Figure 2.96 A 1930 aerial photograph showing development along the subject area at this time. The proposed route of the CSELR is shown overlaid as a red line. (Source: Department of Lands)

Figure 2.97 A 1977 view of the High Street entrance to the Psychiatric Unit, Prince of Wales Hospital. (Source: Prince of Wales Hospital)

2.7 Rozelle Stabling/Maintenance Depot

2.7.1 Introduction

The Rozelle Stabling/Maintenance Depot is proposed to be located on the northern side of the City West Link between Victoria Road and Catherine Street overbridge.

2.7.2 Early Land Use

The proposed Rozelle stabling/maintenance depot occupies reclaimed land once part of the estuary of Rozelle Bay.[230] Early maps show two small streams flowing through the site into the bay (Figure 2.98). By the 1880s the subject area was surrounded by Catherine, White and Brennan Streets. Catherine Street is now part of Lilyfield Road; Brennan Street has been mostly consumed by the construction of the City West Link; and White Street was removed when the marshalling yards were constructed.

Sydney Water Detail plans from 1890 show the original street layout surrounding the subject site and what appears to be three small cottages on the land (Figure 2.111).

2.7.3 Establishment and Use of the Yard: 1916–1996

By the turn of the century, increasing traffic of both freight and passengers was causing congestion on suburban railway lines. A scheme to develop separate railways for goods trains was implemented. The double track from Dulwich Hill to Rozelle and Glebe Island opened in June 1916 and the Rozelle Marshalling Yard was created.[231] The Rozelle Marshalling Yard was designed as a holding yard for traffic proceeding to Darling Harbour which was Sydney's main goods yard at this

time. Following the closure of the Glebe Island Abattoir, grain and coal handling facilities and wharves were developed at White Bay near the Rozelle Marshalling Yard facility.[232]

By 1928, a plan of the site shows the huge amount of trains operating from the site (Figure 2.114) and this is confirmed by photographs (Figure 2.113). The Rozelle Yard was a locomotive depot until World War II with an engine shed, 75 foot (23m) turntable, water columns and coal storage facilities (Figure 2.113).

During World War II, Rozelle Yard became a storage area for the American Army and the locomotive depot was removed. Trains of soldiers would sometimes turn up at the yard during the war years loaded with soldiers bound for active service overseas.[233] Figure 2.116 shows the site in 1943.

Since World War II the Goods Yard has held a variety of freight. Trainloads of wheat, barley, and other grains came in from numerous country branch lines and were transferred to silos for storage before being loaded onto the ships.[234]

Coal exports from the 1960s saw many trains loaded with coal move through an unloader and then moved along to the departure road once emptied (Figure 2.115).[235] During 1967, the railway from Dulwich Hill to Rozelle was electrified. This allowed the movement of electrically-hauled freight trains from the Blue Mountains and Gosford to Rozelle.

2.7.4 Closure and Re-use: 1996 to Present

In 1996 the goods line from Pyrmont to Rozelle closed and in 2000 the light rail to Lilyfield opened using the tracks from the Rozelle marshalling yard near Brennan Road (Figure 2.117). For a few years the yard was used irregularly but was completely closed c2007.[236]

