Company. The house was subsequently demolished in 1939. The estates stables remain standing in the grounds of Gore Hill College of Technical and Further Education.³³

The study area is located on a land grant of 25 acres originally made to Geo. Tilley (Figure 24), in an area to the east of the suburb. Artarmon east remained less developed than the western side of the Pacific Highway into the early 20th century.³⁴

Figure 24: Undated plan of the Parish of Willoughby, showing the 25 acre grant to Tilley, and the location of "Gore's House," to the south. Source: Lands and Property Information, Parish Preservation Project.



³¹ Fallowfield, R. *Artarmon* for the Dictionary of Sydney, 2008.

³² Ibid

³³ Ibid

³⁴ Ibid.

During the 1850s the area was dominated by orchards and market gardens. Brickmaking was also a common industry in the area from the early 19th century. In 1869, when the Municipality of North Willoughby was proclaimed, there were 400 inhabitants in the district.³⁵ The North Shore Railway was opened in 1890, encouraging subdivision throughout the area, although it was not until the late 19th century that subdivision occurred on any real scale. The opening of the Artarmon Railway Station in 1898 encouraged the increasing urbanisation of the suburb. The late 1890s saw the introduction of some public utilities to the area, including gas, and later, electricity. Some areas were supplied with a sewer as early as 1899, but comprehensive coverage of the area did not occur until 1920.³⁶ Municipal garbage collection commenced in the 1920s.

A boom in the residential property market occurred throughout the 1920s and 1930s, and many Federation and Californian Bungalow style homes were constructed at this time.

6.3.2 Heritage listed items

There are no heritage listed items within the Artarmon traction substation study area.

6.3.3 Archaeological assessment

6.3.3.1 Site inspection results

The Artarmon substation site was an active construction site at the time of the site survey, and was not accessed.

Discussion and analysis of site inspection results

Observations of the work site from Barton Road support the background information that the site is extensively disturbed.

Figure 25: View northwest across the Artarmon construction site from Barton Crescent



Figure 26: View northwest across the Artarmon construction site from Barton Crescent



6.3.3.2 Overview of previous structures

An analysis of historic plans of the Artarmon construction site study area indicates that was originally part of the Gore or Artarmon Estate, a substantial land grant made in the early 1800's. In the early to mid-nineteenth century it was part of 25 acres owned by George Tilley (Figure 27).

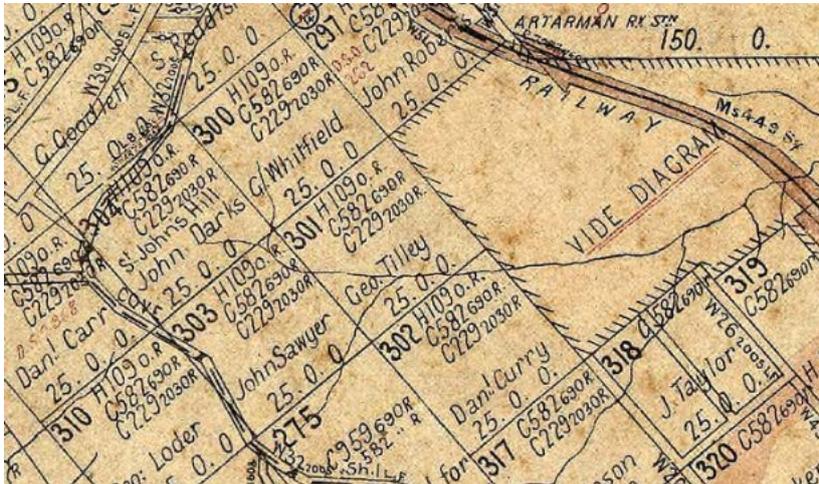
No evidence of earlier structures was found during this analysis, although it is possible that occupants of the land may have constructed sheds or similar structures on the property. An article in the Sydney

³⁵ Fallowfield, R. *Artarmon* for the Dictionary of Sydney, 2008.

³⁶ Ibid

Morning Herald dating to 1889 indicates that the land was held by a number of tenants throughout the mid nineteenth century and used for timber-getting.

Figure 27: Undated plan of the Parish of Willoughby, showing George Tilley's 25 acre grant.



The Artarmon study area is currently in use as a temporary educational/school site. In the mid twentieth century the study area was occupied by small-scale residential subdivision (Figure 28). It is likely that most of these residences were associated with the later nineteenth century expansion of the surrounding area. These residences appear to have been demolished for construction of the Gore Hill Freeway, which is likely to have resulted in substantial modification to the surrounding landscape. Archaeological remains of twentieth century housing are unlikely to reach the local significance threshold.

Figure 28: 1943 aerial of the study area, showing a number of residences.



6.3.3.3 Preliminary assessment of significance

The following is a preliminary assessment of significance, informed by the NSW Heritage Criteria for *Assessing Significance related to Archaeological Sites and 'Relics'* (2009).

Archaeological research potential (NSW Heritage Criterion E):

- Archaeological remains associated with early residential and agricultural development of the study area may have some research potential dependant on the nature and extent of any remains.

Association with individuals, events, or groups of historical importance (NSW Heritage Criteria A, B & D):

- It is possible that evidence of early residential development of the study area may have associations with former residents and known local historical figures. Specific associations have not been identified at this stage.

Aesthetic or technical significance (NSW Heritage Criterion C):

- It is not possible at this stage to identify whether archaeological remains within the study area have potential to demonstrate aesthetic or technical values.

Ability to demonstrate the past through archaeological remains (NSW Heritage Criterion A, C, F & G):

- There is low to moderate potential, due to low intensity building that has occurred throughout the site, that the study area has the potential to demonstrate the past through archaeological remains.

Overall, the site may contain archaeological remains with potential to reach the local significance threshold.

6.3.3.4 Overview archaeological potential

The study area has low potential to contain a substantial archaeological resource with the potential to reach the local significance threshold.

Table 16: Summary of archaeological potential within study area

Potential archaeological resource	Potential	Significance	Heritage impact assessment
Evidence of early development of the study area (Artarmon and Gore Estates) – for example, evidence of land clearance and cultivation, outbuildings, postholes associated with fencing.	Nil-low	Local	Excavation works within the study area have nil-low potential to impact on archaeological remains.
Mid-19th century development (Tilley's Grant) – evidence of timber getting or cultivation	Nil-low	Local	Excavation works within the study area have nil-low potential to impact on archaeological remains.
Late 19th and early 20th residential development	Low - moderate	Unlikely to reach the local significance threshold.	Excavation works within the study area have moderate potential to impact on archaeological remains.

6.3.3.5 Archaeological impact assessment

Proposed works within the Artarmon Substation site with the potential to impact on archaeological remains include:

- Excavation of a shaft (approximately 3 metres in diameter) to reticulate electrical cables to the tunnel below
- Foundation/ground slab excavation for construction of an aboveground building, workshops, site offices, wheel washing bay and water treatment plant.

Works with the potential to impact archaeological resources within the Artarmon substation are likely to be limited to discrete locations. Therefore, works in this location are likely to have a minor impact on potential archaeological resources, dependant on the location and extent of the proposed excavation works.

6.3.4 Overview of constraints

The following table outlines the potential heritage constraints within the study area.

Table 17: Overview of potential heritage constraints for Artarmon study area.

Heritage item	Potential heritage impacts		
	Direct impact	Archaeological impact	Indirect impact
Potential archaeological resource within the study area	N/A	Minor - nil to low potential for locally significant archaeological remains	N/A

6.4 Crows Nest Station

Crows Nest station is strategically located to the south of the existing St Leonards station and close to the entertainment and retail strip along Willoughby Road. The station box would site between the Pacific Highway, Oxley Street, Clarke Lane and Hume Street. The station entrances would be located on Clarke Street and the Pacific Highway (Figure 29 and Figure 30).

Figure 29: Location and indicative layout of Crows Nest Station.



6.4.1 Construction

The Crows Nest Station construction site would be about 6,000 square metres and would be located adjacent to the Pacific Highway to the south of Oxley Street. The site currently contains a variety of commercial and residential buildings.

This station would be constructed using a cut-and-cover methodology, resulting in a total of about 150,000 cubic metres of spoil being removed through the site. The site would function as two separate construction zones split by Hume Street. The cut-and-cover construction through Hume Street would be staged to allow two way traffic access to be maintained, although there may be some short term periods of closure.

Access and egress to and from the site would be to and from Hume Street and Clarke Street.

The station excavation would comprise the majority of the site, necessitating a street level temporary working platform to be installed. Support services including office, amenities, spoil handling and storage, and workshops would be provided on the working platforms.

Figure 30: Crows Nest Station construction site layout.



6.4.2 History of the study area

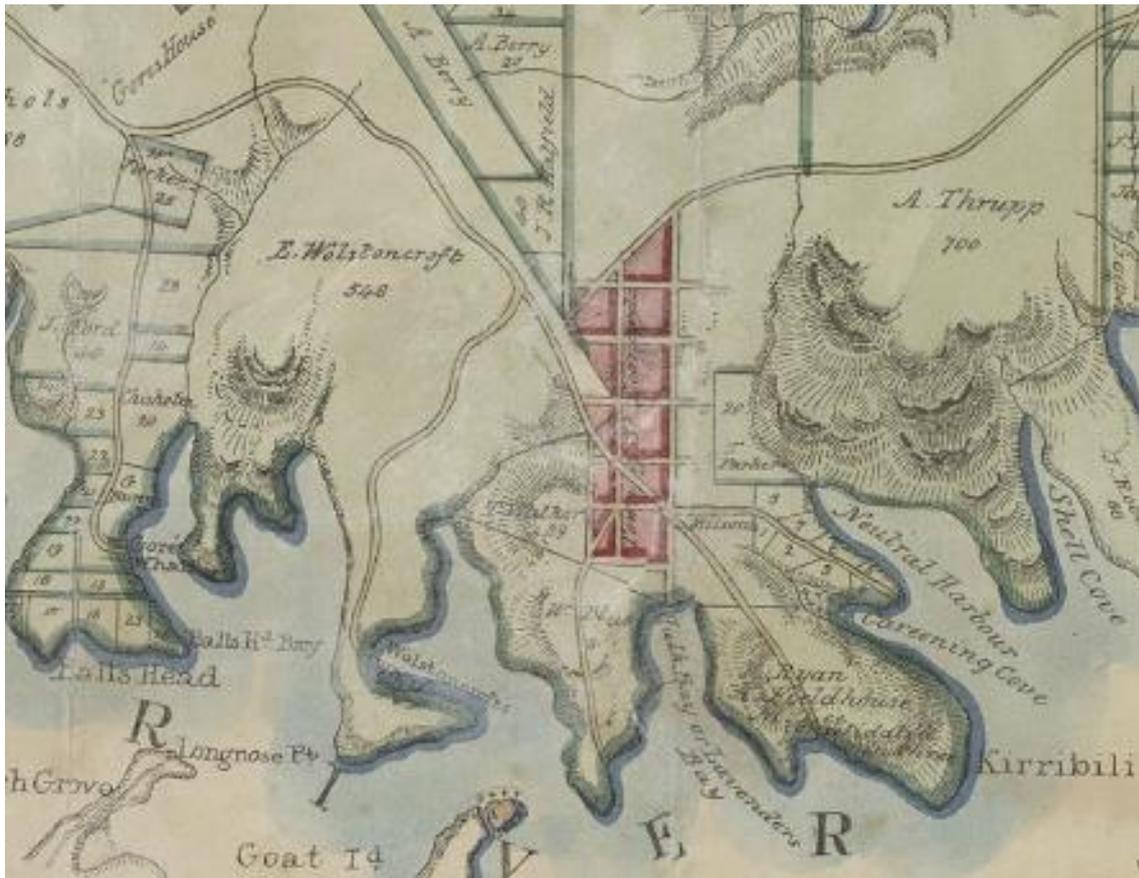
The majority of the lower North Shore is associated with large land grants given to free settlers in the early 19th century. Crows Nest occupies land originally granted to London born Edward Wollstonecraft in 1821. Wollstonecraft, a wealthy merchant and landowner, was a cousin to Mary Shelley, the author of *Frankenstein*. Wollstonecraft resented his connection to the 'unconventional' author and was eager to escape London. In 1812 he met Scottish merchant Alexander Berry (who would also become a wealthy New South Wales landowner) and the two men formed a friendship and business partnership. In addition, Berry, Wollstonecraft and his sister Elizabeth shared lodgings in London for six years. Berry would go onto marry Elizabeth.³⁷

³⁷ Stephen, M. D. 1967. 'Wollstonecraft, Edward (1783–1832)', Australian Dictionary of Biography, National Centre of Biography, Australian National University. Site accessed on 3/6/2015 at: <http://adb.anu.edu.au/biography/wollstonecraft-edward-2812/text4025>

In 1819, Berry, Edward and Elizabeth Wollstonecraft sailed to New South Wales aboard separate ships. Governor Macquarie promised each man a 500 acre grant (Figure 31).³⁸ Wollstonecraft's grant was located on the North Shore, described as 'exclusive of rocks and sand' and named Crow's Nest.³⁹ Here he built a small cottage, on top of a hill, to the south west of the study area.

Wollstonecraft, however, preferred to reside in the three storey shop he and Berry had established at The Rocks. Wollstonecraft passed away in 1832 at the age of 49, owning 30,000 acres with Berry. By this stage, Berry had married Elizabeth and the two were living on his south coast estate in Coolangatta, where he had become a large land holder. Wollstonecraft never married and his Crow's Nest estate was left to Berry and Elizabeth who returned soon after and resided in Crow's Nest.⁴⁰

Figure 31 1846 Parish of Willoughby map showing Wollstonecraft's 548 acre grant. Published by W. Meadows Brownrigg, surveyor. Source. NLA.



Soon after moving into the estate, Berry renovated the small cottage at Crow's Nest. Over time, Berry accumulated land to the east of the estate, and a portion of the study area is located within one of these later grants. By this stage, Berry's landholdings were one of the largest in the North Shore, and he soon began selling and leasing land. In 1845 Elizabeth died and in 1850 the larger, and 'more conveniently located' Crows Nest House was completed.⁴¹

Berry began subdividing and selling off portions of the estate near Lane Cove Road (now the Pacific Highway) soon after Elizabeth's death. Despite subdivisions taking place elsewhere in the area, and

³⁸ Stephen, M. D. 1967. 'Wollstonecraft, Edward (1783–1832)', Australian Dictionary of Biography, National Centre of Biography, Australian National University. <http://adb.anu.edu.au/biography/wollstonecraft-edward-2812/text4025>

³⁹ North Sydney Council. From Land Grant to Subdivision. Site accessed on 3/6/2015 at: file:///C:/Users/artefact/Downloads/From_Land_Grant_to_Subdivision.pdf

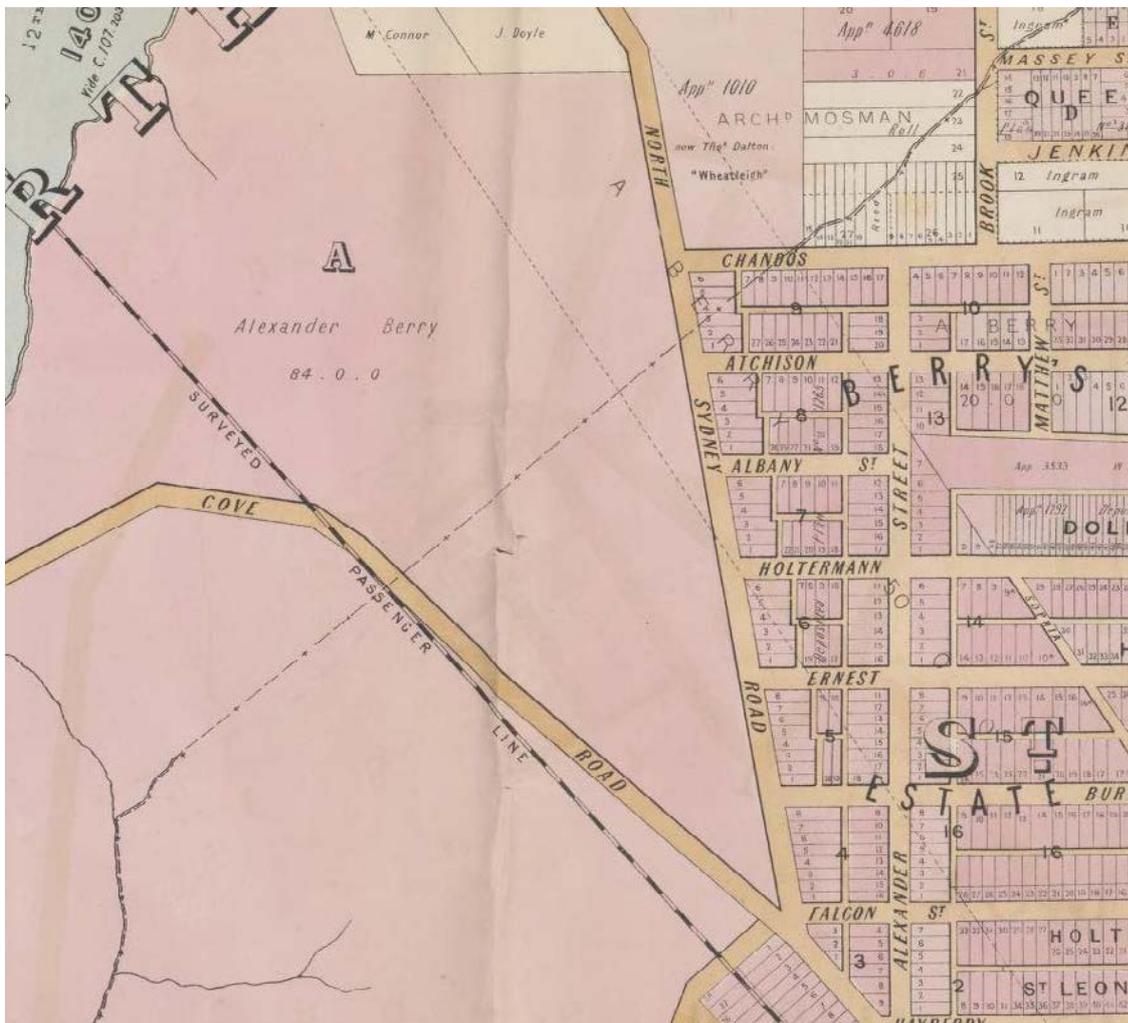
⁴⁰ The Dirt on the Rocks, 2010. Wollstonecraft on the Rocks!. Site accessed on 3/6/2015 at: http://thedirt.ontherocks.com/2010_10_01_archive.html

⁴¹ Historic Houses Trust. Crows Nest House. Site accessed on 3/6/2015 at: <http://collection.hht.net.au/firsththpictures/picturerecord.jsp?recno=37906>

the 1860s and 1880s lower North Shore land boom, land sales and development were slow. The location of these subdivisions, and the intact Crows Nest estate, can be seen Figure 32.

Berry resided in Crows Nest until his death in 1873, at which time the house was leased to District Court Judge Alfred McFarland until 1891. The house was then inherited by Berry's relative Sir John Hay and later, Lady Hay. In the early 1890s, John Hay donated a large portion of the estate to the Government for the construction of the Milsons Point to Hornsby railway line (part of the soon to be completed North Shore Line). This is located to the south west of the study area. Hay took the opportunity to put a number of large subdivisions on the market during this time. However, his timing was poor, and the economic depression of 1890-93 meant few allotments were sold.⁴²

Figure 32: Higginbotham & Robinson. Map of St. Leonards on the North Shore Parish of Willoughby 1887 showing the relatively undeveloped Wollstonecraft and Berry estate and some subdivisions to the east. MAP RM 4458. Source. NLA.



6.4.2.1 1893 -1932

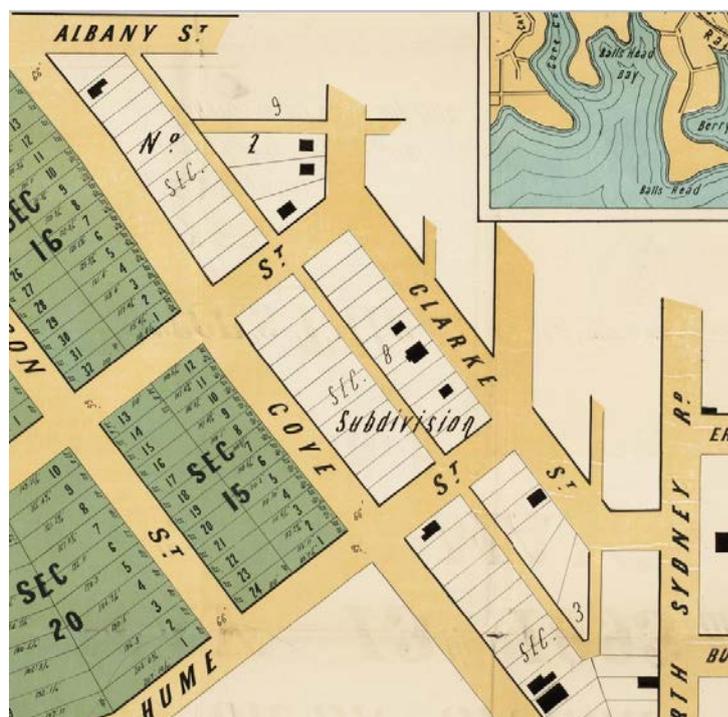
When the North Shore Line was completed in 1893 suburban settlement in the area continued. However, due to difficulties crossing the harbour, this was slow. This is evidenced by subdivision plans of the Berry Estate from 1893 showing land within the study area - to the east of the Pacific Highway (formally Lane Cove Road) - had been subdivided and only a few allotments sold (Figure 33). The study area contains a number of buildings at this time. Many of the dwellings in the surrounding area were larger, Victorian style houses. Nicholson Street had not yet been extended into

⁴² North Sydney Council. From Land Grant to Subdivision. Site accessed on 3/6/2015 at: file:///C:/Users/artefact/Downloads/From_Land_Grant_to_Subdivision.pdf

land to the west of today's Pacific Highway, which remained part of Berry's Crow's Nest House and gardens.

In 1904, additional subdivisions were made to the east of the study area, creating wide streets such as Chandos Street, Atchison Street, Albany Street and Ernest Street. Sir John Hay died in 1909, leaving the remainder of the estate to Lady Hay. Lady Hay would go on to approve a series of subdivisions from 1911 until her death in 1931. By 1909, the number of buildings to the east of the Pacific Highway and along Clark Street had increased, however the Crows Nest House and gardens remained intact (Figure 34). The size and style of dwellings in the area appear to have varied, although the majority of structures were built near or on main streets such as Church Street, Lane Cove Road and Clark Street. By the 1920s, the majority of subdivisions were filled, many of which were occupied by Federation style bungalows, still present within the streetscape today.⁴³ In their analysis of the Lady Hay Estate, Thorp et al (1997) describes this time as a significant reflection of the suburbanisation of the lower North Shore influenced by the break-up of large estates that once occupied the area.⁴⁴

Figure 33. Berry's Estate Subdivision Plan 1893 showing subdivided land to the east and undeveloped land to the west of the study area. MAP Folder 126, LFSP 1982. Source. NLA.



6.4.2.2 1932- present

In 1932, Crows Nest House was demolished for the North Sydney Demonstration School.⁴⁵ Between 1931 and 1934 three more subdivisions in the 'Lady Hay Estate' took place. The completion of the Sydney Harbour Bridge in 1932 created a minor increase in the Crow's Nest population as well as changes to street alignments. Lane Cove Road was extended and renamed the Pacific Highway.

Although the construction of the bridge led to an increase in property buyers in North Sydney and Crows Nest, the Depression meant development was slow and homes were modified rather than built. The majority of Federation bungalows and Victorian mansions - remnants of larger estates and subdivisions that originally defined the area - were soon converted into boarding houses.

⁴³ Staas, R., Thorp, W. and Wright, M. 1997. Conservation Area Studies. Holtermann Estate A,B,C,D and Lady Hay Estate (Crows Nest Road), North Sydney. Report prepared for North Sydney Council, p. 11.

⁴⁴ Staas, R., Thorp, W. and Wright, M. 1997, p. 6.

⁴⁵ Historic Houses Trust. Crow's Nest House. Site accessed on 3/6/2015 at: <http://collection.hht.net.au/firsthhtpictures/picturerecord.jsp?recno=37906>

Development following the Second World War was also slow and the population of North Sydney declined. Aerial photographs of the study area taken in 1947 indicate that the majority of the area consisted of Federation bungalows, although a number of empty lots remained or were in the process of being developed (Figure 35).

The land boom of the 1960s, driven by low land prices, led to a number of corporations establishing premises in North Sydney. They preferred the area over the CBD, where rent was expensive and building allotments small. The boom led to the demolition of many of Crows Nest's earlier architecture, and soon the local community began making public objections to the increase in development.⁴⁶ Today, Crows Nest is a well-known commercial district, predominantly made up of medium density and high density dwellings.⁴⁷

Figure 34: Subdivisions of parts of Berry's Estate, North Sydney 1900 - 1909. Source. NLA MSP Folder 126, LFSP 1973.



⁴⁶ Masson, L. 2010. North Sydney. Dictionary of Sydney. Site accessed on 4/6/2015 at: http://dictionaryofsydney.org/entry/north_sydney

⁴⁷ Australian Bureau of Statistics, 2006. Census of Population and Housing Crows Nest. Site accessed on 4/6/2015 at: <http://info.id.com.au/dosydney/Default.aspx?pg=1&gid=1720>

Figure 35 1947 aerial, Crows Nest. Source: Lands & Property Information SixMaps.