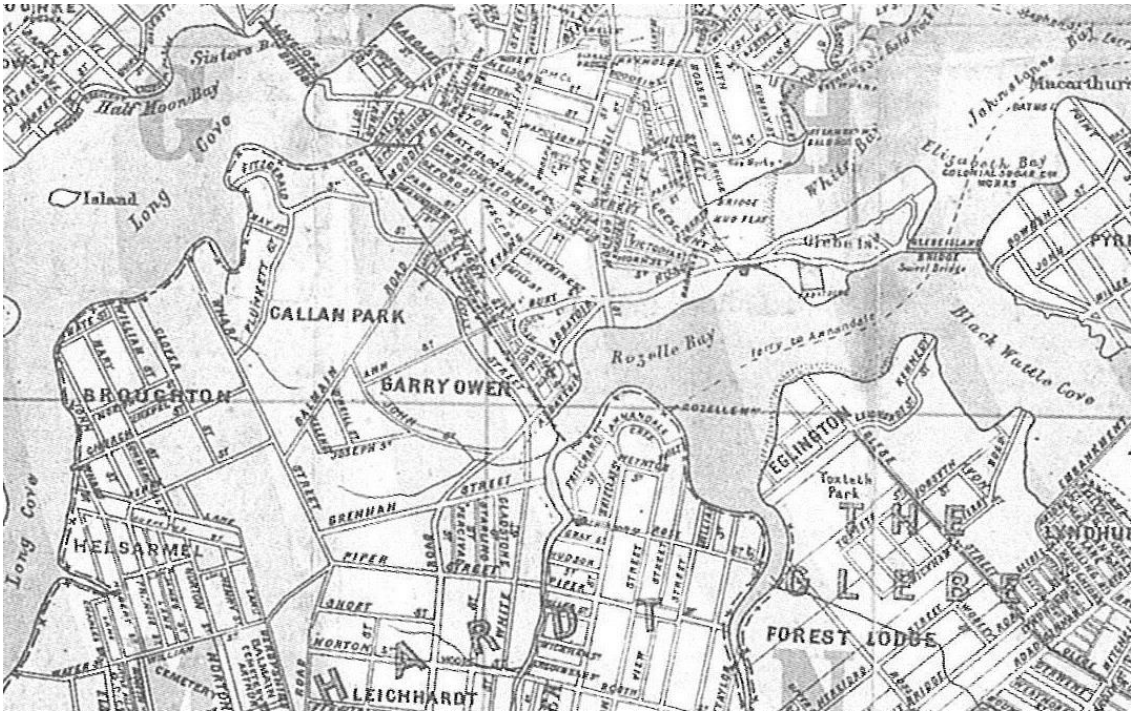

Figure 2.98 The 1885 Gibbs and Shallard Map of the City of Sydney & Suburbs showing streams from Rozelle Bay flowing across the subject site which is north of Brennan Street. White Street and Catherine Street have been constructed. (Source: Ashton P and Waterson D 2000, *Sydney Takes Shape*, p 36)

Figure 2.99 An 1890 Metropolitan Detail Sheet showing development on the subject site prior to the construction of the Rozelle Goods Line in 1916. Catherine Street is now part of Lilyfield Road and much of Brennan Street has been absorbed by the City West Link. White Street no longer exists. (Source: SLNSW)

Figure 2.100 An 1891 Metropolitan Detail Series plan showing the western end of the subject site. Brennan Street now forms much of the City West Link. (Source: SLNSW)