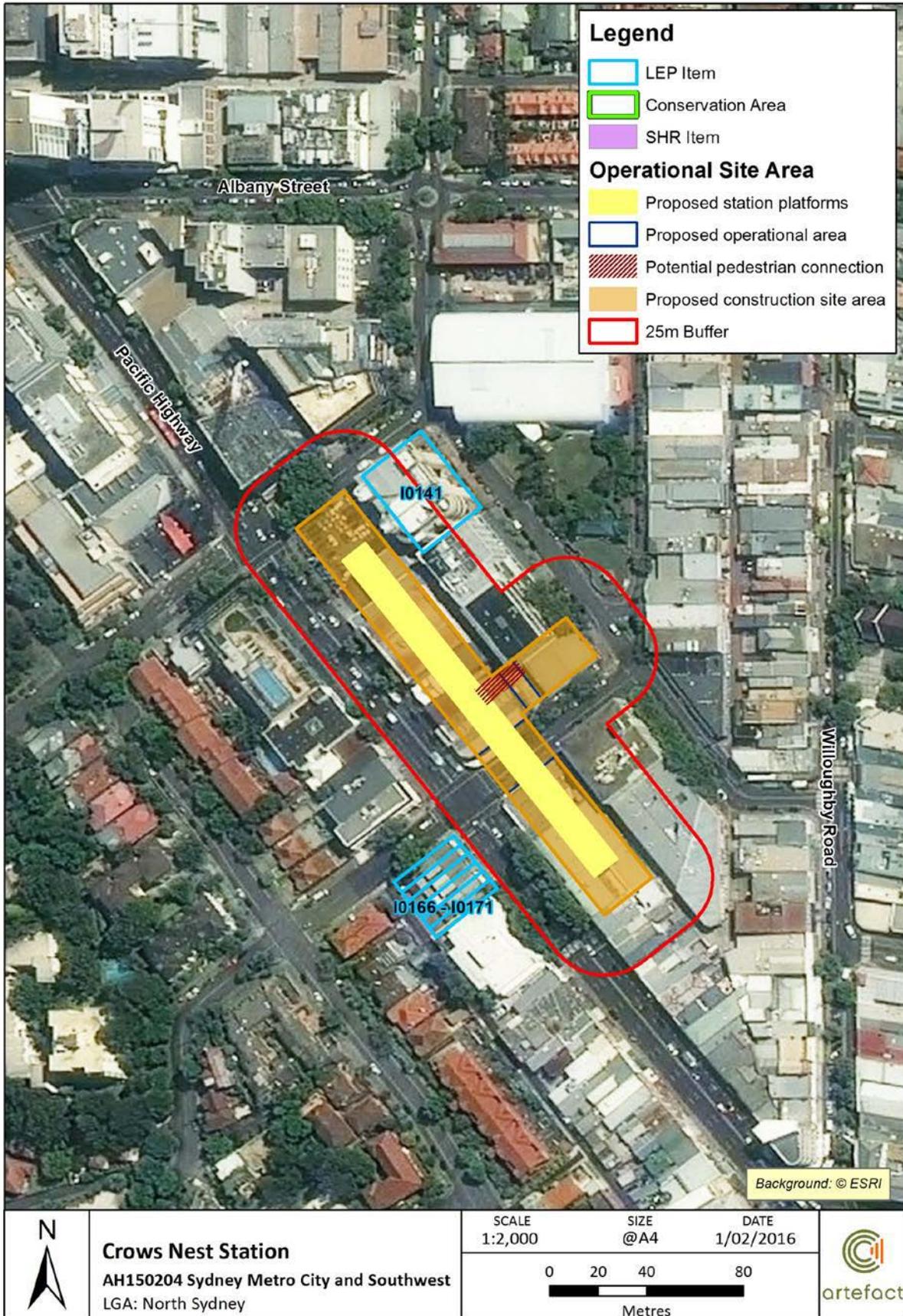
6.4.3 Heritage listed items

The following table outlines the heritage listed items within the study area and shown in Figure 36.

Table 18: Overview of heritage items within the Crows Nest Station study area

Heritage item	Register listings	Significance	Relationship to the study area
St Leonards Centre	North Sydney LEP 2013 I0141	Local	Partially within the buffer zone
Higgins Buildings	North Sydney LEP 2013 I0166-11071	Local	Outside buffer zone, directly opposite construction site.

Figure 36: Heritage items within the Crows Nest study area.



6.4.4 Detailed heritage impact assessments

Heritage items

Table 19: St Leonards Centre heritage impact assessment

St Leonards Centre⁴⁸

Figure 37: The St Leonards Centre. View from Clarke Street. Artefact Heritage 2015.

Image



Significance

Local

Description

Constructed c.1972, the heritage item consists of a six storey commercial building with four levels of car parking below ground. It is designed in the late Twentieth Century, Brutalist style, with expressed, curved risers to the perimeter in off form, fluted concrete with a deeply inset plan form that varies at each level. The elevations are heavily modelled in both directions with raking, metal framed glazing. The building sits on a pebblecrete plinth to the street with sloping walls, steps and sculptural air vents and seating. Above, the plan steps out at each level and at the roof there are several metal screen walls. The structure is infilled with aluminium framed glazing and there is extensive use of curved walls at the upper level with curved balconies to the front elevation.

A dramatically assertive building marked by curvilinear plan bastion tower elements of textured off form reinforced concrete. Between these the storeys step outwards towards the top, bestowing upon the structure a character of great and not totally pleasant strength. It is a well-made and crafted building. This building is designed in the late twentieth century brutalist style.

Statement of significance

28 Clarke Street is an unusual example of a six storey, late Twentieth Century commercial building built c. 1972 designed by Kerr and Smith, Architects and Planners, in the late Twentieth Century Brutalist style and is a dominant building in the local streetscape. A building whose domineering presence and intrusive character is barely balanced by its intrinsic architectural interest.

⁴⁸ Description and Statement of significance extracted from State Heritage inventory sheet "St Leonards Centre" last accessed via <http://www.environment.nsw.gov.au/heritageapp/ViewHeritageItemDetails.aspx?ID=2181335> on 22/10/2015.

St Leonards Centre⁴⁸

Impact type Potential direct impact: Vibration
 Indirect impact: Views and vistas

Heritage impact
assessment

The St Leonards Centre is located adjacent to the Crows Nest Station cut and cover box. The use of Clarke Lane (to the rear of the heritage item) for vehicle egress during construction, and demolition works required to construct Crows Nest Station, may result in minor vibration impacts. Vibration modelling indicates that the closest façade of this item would experience vibration levels above the screening level.

Potential direct impact: Minor

The northern station building would be constructed adjacent to the western boundary of the heritage item. The buildings currently located on the station site do not contribute to the setting of the heritage item, and consist largely of 20th century commercial buildings fronting the Pacific Highway.

The heritage item is oriented to the north-east and away from the site of Crows Nest Station, and there are no direct view corridors between the heritage item and the proposed station site. Demolition of existing buildings in this location would therefore have a negligible impact on the heritage item. Above-ground station elements include the station entrances, oriented to the Pacific Highway and Clarke Street, and station service facilities. The service facilities in the northern portion of the station site would be located to the rear of the heritage item, to the west of Clarke Lane. These elements would not compete visually with the heritage item, and would constitute a negligible visual impact.

Indirect impact: Negligible

Table 20: Higgins Buildings heritage impact assessment

Higgins Buildings⁴⁹

Figure 38: Higgins Buildings.



Image

Significance	Local
Description	A group of six shopfronts (nos. 366, 368, 370, 372, 374, 376 Pacific Highway – individually listed) in a single building, with first floor offices or residences above.
Statement of significance	The buildings are examples of two storey brick and rendered masonry commercial buildings in the Inter War Free Classical style. The group is a good example of an Interwar commercial/retail building housing a group of shops which occupies an important corner location and which complements and reflects the type of development characteristic of this streetscape.
Impact type	Indirect impact: Views and vistas
Heritage impact assessment	The Higgins Buildings are located on the western side of the Pacific Highway, directly opposite the proposed station site. Whilst the removal of the current mid to late 20th century commercial buildings in this location would alter views from the heritage items, this would result in a negligible heritage impact. From a heritage perspective, the buildings proposed for demolition currently constitute an unsympathetic addition to the streetscape, and do not contribute to the significance of the Higgins Buildings. Indirect impact: Negligible

⁴⁹ Description and Statement of significance extracted from State Heritage inventory sheet “Higgins Buildings” last accessed via <http://www.environment.nsw.gov.au/heritageapp/ViewHeritageItemDetails.aspx?ID=2181335> on 28/01/2016.

6.4.5 Archaeological assessment

The following archaeological assessment will focus on the proposed locations of the station buildings and platforms, the construction of which would require the demolition of existing buildings, and construction of new station buildings, incorporating lift shafts and tunnelled access to the proposed platforms.

6.4.5.1 Site inspection results

The proposed Crows Nest Station site is located across a built environment between the Pacific Highway and Clarke Street. The station site is situated across a gentle slope down to the north.

Discussion and analysis of site inspection results

Due to the gentle slope across the proposed station site, many of the built structures are cut into the slope. This is likely to have removed sections of the natural ground surface and may have removed or impacted areas of archaeological potential.

Figure 39: View north along Clarke Lane from Hume Street



Figure 40: View southeast across the Pacific Highway towards the proposed station site

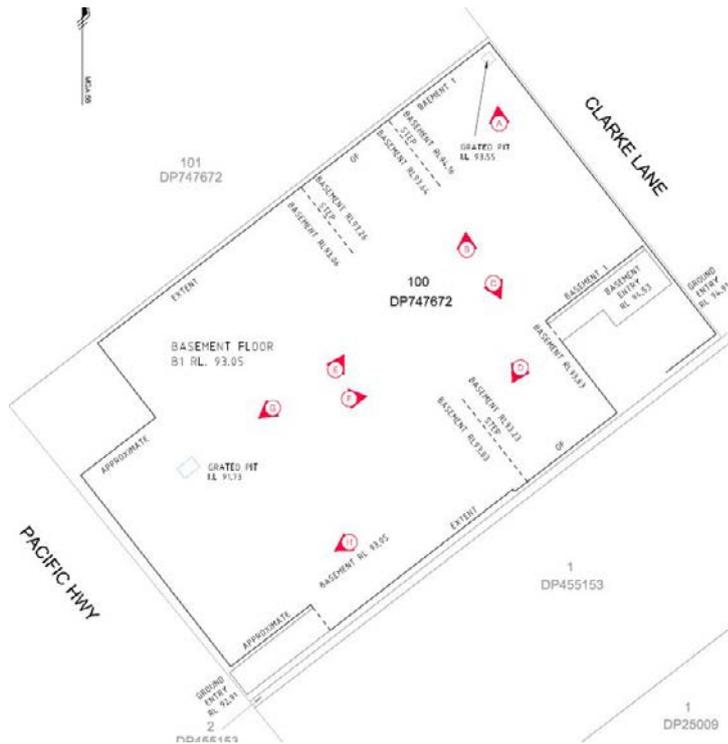


6.4.5.2 Known impacts

Subsurface impacts associated with former or current land uses have the potential to remove or damage potential archaeological remains. Previous impacts within the site need to be further understood and identified before more than a preliminary assessment of archaeological impact can be made. Based on the initial literature review and site inspection undertaken as part of this assessment, the following preliminary assumptions regarding archaeology at the site can be made:

- The construction of successive phases of buildings on the site would have impacted on archaeological remains. Typically, the earlier the building was constructed, the less impact it would have had on the potential archaeological resource.
- A basement covers the majority of the lot located at 477 Pacific Highway (Lot 100 DP747672; Figure 41). The rear of basement appears to be at the same level as Clarke Lane. The basement fronting Pacific Highway appears to be substantially cut in. It can be assumed that any archaeological resource in this location has been removed.
- Due to a gentle slope to the north, many of the buildings located on the site have been cut into the ground surface. This may have removed areas of archaeological potential.

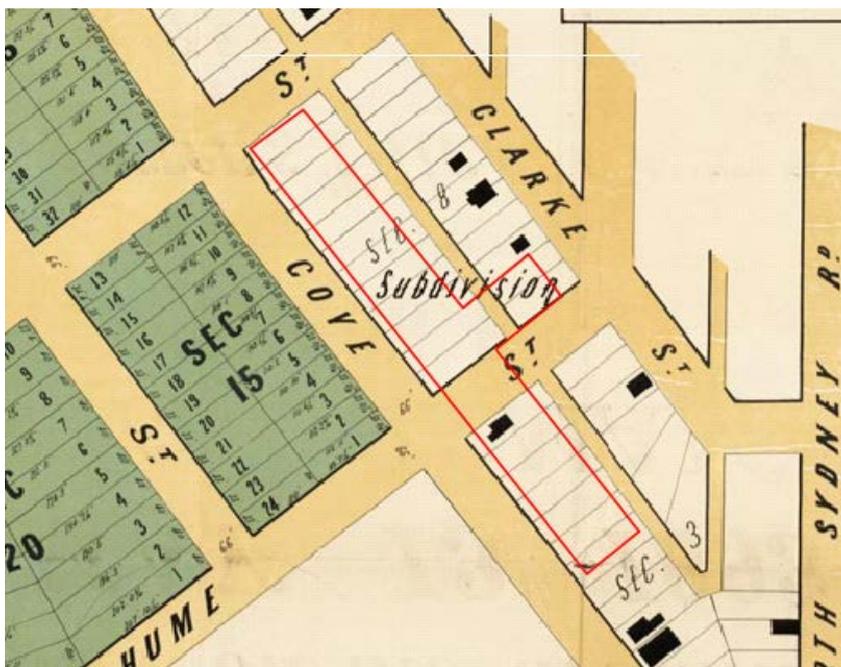
Figure 41: Basement plan of Lot 100 DP747672



6.4.5.3 Discussion of archaeological potential

There are few plans indicating the presence of structures within the study area prior to the late 19th century subdivision of the Berry estate. The earliest structure in the vicinity of the study area can be seen on an 1893 plan of the Berry's Estate subdivision (Figure 42). The study area has the potential to contain an archaeological resource associated with late 19th and early 20th century residential subdivision. Archaeological remains of this type, if found to be substantially intact and containing a substantial artefactual resource, may reach the local significance threshold.

Figure 42: Overlay of the approximate location of the study area on the 1893 plan of the subdivision of the Berry Estate. MAP Folder 126, LFSP 1982. Source. NLA.



6.4.5.4 Preliminary assessment of significance

The following is a preliminary assessment of significance, informed by the NSW Heritage Criteria for *Assessing Significance related to Archaeological Sites and 'Relics'* (2009).

Archaeological research potential (NSW Heritage Criterion E):

- Archaeological remains associated with early residential and agricultural development of the study area may have some research potential dependant on the nature and extent of any remains.

Association with individuals, events, or groups of historical importance (NSW Heritage Criteria A, B & D):

- It is possible that evidence of early residential development of the study area may have associations with former residents and known local historical figures. Specific associations have not been identified at this stage.

Aesthetic or technical significance (NSW Heritage Criterion C):

- It is not possible at this stage to identify whether archaeological remains within the study area have potential to demonstrate aesthetic or technical values.

Ability to demonstrate the past through archaeological remains (NSW Heritage Criterion A, C, F & G):

- There is low to moderate potential, due to low intensity building that has occurred throughout the site, that the study area has the potential to demonstrate the past through archaeological remains.

Overall, the site may contain archaeological remains with potential to reach the local significance threshold.

6.4.5.5 Overview archaeological potential

The study area has low potential to contain a substantial archaeological resource with the potential to reach the local significance threshold.

Table 21: Summary of archaeological potential within study area

Potential archaeological resource	Potential	Significance	Heritage impact assessment
Evidence of early occupation of the study area– for example, evidence of land clearance and cultivation, outbuildings, postholes associated with fencing.	Nil-low	Local	Excavation works within the study area have nil-low potential to impact on archaeological remains.
Mid to late 19th century residential and commercial development	Low-moderate	Local	Excavation works within the study area have low-moderate potential to impact on archaeological remains
20th century residential and commercial development	Moderate	Unlikely to reach the local significance threshold.	Excavation works within the study area have moderate potential to impact on archaeological remains.

6.4.5.6 Archaeological impact assessment

Proposed works within the Crows Nest Station site with the potential to impact on archaeological remains include:

- Excavation during demolition works
- Excavation of open shafts during construction phase
- Foundation/ground slab excavations for establishment of staff amenities, site offices, water treatment plant, wheel washing bays, workshops, dangerous goods and material storage buildings during construction phase
- Cut and cover excavation for station box

Whilst excavation works during the construction phase of the project are likely to be limited to discrete locations, the excavation of the cut-and-cover station would result in the complete removal of archaeological remains within the station box footprint. Therefore, works in this location would have a major impact on the potential archaeological resources.

6.4.6 Overview of constraints

The following table outlines the potential heritage constraints within the study area:

Table 22: Overview of potential heritage constraints for Crows Nest study area.

Heritage item	Potential heritage impacts		
	Direct impact	Archaeological impact	Indirect impact
St Leonards Centre	Potential direct impact: Minor (vibration)	Neutral	Negligible – views and vistas
Higgins Buildings	Neutral	Neutral	Negligible – views and vistas
Potential archaeological resource within the study area	N/A	Major – low to moderate potential for locally significant archaeological remains	N/A

6.5 Victoria Cross Station

Victoria Cross Station is located in the heart of North Sydney central business district with the potential to serve the northern and eastern commercial centres of North Sydney. The station box would be located under Miller Street between Berry Street and McLaren Street. The station entry would be from Miller Street. The location of the station is illustrated on Figure 43 and Figure 44.

Figure 43: Location and indicative layout of Victoria Cross Station.



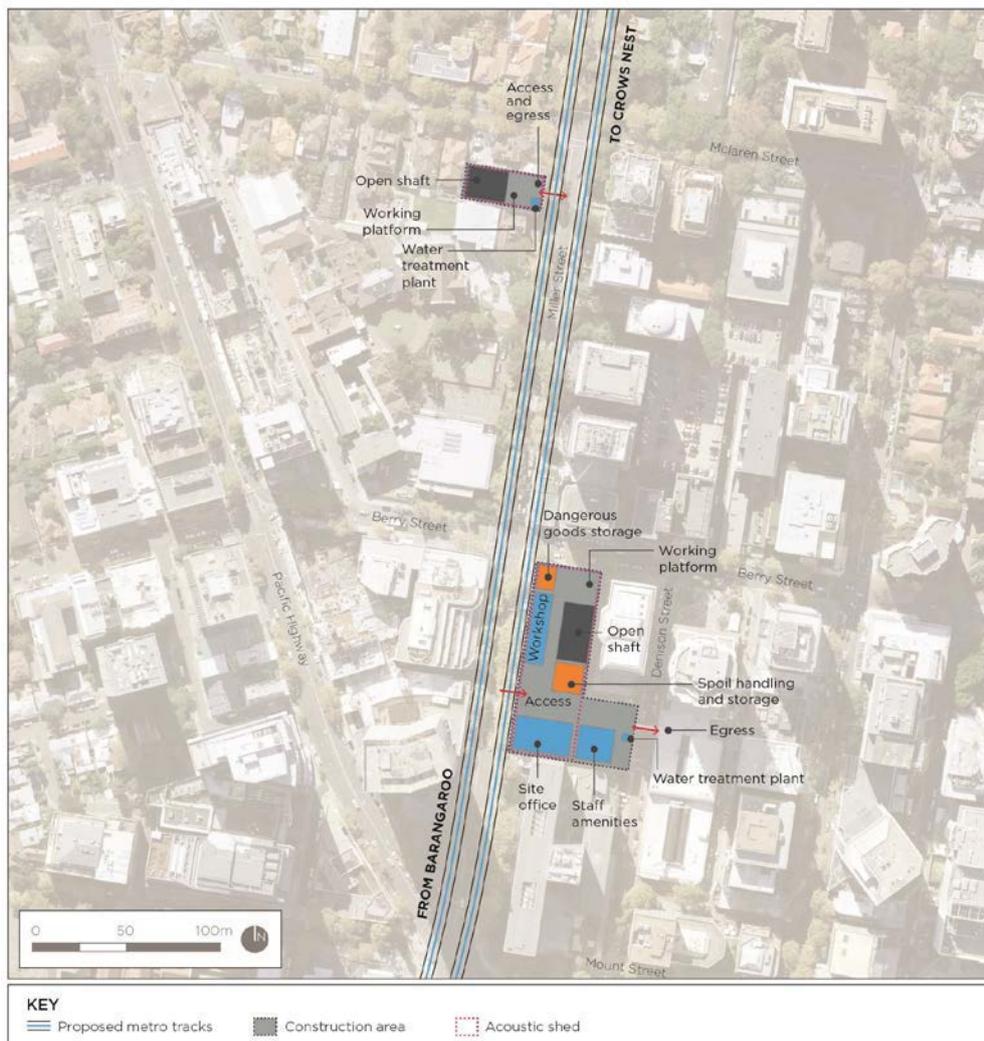
6.5.1 Construction

The proposed arrangements during construction phase at Victoria Cross include the northern and southern building shafts (site areas A & B) that would be serviced from a suspended working platform over the majority of the shaft area.

The proposed sequencing of the excavation works for the northern and southern shafts of Victoria Cross entails the following:

- Demolition of existing buildings to basement
- Working platforms are formed for piling rigs i.e. backfill pits if necessary
- Piling works – perimeter walls and long piles
- Initial excavation site to allow for the construction of the working platform
- Construction of suspended working platform over shafts, with a shaft opening of at least 15.0m x 20.0m for the removal of spoil and machinery access
- Construction of acoustic shed where necessary and site infrastructure i.e. site office, staff amenities, workshop
- Shaft excavation to required depth.

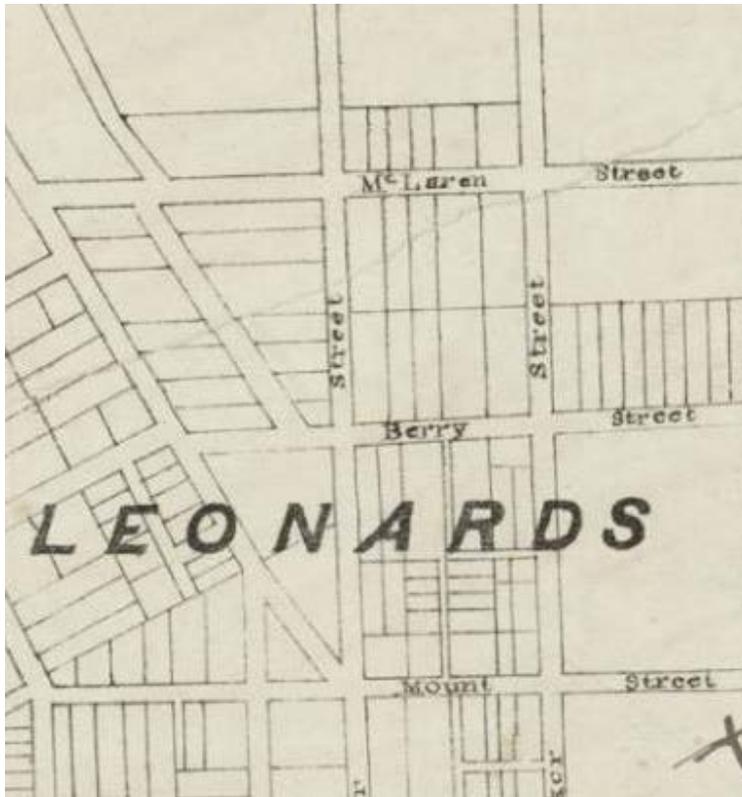
Figure 44: Victoria Cross construction site layout.



6.5.2 History of the study area

The majority of the lower North Shore, and land surrounding the study area, is associated with large land grants given to soldiers, convicts and free settlers in the early 19th century. Milson's Point (to the south east of the study area) was one of the earliest land grants given in the area and consisted of 120 acres given to soldier Robert Ryan in 1800.⁵⁰ Records of the grant indicate that the plot was described as 'lying in situate on the north side of the harbour opposite Sydney Cove. The name of the farm was 'Hunters Hill'.⁵¹ No evidence exists of subdividing or farming taking place on Ryan's land until 1806, when prominent merchant Robert Campbell, at that stage the colony's largest private cattle owner, purchased the grant.⁵² In the same year, this portion of the land was also granted as a permissive occupancy to a free settler, James Milson, after whom Milsons Point is now named. Milson constructed a slab cottage on the grant, that later became known as Milk House.⁵³ The cottage was located near today's Broughton Street. In 1826, Milk House, and the only existing record of his promissory grant, was destroyed by bush fire.⁵⁴ It was after this incident that a dispute arose between Milson and Campbell regarding ownership of the land.

Figure 45. 1858 Map of Sydney and its environs showing location of Berry, Mount, Blue, Walker and Lavender Streets. Drawn by J. Russell. Source. State Library of NSW.



⁵⁰ The Sydney Morning Herald, 'Famous Old Home: Admiralty House', Sydney, 28/1/1950.

⁵¹ The World's News, 'Hunters Hill, Its Wandering Title', 31/12/1927 and Watson, J. J. Hunter's Hill: 1794-1861. In The Sydney Morning Herald, 7/6/1913.