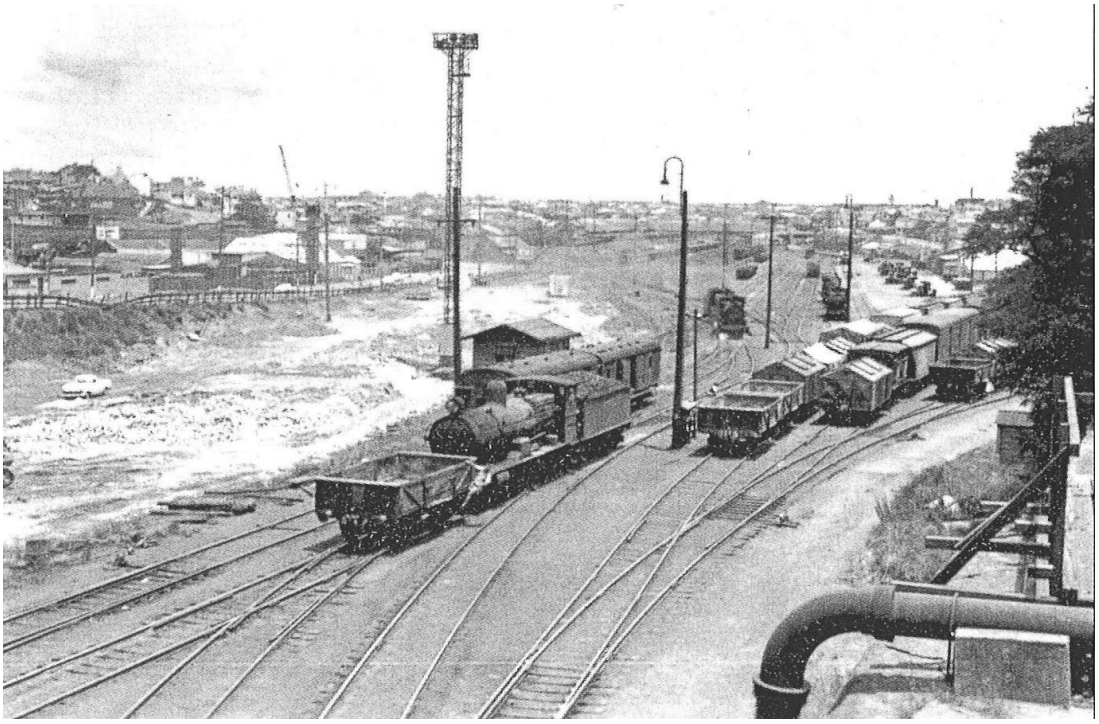

Figure 2.101 An early image of the Rozelle stabling/maintenance depot looking west towards Catherine Street Bridge (nd). Brennan Street, now the City West Link, is to the left of the image. (Source: Oakes J, 2002, *Sydney's Forgotten Goods Railways*, Australian Railway Historical Society, p 43)

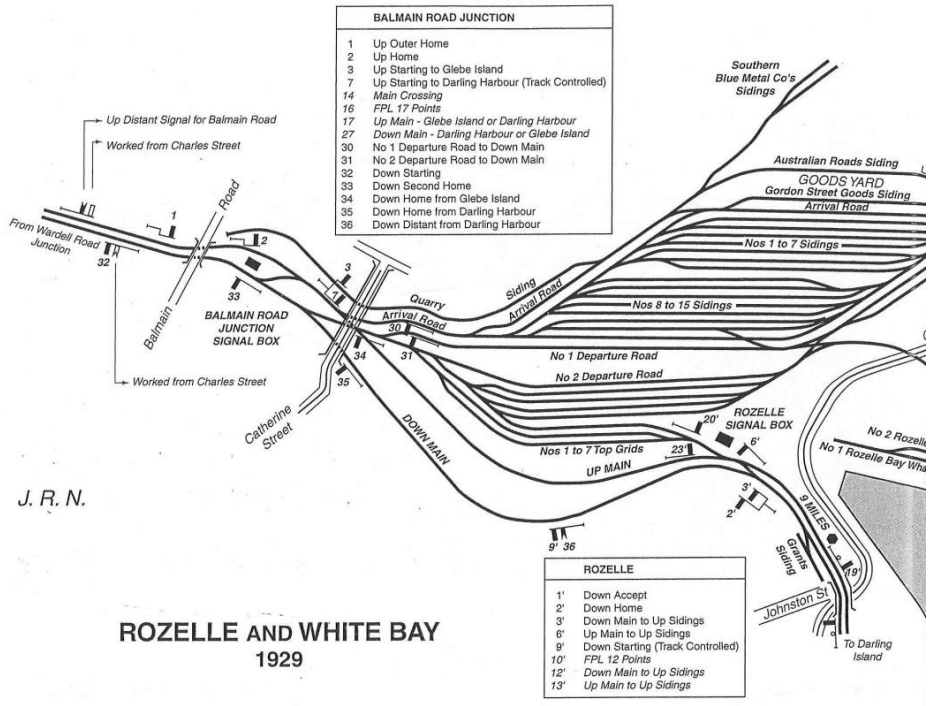

Figure 2.102 1929 plan showing the usage of the Rozelle stabling/maintenance depot at this time. (Source: Oakes J, 2002, *Sydney's Forgotten Goods Railways*, Australian Railway Historical Society, p 46)

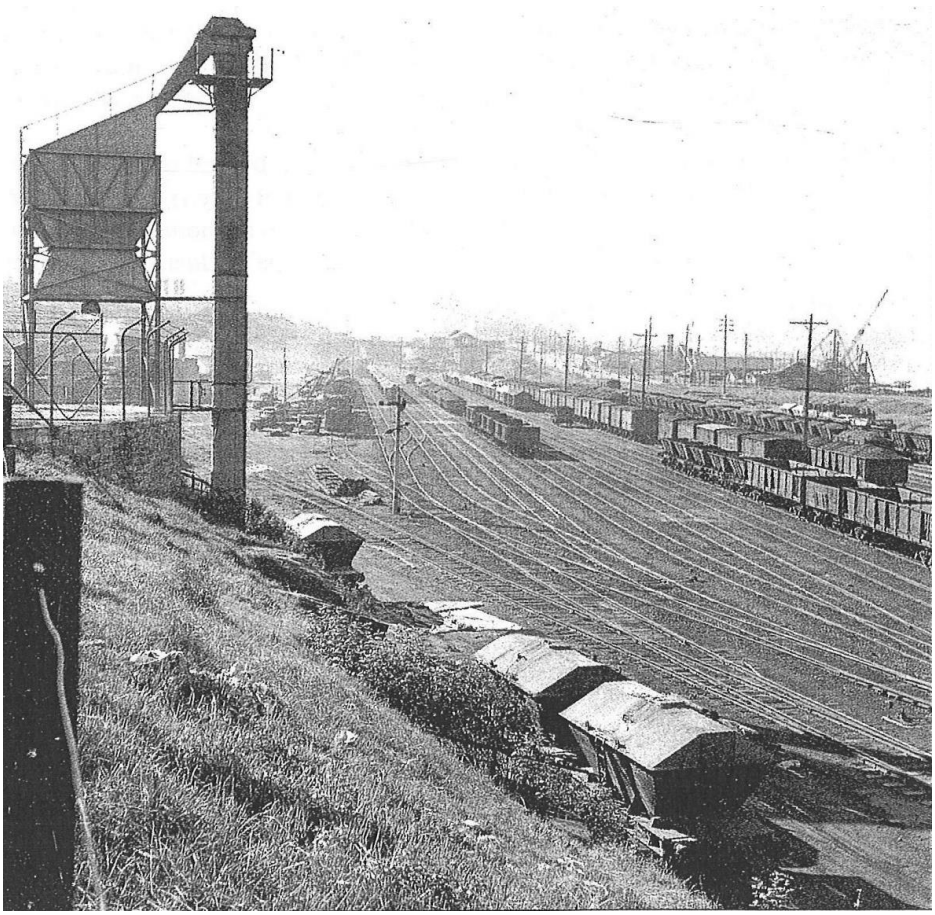

Figure 2.103 Rozelle stabling/maintenance depot viewed from Lilyfield Road near the Catherine Street overbridge. (Source: Oakes J, 2002, *Sydney's Forgotten Goods Railways*, Australian Railway Historical Society, p 49)

Figure 2.104 A 1943 aerial photograph of the Rozelle stabling/maintenance depot. (Source: Department of Lands)