⁵² The Sydney Morning Herald, 'Famous Old Home: Admiralty House', Sydney, 28/1/1950.

⁵³ Thorp, W. 1999. North Sydney Olympic Pool, Milsons Point. Archaeological Assessment for Brian McDonald and Associates, p. 8.

⁵⁴ *ibid*

In early 1828, Government surveyor and explorer Sir Thomas Mitchell visited the property in order to provide a report on the land dispute. In doing so, he identified a suitable site for a Township, a few kilometres north of Milsons Point. Mitchell drew up a plan for the Township, including subdivisions, a reserve and a great road towards the north of the colony and Broken Bay.⁵⁵ In 1836, Mitchell's plan was revised and unreserved land resurveyed. By 1838, a basic design of the Township was produced, including a basic road structure on a traditional 10-chain grid.⁵⁶ The plan had Berry, Mount, Blue and Lavender streets running east-west, and Miller and Walker streets running north-south (Figure 45). Berry and Miller Street constitute portions of the study area. In 1838, the Township of St Leonards, in which the study area is located, was formally gazetted.

6.5.2.1 1838-1930

Once the town was gazetted, 48 half-acre building allotments in three sections were offered for purchase by application. In the 1840s, a few Crown lots were sold, and larger, more substantial sales took place in the north and north east portion of the Township. In the 1850s, the town was sold and divided into 35 additional sections. The study area is located in sections 3 and 7, on the south west edge of St Leonards township (Figure 46). A predicted real estate boom in the 1850s and 60s led to varying allotment sizes within these subdivisions. This allowed for villas and mansions to be built in the area, as well as terraces and cottages. During this time, St Leonards Park (north east of the study area) was also laid out.

Figure 46 Parish of Willoughby 1860-1869 showing St Leonards Town centre. The study area is located in allotment 7. Source. NLA.

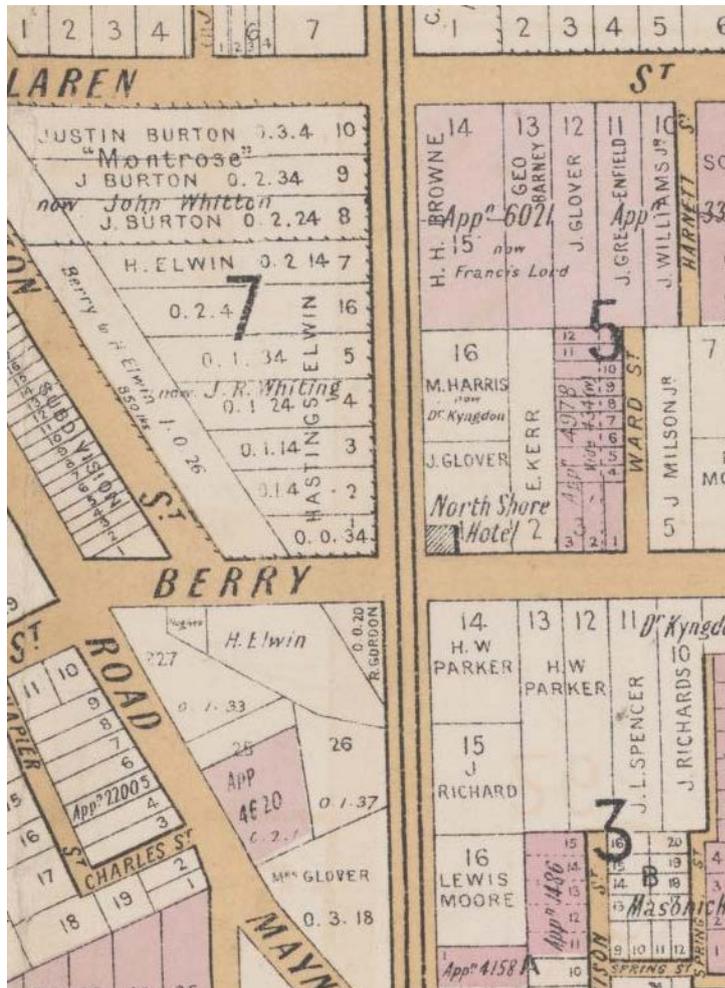


In 1857, a number of businesses had been established along Miller Street, where the study area is today located. These are illustrated in Figure 47 and consisted of a Druggist, Bakery, Grocer, and

⁵⁵ Masson, L. 2010. North Sydney. Dictionary of Sydney. Site accessed on 4/6/2015 at: http://dictionaryofsydney.org/entry/north_sydney

⁵⁶ *ibid*

Figure 48: Higginbotham & Robinson. Map of St. Leonards on the North Shore Parish of Willoughby 1887, showing the “Montrose” property within the northern study area, and land owned by Parker, Richard and Moore in the southern study area. MAP RM 4458. Source. NLA.



6.5.2.2 1930-present

The completion of the Sydney Harbour Bridge and start of the Depression stunted economic and population growth in St Leonards. Land prices dropped and the population remained static. The Sydney Harbour Bridge had dramatically changed the surrounding streetscapes, Lane Cove Road was extended, widened and renamed the Pacific Highway and Junction Street to the south was completely removed.

Redevelopment in the area was primarily associated with Art Deco architecture, although the majority of development was associated with the conversion of large Federation and Victorian houses into boarding houses. Verandahs and balconies were often enclosed to make more room, and earlier servant's quarters and outhouses were modified and turned into flats.⁶¹

The late 1950s and early 1960s saw a dramatic change in St Leonards with low land prices attracting large corporations into the area. During this period, substantial office blocks and towers were constructed in the area, many conglomerating along the Pacific Highway, taking over land on Berry and Miller Street. The boom of the 1960s continued into the 80s and was disastrous in terms of its effect on the historic character of the area. Many of the early low-rise Victorian and Federation buildings that occupied the area were demolished, replaced by buildings such as the Mutual Life and

⁶¹ Masson, L. 2010. North Sydney. Dictionary of Sydney. Site accessed on 4/6/2015 at: http://dictionaryofsydney.org/entry/north_sydney

Citizens Assurance Company, AMP Building and offices occupied by Phillips, NRMA, Ampol and Transfield.⁶²

The local community fought to slow down development through the 1970s and 80s. Today the study area is associated with various office buildings and towers built during the property boom. Development is continuing. The former Post Office/Court House/Police Station complex, built in the 1880s is still extant on the corner of Mount Street and the Pacific Highway.

6.5.3 Heritage listed items

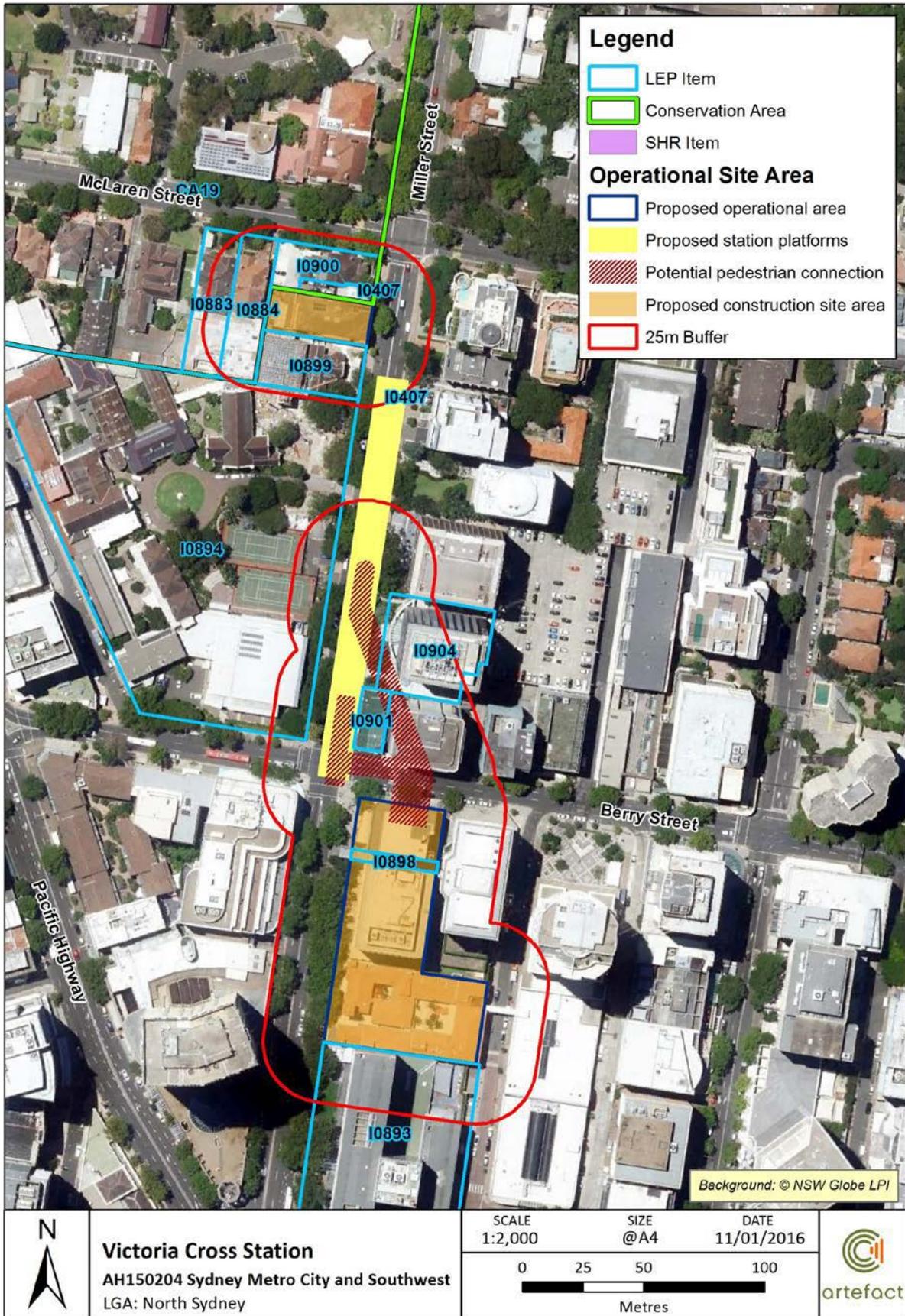
The following table outlines the heritage listed items within the study area which are shown in Figure 49.

Table 23: Overview of heritage items within the Victoria Cross study area

Heritage item	Register listings	Significance	Relationship to the study area
Restaurant	North Sydney LEP 2013 I0900	Local	Adjacent to Victoria Cross northern site, within buffer zone
“Fairhaven”	North Sydney LEP 2013 I0883	Local	Within buffer zone, Victoria Cross northern site
House (31 McLaren Street)	North Sydney LEP 2013 I0884	Local	Adjacent to Victoria Cross northern site, within buffer zone
“O’Regan”	North Sydney LEP 2013 I0889	Local	Adjacent to Victoria Cross northern site, within buffer zone
Monte Sant Angelo Group	North Sydney LEP 2013 I0894-I0897	Local	Partially within buffer zone, Victoria Cross northern site
Shop at 187 Miller Street	North Sydney LEP 2013 I0898	Local	Within Victoria Cross southern site
MLC Building	North Sydney LEP 2013 I0893	Local	Adjacent to Victoria Cross southern site, partially within buffer zone
Rag and Famish Hotel (199 Miller Street)	North Sydney LEP 2013 I0901	Local	Partially within buffer zone, Victoria Cross southern site
Commercial building (201 Miller Street)	North Sydney LEP 2013 I0904	Local	Partially within buffer zone, Victoria Cross southern site
North Sydney bus shelters	North Sydney LEP 2013 I0407	Local	Within Victoria Cross northern site buffer zone
McLaren Street Conservation Area	North Sydney LEP 2013 CA19	Local	Victoria Cross northern site and buffer zone within conservation area

⁶² Ibid.

Figure 49: Heritage items within Victoria Cross Station study area



6.5.4 Detailed heritage impact assessments

Heritage items

Table 24: Restaurant heritage impact assessment

Restaurant ⁶³	
Image	<p>Figure 50: Restaurant at 196 Miller Street. Artefact Heritage 2015.</p> 
Significance	Local
Description	Federation era double storey building in the Federation Queen Anne style. Originally a doctor's residence, the item was named for the former 'Montrose' which was demolished for this subdivision.
Statement of significance	See McLaren Street Group - A fine group of buildings which contains individually interesting examples of Federation architecture which taken together, form an important period streetscape. The group relates well to the St. Thomas Church and Council Chambers and the majority being large houses with mature gardens, forms an important and attractive air of comfort and prosperity close to the encroaching commercial centre. Relic of nineteenth century character of vicinity.
Impact type	Potential direct impact: Vibration
Heritage impact assessment	<p>The heritage item is located adjacent (north of) the Victoria Cross northern side. The northern mechanical and electrical services building would be constructed to the rear of the heritage property. The heritage item is oriented away from the proposed development, and there are no direct view corridors between the heritage item and the services building. The demolition and construction works would therefore have no visual impact on the heritage item.</p> <p>Indirect impact: Neutral</p> <p>Modelling indicates that the closest façade of this item would experience vibration levels above the screening level for cosmetic damage. Shaft excavation and the demolition of the adjoining building may result in minor vibration impacts to the heritage item.</p> <p>Potential direct impact: Minor</p>

⁶³ Description and Statement of significance extracted from State Heritage inventory sheet "Restaurant" last accessed via <http://www.environment.nsw.gov.au/heritageapp/ViewHeritageItemDetails.aspx?ID=2180865> on 22/10/2015.

Table 25: “Fairhaven” heritage impact assessment

“Fairhaven”⁶⁴

Figure 51: “Fairhaven.” Artefact Heritage 2015

Image



Significance	Local
Description	Constructed c1910, the heritage item is a Federation Bungalow, designed in the Federation Queen Anne style.
Statement of significance	See McLaren Street Group - A fine group of buildings which contains individually interesting examples of Federation architecture which taken together, form an important period streetscape. The group relates well to the St. Thomas Church and Council Chambers and the majority being large houses with mature gardens, forms an important and attractive air of comfort and prosperity close to the encroaching commercial centre. Relic of nineteenth century character of vicinity.
Impact type	Potential direct impact: Vibration
Heritage impact assessment	<p>The Victoria Cross northern services and emergency access site would be constructed immediately west of the property. The heritage building is oriented away from the site, and there are no direct view corridors between the heritage item and the northern services and emergency access site. The works would therefore have no visual impact on the heritage item.</p> <p>Indirect impact: Neutral Modelling indicates that the closest façade of this item would experience vibration levels above the screening level for cosmetic damage. Therefore, shaft excavation and demolition immediately adjacent to the heritage item may result in minor vibration impacts to the heritage item.</p> <p>Potential direct impact: Minor</p>

⁶⁴ Description and Statement of significance extracted from State Heritage inventory sheet “Fairhaven” last accessed via <http://www.environment.nsw.gov.au/heritageapp/ViewHeritageItemDetails.aspx?ID=2180863> on 22/10/2015.

Table 26: “O’Regan” heritage impact assessment

“O’Regan”⁶⁵

Figure 52: O’Regan (192 Miller Street). Artefact Heritage 2015.

Image



Significance	Local
Description	<p>The heritage item is a two storey roughcast rendered house with hipped and gabled slate roof on a rusticated ashlar foundation, designed in the Federation Academic Classical style. Segmental arched window with sandstone archivolt, faceted corner bay with hipped faceted roof, parapeted gable end with horizontal moulded bands and circular and rectangular ventilator openings are features.</p> <p>The interior and landscape setting are also of significance.</p>
Statement of significance	<p>See Monte Sant’ Angelo Group - Important regional private school since the 1880s. Contains a significant early mansion as it’s central building. Chapel and Mercy Hall are both fine buildings from the turn of the century. O’Regan House is a complementary building to the rest and respectable in its own right. The group, all in sight of each other, form an impressive precinct.</p> <p>A two-storey dwelling in the Federation Academic Classical style that forms part of the Group of Monte Sant’ Angelo. The building sits in dialogue with the Chapel and Mercy Hall.</p> <p>The interior is also of significance.</p>
Impact type	<p>Indirect impact: Views and vistas Potential direct impact: Vibration</p>
Heritage impact assessment	<p>The Victoria Cross northern services and emergency access site is located adjacent to the northern boundary of the heritage item. The demolition of existing buildings in this location, and construction of the proposed services and emergency access structures, would result in a negligible to minor impact to the setting of the heritage item. The setting of the heritage item is currently compromised by the modern building located within the proposed Victoria Cross northern site. This building does not contribute to the significance of the heritage item.</p> <p>Indirect impact: Minor Modelling indicates that the closest façade of this item would experience vibration levels above the screening level for cosmetic damage. Shaft excavation and demolition immediately adjacent to the heritage item may result in minor vibration impacts to the heritage item.</p> <p>Potential direct impact: Minor</p>

⁶⁵ Description and Statement of significance extracted from State Heritage inventory sheet “O’Regan” last accessed via <http://www.environment.nsw.gov.au/heritageapp/ViewHeritageItemDetails.aspx?ID=2180848> on 22/10/2015.

Table 27: House (31 McLaren Street) heritage impact assessment

House (31 McLaren Street)⁶⁶

Figure 53: House at 31 McLaren Street. Artefact Heritage 2015.

Image



Significance	Local
Description	Two storey Federation house; gabled Marseilles - tiled roof; pebble dash treatment to gables; brown brick tuckpointed construction; timber sash windows with small panes above; shingled verandah treatment - upper portion filled in; modern fence. This building is designed in the Federation Queen Anne style.
Statement of significance	See McLaren Street Group - A fine group of buildings which contains individually interesting examples of Federation architecture which taken together, form an important period streetscape. The group relates well to the St. Thomas Church and Council Chambers and the majority being large houses with mature gardens, forms an important and attractive air of comfort and prosperity close to the encroaching commercial centre. Relic of nineteenth century character of vicinity.
Impact type	Potential direct impact: Vibration
Heritage impact assessment	The Victoria Cross northern services and emergency access site would be constructed immediately west of the property. The heritage building is oriented away from the site, and there are no direct view corridors between the heritage item and the northern services and emergency access site. The works would therefore have no visual impact on the heritage item. Indirect impact: Neutral Modelling indicates that the closest façade of this item would experience vibration levels above the screening level for cosmetic damage. Therefore, shaft excavation and demolition immediately adjacent to the heritage item may result in minor vibration impacts to the heritage item. Potential direct impact: Minor

⁶⁶ Description and Statement of significance extracted from State Heritage inventory sheet "House" last accessed via <http://www.environment.nsw.gov.au/heritageapp/ViewHeritageItemDetails.aspx?ID=2180864> on 22/10/2015.

Table 28: Mont Sant’ Angelo Group heritage impact assessment

Mont Sant’ Angelo Group⁶⁷

Figure 54: Mont Sant’ Angelo Group. Artefact Heritage 2015.

Image



Significance	Local
Description	The school is contained behind a high brick wall along Miller and Berry Streets. Entry through the main gates is to a circular drive with the Chapel, Masalou and the Mercy Hall forming the northern side of the circle and O'Regan set back in the north-west corner. All these buildings are two storeys, with gabled slate roofs and are generally smooth or rough-cast rendered. Linking and ancillary buildings on the north side are generally sympathetic to the main structures. Their interiors and landscape setting are also of significance.
Statement of significance	Important regional private school since the 1880s. Contains a significant early mansion as its central building. Chapel and Mercy Hall are both fine buildings from the turn of the century. O'Regan House is a complementary building to the rest and respectable in its own right. The group, all in sight of each other, form an impressive precinct.
Impact type	Indirect impact: Views and vistas
Heritage impact assessment	The Mont Sant’ Angelo Group is located to the south of the Victoria Cross northern services and emergency access site. There are few direct view corridors between the station site and the significant buildings within the Mont Sant’ Angelo group. Views towards the northern services and emergency access site are currently compromised by a modern building that does not contribute to the setting of the heritage item. Therefore, the demolition of the existing buildings and construction of the proposed station entrances would have a negligible impact to the setting of the heritage item. Indirect impact: Negligible

⁶⁷ Description and Statement of significance extracted from State Heritage inventory sheet “Mont Sant’ Angelo Group” last accessed via <http://www.environment.nsw.gov.au/heritageapp/ViewHeritageItemDetails.aspx?ID=2180844> on 22/10/2015.

Table 29: Shop (187 Miller Street) heritage impact assessment

Shop (187 Miller Street)⁶⁸

Figure 55: Shop at 187 Miller Street. Artefact Heritage 2015.

Image



Significance	Local
Description	Two storey narrow-fronted shop building of rendered brick. Ground floor glass and metal shopfront. Corrugated-iron roofed awning and upper floor has triple semi-circular arched windows, central to facade between pilasters with horizontal course lines. Windows have label mould and facade is parapeted with corbelled cornice and flanking finials in the shape of square urns on circular pedestals. This building is designed in the Victorian Italianate style.
Statement of significance	One of the few remaining Victorian shopfronts on Miller Street and the last in this vicinity. An interesting example of it's type, with attractive detailing. Provides a strong contrast to the surrounding multi-storey commercial buildings. Important reminder of the continuity of retailing over time in this vicinity. The item has been assessed as locally significant under SHR assessment criteria g – representativeness.
Impact type	Direct physical impact: Complete demolition
Heritage impact assessment	As the heritage item would be demolished to facilitate construction of the station building, the work would result in the complete removal of heritage fabric, and would result in de-listing of the heritage item. The item would not retain its heritage significance and would no longer provide a representative example of its type. Direct physical impact: Major – complete demolition

⁶⁸ Description and Statement of significance extracted from State Heritage inventory sheet "Shop" last accessed via <http://www.environment.nsw.gov.au/heritageapp/ViewHeritageItemDetails.aspx?ID=2180834> on 22/10/2015.

Table 30: MLC Building heritage impact assessment

MLC Building⁶⁹

Figure 56: MLC Building. Artefact Heritage 2015.

Image



Significance	Local
Description	A fourteen storey cubiform office block of 450,000 feet of floorspace constructed on a rigid steel frame with hollow steel floors. Curtain walls of glass and anodized aluminium spandrels. Vermiculate plaster fireproofing, stamped metal ceilings. Double glazed using anti-actinic heat resisting glass outer and plate glass inner, ten inches apart. Facing materials include terracotta, marble, granite and mosaic tiles. This building is designed in the Post-War International style.
Statement of significance	The first high rise office block in North Sydney and the largest for a number of years after its construction. Seminal building on subsequent high-rise design in Sydney and utilised construction and structural techniques not previously used in Australia. First use of curtain wall design; first use of modular units in Australia. Major landmark in North Sydney. The interior, exterior and landscape setting are of significance.
Impact type	Indirect impact: Views and vistas Potential direct impact: Vibration
Heritage impact assessment	The Victoria Cross southern site station entrance would be constructed immediately north of this heritage item. The demolition of the existing buildings and construction of the proposed station entrance would result in a minor visual impact to this heritage item. Indirect impact: Minor Although modelling indicates that the closest façade of this item would not experience vibration levels above the screening level for cosmetic damage, demolition of existing adjacent and adjoining structures to the north of this item may result in vibration impacts. Potential direct impact: Minor (demolition of adjacent and adjoining structure potentially resulting in impacts to fabric of heritage item)

⁶⁹ Description and Statement of significance extracted from State Heritage inventory sheet “MLC Building” last accessed via <http://www.environment.nsw.gov.au/heritageapp/ViewHeritageItemDetails.aspx?ID=2180854> on 22/10/2015.

Table 31: Rag and Famish Hotel heritage impact assessment

Rag and Famish Hotel⁷⁰

Figure 57: Rag and Famish Hotel. Artefact Heritage 2015.

Image



Significance	Local
Description	Originally constructed in the 1860's as the 'Sailors Return,' it was acquired in 1866 by Charles Bullivant and renamed the 'Rag and Famish'. The hotel was rebuilt in 1892 as the 'North Shore Hotel'. In 1982 it was restored and renamed the 'Rag and Famish.'
Statement of significance	A very good example of a two storey Hotel in the Federation Free Classical style set on a prominent corner location. Important local hotel with antecedents to the mid-nineteenth century. Associated by tradition with prominent local pioneer and founder of the hotel, Charles Bullivant. Interesting example of its style. The last surviving traditional hotel in the commercial centre. Important and prominent: streetscape item.
Impact type	Indirect impact: Views and vistas
Heritage impact assessment	The station entrance would be constructed to the south of this heritage item on the other side of Berry Road. The demolition of the existing buildings opposite this item and construction of the proposed station entrance would result in a minor visual impact to this heritage item. Indirect impact: Minor The heritage item is located to the north of the station site. The use of roadheaders and rock hammers would be used in the construction of underground adits and pedestrian connections between platforms located directly below the heritage item, would result in vibration levels below the screening level for cosmetic damage. Potential direct impact: Neutral

⁷⁰ Description and Statement of significance extracted from State Heritage inventory sheet "The Rag & Famish Hotel" last accessed via <http://www.environment.nsw.gov.au/heritageapp/ViewHeritageItemDetails.aspx?ID=2180852> on 08/12/2015.

Table 32: Commercial building (201 Miller Street) heritage impact assessment

Commercial Building (201 Miller Street)⁷¹

Figure 58: Commercial building at 201 Miller Street. Artefact Heritage 2015.