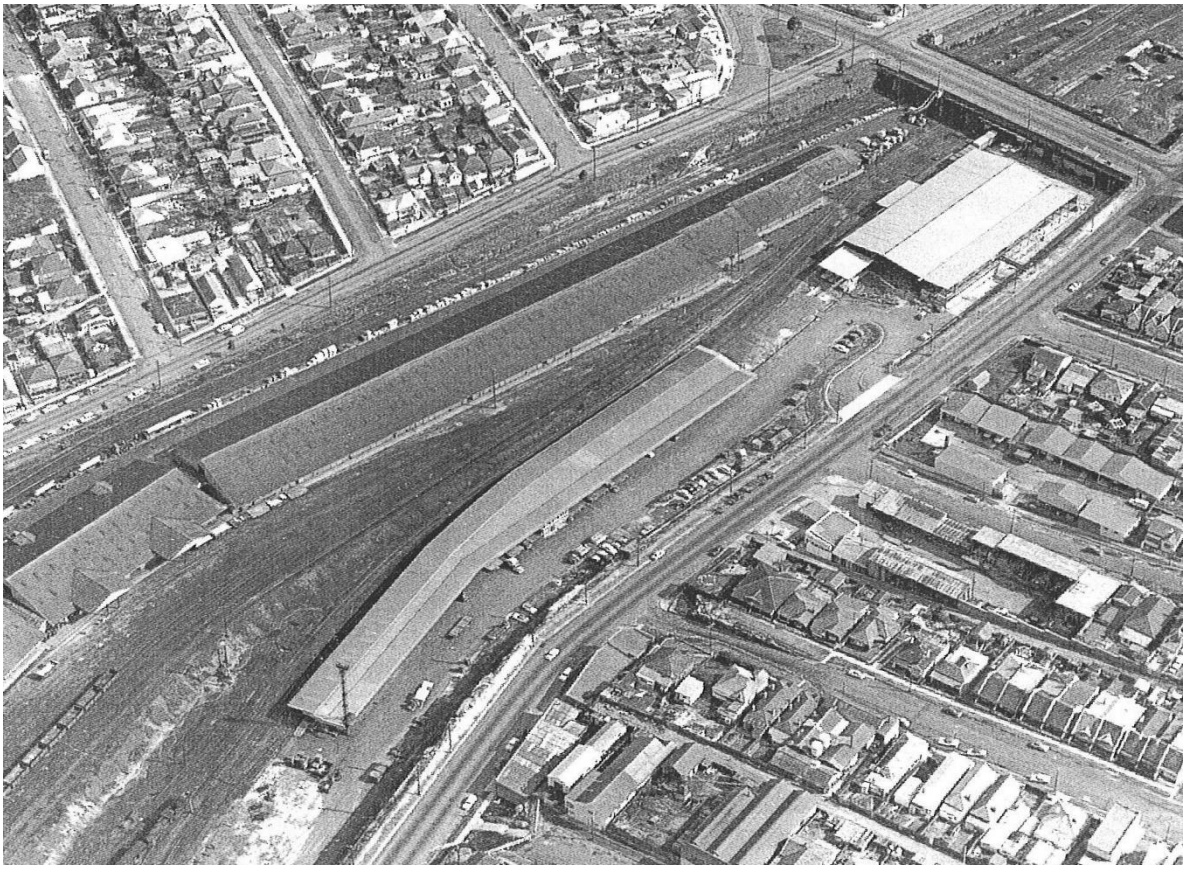

Figure 2.105 A 1960s view of the Rozelle stabling/maintenance depot looking west toward Catherine Street overbridge. Brennan Street (now City West Link) is to the top left of the image and Lilyfield Road is in the foreground. The Up and Down lines to Darling Harbour (now the tracks for the Sydney Light Rail) are located at the far boundary of the yard just below Brennan Street and the arrival and departure roads are located between the two lines of sheds. (Source: Oakes J, 2002, *Sydney's Forgotten Goods Railways*, Australian Railway Historical Society, p 48)

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3.0 Aboriginal Archaeology

3.1 Preamble

This section presents an assessment of Aboriginal archaeological potential along the route of the proposed CSELR, prepared in accordance with the *Due Diligence Code of Practice for the Protection of Aboriginal Objects in NSW.*

This section analyses the available environmental and archaeological background information to prepare an Aboriginal archaeological predictive model. This predictive model is used to determine the likelihood that Aboriginal archaeology will be present along the CSELR route. An assessment of the impact of the CSELR on Aboriginal archaeology, and appropriate mitigation measures, are also provided for each precinct.

3.2 Aboriginal Archaeological Management in NSW

In NSW, Aboriginal heritage is primarily protected under the *National Parks and Wildlife Act 1974* (NSW) (NPW Act), which provides statutory protection for all Aboriginal objects and sites. In order to impact an Aboriginal object or site, an application for an Aboriginal Heritage Impact Permit (AHIP) under Section 90 of the NPW Act must be made. The NSW Office of Environment and Heritage (OEH) have issued a series of best practice guidelines and policies for the management of Aboriginal cultural heritage. These guidelines as listed below, detail requirements, procedures and strategies for the best practice investigation and management of Aboriginal cultural heritage management in NSW. These guidelines aim to facilitate positive Aboriginal cultural heritage outcomes through consultation with the local Aboriginal community, registration of Aboriginal sites, assessment of environmental and historical context, field survey, impact assessment, and significance assessment. These guidelines include:

- DECCW *Aboriginal cultural heritage consultation requirements for proponents 2010. Part 6 National Parks and Wildlife Act 1974* (April 2010);
- DECCW *Due Diligence Code of Practice for the Protection of Aboriginal Objects in NSW* (13 September 2010);
- DECCW *Code of Practice for Archaeological Investigation of Aboriginal Objects in New South Wales* (24 September 2010); and
- OEH *Guide to investigating, assessing and reporting on Aboriginal cultural heritage in NSW* (April 2011).

Aboriginal cultural heritage assessment and investigation as undertaken in accordance with the above guidelines are generally presented in the form of an Aboriginal Cultural Heritage Assessment Report (ACHAR) and Aboriginal Archaeological Technical Report (ATR). The NPW Act and OEH guidelines also require the registration of all Aboriginal objects and/or sites with the OEH administered database Aboriginal Heritage Information Management System (AHIMS). This database provides a detailed inventory of the location of Aboriginal sites and archaeological work within NSW.