Image



Significance	Local
Statement of significance	An example of a highly integrated office tower in the Twentieth Century International style of considerable quality and distinctive detailing, contributing much to the urban streetscape of this high-rise area. It was controversial when first opened for opened for its unusual and prominent colour and finish.
Impact type	No impact
Heritage impact assessment	The heritage item is located to the north of the Victoria Cross southern site. The construction of a pedestrian connection to platform level would also be located beneath this building. The use of roadheaders and rock hammers to be used in the construction of the pedestrian connections directly below the heritage item have been assessed as being below the vibration screening level for cosmetic damage. Potential direct impact: Neutral

⁷¹ Description and Statement of significance extracted from State Heritage inventory sheet “Commercial Building” last accessed via <http://www.environment.nsw.gov.au/heritageapp/ViewHeritageltemDetails.aspx?ID=2181331> on 08/12/2015.

Table 33: North Sydney bus shelters heritage impact assessment

North Sydney bus shelters⁷²

Figure 59: View of the ‘Monte’ heritage bus shelter.

Image



Significance	Local
Description	The bus shelter is listed on the North Sydney LEP, in a group listing for the North Sydney bus shelters. The shelter within the study area is referred to as the Monte shelter, and located on the western side of Miller Street. The installation of the bus shelters was supervised by architect Hugh Slatyer. The construction was undertaken by Stephen Edwards Construction for \$9220 per shelter in 1984.
Statement of significance	This heritage item consists of a series of small and effective functional buildings of handsome design and good workmanship. They are traditional and conservative in form and detail and designed to their varied locations. The structures have historic interest as elements of a particular and controversial attempt at Municipal civic design.
Impact type	Direct physical impact: removal and relocation
Heritage impact assessment	The bus shelter is located immediately east of the Victoria Cross northern site. This bus stop would be removed, stored, and relocated on completion of the project. Direct physical impact: Moderate

⁷² Description and Statement of significance extracted from State Heritage inventory sheet “North Sydney Bus Shelters” last accessed via <http://www.environment.nsw.gov.au/heritageapp/ViewHeritageItemDetails.aspx?ID=2181325> on 22/10/2015.

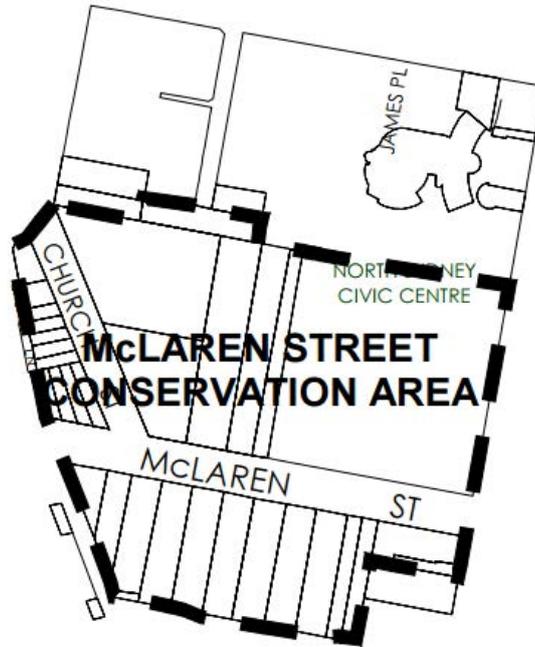
Conservation Areas

Table 34: McLaren Conservation Area heritage impact assessment

McLaren Conservation Area⁷³

Figure 60: McLaren Street Conservation Area. North Sydney Council DCP 2002.

Image



Significance

Local

Description

The McLaren Street Conservation Area straddles two separate estates. The 1890's Water Board plan shows a Victorian subdivision surrounding St Thomas' Church. James Street, no longer visible in the urban fabric, ran north from McLaren Street. There is no evident historic rationale for the northern boundary of the current Conservation Area as the subdivision included the land to the north.

Statement of significance

The statement of significance for the McLaren Street Conservation Area identifies its key significant characteristics as:

- An area close to the centre of North Sydney that retains representative details from its development in the late 19th and early 20th centuries
- The landmark qualities and associations with St Thomas' Church and the Council buildings
- The intact character of the buildings on the southern side of McLaren Street that provide a strong edge to the church and civic precinct.

Impact type

Indirect impact: Views and vistas

Heritage impact assessment

The southern boundary of the McLaren Street Conservation Area is located immediately north of the northern station site. Demolition of existing modern buildings within this site, and the construction of service and emergency egress would have a minor impact on the conservation area, as views and vistas to the south are currently compromised by a modern building that does not contribute to the setting of the heritage item.
Indirect impact: Minor

⁷³ Character statement and Statement of significance extracted from PART B North Sydney Council DCP 2002 Area Character Statements July 2013: 298.

6.5.5 Archaeological assessment

The following archaeological assessment will focus on the proposed locations of the northern and southern station buildings, the construction of which would require the demolition of existing buildings, and construction of new station buildings, incorporating lift shafts and tunnelled access to the proposed platforms.

6.5.5.1 Site inspection results

The Victoria Cross Station site is located across a built environment. The station site is situated across a moderate to gentle slope down to the south. Below ground car park entrances were observed associated with 189 Miller Street and 194 Berry Street.

Discussion and analysis of site inspection results

Below ground car parks at 189 Miller Street and 194 Berry Street indicate removal of natural deposits and consequently archaeological potential at those locations. The heavily built environment and multiple underground services across the remainder of the area indicate the possible removal of archaeological deposits in some locations.

Figure 61: View southeast across Miller Street towards the proposed southern section of Victoria Cross Station



Figure 62: View north across Berry Street towards the Rag and Famish Hotel



Figure 63: View south across Berry Street towards the northwestern corner of the southern section of Victoria Cross Station



Figure 64: View northwest towards the proposed northern section of Victoria Cross Station at 194 Mill Street



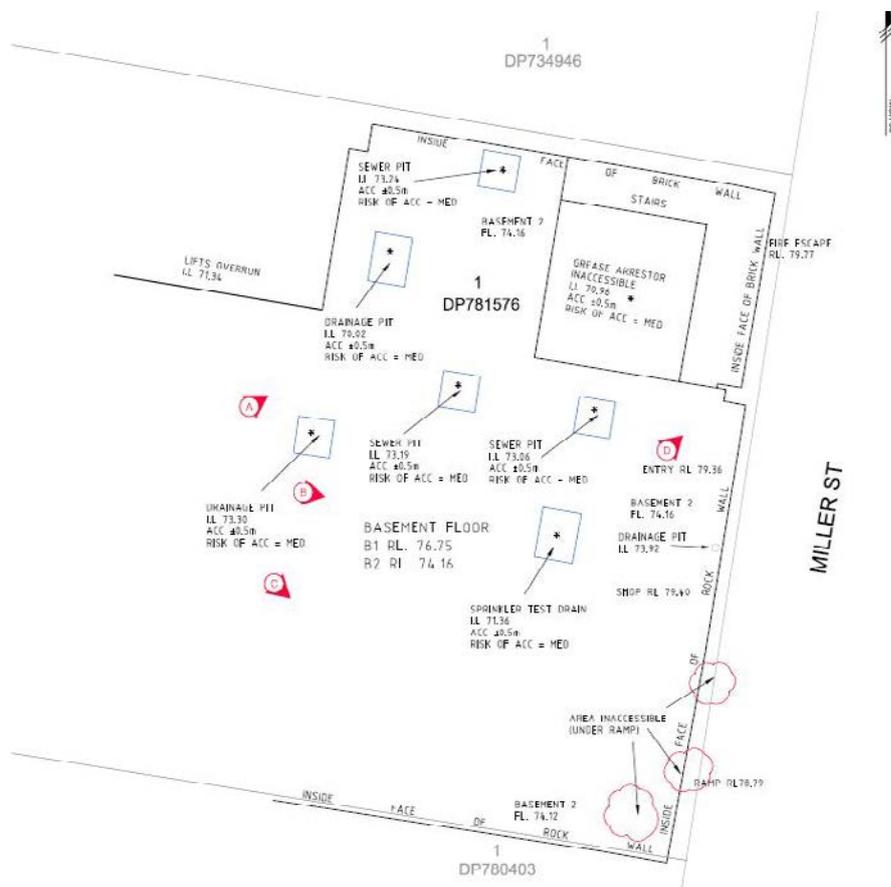
6.5.5.2 Known impacts

Subsurface impacts associated with former or current land uses have the potential to remove or damage potential archaeological remains. Previous impacts within the site need to be further understood and identified before more than a preliminary assessment of archaeological impact can

be made. Based on the initial literature review and site inspection undertaken as part of this assessment, the following preliminary assumptions regarding archaeology at the site can be made:

- The construction of successive phases of buildings on the site would have impacted on archaeological remains. Typically, the earlier the building was constructed, the less impact it would have had on the potential archaeological resource.
- A basement covers the majority of the lot located at 194 Miller Street (Lot 1 DP1183173; Figure 65), in the northernmost study area. The property has two basement levels, with basement 2 (the lowest) ranging between 4.94 metres below ground level fronting Miller Street and 8.94 metres below ground level towards the rear of the property (74.16 metres AHD). It can be assumed that any archaeological resource in this location has been removed.
- During the site inspection an entrance to underground car parking was observed at 189 Miller Street, suggesting excavation has occurred in this location.

Figure 65: Basement plan of Lot 1 DP1183173.



6.5.5.3 Discussion of archaeological potential

The study area was likely unoccupied until the mid-1800s. Although the study area was located within early land grants, it is unlikely that the area was occupied, and it is more likely that the majority of the land in the North Sydney area was utilised for timber felling, grazing of livestock and other agricultural uses.

Following Mitchell's gazetting of the township of St Leonards in the early 19th century, the town developed, and by the mid-19th century the study area may have contained commercial premises, likely associated with residences and gardens.

Overall, dependant on existing impacts, there is some potential that archaeological remains dating from the mid-19th to early 20th century may be located within the study area. Table 35 includes a summary of the archaeological potential of the study area.

6.5.5.4 Preliminary assessment of significance

The following is a preliminary assessment of significance, informed by the NSW Heritage Criteria for *Assessing Significance related to Archaeological Sites and 'Relics'* (2009).

Archaeological research potential (NSW Heritage Criterion E):

- Archaeological remains associated with early residential and agricultural development of the study area may have some research potential dependant on the nature and extent of any remains.

Association with individuals, events, or groups of historical importance (NSW Heritage Criteria A, B & D):

- It is possible that evidence of early residential development of the study area may have associations with former residents and known local historical figures. Specific associations have not been identified at this stage.

Aesthetic or technical significance (NSW Heritage Criterion C):

- It is not possible at this stage to identify whether archaeological remains within the study area have potential to demonstrate aesthetic or technical values.

Ability to demonstrate the past through archaeological remains (NSW Heritage Criterion A, C, F & G):

- There is low to moderate potential, due to low intensity building that has occurred throughout the site, that the study area has the potential to demonstrate the past through archaeological remains.

Overall, the site may contain archaeological remains with potential to reach the local significance threshold.

6.5.5.5 Overview archaeological potential

The study area has low to moderate potential to contain an archaeological resource with the potential to reach the local significance threshold, as summarised in Table 35.

Table 35: Summary of archaeological potential within study area

Potential archaeological resource	Potential	Significance	Heritage impact assessment
Evidence of early occupation of the study area– for example, evidence of land clearance and cultivation, outbuildings, postholes associated with fencing.	Nil-low	Local	Excavation works within the study area have nil-low potential to impact on archaeological remains.
Mid 19th century residential and commercial development	Low-moderate	Local	Excavation works within the study area have low-moderate potential to impact on archaeological remains
Late 19th and early 20th residential and commercial development	Moderate	Intact and substantial artefact bearing deposits, with the ability to answer research questions, may reach the local significance threshold.	Excavation works within the study area have moderate potential to impact on archaeological remains.

6.5.5.6 Archaeological impact assessment

Proposed works within the Victoria Cross Station site with the potential to impact on archaeological remains include:

- Excavation during demolition works
- Excavation of two open shafts during construction
- Foundation/ground slab excavations for establishment of staff amenities, site offices, water treatment plant and dangerous goods storage buildings during construction phase

The extent of excavation within the Victoria Cross Station site varies from discrete areas of minor excavation through to two open shaft excavations. Therefore, works in this location are likely to have a minor to major impact on potential archaeological resources, dependent on the location and extent of excavation.

6.5.6 Overview of constraints

The following table outlines the potential heritage constraints within the study area:

Table 36: Overview of potential heritage constraints for Victoria Cross study area.

Heritage item	Potential heritage impacts		
	Direct impact	Archaeological impact	Indirect impact
Restaurant	Potential direct impact: Minor (vibration)	Neutral	Neutral
“Fairhaven”	Potential direct impact: Minor (vibration)	Neutral	Neutral
House (31 McLaren Street)	Potential direct impact: Minor (vibration)	Neutral	Neutral
“O’Regan”	Potential direct impact: Minor (vibration)	Neutral	Minor – views and vistas
Monte Sant’ Angelo Group	Neutral	Neutral	Negligible – views and vistas
Shop at 187 Miller Street	Direct impact: Major (complete demolition)	N/A	N/A
MLC Building	Potential direct impact: Minor (vibration – demolition of adjacent and adjoining structure)	Neutral	Minor – views and vistas
Rag and Famish Hotel (199 Miller Street)	Potential direct impact: Neutral (vibration)	Neutral	Minor – views and vistas
Commercial building (201 Miller Street)	Potential direct impact: Neutral (vibration)	Neutral	Neutral
McLaren Street Conservation Area	Neutral	Neutral	Minor – views and vistas
Bus stop	Moderate	Neutral	Neutral
Potential archaeological resource within the study area	N/A	Minor to major – low to moderate potential for locally significant archaeological remains	N/A

6.6 Blues Point temporary site

The temporary construction site at Blues Point is proposed for the retrieval of the cutter head and shield of TBMs launched from Chatswood and Barangaroo. The location of the site is illustrated in Figure 66.

6.6.1 Construction

The Blues Point temporary construction site would be about 2,100 square metres and would be located within Blues Point Reserve at the end of Blues Point Road. The site currently contains public open space and a public road.

Construction works at this site would involve the excavation of a shaft to the tunnels below resulting in around 8,000 cubic metres of spoil being removed through the site. The cutter heads and shield of the tunnel boring machines from the northern portal and from Barangaroo would be retrieved through this shaft. During retrieval of the tunnel boring machine components, this site would expand to encompass the current car parking on Blue Point Road adjacent to the reserve and the end of Blues Point Road to gain access to the existing wharf.

Access and egress to and from the site would be left in from Blues Point Road and left out to Henry Lawson Drive.

Figure 66: Blues Point Temporary Tunnel Support Site.



6.6.2 History of the study area

The study area was originally located within land granted to William (Billy) Blue in 1817. Blue was appointed ferryman to the North Shore and began a rowing boat service between Dawes Point in the Rocks and Blues Point, as the site of his northern ferry terminus became known. In 1823 Edward Wollstonecraft and William Gore, both landholders on the north shore with vested interests in harbour trade, attempted to oust Blue from his land and ferrying service, alleging that he was a law-breaker who regularly smuggled goods and harboured escaped prisoners. In response Blue petitioned Sir Thomas Brisbane that, in view of his long and trusted service for the government, he should be granted 'in his old age the peaceable enjoyment of his premises and ferry'. The governor found in his favour, authorizing him to 'have the Use and Occupation of his ferry, which he formerly occupied between his farm in Northampton and Sydney'.⁷⁴On Blue's death in 1834 the estate was divided amongst his children, and stayed in his family until the mid-nineteenth century.

From the 1850s Blue's estate was subdivided, with the earliest developments occurring around its northern end. Blues Point Road was gazetted from 1839 as a thoroughfare from the ferry wharf to the St Leonards township (today known as North Sydney).

By the 1870s, most of the middle and southern portions of the peninsula had been subdivided. The foreshore was known for its boatbuilding and repair industry from the late 1800s, and a vehicular ferry was established in 1900. A tramway was extended to McMahons Point in 1909, stimulating further development and growth of the area. By the early twentieth century ferry wharves ringed the peninsula, with many berths used by the Sydney Ferry Company Limited (Figure 67)

The tram and ferry service was replaced with a bus service following the opening of the Sydney Harbour Bridge in 1932.

Some of the original housing in the vicinity was demolished in the 1950s, and replaced by Blues Point Tower in 1962.

Figure 67: The vehicular ferry P.S. "Warrane" at Blues Point, undated. MLNSW Government Printing Office 1 – 19851.



⁷⁴ Park, M. 'William (Billy) Blue' in *Australian Dictionary of Biography*.

6.6.3 Heritage listed items

The following table outlines the heritage listed items within the study area which are shown in Figure 68).

Table 37: Overview of heritage items within the Blues Point temporary tunnel support site.

Heritage item	Register listings	Significance	Relationship to the study area
Sydney Opera House Buffer Zone	World Heritage List	Outstanding universal value	Construction area within heritage item
Blues Point Waterfront Group	North Sydney LEP 2013 I0423 Includes the following individually listed items <ul style="list-style-type: none"> Blues Point vehicular ferry dock (I0451) World War II Observation Post and stone stairs (I0424) Blues Point Foreshore Shelf (I0425) Stone retaining wall (I0426) Bollard (I0427) Bollard with chain (I0428) Excavation (archaeological site) (I0429) Steps with bollards (I0450) 	Local	Construction area within Blues Point Waterfront Group (not all individually listed items within study area)
Blues Point Tower	North Sydney LEP 2013 I0408	Local	Partially within buffer zone
North Sydney bus shelters	North Sydney LEP 2013 I0407	Local	Partially within study area
House (3 Warung Street)	North Sydney LEP 2013 I0515	Local	Partially within buffer zone
House (5 Warung Street)	North Sydney LEP 2013 I0516	Local	Partially within buffer zone
McMahons Point South heritage conservation area	North Sydney LEP 2013 CA14	Local	Construction area within heritage item

Figure 68: Heritage items within the Blue Point temporary tunnel support site.



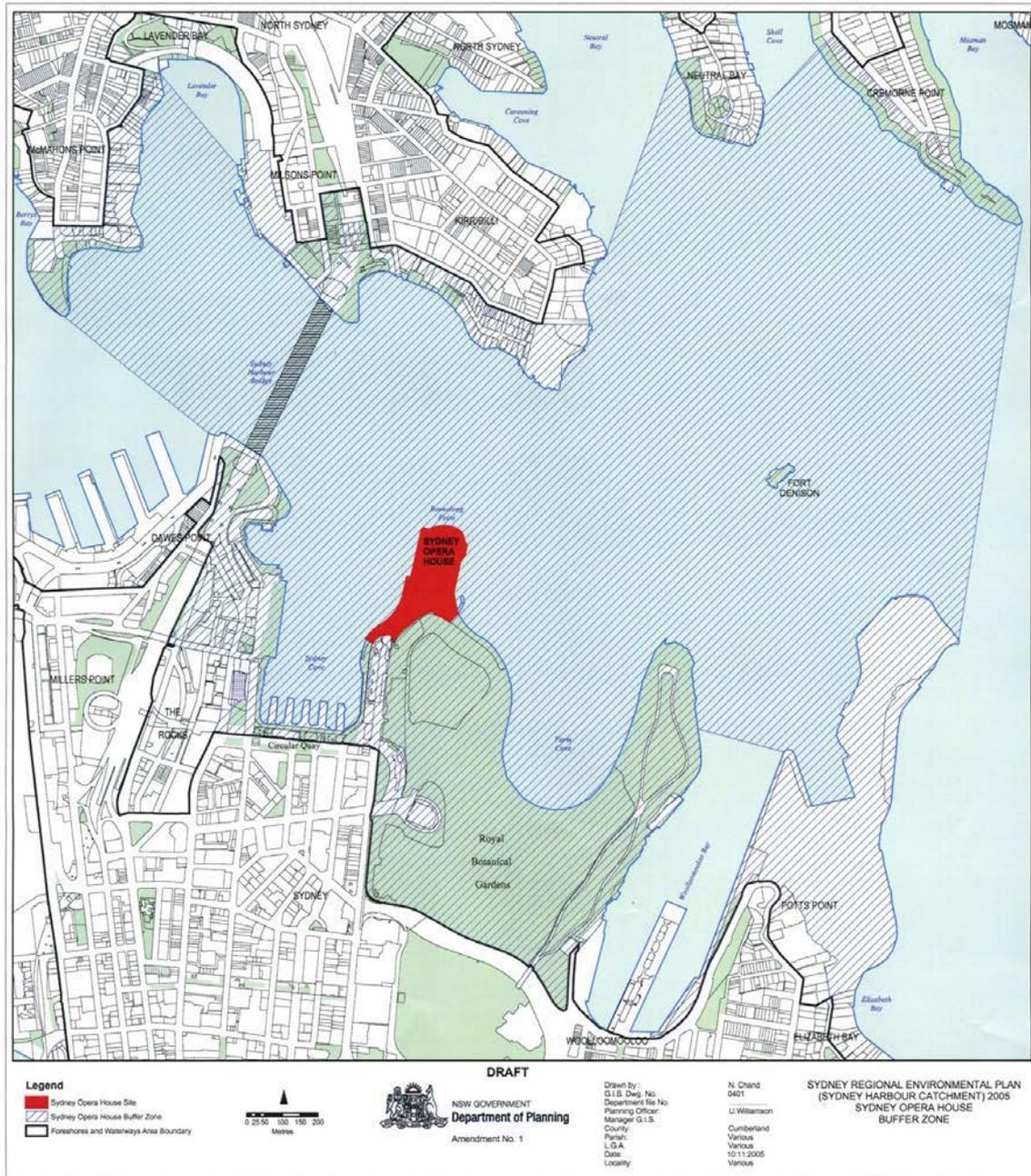
6.6.4 Detailed heritage impact assessments

Heritage items

Table 38: Sydney Opera House Buffer zone heritage impact assessment

Sydney Opera House Buffer zone heritage impact assessment⁷⁵

Figure 69: Sydney Harbour Bridge buffer zone heritage impact assessment



⁷⁵ Description and Statement of significance extracted from State Heritage inventory sheet “Blues Point Waterfront Group” last accessed via <http://www.environment.nsw.gov.au/heritageapp/ViewHeritageItemDetails.aspx?ID=2180677> on 22/10/2015.

Sydney Opera House Buffer zone heritage impact assessment⁷⁵

Figure 70: Views from Blues Point towards the Sydney Opera House. Artefact Heritage 2015.

Image



Value

Outstanding universal value

Description

The Sydney Opera House is a building recognised worldwide as an iconic landmark overlooking the waters of Sydney Harbour. In acknowledgement of its cultural significance, the *Sydney Regional Environmental Plan (Sydney Harbour Catchment) 2005* has inserted buffer zone controls for the Sydney Opera House. The buffer is intended to give additional protection to the world heritage values of the Sydney Opera House. The buffer intends to protect views of the site from public places on the foreshores that contribute to its world heritage significance balanced against the need for orderly and economic development of the land.

Statement of significance

The Sydney Opera House constitutes a masterpiece of 20th century architecture. Its significance is based on its unparalleled design and construction; its exceptional engineering achievements and technological innovation and its position as a world-famous icon of architecture. It is a daring and visionary experiment that has had an enduring influence on the emergent architecture of the late 20th century. Utzon's original design concept and his unique approach to building gave impetus to a collective creativity of architects, engineers and builders. Ove Arup's engineering achievements helped make Utzon's vision a reality. The design represents an extraordinary interpretation and response to the setting in Sydney Harbour. The Sydney Opera House is also of outstanding universal value for its achievements in structural engineering and building technology. The building is a great artistic monument and an icon, accessible to society at large.

Criterion (i): The Sydney Opera House is a great architectural work of the 20th century. It represents multiple strands of creativity, both in architectural form and structural design, a great urban sculpture carefully set in a remarkable waterscape and a world famous iconic building.

All elements necessary to express the values of the Sydney Opera House are included within the boundaries of the nominated area and buffer zone. This ensures the complete representation of its significance as an architectural object of great beauty in its waterscape setting. The Sydney Opera House continues to perform its function as a world-class performing arts centre. The Conservation Plan specifies the need to balance the roles of the building as an architectural monument and as a state of the art

Sydney Opera House Buffer zone heritage impact assessment⁷⁵

performing centre, thus retaining its authenticity of use and function. Attention given to retaining the building's authenticity culminated with the Conservation Plan and the Utzon Design Principles.

The Sydney Opera House was included in the National Heritage List in 2005 under the *Environment Protection and Biodiversity Conservation Act 1999* and on the State Heritage Register of New South Wales in 2003 under the Heritage Act 1977. Listing in the National Heritage List implies that any proposed action to be taken inside or outside the boundaries of a National Heritage place or a World Heritage property that may have a significant impact on the heritage values is prohibited without the approval of the Minister for the Environment and Heritage. A buffer zone has been established. The present state of conservation is very good. The property is maintained and preserved through regular and rigorous repair and conservation programmes. The management system of the Sydney Opera House takes into account a wide range of measures provided under planning and heritage legislation and policies of both the Australian Government and the New South Wales Government. The Management Plan for the Sydney Opera House, the Conservation Plan and the Utzon Design Principles together provide the policy framework for the conservation and management of the Sydney Opera House.