As this project is to be assessed under Part 5 (1), of the *Environmental Planning and Assessment Act 1979* (NSW) (EPA Act), the need to obtain Section 90 approval under the NPW Act to allow impact to Aboriginal objects or sites, is removed. However, the EPA Act requires that appropriate measures be taken for the management of Aboriginal cultural heritage by means consistent with

practices and standards adopted in meeting the requirements of the NPW Act (ie the OEH guidelines). This includes the registration of any newly recorded Aboriginal sites with AHIMS.

Therefore, although an AHIP will not be required for this project, the OEH guidelines as detailed above have been adhered to throughout this project in order to provide the most pragmatic and best practice assessment and advice with relation to Aboriginal cultural heritage management.

3.3 Structure

An outline of the environmental context, including an overview of the geology and soils; landforms and landscape; hydrology; fauna and flora; modern land use and Aboriginal archaeological context is provided, precinct by precinct. The precincts are identified as the City Centre precinct (Circular Quay to Chalmers Street); Surry Hills precinct (Devonshire Street to South Dowling Street); Moore Park precinct (South Dowling Street to Alison Road); Kensington precinct (Alison Road to the University of New South Wales); Randwick precinct (Alison Road to High Cross Park); and the Rozelle precinct (Rozelle Maintenance/Stabling Facility).

A summary of the Aboriginal archaeological potential, impact assessment and mitigation measures for each precinct are then outlined.

3.3.1 Aboriginal Archaeological Management Zones

Four Aboriginal archaeological management zones have been defined for the CSELR route, based on the assessed Aboriginal archaeological potential, impact assessment and appropriate mitigation measures. The four zones are outlined in Table 3.1, and correspond to the zones illustrated for each precinct (Figures 3.9–3.10, 3.18, 3.24, 3.33–3.34, 3.41–3.42 and 3.46).

Table 3.1 Definition of Aboriginal archaeological management zones for the CSELR route.

Zone 1	
Aboriginal Archaeological Potential	Aboriginal archaeological potential for Aboriginal objects to be found and/or impacted.
Impact Assessment	Works associated with the CSELR will involve excavation, and are likely to impact on Aboriginal objects.
Mitigation Measures	Aboriginal archaeological investigation (which may include testing, monitoring and/or salvage excavation) will occur during the onsite works program in accordance with OEH guidelines to mitigate any potential impacts on Aboriginal objects. An Archaeological Technical Report (ATR) and an Aboriginal Cultural Heritage Assessment Report (ACHAR) would be prepared by a qualified archaeologist with demonstrated expertise in Aboriginal archaeology in accordance with the *Code of Practice for Archaeological Investigation of Aboriginal Objects in NSW* (2012). The ATR and ACHAR would respond to the detailed design and would present methodologies for the conservation, management, investigation and long-term care and control of potential Zone 1 Aboriginal archaeology proposed to be impacted upon within the CSELR construction boundary. The ATR and ACHAR would be prepared in consultation with the Aboriginal stakeholders. The ATR and ACHAR will be provided to the Aboriginal stakeholders involved in the project for review, comment and endorsement prior to the commencement of onsite works. Aboriginal archaeological works will require the involvement of and consultation with local Aboriginal stakeholders. Any Aboriginal archaeological deposits or objects are identified during CSELR works they will be registered with Aboriginal Heritage Information Management System (AHIMS).