Impact type	Indirect impact: Views and vistas
Heritage impact assessment	<p>The temporary construction site at Blues Point is located within the north-western portion of the Sydney Opera House buffer zone, and within direct visual catchment of the Sydney Opera House. The construction site may be temporarily visible from the Sydney Opera House. On finalisation of the works, the area would be reinstated to its pre-construction condition. There would be no permanent project infrastructure located at this site.</p> <p>Indirect impact: Temporary (negligible)</p>

Table 39: Blues Point Waterfront Group heritage impact assessment

Blues Point Waterfront Group⁷⁶

Figure 71: Blues Point Waterfront Group. Artefact Heritage 2015.

Image



Significance Local

Description	<p>Originally land granted to William Blue in 1817, the area encompassed in this listing covers all lands south of the cliff face that form the northern boundary of Henry Lawson Drive, from the McMahons Point Ferry Wharf to the northernmost end of the public reserve on the western side of Blues Point, but additionally includes the public steps from the corner of East Crescent Street and Warung Street down to the McMahons Point Ferry Wharf. This area is largely a flat shelf retained by seawalls around the foreshore, with a ridge along Blues Point on which sits the Blues Point Tower. Most of the land, excepting the Blues Point Tower, is publicly owned. Numerous features, plus the landform itself, are evidence of the progressive usage of the area from the early nineteenth century.</p> <p>The Blues Point Waterfront Group incorporates a number of elements that are also listed individually on the North Sydney LEP, including the following:</p> <ul style="list-style-type: none"> • Blues Point vehicular ferry dock (I0451) • World War II Observation Post and stone stairs (I0424) • Blues Point Foreshore Shelf (I0425) • Stone retaining wall (I0426) • Bollard (I0427) • Bollard with chain (I0428) • Excavation (archaeological site) (I0429) • Steps with bollards (I0450) <p>The majority of these elements are located outside the study area.</p>
Statement of significance	<p>One of the earliest areas of settlement on the North Shore and with Milson's Point, the major gateway from the city to the North Shore until the opening of the Bridge. Important relics of transportation by ferry and tram, plus associated modified landforms, all now contained in a Public Reserve. Highly regarded public reserve with important views to and from the harbour, made colourful and interesting by relics of its development.</p>
Impact type	<p>Direct impact: Physical Indirect impact: Views and vistas</p>
Heritage impact assessment	<p>The excavation of the shaft would result in minor to moderate temporary physical and visual impacts to the heritage item through the excavation of existing public park, removal of spoil and establishment of the compound and worksite.</p> <p>Direct impact: Minor to moderate</p> <p>The temporary use of the site would result in minor to moderate temporary visual impacts.</p> <p>Temporary indirect impact: Minor to moderate</p>

⁷⁶ Description and Statement of significance extracted from State Heritage inventory sheet "Blues Point Waterfront Group" last accessed via <http://www.environment.nsw.gov.au/heritageapp/ViewHeritageItemDetails.aspx?ID=2180677> on 22/10/2015.

Table 40: Blues Point Tower heritage impact assessment

Blues Point Tower⁷⁷

Figure 72: Blues Point Tower. Artefact Heritage 2015.

Image



Significance Local

Description

Built between 1958-1962 to the design of Harry Siedler, the structure consists of a twenty-five storey apartment building, square in plan, constructed of steel and reinforced concrete. The design was initially part of a larger concept plan for high-rise residential development for McMahon's Point, but by the time it was completed was falling in popular acceptance, as was the general perception of high-rise, high-density residential development. In recent years, whilst generally respected, it is often cited as an example of a structure inappropriate to its context.

Statement of significance

Conspicuous, though unpopular, example of Internationalist style. This landmark building was innovative in its day and intended as a forerunner of a whole movement in architecture and high-density housing. The tower in its landscaped setting is illustrative of the modernist architectural philosophies propounded by Le Corbusier and others. Its construction was a factor in a popular revolt against such types of development, particularly in this area. It was voted, in a popular poll, the building most Sydneysiders would like to see removed. Interior Ground Level foyer of significance including its relationship with the exterior landscape.

Impact type

Indirect impact: Views and vistas

Heritage impact assessment

The use of the site would result in minor to moderate temporary visual impacts to this heritage item.

Temporary indirect impact: Minor to moderate

⁷⁷ Description and Statement of significance extracted from State Heritage inventory sheet "Blues Point Waterfront Group" last accessed via <http://www.environment.nsw.gov.au/heritageapp/ViewHeritageItemDetails.aspx?ID=2180677> on 22/10/2015.

Table 41: North Sydney bus shelters heritage impact assessment

North Sydney bus shelters⁷⁸

Figure 73: View to the north, towards North Sydney bus shelters. Artefact Heritage 2015.

Image



Significance	Local
Description	The bus shelter is listed on the North Sydney LEP, in a group listing for the North Sydney bus shelters. The shelter within the study area is referred to as the Henry Lawson shelter, and located on Henry Lawson Avenue. The installation of the bus shelters was supervised by architect Hugh Slatyer. The construction was undertaken by Stephen Edwards Construction for \$9220 per shelter in 1984.
Statement of significance	This heritage item consists of a series of small and effective functional buildings of handsome design and good workmanship. They are traditional and conservative in form and detail and designed to their varied locations. The structures have historic interest as elements of a particular and controversial attempt at Municipal civic design.
Impact type	Direct physical impact: removal and relocation
Heritage impact assessment	The establishment of the temporary site would require the removal, storage and relocation of the bus shelter on finalisation of the works. Direct physical impact: Moderate

⁷⁸ Description and Statement of significance extracted from State Heritage inventory sheet “North Sydney Bus Shelters” last accessed via <http://www.environment.nsw.gov.au/heritageapp/ViewHeritageItemDetails.aspx?ID=2181325> on 22/10/2015.

Table 42: House (3 Warung Street) heritage impact assessment

House (3 Warung Street)⁷⁹

Figure 74: House at 3 Warung Street. Artefact Heritage 2015.

Image



Significance	Local
Description	The heritage item consists of a single storey rendered brick house with basement storey towards the waterfront. Hipped gable roof is clad in slate and a three-facet projecting bay to the waterfront has a faceted hipped roof. Verandah bay is modified by projecting balcony over lower storey with cast-iron lace balustrade. This building is designed in the Victorian Italianate style.
Statement of significance	See under Warung Street Group NSHS0673. A group of fine quality late nineteenth century waterfront villas prominently sited and with important views across the Harbour. Each house is a good example of its type, the three being stylistically similar, and as a group would be exceptional on any site. Their survival here is remarkable and is a tribute to their standard.
Impact type	Indirect impact: Views and vistas
Heritage impact assessment	The establishment of the Blues Point temporary site may have a minor visual impact on the heritage item that is elevated to the north of the study area. On finalisation of the works, the project would not impact on the heritage item. Temporary indirect impact: Minor

⁷⁹ Description and Statement of significance extracted from State Heritage inventory sheet “House” last accessed via <http://www.environment.nsw.gov.au/heritageapp/ViewHeritageItemDetails.aspx?ID=2180674> on 22/10/2015.

Table 43: House (5 Warung Street) heritage impact assessment

House (5 Warung Street)⁸⁰

Figure 75: House at 5 Warung Street. Artefact Heritage 2015.

Image



Significance	Local
Description	The heritage item consists of a single storey rendered brick house with hipped gable roof of slate and a verandah returning on two sides towards the waterfront, which has a corrugated-iron skillion roof. There are two three-faceted projecting bays, each with faceted hipped roof, one central to the western facade, the other forming the south-east corner. This building is designed in the Victorian Italianate style.
Statement of significance	See under Warung Street Group NSHS0673. A group of fine quality late nineteenth century waterfront villas prominently sited and with important views across the Harbour. Each house is a good example of its type, the three being stylistically similar, and as a group would be exceptional on any site. Their survival here is remarkable and is a tribute to their standard.
Impact type	Indirect impact: Views and vistas
Heritage impact assessment	The establishment of the temporary tunnel support site may have a minor visual impact on the heritage item that is elevated to the north of the study area. On finalisation of the works, the project would not impact on the heritage item. Temporary indirect impact: Minor

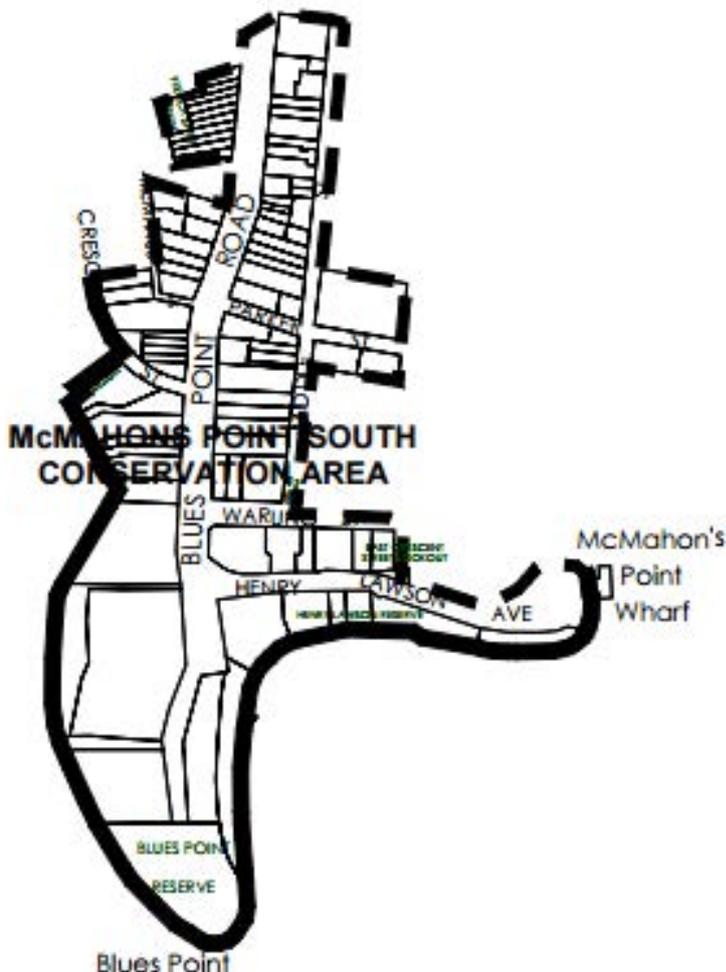
⁸⁰ Description and Statement of significance extracted from State Heritage inventory sheet “House” last accessed via <http://www.environment.nsw.gov.au/heritageapp/ViewHeritageItemDetails.aspx?ID=2180675> on 22/10/2015.

Heritage conservation area

Table 44: McMahons Point South conservation area heritage impact assessment

McMahons Point South conservation area⁸¹

Image



Significance	Local
Character statement	<p>Blues Point Road runs along the ridge line to the waterfront where there are expansive views to the harbour, Sydney City and Berry's Bay. Lot sizes within the area are large. Buildings are mainly residential ranging from 1840s stone cottages through to Interwar buildings. The majority of the buildings are small to modest dwellings, with much group development (eg terraces) and most have rear access. The architectural periods and styles of buildings are quite mixed.</p> <p>Street trees (Jacarandas, mixed Australian species and occasionally palms) are mature and substantial on the major streets with front garden plantings that help supplement street plantings and give a reasonable sense of continuity with Blues Point Road. Other urban elements such as stone retaining walls, rocky outcrops and a maturing avenue of jacaranda trees also help to create a sense of place. Public open space is provided at the water's edge in Public Reserves (Blues Point Reserve and a small pocket park at Warung Street) that provide outstanding views of Sydney Harbour.</p>

⁸¹ Character statement and Statement of significance extracted from PART B North Sydney Council DCP 2002 Area Character Statements July 2013: 370.

McMahons Point South conservation area⁸¹

Statement of significance	<p>McMahons Point South Conservation Area is of significance:</p> <ol style="list-style-type: none"> 1. as a mid 19th century to mid 20th century residential area with a mix of Victorian, Federation and 1920s and 30s housing mixed with a small amount of Interwar residential flat buildings. 2. for the extensive and important open space precinct around the foreshore of Blues Point which is a major civic facility with extensive views of the Harbour Bridge, North Sydney, Milsons Point and the city. It also marks an early crossing point of the harbour with its remaining ferry access point and remnants of waterfront industry.
Impact type	<p>Direct impact: Physical Temporary indirect impact: Views and vistas</p>
Heritage impact assessment	<p>The project would result in minor to moderate temporary physical and visual impacts arising from the establishment of the Blues Point support site and the temporary removal of previously open land from public use. Minor works to facilitate the movement of trucks up Blues Point Road may be required. These works are likely to result in minor physical impacts. On finalisation of the works, the project would not impact on the heritage item.</p> <p>Temporary indirect impact: Minor to moderate Direct impact: Minor to moderate</p>

6.6.5 Archaeological assessment

6.6.5.1 Site inspection results

The proposed site consists of a gently sloping grassed land bordering the northern foreshore of Sydney Harbour. The foreshore is delineated by a sandstone block retaining wall. A sandstone retaining wall demarcates Warung Street.

Figure 76: View of sandstone retaining wall.



Figure 77: View to the west.



6.6.5.2 Overview of previous structures

The configuration of the study area in the early 19th century is unknown, although it can be assumed that it may have contained simple wharfage associated with Billy Blue's ferry service. Small structures may also be associated with this phase of development.

Following subdivision of the estate the valuable foreshore areas of Blues Point became popular with shipbuilders and ferry wharfage. It is possible that reclamation or quarrying also occurred at this time, in order to make the rocky and steep Blue's Point foreshore more conducive to industry. In the late 1850s a substantial network of stone sea walls and a series of small timber wharves were located to the south of the study area (Figure 78). A c.1864 plan partially incorporating the study area also indicates that a number of structures were located in the west of the study area at this time (Figure 79). The plan also illustrates the location of the original rocky shoreline, with sketches indicating the possible location of earlier wharfage, potentially associated with the Blue Estate. These are to the south of the study area

An undated subdivision plan of Blue's Point illustrated a line of reclaimed land on the eastern side of the peninsula (in the vicinity of the earlier stone sea walls; Figure 78).

Historical evidence shows that a structure, probably a dwelling was located within the study area, at the location of the proposed shaft from around 1870. Additions to the structure can be seen in historical photographs up until the 1940s, when it is presumed it was demolished (Figure 80, Figure 81 and Figure 82). There is no clear evidence that further ground disturbance at this location occurred and it is possible that remains of the structure may be present beneath the fill and turf.

By the early 20th century the vehicular ferry had been established, presumably in conjunction with wharfage and possible shelters.

Figure 78: Photograph of Blues Point taken by Robert Hunt c.1858. MLNSW SPF/799



Figure 79: Detail from plan of the Blues Point Estate, Parish of Willoughby c.1864. MLNSW Z/M3 811.1411/1864/1. Study area shown in red.



Figure 80: View southwest across Blues Point showing small dwelling in the study area. Date of image ca. early 1870s (State Library of NSW SPF 933)

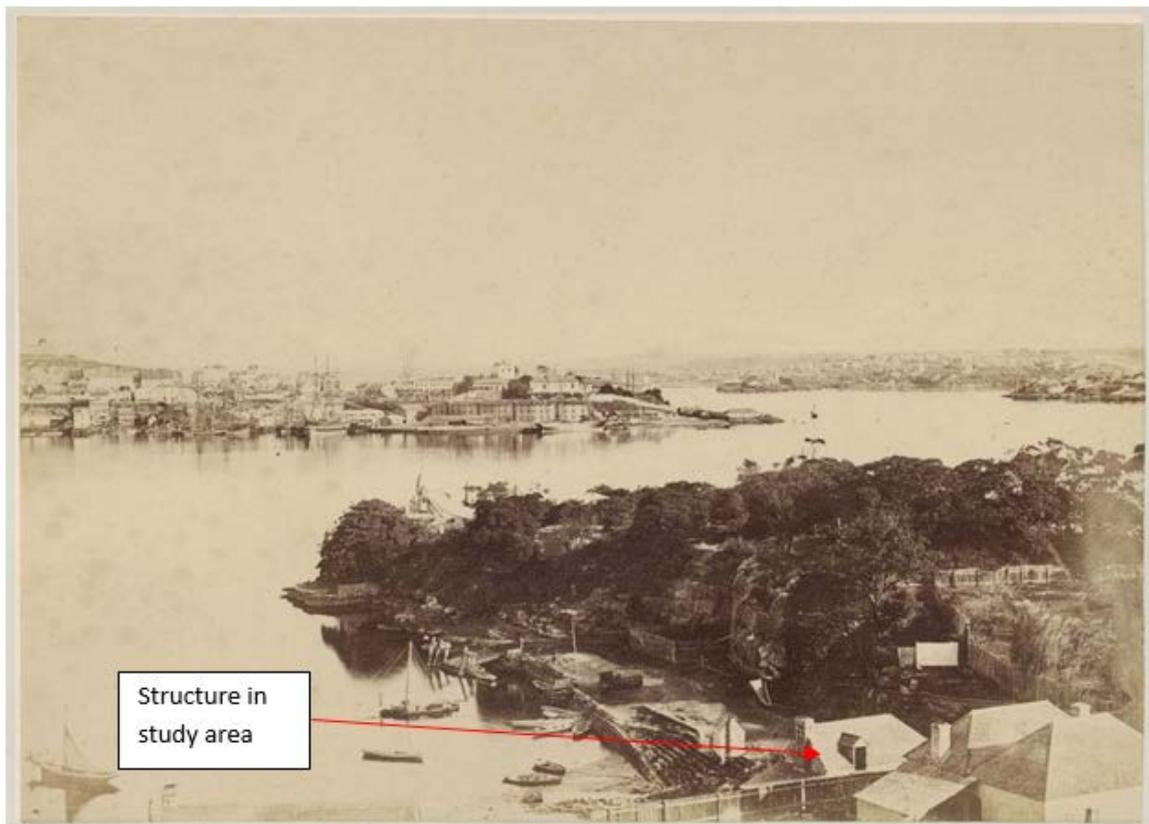


Figure 81: View of Blues Point c.1910. MLNSW PXE 711/59



Figure 82: Image assumed to have been taken early Second World War of the SS Stratheden passing Blues Point. Structures within the Blues Point Temporary site visible in the background (Australian War Memorial ID P00172.001)

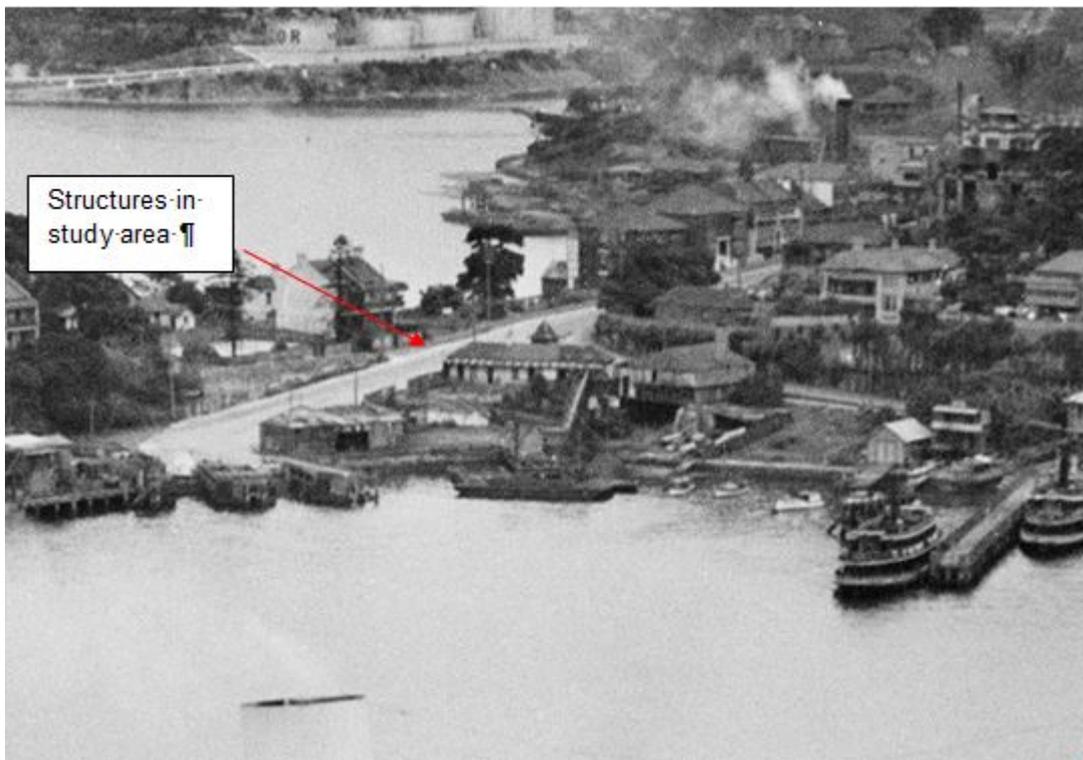
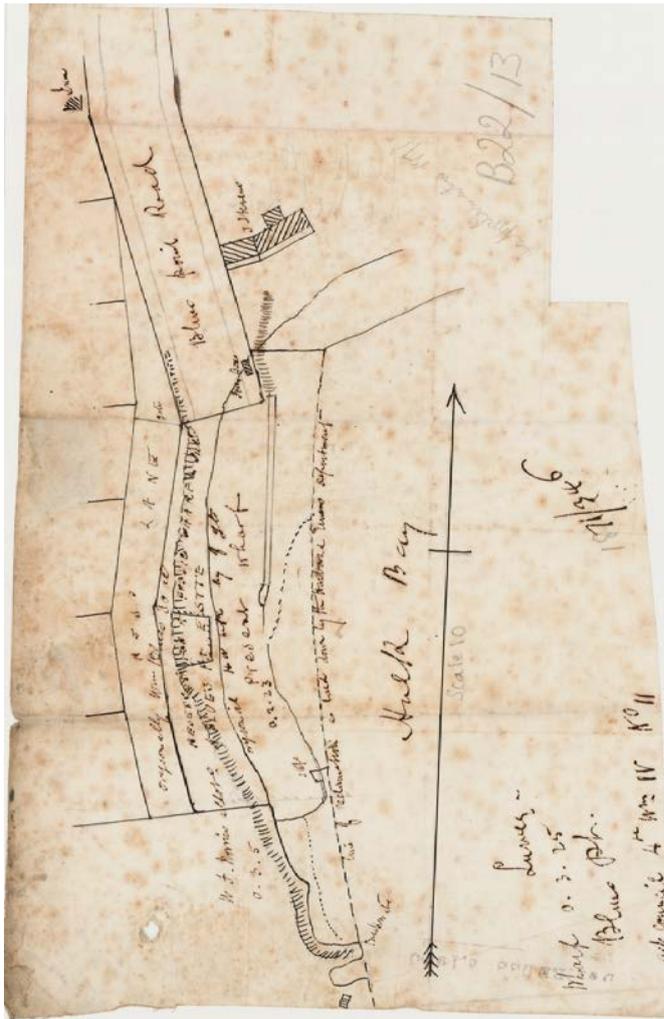


Figure 83: Detail from an undated Blue's Point subdivision plan. MLNSW Z/SP/B22.



6.6.5.3 Known impacts

Subsurface impacts associated with former or current land uses have the potential to remove or damage potential archaeological remains. Previous impacts within the site need to be further understood and identified before more than a preliminary assessment of archaeological impact can be made. Based on the initial literature review and site inspection undertaken as part of this assessment, the following preliminary assumptions regarding archaeology at the site can be made:

- Foreshore environments such as the landscape within the study area, and particularly those utilised for shipbuilding works, tend to be heavily modified. In some locations this modification can protect earlier archaeological remains, for example, within reclamation fills.
- Examination of mid twentieth century aerial photography indicates that the study area may have been subject to in-cutting in a number of locations. It is possible that this has partially removed areas of archaeological potential.
- Reclamation of shallow foreshores area, and successive periods of expansion, rebuilding and subdivision throughout the early to mid 1800s may have buried or removed earlier evidence within the study area, and obscured the original shore line.

- Industrial activity throughout the late 1800s, and into the 20th century, included the demolition of earlier wharves and jetties, reclamation and reconstruction of wharves to better accommodate larger ships and new technologies. This may have disturbed or removed evidence of earlier activities. It is likely, however, that in most instances, structures were demolished to ground level before being backfilled, as was the common practise in 19th century demolition.
- It is likely that some quarrying occurred to the north of the study area, potentially in the mid to late nineteenth century, and currently represented by the sandstone retaining wall on the northern side of Henry Lawson Avenue. This may have impacted on archaeological remains in the north of the study area.

6.6.5.4 Preliminary assessment of significance

The following is a preliminary assessment of significance, informed by the NSW Heritage Criteria for *Assessing Significance related to Archaeological Sites and 'Relics'* (2009).

Archaeological research potential (NSW Heritage Criterion E):

- Archaeological remains associated with early and late nineteenth century foreshore development, wharfage and sea walls (if associated with an intact archaeological site), would have significant research potential, dependant on the nature and extent of any remains.

Association with individuals, events, or groups of historical importance (NSW Heritage Criteria A, B & D):

- Archaeological remains associated with Billy Blue may have significance at a State level.
- It is possible that evidence of early residential development of the study area may have associations with former residents and known local historical figures. Specific associations have not been identified at this stage.

Aesthetic or technical significance (NSW Heritage Criterion C):

- If intact remains associated with early foreshore development, such as wharfage and seawalls, were identified within the study area, they would have technical significance.

Ability to demonstrate the past through archaeological remains (NSW Heritage Criterion A, C, F & G):

- The study area has low to moderate potential to demonstrate the past through archaeological remains.

Overall, the site may contain archaeological remains with potential to reach the local and State significance threshold.

- Archaeological remains associated with Billy Blue's ferry service or the pre-1850 Blue Estate, if found to be substantially intact and legible, may have significance at a State level.
- Evidence associated with mid and later nineteenth century reclamation and associated infrastructure, wharfage and warehousing, on the eastern side of Blues Point may have significance at a local level.
- Evidence of former late 19th century structure identified in the location of the proposed shaft excavation is likely to have significance at a local level.
- Early and later 20th century reclamation and wharfage is unlikely to meet the local significance threshold.

6.6.5.5 Overview archaeological potential

An overview of the archaeological potential within the study area has been included in Table 45.

Table 45: Summary of archaeological potential within study area

Potential archaeological resource	Potential	Significance	Heritage impact assessment
Pre-1850's development of the foreshore (Blue ownership) – wharfage and sea walls associated with early ferry service operated by Blue.	Low	Local - State	Excavation works within the study area have low potential to impact on archaeological remains.
Mid to late 19th century evidence of shipbuilding industry – sea walls, wharfage, reclamation, warehousing and other structures such as the potential dwelling identified within the study area.	Moderate	Local	Excavation works within the study area have moderate potential to impact on archaeological remains
Early 20th century development – vehicular ferry, wharfage, reclamation.	Moderate	Unlikely to reach local significance threshold.	Excavation works within the study area have moderate potential to impact on archaeological remains.

6.6.5.6 Archaeological impact assessment

Proposed works within the Blues Point temporary site with the potential to impact on archaeological remains include:

- Excavation of open shaft to tunnel
- Foundation/ground slab excavations for establishment of staff amenities and site offices during the construction phase

Works with the potential to impact archaeological resources within the Blues Point temporary site, with the exception of the open shaft excavation, are likely to be limited to discrete locations. Therefore, works in this location are likely to have a minor to major impact on potential archaeological resources, dependant on the location and extent of the proposed excavation works.

6.6.6 Overview of constraints

The following table outlines the potential heritage constraints within the study area:

Table 46: Overview of constraints on heritage items and areas of archaeological potential

Heritage item	Potential heritage impacts		
	Direct impact	Archaeological impact	Indirect impact
Sydney Opera House World Buffer Zone	N/A	N/A	Temporarily negligible – views and vistas
Blues Point Waterfront Group	Temporarily minor to moderate – shaft excavation	Minor to major – low to moderate potential for local and state significant archaeological remains	Temporarily minor to moderate – views and vistas
Blues Point Tower	Neutral	Neutral	Temporarily minor to moderate – views and vistas
North Sydney bus shelters	Direct impact: Moderate (relocation)	Neutral	Neutral
House (3 Warung Street)	Neutral	Neutral	Temporarily minor – views and vistas
House (5 Warung Street)	Neutral	Neutral	Temporarily minor – views and vistas
McMahons Point South heritage conservation area	Temporarily minor to moderate – shaft excavation	Minor to major – low to moderate potential for local and state significant archaeological remains	Temporarily minor to moderate – views and vistas
Potential archaeological resource within the study area	N/A	Minor to major – low to moderate potential for local and state significant archaeological remains	N/A

6.7 Barangaroo Station

The proposed Barangaroo Metro station is located on Hickson Road within the Barangaroo precinct on the west side of the Sydney CBD. The Barangaroo development is Sydney and Australia's largest commercial and residential development.

Figure 84: Location and indicative layout of Barangaroo Station.



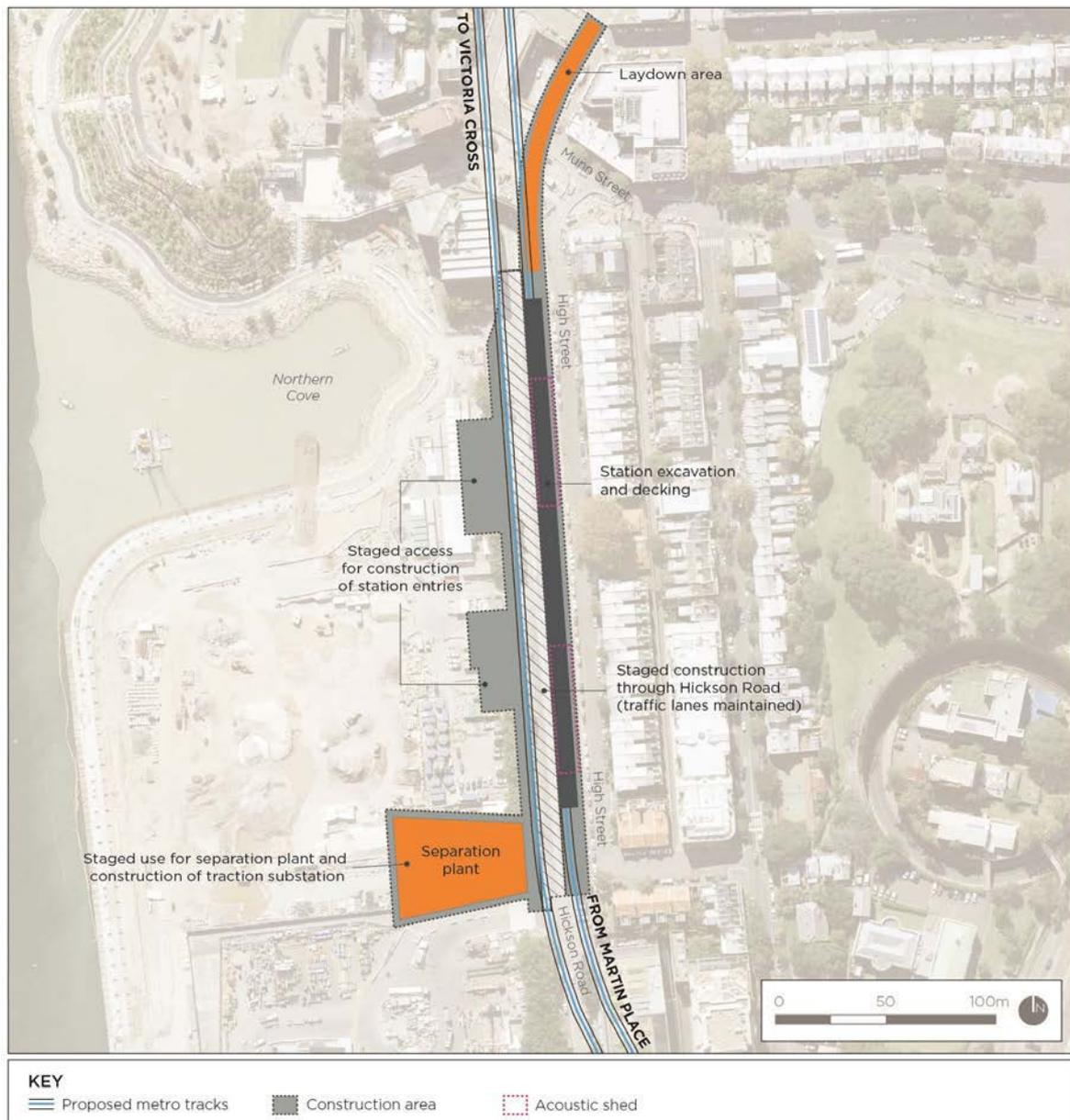
6.7.1 Construction

The Barangaroo Station construction site would cover about 13,800 square metres within the road reserve of Hickson Road and the adjacent Barangaroo development area (Figure 84 and Figure 85). The site would be used to:

- Launch and support the tunnel boring machine for the Sydney Harbour crossing drive to Blues Point
- Retrieve the cutter heads and shields of the two tunnel boring machines driven from the Marrickville dive site
- Carry out the excavation and construction of the future Barangaroo Station.

Access to and egress from the Barangaroo site would be via Hickson Road.

Figure 85: Barangaroo Station construction site layout.



6.7.2 History of the study area

Historic plans indicate that in the early years of the colony the landscape in the vicinity of the study area was underutilised by the British settlers, with settlement concentrated around Sydney Cove and the Tank Stream to the north, and the Brickfields to the east. By Lesueur's plan of 1802, however, the colony appears to have moved west, towards the rocky western ridge overlooking what is now Darling Harbour (Figure 86).⁸² Lesueur's plan indicates that the eastern shore of Darling Harbour was originally rocky and steep. The early plans illustrate how modified the current shoreline is in comparison to the original landform.

⁸² RPS *Barangaroo Ferry Hub Statement of Heritage Impact*, November 2014: 22.

Figure 86: Detail from Charles Alexandre Lesueur’s 1802 Plan de la ville de Sydney. Source: NLA MAP F 307.

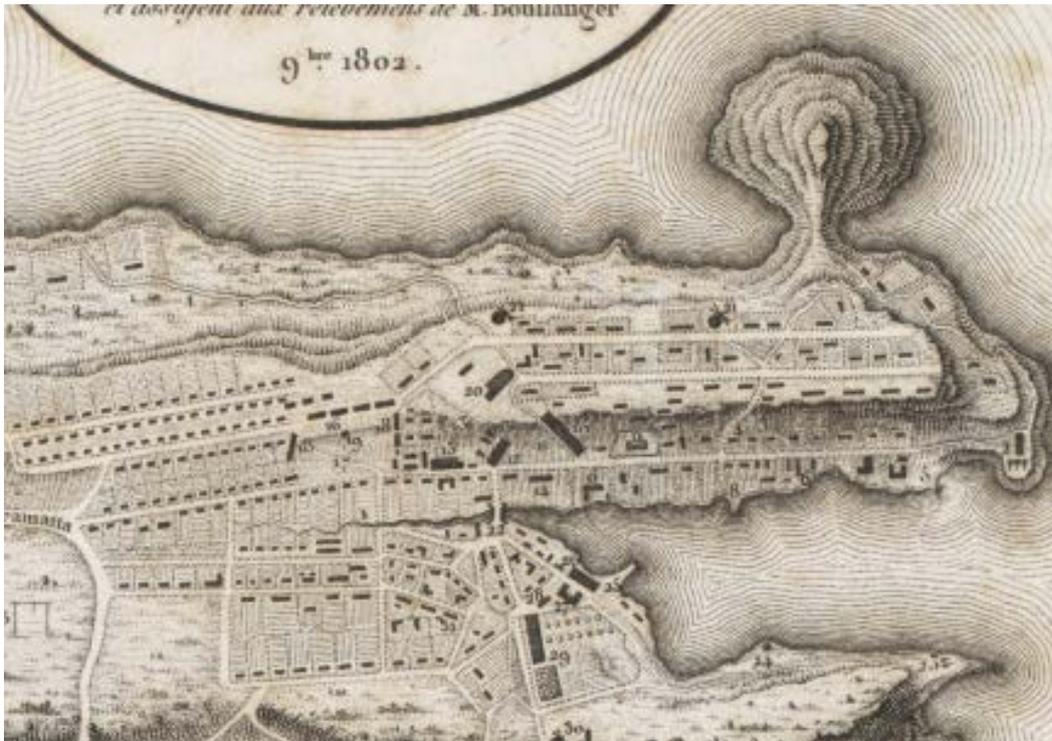


Figure 87: Part of the harbour of Port Jackson and the country between Sydney and the Blue Mountains, New South Wales. Drawn by Major Taylor, 48 Regiment, engraved by R Havell & Son c. 1820 Millers Point headland can be seen in the background with two mills. NLA S1974.



For the first decades of European occupation in Sydney, there is very little documentary evidence to suggest extended occupation and use of the lands within the study area, including in and around the Cockle Bay shores (Figure 86). Occupation of the eastern side of what was to be named Cockle Bay (and later Darling Harbour) was confined to several key grants—largely to those associated with the military, including the military hospital, military bathing house and the military barracks—all on the ridge to separate the main settlement from the cove. In terms of desirable land much of the foreshores were marshy or rocky—therefore, initially considered less suitable for occupation and difficult to develop (Figure 87).

From 1810 onwards, Governor Lachlan Macquarie expanded and developed the town of Sydney, including implementation of an organised street layout as part of the Governor's General Orders (Figure 88). The General Orders included the construction of a wharf at the base of Market Street to allow for the easy transport of produce from the farms on the Hawkesbury River, and as a link to the Sydney markets. This was an acknowledgement of the potential of Cockle Bay to play an important role in trade.

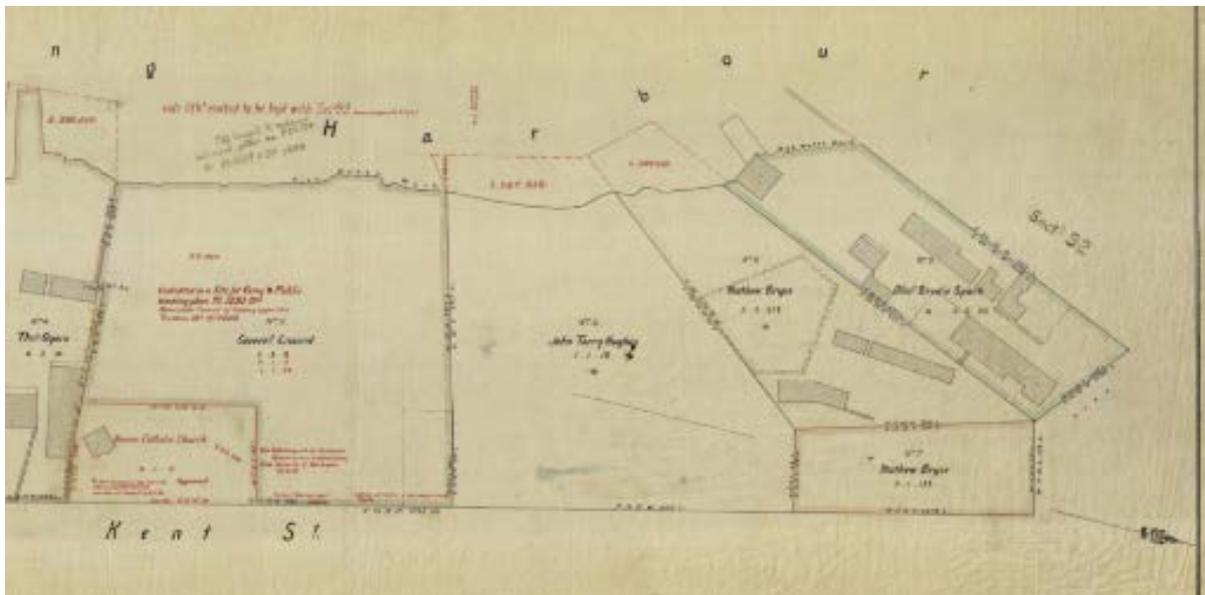
Over the following decades, numerous shipbuilding and transport wharves were constructed along the eastern shore of Darling Harbour (Figure 89).⁸³

The spread of Bubonic Plague in 1900 sparked a large-scale redevelopment of the Darling Harbour waterfront. This resulted in a program of land reclamation, amongst other works (Figure 90). Reclamation altered the natural shore line and buried many of the timber wharves constructed prior to 1900.

From 1908, the Sydney Harbour Trust carried out a number of improvements in north Darling Harbour, including the construction of Hickson Road in the mid-1920s. The construction of the road required the pouring of a six-inch thick concrete foundation over a four-inch thick foundation of blue metal, in areas without solid bedrock foundations.⁸⁴

This was part of Hickson Road, the broad thoroughfare that would link the new wharves at Walsh Bay with new and existing wharves at Darling Harbour. Because the Council would be responsible for this road and its maintenance, its officers wished to ensure that the road construction was of high quality. The City Surveyor settled on a concrete roadway at least 6 inches thick where it went over solid rock, and 8 inches thick 'over all portions where solid rock did not exist'. Reinforced with No 9 B. R. C. fabric, the concrete was to be laid on 4 inches of blue metal and topped by a bituminous pavement.⁸⁵

Figure 88: Detail from the 1833 City Section Survey plan. Source: Historical Atlas of Sydney.



⁸³ RPS 2014: 22.

⁸⁴ Broomham, R. Land at Millers Point Ownership and Usage, June 2007: 3.

⁸⁵ Broomham 2007: 39.

Figure 89: View of Darling Harbour, looking south from Millers Point c. 1871. SLNSW.



Figure 90: Detail from the Rocks and Foreshore Resumption Plan, c. 1900. Source: Historical Atlas of Sydney.



6.7.3 Heritage listed items

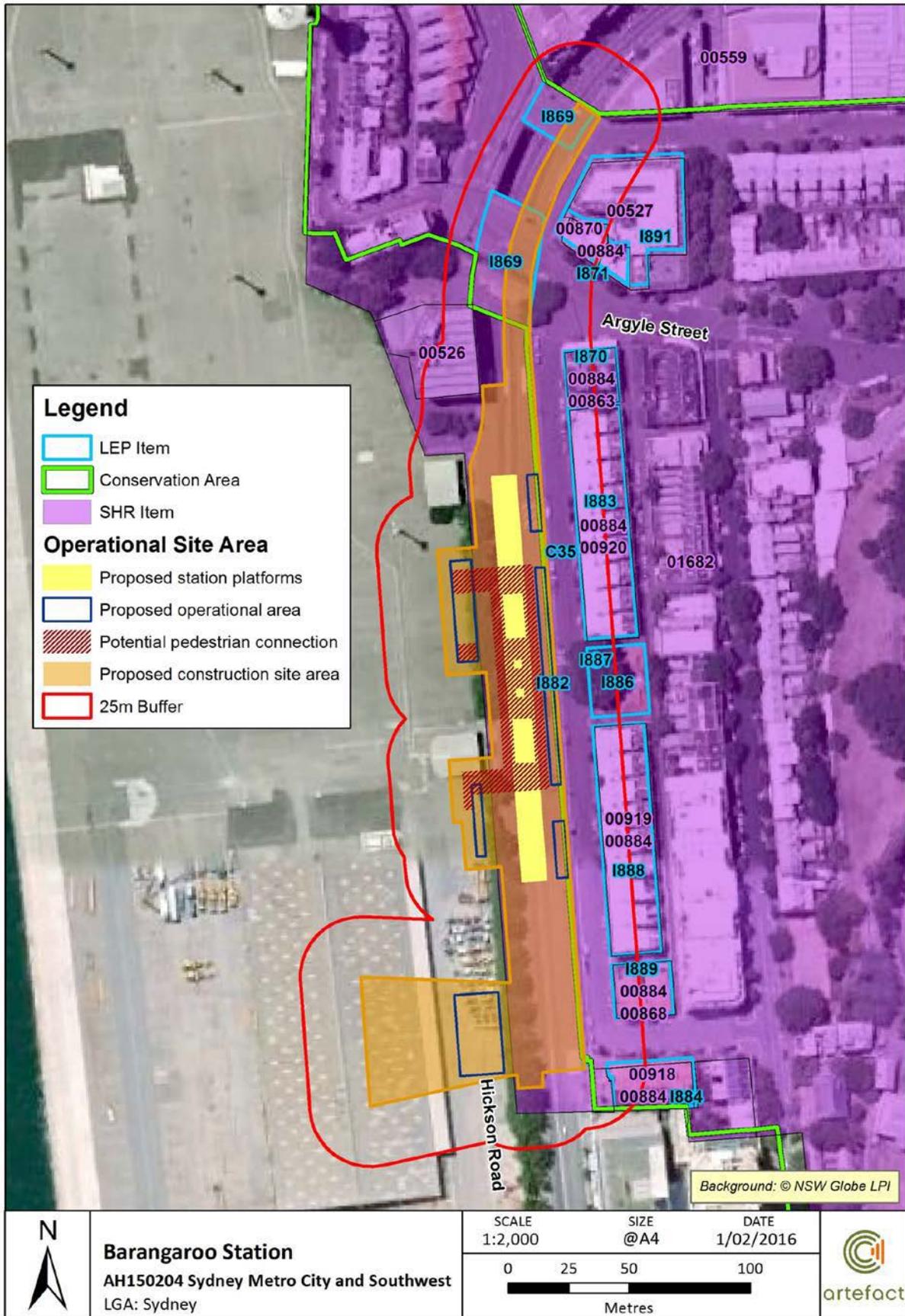
The following table outlines the heritage listed items within the study area which are shown in Figure 91.

Table 47: Overview of heritage items within the Barangaroo study area

Heritage item	Register listings	Significance	Relationship to the study area
Millers Point & Dawes Point Village Precinct	State Heritage Register 01682	State	Partially within construction area and buffer zone
Bridges over Hickson Road	Sydney LEP 2012 I869	Local	Partially within construction area and buffer zone
Palisade Fence and High Steps	Sydney LEP 2012 I882	Local	Within construction area
Warehouses/Dalgety's Bond Store Group	State Heritage Register 00526 State Environmental Planning Policy (Major Development) 2005 Barangaroo heritage Roads and Maritime S170	State	Partially within buffer zone
Shops and residences including interiors	State Heritage Register 00863 Department of Housing S170 register Sydney LEP 2012 I870	State	Partially within buffer zone
Shops 6, 8 Argyle Place	State Heritage Register 00870 Department of Housing S170 register Sydney LEP 2012 I871	State	Partially within buffer zone
Millers Point Conservation Area	State Heritage Register 00884 Department of Housing S170 register Sydney LEP 2012 C35 Register of the National Estate	State	Adjacent to construction area and partially within buffer zone
Terrace Duplexes 2-36 High Street Millers Point	State Heritage Register 00920 Department of Housing S170 register Sydney LEP 2012 I883	State	Partially within buffer zone
Terrace Duplexes 3, 5, 7, 9 High Street Millers Point	State Heritage Register 00918 Department of Housing S170 register Sydney LEP 2012 I884	State	Partially within buffer zone
MSB Bond Store No. 3 Terrace Walsh Bay Wharves Precinct	SHR 00559	State	Partially within buffer zone
Lance Kindergarten including buildings and interiors, early remnant fencing and ground	Sydney LEP 2012 I886	Local	Partially within buffer zone
Trees at Lance Kindergarten	Sydney LEP 2012 I887	Local	Partially within buffer zone

Heritage item	Register listings	Significance	Relationship to the study area
Terrace Duplexes 38-72 High Street Millers Point	State Heritage Register 00919 Department of Housing S170 register Sydney LEP 2012 I888	State	Partially within buffer zone
Terrace Duplexes 74-80 High Street Millers Point	State Heritage Register 00868 Department of Housing S170 register Sydney LEP 2012 I889	State	Partially within buffer zone
Oswald Bond Store	State Heritage Register 00527 Sydney LEP 2012 I891 National Trust Register 9186	State	Partially within buffer zone

Figure 91: Heritage items within the Barangaroo Station study area.



6.7.4 Detailed heritage impact assessments

Heritage items

Table 48: Bridges over Hickson Road heritage impact assessment

Bridges over Hickson Road⁸⁶

Figure 92: View north onto Hickson Road from Argyle Place, showing the deep cutting and Windmill Street bridge. Artefact Heritage 2015.

Image



Significance	Local
Description	Constructed in 1908 this heritage group includes landmark bridge structures which form a "tunnel", and gateway between the Darling Harbour and the Walsh Bay wharf and shipping terminus. Rock excavations and concrete walling form dramatic high walls, and the generous width of Hickson Road emphasises the scale. Demonstrates an early use of reinforced concrete in Sydney. The bridges are located on Munn Street, Argyle Place and Windmill Street.
Statement of significance	Of historical significance as physical evidence of the major state government redevelopment of the district, in the years following the 1901 bubonic plague. Of historical significance as physical evidence of the growth of maritime activities to the west of Circular Quay.
Impact type	Indirect impact: Views and vistas
Heritage impact assessment	The area immediately below the bridges would be utilised as a temporary laydown area during construction. This would result in minor (temporary) visual impacts. There would be no impacts to the historical significance of the item. Indirect impact: Minor

⁸⁶ Description and Statement of significance extracted from State Heritage Register inventory sheet "Bridges over Hickson Road" last accessed via <http://www.environment.nsw.gov.au/heritageapp/ViewHeritageItemDetails.aspx?ID=2423650> on 8/01/2016.

Table 49: Palisade Fence and High Steps heritage impact assessment

Palisade Fence and High Steps⁸⁷

Figure 93: Palisade Fence and High Steps.

Image



Significance Local

Description Constructed in 1920, the Palisade fence and High Steps start 300m from Argyle Place and run along the western edge of High Street. Listing Includes palisade fence, decorative cast iron posts and sandstone posts that flanked the bridges over Hickson Road (most of these bridges have been demolished).

Statement of significance The High Street sandstone wall and palisade fence are of historical significance for their association with the Sydney Harbour Trust's redevelopment early in the 20th century. They are aesthetically significant as a dramatic landmark feature that defines the edge of the village of Millers Point. The open steps at the southern end of High Street between High Street and Hickson Road are of heritage significance as an integral part of the pedestrian network of Millers Point that connected the wharfs to the suburb above. The remnant elements of the closed steps at the northern end of High Street between High Street and Hickson Road are of heritage significance as an integral part of the pedestrian network of Millers Point that connected the wharfs to the suburb above. They are of historical significance for their association with the Sydney Harbour Trust's redevelopment early in the 20th century, they form part of the well designed and extensive network of stairs and access routes designed to move large numbers of workers to and from the wharves, and display a fine level of detailing for their period of construction.

Impact type Indirect impact: Views and vistas

Heritage impact assessment High Street is located on a high ridge overlooking the harbour. There are few direct view corridors between the heritage item and Hickson Road / the study area and the proposed works would have a negligible visual impact on the setting of the heritage item. There would be no impact on the historical significance of the item.
Indirect impact: Negligible

⁸⁷ Description and Statement of significance extracted from State Heritage Register inventory sheet "Palisade Fence and High Steps" last accessed via <http://www.environment.nsw.gov.au/heritageapp/ViewHeritageItemDetails.aspx?ID=2424625> on 8/01/2016.

Table 50: Warehouses/Dalgety’s Bond Store group heritage impact assessment

Warehouses/Dalgety’s Bond Store Group⁸⁸

Figure 94: Warehouses/Dalgety’s Bond Store. Artefact Heritage 2015.

Image



Significance	State
Description	The group consists of two complimentary warehouse buildings fronting onto what is now the Munn Reserve. The former Dalgety's Bond Stores were originally a complex of three warehouse components, known as Dalgety's Bond A, B and C. Only blocks A and C survive.
Statement of significance	The Munn Street former warehouse complex is important as a townscape feature in this area of dramatic topography. Its different building forms and shapes display a progression of functional architectural style, reflecting the difficulties of building on this contorted terrain. It also demonstrates the redevelopment and change of the area associated with civil works that followed the bubonic plague of 1901. It perpetuates the memory of Dalgety & Co, one of Australia's largest mercantile companies, and maintains a historic link with the maritime activities of Millers Point. The internal structure and mechanical features provide additional scientific significance.
Impact type	Potential direct impact: Vibration Indirect impact: Views and vistas
Heritage impact assessment	Based on its age and likelihood to exhibit timber reinforcing structures rather than concrete or steel reinforcing structures, this item is assumed to be more sensitive to vibration impacts. Based on excavation for the cut-and-cover station being relatively close to this item, modelling indicates that at the closest façade of this item would experience vibration levels above the screening level for cosmetic damage. Potential direct impact: Minor At-surface or above-surface station infrastructure, including both station entry points, would be located to the south of the heritage item. The introduction of new station infrastructure in this location would result in a minor impact to the setting of the heritage item. The scientific significance of the item would not be impacted. Indirect impact: Minor

⁸⁸ Description and Statement of significance extracted from State Heritage Register inventory sheet “Warehouses” last accessed via <http://www.environment.nsw.gov.au/heritageapp/ViewHeritageItemDetails.aspx?ID=5051348> on 22/10/2015.

Table 51: Shops 6, 8 Argyle Place heritage impact assessment

Shops 6, 8 Argyle Place⁸⁹

Figure 95: Shops 6, 8 Argyle Place.

Image



Significance	State
Description	Constructed c.1906, this item is one of a row of terraces, consisting of commercial on the ground floor and residential space above. .
Statement of significance	This building is one of a group of five post-plague Edwardian commercial and residential properties, which are very important to the streetscape of Millers Point. It is part of the Millers Point Conservation Area, an intact residential and maritime precinct. It contains residential buildings and civic spaces dating from the 1830's and is an important example of C19th adaptation of the landscape.
Impact type	Indirect impact: Views and vistas
Heritage impact assessment	High Street is located on a high ridge overlooking the harbour. There are few direct view corridors between the heritage item and Hickson Road / the study area and the proposed works would have a negligible visual impact on the setting of the heritage item. Indirect impact: Negligible

⁸⁹ Description and Statement of significance extracted from State Heritage Register inventory sheet "Shops" last accessed via <http://www.environment.nsw.gov.au/heritageapp/ViewHeritageItemDetails.aspx?ID=5045110> on 8/01/2016.

Table 52: Shops and residences including interiors heritage impact assessment

Shops and residences including interiors⁹⁰

Figure 96: Shops and residences.

Image



Significance	State
Description	Constructed c.1910 in the Federation style, the two storey shops, with residences over, form part of a group located in a conservation area and are important to the streetscape.
Statement of significance	An interesting example of early 20th Century commercial and residential development being part of the post-plague redevelopment, very important to the streetscape of Millers Point. It is part of the Millers Point Conservation Area, an intact residential and maritime precinct. It contains residential buildings and civic spaces dating from the 1830's and is an important example of 19 th century adaptation of the landscape.
Impact type	Indirect impact: views and vistas
Heritage impact assessment	High Street is located on a high ridge overlooking the harbour. There are few direct view corridors between the heritage item and Hickson Road / the study area and the proposed works would have a negligible visual impact on the setting of the heritage item. Indirect impact: Negligible

⁹⁰ Description and Statement of significance extracted from State Heritage Register inventory sheet "Shops and residences including interiors" last accessed via <http://www.environment.nsw.gov.au/heritageapp/ViewHeritageItemDetails.aspx?ID=2424652> on 22/10/2015.

Table 53: Terrace duplexes 2-36 High Street Millers Point heritage impact assessment

Terrace Duplexes 2-36 High Street Millers Point⁹¹

Figure 97: Duplexes 2-36 High Street, Millers Point. Artefact Heritage 2015.

Image



Significance	State
Description	Constructed c.1911, the large terraces feature elaborate timber verandahs with ornamental brackets in the Federation style. Usually, accommodation consists of either two or three bedroom units on both the ground and first floors. Access to the first floor is shared by two units via stairs off the street. To either side of the stairwell are the entrances to the lower units.
Statement of significance	This terrace is one of a group of early twentieth century workmen's terraces built as part of the post plague redevelopment by the Sydney Harbour Trust. It is part of the Millers Point Conservation Area, an intact residential and maritime precinct. It contains residential buildings and civic spaces dating from the 1830's and is an important example of 19th century adaptation of the landscape.
Impact type	Indirect impact: views and vistas
Heritage impact assessment	High Street is located on a high ridge overlooking the harbour. There are few direct view corridors between the heritage item and Hickson Road / the study area and the proposed works would have a negligible visual impact on the setting of the heritage item. Indirect impact: negligible

⁹¹ Description and Statement of significance extracted from State Heritage Register inventory sheet "Terrace Duplexes" last accessed via <http://www.environment.nsw.gov.au/heritageapp/ViewHeritageItemDetails.aspx?ID=5000859> on 22/10/2015.

Table 54: Terrace duplexes 3, 5, 7, 9 High Street Millers Point heritage impact assessment

Terrace Duplexes 3, 5, 7, 9 High Street Millers Point⁹²

Figure 98: Duplexes 3, 5, 7, 9 High Street, Millers Point.

Image



Significance	State
Description	Constructed c.1911, the large terraces feature elaborate timber verandahs with ornamental brackets in the Federation style. Usually, accommodation consists of either two or three bedroom units on both the ground and first floors. Access to the first floor is shared by two units via stairs off the street. To either side of the stairwell are the entrances to the lower units.
Statement of significance	This terrace is one of a group of early twentieth century workmen's terraces built as part of the post plague redevelopment by the Sydney Harbour Trust. It is part of the Millers Point Conservation Area, an intact residential and maritime precinct. It contains residential buildings and civic spaces dating from the 1830's and is an important example of 19th century adaptation of the landscape.
Impact type	Indirect impact: views and vistas
Heritage impact assessment	High Street is located on a high ridge overlooking the harbour. There are few direct view corridors between the heritage item and Hickson Road / the study area and the proposed works would have a negligible visual impact on the setting of the heritage item. Indirect impact: negligible

⁹² Description and Statement of significance extracted from State Heritage Register inventory sheet "Terrace Duplexes" last accessed via <http://www.environment.nsw.gov.au/heritageapp/ViewHeritageItemDetails.aspx?ID=5000858> on 11/01/2016.

Table 55: Terrace duplexes 38-72 High Street Millers Point heritage impact assessment

Terrace Duplexes 38-72 High Street Millers Point⁹³

Figure 99: Example of terrace, High Street, Millers Point. Artefact Heritage 2015.

Image



Significance	State
Description	Constructed c.1911, the large terraces feature elaborate timber verandahs with ornamental brackets in the Federation style. Usually, accommodation consists of either two or three bedroom units on both the ground and first floors. Access to the first floor is shared by two units via stairs off the street. To either side of the stairwell are the entrances to the lower units.
Statement of significance	This terrace is one of a group of early twentieth century workmen's terraces built as part of the post plague redevelopment by the Sydney Harbour Trust. It is part of the Millers Point Conservation Area, an intact residential and maritime precinct. It contains residential buildings and civic spaces dating from the 1830's and is an important example of 19th century adaptation of the landscape.
Impact type	Indirect impact: views and vistas
Heritage impact assessment	High Street is located on a high ridge overlooking the harbour. There are few direct view corridors between the heritage item and Hickson Road / the study area and the proposed works would have a negligible visual impact on the setting of the heritage item. Indirect impact: negligible

⁹³ Description and Statement of significance extracted from State Heritage Register inventory sheet "Terrace Duplexes" last accessed via <http://www.environment.nsw.gov.au/heritageapp/ViewHeritageItemDetails.aspx?ID=5045221> on 22/10/2015.

Table 56: Terrace duplexes 74-80 High Street Millers Point heritage impact assessment

Terrace Duplexes 74-80 High Street Millers Point⁹⁴

Figure 100: View south along High Street, terraces to the left. Artefact Heritage 2015.

Image



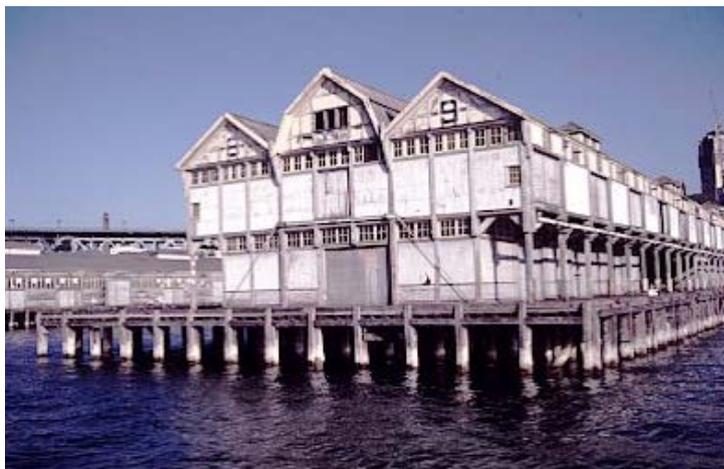
Significance	State
Description	Constructed c.1911, the large terraces feature elaborate timber verandahs with ornamental brackets in the Federation style. Usually, accommodation consists of either two or three bedroom units on both the ground and first floors. Access to the first floor is shared by two units via stairs off the street. To either side of the stairwell are the entrances to the lower units.
Statement of significance	This terrace is one of a group of early twentieth century workmen's terraces built as part of the post plague redevelopment by the Sydney Harbour Trust. It is part of the Millers Point Conservation Area, an intact residential and maritime precinct. It contains residential buildings and civic spaces dating from the 1830's and is an important example of 19 th century adaptation of the landscape.
Impact type	Indirect impact: views and vistas
Heritage impact assessment	High Street is located on a high ridge overlooking the harbour. There are few direct view corridors between the heritage item and Hickson Road / the study area and the proposed works would have a negligible visual impact on the setting of the heritage item. Indirect impact: negligible

⁹⁴ Description and Statement of significance extracted from State Heritage Register inventory sheet "Terrace Duplexes" last accessed via <http://www.environment.nsw.gov.au/heritageapp/ViewHeritageItemDetails.aspx?ID=5001051> on 22/10/2015.

Table 57: MSB Bond Store No. 3 / Terrace / Walsh Bay Wharves Precinct heritage impact assessment

MSB Bond Store No. 3 / Terrace / Walsh Bay Wharves Precinct heritage impact assessment ⁹⁵

Figure 101: MSB Bond Store No. 3 / Terrace / Walsh Bay Wharves Precinct.



Image

⁹⁵ Description and Statement of significance extracted from State Heritage Register inventory sheets “MSB Bond Store No.3”, “Terrace” and “Walsh Bay Wharves Precinct” last accessed via <http://www.environment.nsw.gov.au/heritageapp/ViewHeritageItemDetails.aspx?ID=5014135> ; <http://www.environment.nsw.gov.au/heritageapp/ViewHeritageItemDetails.aspx?ID=5045067> on 28/01/2016.

MSB Bond Store No. 3 / Terrace / Walsh Bay Wharves Precinct heritage impact assessment ⁹⁵

Significance	State
Description	<p>This heritage item consists of three individual items that have been listed under the Same SHR number.</p> <p><u>MSB Bond Store No.3</u> Bond Store No. 3 is a six-storey, brick-faced building in Queen Anne Revival style, with three-storey fronting Windmill Street.</p> <p><u>Terrace</u> Sandstone stairway with low landings. It features a cast iron palisade fence and railings.</p> <p><u>Walsh Bay Wharves Precinct</u> Integrated port precinct comprising wharves, shore sheds, bond stores, bridges and roads. A standard modular timber design was developed for the wharves, wharf sheds and shore sheds so that they could easily be adapted to the requirements of individual sites.</p>
Statement of significance	<p><u>MSB Bond Store No.3</u> Bond Store No. 3 is of significance for its historical association with the development of the waterfront trade in the Miller's Point and Walsh Bay area. In its architectural merits, Bond Store No. 3 ranks with three other 19th century bond stores - Grafton Bond (1881) and Parbury's No. 1 Bond (1880s) both in Hickson Road, and Oswald Bond (c1890) in Argyle Place. The building also contributes to the unique streetscape quality of Walsh Bay. The site has potential archaeological research value.</p> <p><u>Terrace</u> The Hickson Steps are of environmental heritage significance as an integral part of the old pedestrian network of Dawes Point. They are of historical association with the Sydney Harbour Trust's ownership and development of Millers Point residential area early this century.</p> <p><u>Walsh Bay Wharves Precinct</u> The Walsh Bay area is of State cultural significance due to its unique combination of steep rocky terrain, early, mid, late-Victorian and Edwardian housing, surviving relatively intact Victorian bond stores, and the results of an early twentieth century urban redevelopment scheme of unique scale: the magnificent timber wharf and shore structures and associated rock cuttings, roads and bridges. The Walsh Bay Wharves and associated buildings and works are a virtually intact port and stevedoring facility created by the Sydney Harbour Trust in response to the requirements of maritime trade at the time (1900s-1910s). The precinct documents the workings of a technologically advanced early twentieth century shipping port, developed specifically to accommodate new mechanised transportation technology. The wharves have a strong distinctive character created by the logical use of heavy timber construction and the regular grid layout of piles, columns, beams and infill cladding. The precinct is unified in materials, form and scale and contains structures demonstrating maritime uses. It demonstrates the life of inner Sydney in the early twentieth century. The precinct demonstrates technical and creative excellence of the period 1820-1930.</p>
Impact type	No impact
Heritage impact assessment	<p>The MSB Bond Store No. 3 itself is outside the study area, and would not be impacted by the project.</p> <p>The terrace steps would not be impacted by the project.</p> <p>All significant components of the Walsh Bay Wharves precinct are located to the north of the study area, and the heritage item would not be impacted by the project.</p> <p>Indirect impact: Neutral</p>

Table 58: Lance Kindergarten heritage impact assessment

Lance Kindergarten⁹⁶

Figure 102: Lance Kindergarten.

Image



Significance

Local

Description

Lance Kindergarten is set within a row of early Federation housing along High Street. To the rear of the site is a very high vertical stone cutting, which is the most imposing element of the site. A narrow lane runs along the back side of the properties in front of the wall.

Statement of significance

Lance Kindergarten is significant for the ongoing use of the site, first as a children's playground and then as a kindergarten from 1913 and 1925 respectively. Considered to be the first public playground in the City of Sydney, the place is of high social significance as a community playground for the use of Millers Point residents developed as compensation for the absence of garden and yard space for the occupants of the Trust's housing developments. It is also significant as physical evidence of the major state government redevelopment of the district in the years following the 1901 bubonic plague. The kindergarten was a product of the movement to provide free preschool education and playground facilities for the children of the inner city. The facility has historical associations with a former President of the Sydney Harbour Trust after whom the kindergarten is named. The complex is also a testimony to the efforts of the Kindergarten Union of NSW to develop facilities for the use of children in crowded suburbs of the late nineteenth century. The kindergarten is an important element in the townscape, providing a landscaped relief to the townhouse development on the eastern side of High Street. The site also features a number of significant trees that provide amenity, aesthetic value and have historic associations with the development of the centre.

Impact type

Indirect impact: views and vistas

Heritage impact assessment

High Street is located on a high ridge overlooking the harbour. There are few direct view corridors between the heritage item and Hickson Road / the study area and the proposed works would have a negligible visual impact on the setting of the heritage item.
Indirect impact: negligible

⁹⁶ Description and Statement of significance extracted from State Heritage inventory sheet "Lance Kindergarten" last accessed via <http://www.environment.nsw.gov.au/heritageapp/ViewHeritageItemDetails.aspx?ID=2423589> on 28/01/2016.

Table 59: Trees at Lance Kindergarten heritage impact assessment

Trees at Lance Kindergarten⁹⁷

Figure 103: Trees at Lance Kindergarten.

Image



Significance	Local
Description	Lance Kindergarten is set within a row of early Federation housing along High Street. The existing four London Plane trees (<i>Platanus x hybridas</i>) within the site were assessed in 2014 as ranging in height from 20m - 25m. In 2014 an assessment of the four trees indicated that they all appeared to be stable with branching structures and good vigour. The remaining safe usable expectancy was assessed as being long, more than 40 years for three of the trees whilst the northern most tree along Argyle Lane was assessed as having a medium expectancy of 15-40 years.
Statement of significance	The playground of the Lance Kindergarten has four large plane trees which are located near the High Street frontage of the site. The trees are of considerable aesthetic value to Millers Point, improve the amenity of the area and provide welcome shade to the outdoor play area of the kindergarten during the summer months. The trees have historical associations with the early development of the site, first as a children's playground and then as being part of Lance Kindergarten from 1913 and 1925 respectively.
Impact type	Indirect impact: views and vistas
Heritage impact assessment	High Street is located on a high ridge overlooking the harbour. There are few direct view corridors between the heritage item and Hickson Road / the study area and the proposed works would have a negligible visual impact on the setting of the heritage item. Indirect impact: negligible

⁹⁷ Description and Statement of significance extracted from State Heritage inventory sheet "Trees at Lance Kindergarten" last accessed via <http://www.environment.nsw.gov.au/heritageapp/ViewHeritageItemDetails.aspx?ID=2424616> on 28/01/2016.

Table 60: Oswald Bond Store heritage impact assessment.

Oswald Bond Store⁹⁸

Figure 104: Oswald Bond Store.

Image



Significance	State
Description	The Bond Store is an example of late Victorian (1892-3 facades)/ Federation (1904) and Free Classical style warehouse structure [Tropman 5.3]. The existing building is essentially in sound condition, there is some cracking and water damage identified on Level 3. Only part of the original 1892-3 brickwork facades survived the 1903 fire. The existing building dates from 1904 when it was rebuilt to original detail after the fire, with the omission of the two upper levels and with other fire prevention measures. The internal timber structure was rebuilt using the original storey post system.
Statement of significance	The Oswald Bond Store is of State significance as an outstanding example of a turn of the century bond store in the Free Classical style. The Store has a strong architectural presence, its scale and facade contributing to the streetscape. The timber driveway doors are part of a rare avenue of industrial openings along Windmill Street, which are a reminder of the commercial use of the area. The storey post system supporting the internal floors is typical of the construction of the Sydney Harbour Trust during this period.
Impact type	Indirect impact: views and vistas
Heritage impact assessment	Windmill and Kent Streets are elevated a ridge overlooking the harbour. There are few direct view corridors between the heritage item and Hickson Road / the study area and the proposed works would have a negligible visual impact on the setting of the heritage item. Indirect impact: negligible

⁹⁸ Description and Statement of significance extracted from State Heritage Register inventory sheet “Oswald Bond Store” last accessed via <http://www.environment.nsw.gov.au/heritageapp/ViewHeritageItemDetails.aspx?ID=5045357> on 09/01/2016.

Heritage Conservation Areas

Table 61: Millers Point Conservation Area heritage impact assessment

Millers Point Conservation Area⁹⁹

Heritage Council of New South Wales



Image

State Heritage Register - SHR 00884, Plan 2282

Millers Point Conservation Area

Gazetted Date: 2 April 1989

0 100 200 Metres

Scale: 1:3,500
 Datum/Projection: GCS GDA 1984



- Legend
- SHR Curtilage
 - Land Parcel
 - LGAs
 - Suburbs

Significance State

⁹⁹ Description and Statement of significance extracted from State Heritage Register inventory sheet “Millers Point Conservation Area” last accessed via <http://www.environment.nsw.gov.au/heritageapp/ViewHeritageItemDetails.aspx?ID=5001049> on 22/10/2015.

Millers Point Conservation Area⁹⁹

Description	<p>An integrated port town developed between the 1810s and the 1930s and little changed since then; considered remarkable for its completeness and intactness. Its components include deep-sea wharves and associated infrastructure, bond and free stores, roadways and accessways, public housing built for port workers, former private merchant housing, hotels and shops, schools, churches, post office and community facilities.</p> <p>This is the Department of Housing's Conservation Area only and only applies to Department of Housing property. Because of this, the Department's Conservation Area is not contiguous.</p>
Statement of significance	<p>Millers Point Conservation Area is an intact residential and maritime precinct of outstanding State and national significance. It contains buildings and civic spaces dating from the 1830s and is an important example of nineteenth and early twentieth century adaptation of the landscape. The precinct has changed little since the 1930s.</p>
Impact type	<p>Indirect impact: views and vistas</p>
Heritage impact assessment	<p>The conservation area terminates at High Street. High Street is located on a ridge overlooking the harbour. There are few direct view corridors between the conservation area and Hickson Road / the study area and the proposed works would have a negligible visual impact on the setting of the heritage item. There would be no impacts to the historical, associative or social significance of the item, or to its rarity or representativeness values or research potential.</p> <p>Indirect impact: negligible</p>

Heritage precincts

Table 62: Millers Point & Dawes Point Village Precinct heritage impact assessment

Millers Point & Dawes Point Village Precinct¹⁰⁰

Figure 105: View of Millers Point and Dawes Point Village Precinct. Artefact Heritage 2015.

Image



Significance

State

Description

The precinct is bounded on the north by the existing Walsh Bay State Heritage Register listed precinct, on the far-north by the waters of Sydney Harbour in the vicinity of Ives Steps on Dawes Point/Tar-ra, on the north-west by the existing Sydney Harbour Bridge State Heritage Register listed item, on the north-east by the Bradfield Highway (bridge approaches) forming a distinctive physical boundary, on the south by the existing high-rise apartment buildings forming a distinctive boundary, on the west by the edge of the concrete-surfaced Darling Harbour wharf aprons forming a distinctive change in the landscape, and on the north-west by the cliff-edges of Old Millers Point, again forming a distinctive boundary.

Statement of significance

Millers Point & Dawes Point Village Precinct is of State significance for its ability to demonstrate, in its physical forms, historical layering, documentary and archaeological records and social composition, the development of colonial and post-colonial settlement in Sydney and New South Wales.

The natural rocky terrain, despite much alteration, remains the dominant physical element in this significant urban cultural landscape in which land and water, nature and culture are intimately connected historically, socially, visually and functionally. The close connections between the local Cadigal people and the place remain evident in the extensive archaeological resources, the historical records and the geographical place names of the area, as well as the continuing esteem of Sydney's Aboriginal communities for the place.

Much (but not all) of the colonial-era development was removed in the mass resumptions and demolitions following the bubonic plague outbreak of 1900, but remains substantially represented in the diverse archaeology of the place, its

¹⁰⁰ Description and Statement of significance extracted from State Heritage Register inventory sheet "Millers Point & Dawes Point Village Precinct" last accessed via <http://www.environment.nsw.gov.au/heritageapp/ViewHeritageItemDetails.aspx?ID=5054725> on 22/10/2015.

Millers Point & Dawes Point Village Precinct¹⁰⁰

associated historical records, the local place name patterns, some of the remaining merchants villas and terraces, and the walking-scale, low-rise, village-like character of the place with its central 'green' in Argyle Place, and its vistas and glimpses of the harbour along its streets and over rooftops, the sounds of boats, ships and wharf work, and the smells of the sea and harbour waters.

The post-colonial phase is well represented by the early 20th century public housing built for waterside workers and their families, the technologically innovative warehousing, the landmark Harbour Bridge approaches on the heights, the parklands marking the edges of the precinct, and the connections to working on the wharves and docklands still evident in the street patterns, the mixing of houses, shops and pubs, and social and family histories of the local residents.

Millers Point & Dawes Point Village Precinct has evolved in response to both the physical characteristics of its peninsular location, and to the broader historical patterns and processes that have shaped the development of New South Wales since the 1780s, including the British invasion of the continent; cross-cultural relations; convictism; the defence of Sydney; the spread of maritime industries such as fishing and boat building; transporting and storing goods for export and import; immigration and emigration; astronomical and scientific achievements; small scale manufacturing; wind and gas generated energy production; the growth of controlled and market economies; contested waterfront work practises; the growth of trade unionism; the development of the state's oldest local government authority the City of Sydney; the development of public health, town planning and heritage conservation as roles for colonial and state government; the provision of religious and spiritual guidance; as inspiration for creative and artistic endeavour; and the evolution and regeneration of locally-distinctive and self-sustaining communities. The whole place remains a living cultural landscape greatly valued by both its local residents and the people of New South Wales.

Impact type
Direct impact: physical
Indirect impact: views and vistas

Heritage impact
assessment

Cut and cover excavation to facilitate the construction of the station box would result in the potential removal of fabric, archaeological and other evidence associated with the heritage listed Village Precinct. The impact is considered minor in the context of the precinct's extent, although any archaeological remains may be relevant to the historical layering of the precinct in that they may include early European and Aboriginal components. Impacts to the fabric of Hickson Road itself are considered minor in the context of the road and precinct as a whole. Archaeological remains associated with the construction of Hickson Road may include former road surfaces and infrastructure such as drains.

Construction and use of the works site, separation plant and staging areas would result in negligible physical and visual impacts. Any impacts would be temporary in nature and would not impact the heritage significance of the item.

Operational impacts would primarily be associated with impacts to views and setting as a result of the station entrances and skylights. The station entrances and services building would be to the west of Hickson Road, outside the precinct. The station entrance would be below High Street cutting and obscured from view from the majority of the precinct. There would be some additional operational impacts such as installation of signage, pedestrians crossing, bus stop and kiss and ride along Hickson Road. This would result in negligible visual impacts and negligible impacts to fabric.

Ventilation risers and skylights fronting the Hickson Road wall would be within the precinct and would constitute a visual impact to views from the Barangaroo Development Area towards the precinct. Ventilation shafts would be designed to minimise visual impacts and minimise impacts to the fabric of the Hickson Road cutting.

The introduction of new station buildings and services infrastructure would constitute a minor to moderate visual impact to the precinct as a whole.

Millers Point & Dawes Point Village Precinct¹⁰⁰

A number of bus stops and pedestrian crossings are proposed along Hickson Road, these would have a negligible impact on the heritage significance of the precinct and would have negligible visual impacts in the context of the roads current use as a transport and pedestrian corridor.

Direct impact: minor

Indirect impact: minor to moderate

6.7.5 Archaeological assessment

The following archaeological assessment will focus on the proposed locations of station buildings and platforms. The construction of these elements would require the demolition of existing road surfaces, and construction of new station buildings, incorporating lift shafts and tunnelled access to the proposed platforms.

6.7.5.1 Site inspection results

The Barangaroo Station site is located across a hardstand area associated with Hickson Road and includes portions of the Barangaroo redevelopment area. The eastern boundary of the proposed station site is delineated by a steep sandstone cutting and upper concrete retaining wall. To the west of Hickson Road is the large flat hardstand area associated with reclaimed land for a former shipping terminal.

The northern section of the proposed station site is located beneath the deep sandstone cutting associated with the Argyle Place and Windmill Street overpasses. There is no evidence in this portion of the proposed station site of any remaining natural ground surface at the Hickson Street level.

Discussion and analysis of site inspection results

There is no visible evidence of the location of former ground surfaces across the Barangaroo Station site. Hickson Road and adjacent Barangaroo redevelopment area are covered by either concrete or bitumen, whilst the eastern and northwestern boundaries of the road are bordered by steep sandstone cuttings.

Figure 106: View south along Hickson Road from the Argyle Place overpass



Figure 107: View southwest across Hickson Road, the New Bond Stores, and the Barangaroo redevelopment area in the background



Figure 108: View north along Hickson Road from HighStreet



Figure 109: View north onto Hickson Road from Argyle Place, showing the deep cutting and Windmill Street bridge



6.7.5.2 Previous archaeological investigations in the vicinity

An analysis of the archaeological resource of Millers Point was undertaken in 1991 in 'The Rocks and Millers Point Archaeological Management Plan' prepared by Dr E Higginbotham (with T Kass and M Walker) for the Sydney Cove Authority and NSW Department of Planning. The study area was identified in this plan as being mostly disturbed. The Archaeological Management Plan states that deep features, such as wells and cess pits, may be present under Hickson Road.

In 2010, Austral Archaeology identified the Barangaroo Development Site (located immediately south and west of the study area), as having a moderate to high degree of sensitivity for archaeological resources that are likely to possess a high level of research potential. Austral assessed the Barangaroo site as having potential to contain archaeological evidence of structures and deposits that are likely to include 19th and 20th century remains of wharves and associated buildings, and shoreline modifications such as sea walls and evidence of trade and industry.¹⁰¹

In 1980 Lampert and Truscott excavated the site of the Bond Store at Moore's Wharf.¹⁰² The original sandstone warehouse in this location had been constructed in the 1830s. The building was found to have been constructed on harbour infill, and a remnant shell midden was identified below the floorboards of the building, mixed with European artefacts. The intact survival of the archaeological remains in this location suggest that the northern portion of Barangaroo has potential to contain remnants of early wharfage.

In 2000 a large sandstone seawall was encountered during roadworks within Hickson Road, The Rocks.¹⁰³ As has also been demonstrated by subsequent archaeological investigations, reclamation had buried, rather than demolished, this earlier evidence of land modification.

Archaeological excavation of the Barangaroo South site was undertaken by Casey & Lowe between 2011 and 2012.¹⁰⁴ This excavation identified archaeological remains within 40 metres of the eastern boundary of Hickson Road. The remains included informal boat ramps buried by 1840s reclamation. Land reclamation undertaken throughout the 1830s and 1850s was evidenced by a series of informal sandstone sea walls in-filled with layers of crushed sandstone, sand and clay. Timber wharfage was then constructed, along with warehouses and stores. A cottage from the 1840s was identified, built partially on reclaimed land and seawall. Evidence of the original sandstone shoreline was

¹⁰¹ Austral Archaeology Barangaroo Archaeological Assessment and Management Plan June 2010: 5.

¹⁰² Lampert, R. J. and Truscott, M. C. *The Archaeological Investigation of the Bond Store, Moore's Wharf*. Prepared for the Department of Environment and Planning NSW and the Maritime Services Board. 1980.

¹⁰³ McLeod, K. *Sea Wall Excavation in Hickson Road, The Rocks*. Prepared for the Sydney Harbour Foreshore Authority. 2000.

¹⁰⁴ Casey & Lowe *Archaeological Excavation Barangaroo South Preliminary Results Report to Lend Lease (Millers Point)* October 2012.

encountered adjacent to Hickson Road. This consisted of a sandstone outcropping that was quite steep and contained several natural flat platforms. There were no natural soil or sand deposits. The sandstone displayed signs of natural water erosion below the high water mark and weathering above it. There was no evidence that this part of the shoreline had been quarried in the early 19th century.¹⁰⁵

In 2013 Austral Archaeology commenced excavations and Barangaroo North.¹⁰⁶ The work has revealed part of Munn's 1830s stone slipway, as well as Cuthbert's mid-1800s sandstone wharf.

It is also noted the site of Australia's first gas works, Miller's Point Gas Works, is just to the south of the study area.

6.7.5.3 Known impacts

Subsurface impacts associated with former or current land uses have the potential to remove or damage potential archaeological remains. Previous impacts within the site need to be further understood and identified before more than a preliminary assessment of archaeological impact can be made. Based on the initial literature review and site inspection undertaken as part of this assessment, the following preliminary assumptions regarding archaeology at the site can be made:

- Sites within Darling Harbour tend to have been occupied intensively, and therefore have the potential to contain a range of archaeological evidence dating to different periods of use. This is particularly true of area utilised for industrial activity, where rapidly changing technologies impacted on the types of structures and infrastructure required. Often, the rate of change was so rapid that plans were out-of-date as they were published.
- The construction of successive phases of buildings on the site would have impacted on archaeological remains. Typically, the earlier the building was constructed, the less impact it would have had on the potential archaeological resource.
- Reclamation of shallow area, and successive periods of expansion, rebuilding and subdivision throughout the early to mid 1800s may have buried or removed earlier evidence within the study area, and obscured the original shore line.
- Industrial activity throughout the late 1800s, and into the 20th century, included the demolition of earlier wharves and jetties, reclamation and reconstruction of wharves to better accommodate larger ships and new technologies. This may have disturbed or removed evidence of earlier activities. It is likely, however, that in most instances, structures were demolished to ground level before being backfilled, as was the common practise in 19th century demolition.
- A program of government resumption in the early 20th century is likely to have had the most severe impact on any potential archaeological resource. The cutting back of the headland – to the north of the study area – and the construction of Hickson Road – that required some areas of cutting and some areas of infilling – is likely to have impacted on the archaeological potential of the study area.
- It is likely that some quarrying occurred in the vicinity of the study area in the mid 19th century. Most of this activity, however, appears to have been concentrated to the south-west of the study area.

6.7.5.4 Discussion of archaeological potential

Despite the difficulties of the physical environment, European occupants began to recognise the potential of the area for industry, with industries such as the government brickyards located in Haymarket nearby.

Hickson Road marks the approximate location of the original high water mark. Various phases of resumption occurred throughout the early and later 19th century, to provide for additional wharfage

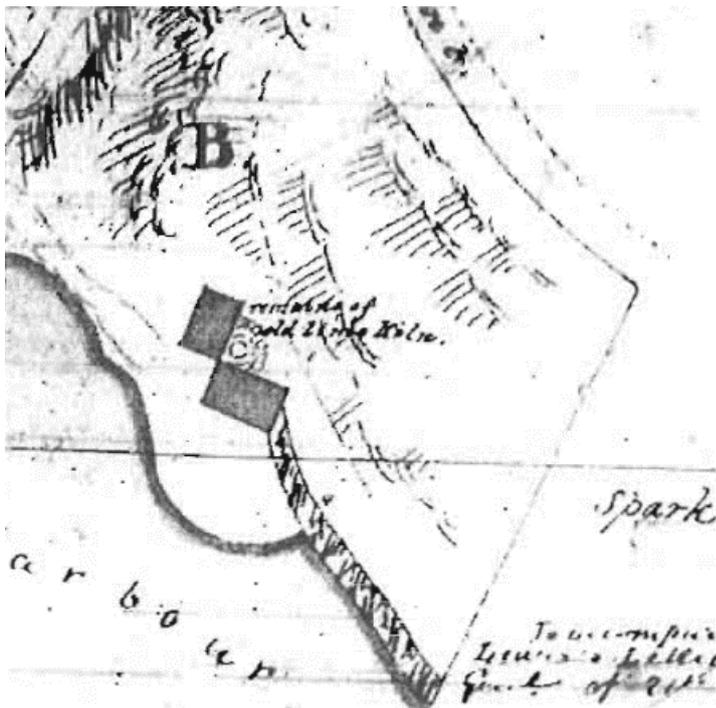
¹⁰⁵ Casey & Lowe 2012: 44.

¹⁰⁶ Headland Park Archaeological Site Fact Sheet June 2013.

and create useable land for industry. The eastern portion of the study area is located on the original shoreline, and the western portion within early reclaimed land.

Despite the lack of evidence in the historical documentation, it is likely that the foreshore in the vicinity of the study area was utilised for small-scale non-industrial farming activities before documented use of the site in the 1820s. This may have consisted of early shipbuilding activities, fishing, foraging, brick making or lime burning. Abundant shell deposits in the Cockle Bay area would have meant that informal lime burning activities would have been a common activity along the rocky foreshore. Lime kilns were located immediately north of the study area, within Munn's property, as illustrated on Figure 110 (not dated, but likely to be c.1830).

Figure 110: Detail from plan showing the 'old lime kiln' on Munn's property. State Records maps and plans Parish of St Philip Vo;1 folios 1-15 reel 2746.



Numerous structures were originally located in the study area prior to the construction of Hickson Road in the early 20th century. These were associated with Munn and Cuthbert's shipyards (Figure 111). These structures would have included workshops and sheds, offices and other structures that constitute a large commercial enterprise of this type. The northern portion of the study area was later subdivided to provide workers housing (Figure 112 and Figure 113).

In 2010 Austral Archaeology stated the following:

"Given the depth of fill (between 2 metres to 7 metres), it is not unreasonable to assume that below ground archaeological features will be present especially along the Hickson Road boundary where the fill deposits are shallow... there is low to moderate potential for evidence of wharf piles, slip ways, building foundations, sea walls, wells, cess pits, landscaping, artefact deposits and infilling representation a range of domestic, commercial and industrial activities from the 1830s, despite later development impacts, on the western boundary of Hickson Road to the south of the headland"

Overall, the Hickson Road study area has potential to contain a range of archaeological resources spanning the 19th century. These have been summarised in Table 63.

Figure 111: The location of the study area on the 1833 City Section plan (Section 93). City of Sydney Archives. Approximate location of station box shown in blue.

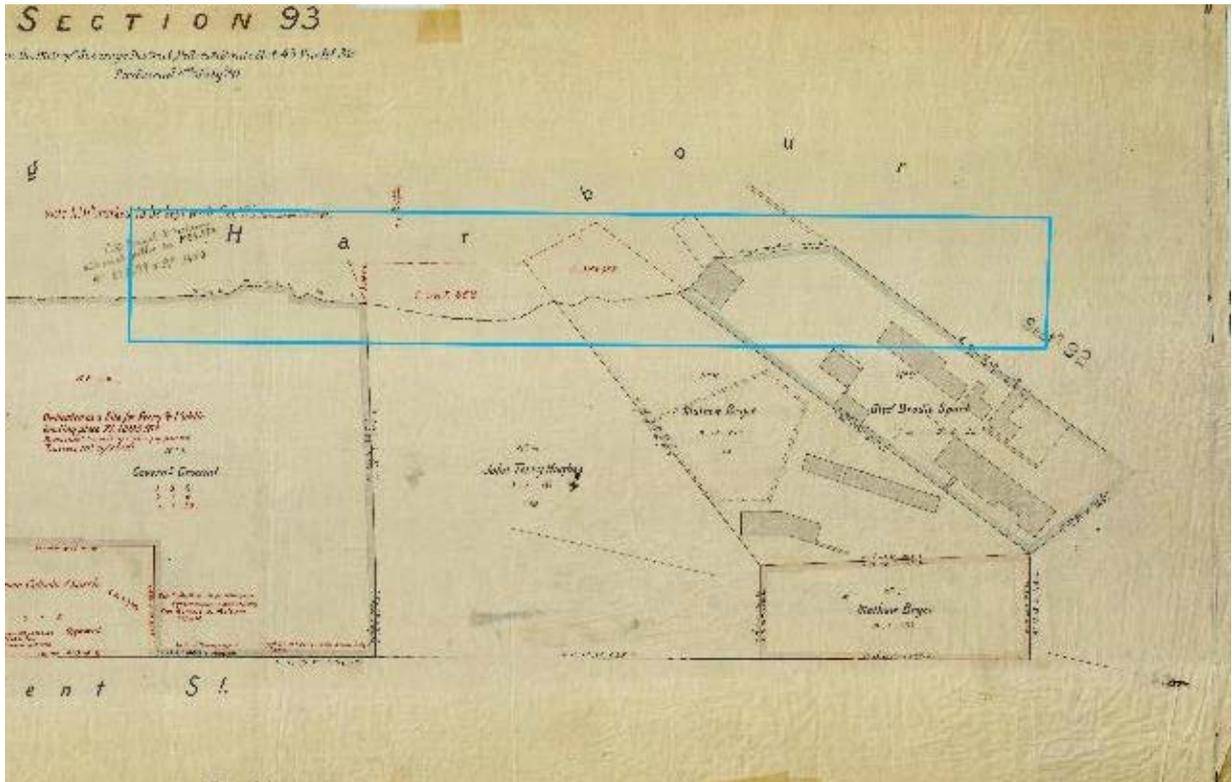


Figure 112: Detail from c.1858 plan of part of Miller's Point. MLNSW M1 811.1718/1858/1.

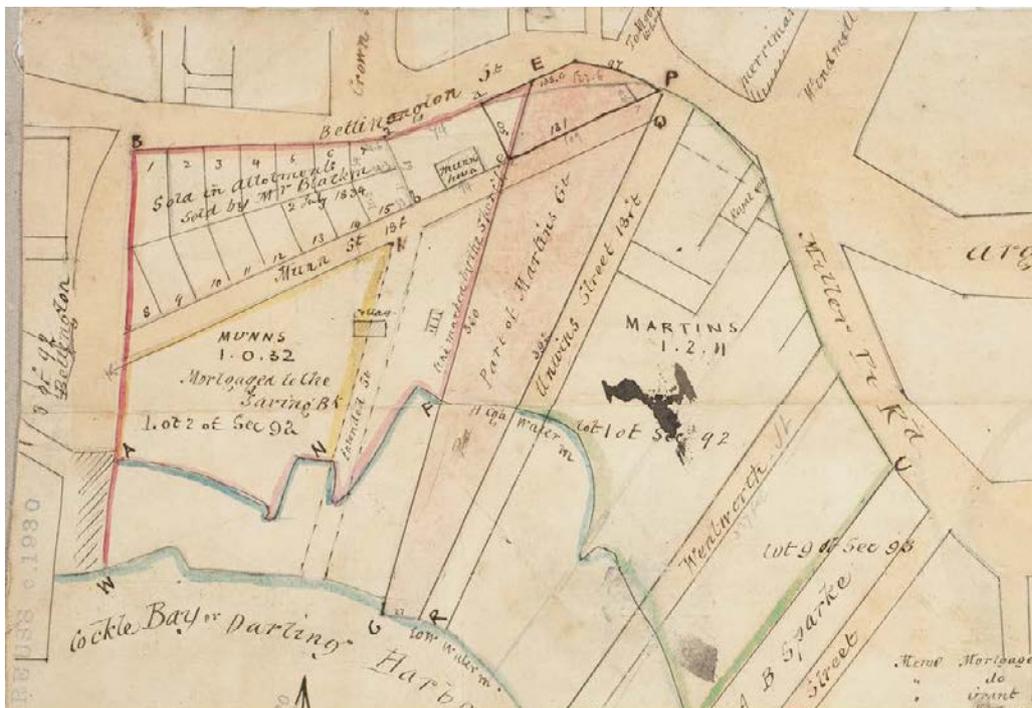
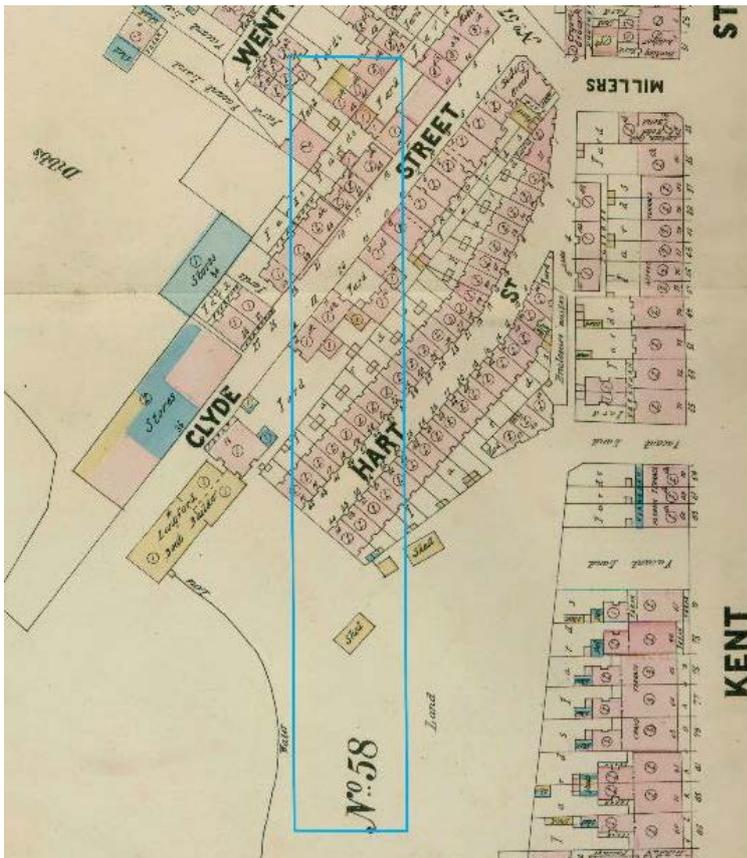


Figure 113: The location of the study area on the 1880 Doves plan (Block 54, 55A, 56A, 57 and 58). City of Sydney Archives. Approximate station box location shown in blue.



6.7.5.5 Preliminary assessment of significance

The following is a preliminary assessment of significance, informed by the NSW Heritage Criteria for *Assessing Significance related to Archaeological Sites and 'Relics'* (2009).

Archaeological research potential (NSW Heritage Criterion E):

- As the study area is partially within the former shoreline, archaeological remains associated with early foreshore and industrial development (such as limeburing), or sea walls (if associated with an intact archaeological site) would have significant research potential, dependant on the nature and extent of any remains. Previous archaeological investigations have shown that reclamation has often buried and protected evidence of former structures. These type of remains are rare and although some information has been obtained from recent archaeological excavation in the vicinity, additional archaeological data would contribute to understating of the early development of the Sydney foreshore. Evidence of reclamation (including reclamation fill) and subsequent development in the 1840s may also have significant research potential depending on its extent and intactness.

Association with individuals, events, or groups of historical importance (NSW Heritage Criteria A, B & D):

- It is likely that evidence of early development of the study area may have associations with former landowners, entrepreneurs and known local historical figures. For example remains of Munn and Cuthbert's shipyards may be present within the study area. As workers cottages were constructed in early 20th century the northern portion of the study area, archaeological remains may also be associated with working class families who were being increasingly confronted by the challenges of high density urban living.

Aesthetic or technical significance (NSW Heritage Criterion C):

- If intact remains associated with early foreshore development, such as wharfage and seawalls, were identified within the study area, they would demonstrate technical significance. Early seawalls were generally constructed of quarried sandstone, some within high levels of craftsmanship, some showing adaptive technologies using available materials. Evidence of the reclamation process, both filling and shoring, may also demonstrate technical significance.

Ability to demonstrate the past through archaeological remains (NSW Heritage Criterion A, C, F & G):

- The study area has moderate to high potential to demonstrate the past through archaeological remains.

Overall, the site may contain archaeological remains with potential to reach the local and State significance thresholds.

6.7.5.6 Overview archaeological potential

The study area has moderate to high potential to contain an archaeological resource with the potential to reach the local and State significance threshold.

Table 63: Summary of archaeological potential within study area

Potential archaeological resource	Potential	Significance	Heritage impact assessment
Pre-1830's use of the foreshore – evidence of lime burning and boat building.	Low-moderate	State	Excavation works within the study area have low potential to impact on archaeological remains
Pre-1850s resumption and development of the foreshore	Moderate	Local-State	Excavation works within the study area have moderate potential to impact on archaeological remains
Pre-1850s wharfage and industrial development	Moderate	Local-State	Excavation works within the study area have moderate potential to impact on archaeological remains
Pre-1900 wharfage and industrial development	Moderate to high	Local	Excavation works within the study area have moderate to high potential to impact on archaeological remains
Evidence of early 20th century resumption and construction of Hickson Road	High	Local	Excavation works within the study area have moderate to high potential to impact on archaeological remains

6.7.5.7 Archaeological impact assessment

Proposed works within the Barangaroo Station site with the potential to impact on archaeological remains include:

- Excavation of open shafts during construction phase
- Foundation/ground slab excavations for establishment of staff amenities, water supply, ventilation, work train, grout batching plant, drainage and water treatment, workforce facilities, spoil storage and removal during construction phase
- Cut and cover excavation for station box

Whilst excavation works during the construction phase of the project are likely to be limited to discrete locations, the excavation of the cut-and-cover station would result in the complete removal of archaeological remains within the station box footprint. Therefore, works in this location would have a major impact on the potential archaeological resources.

6.7.6 Overview of constraints

The following table outlines the potential heritage constraints within the study area:

Table 64: Overview of potential heritage constraints for Barangaroo study area.

Heritage item	Potential heritage impacts		
	Direct impact	Archaeological impact	Indirect impact
Bridges over Hickson Road	Neutral	Neutral	Minor – views and vistas
Palisade Fence and High Steps	Neutral	Neutral	Negligible – views and vistas
Warehouses/Dalgety’s Bond Store Group	Potential direct impact: Minor – vibration	Neutral	Minor – views and vistas
Shops 6, 8 Argyle Place	Neutral	Neutral	Negligible – views and vistas
Shops and residences including interiors	Neutral	Neutral	Negligible – views and vistas
Terrace Duplexes 2-36 High Street Millers Point	Neutral	Neutral	Negligible – views and vistas
Terrace Duplexes 3, 5, 7, 9 High Street Millers Point	Neutral	Neutral	Negligible – views and vistas
Terrace Duplexes 38-72 High Street Millers Point	Neutral	Neutral	Negligible – views and vistas
Terrace Duplexes 74-80 High Street Millers Point	Neutral	Neutral	Negligible – views and vistas
MSB Bond Store No. 3 / Terrace / Walsh Bay Wharves precinct	Neutral	Neutral	Neutral
Lance Kindergarten	Neutral	Neutral	Negligible – views and vistas
Trees at Lance Kindergarten	Neutral	Neutral	Negligible – views and vistas
Oswald Bond Store	Neutral	Neutral	Negligible – views and vistas
Millers Point Conservation Area	Neutral	Neutral	Negligible – views and vistas
Millers Point & Dawes Point Village Precinct	Direct impact: Minor	Major – low to high potential for local and state significant archaeological remains	Minor to moderate – views and vistas
Potential archaeological resource within the study area	N/A	Major – low to high potential for local and state significant archaeological remains	N/A