	Any Aboriginal objects identified during works will need to be administered under a Care and Control agreement negotiated between Aboriginal stakeholders. Interpretation of Aboriginal archaeology and cultural heritage, developed in consultation with Aboriginal stakeholders, may be appropriate. All contractors will receive a heritage induction prior to undertaking works within the construction boundary of the CSLER.
Zone 2	
Aboriginal Archaeological Potential	Aboriginal archaeological potential for Aboriginal objects to be found and/or impacted.
Impact Assessment	Works associated with the CSELR in Zone 2 will be minor and primarily restricted to surface levels that have experienced some level of historical disturbance. Little to no impact to areas of Aboriginal archaeological potential is anticipated. Where the impacts extend to deeper stratigraphic levels, there is some likelihood for intact Aboriginal archaeological resources to occur. These levels are unlikely to impact on Aboriginal objects.
Mitigation Measures	Aboriginal archaeological investigation (which may include testing, monitoring and/or salvage excavation) will occur during the onsite works program in accordance with OEH guidelines to mitigate any potential impacts on Aboriginal objects. An Archaeological Technical Report (ATR) and an Aboriginal Cultural Heritage Assessment Report (ACHAR) would be prepared by a qualified archaeologist with demonstrated expertise in Aboriginal archaeology in accordance with the *Code of Practice for Archaeological Investigation of Aboriginal Objects in NSW* (2012). The ATR and ACHAR would respond to the detailed design and would present methodologies for the conservation, management, investigation and long-term care and control of potential Zone 2 Aboriginal archaeology proposed to be impacted upon within the CSELR construction boundary. The ATR and ACHAR would be prepared in consultation with the Aboriginal stakeholders. The ATR and ACHAR will be provided to the Aboriginal stakeholders involved in the project for review, comment and endorsement prior to the commencement of onsite works. In areas within Zone 2 where impacts on Aboriginal archaeology are not anticipated, an archaeological watching brief would be implemented. As part of this brief, an archaeologist would be on call to investigate archaeological remains identified during ground works, where an archaeologist is not on site. Any Aboriginal archaeological works will require the involvement of and consultation with local Aboriginal stakeholders. Any Aboriginal archaeological deposits or objects are identified during CSELR works they will be registered with Aboriginal Heritage Information Management System (AHIMS). Any Aboriginal objects identified during works will need to be administered under a Care and Control agreement negotiated between Aboriginal stakeholders. Interpretation of Aboriginal archaeology and cultural heritage, developed in consultation with Aboriginal stakeholders, may be appropriate. All contractors will receive a heritage induction prior to undertaking works within the construction boundary of the CSLER.
Zone 3	
Aboriginal Archaeological Potential	Aboriginal archaeological evidence may be present; however, due to the nature and extent of modern land use, it is likely to be disturbed. It may be present in isolated pockets, truncated soil profiles or in historical/modern layers of activity. The location and depth of such deposits is not able to be accurately predicted.

Impact Assessment	Aboriginal archaeological evidence may be present in isolated pockets within the impact zone of the CSELR; however, the exact locations of Aboriginal archaeology are not able to be accurately predicted. Where Aboriginal archaeological evidence is absent, CSELR construction would not have an impact. Where Aboriginal archaeological evidence is present, CSELR construction would have an adverse impact and will be mitigated through a program of investigation.
Mitigation Measures	Aboriginal archaeological investigation (which may include testing, monitoring and/or salvage excavation) will occur during the onsite works program in accordance with OEH guidelines to mitigate any potential impacts on Aboriginal objects. An Archaeological Technical Report (ATR) and an Aboriginal Cultural Heritage Assessment Report (ACHAR) would be prepared by a qualified archaeologist with demonstrated expertise in Aboriginal archaeology in accordance with the *Code of Practice for Archaeological Investigation of Aboriginal Objects in NSW* (2012). The ATR and ACHAR would respond to the detailed design and would present methodologies for the conservation, management, investigation and long-term care and control of potential Zone 3 Aboriginal archaeology proposed to be impacted upon within the CSELR construction boundary. The ATR and ACHAR would be prepared in consultation with the Aboriginal stakeholders. The ATR and ACHAR will be provided to the Aboriginal stakeholders involved in the project for review, comment and endorsement prior to the commencement of onsite works. In areas within Zone 3 where impacts on Aboriginal archaeology are not anticipated, an archaeological watching brief would be implemented. As part of this brief, an archaeologist would be on call to investigate archaeological remains identified during ground works, where an archaeologist is not on site. Any Aboriginal archaeological works will require the involvement of and consultation with local Aboriginal stakeholders. Any Aboriginal archaeological deposits or objects are identified during CSELR works they will be registered with Aboriginal Heritage Information Management System (AHIMS). Any Aboriginal objects identified during works will need to be administered under a Care and Control agreement negotiated between Aboriginal stakeholders. Interpretation of Aboriginal archaeology and cultural heritage, developed in consultation with Aboriginal stakeholders, may be appropriate. All contractors will receive a heritage induction prior to undertaking works within the construction boundary of the CSLER.
Zone 4	
Aboriginal Archaeological Potential	No Aboriginal archaeological potential due to large-scale excavations, and demolition and construction activities which would have removed any Aboriginal archaeological deposits in these locations.
Impact Assessment	CSELR construction would have no impact on Aboriginal archaeology in Zone 4.

Mitigation Measures	Further assessment or physical investigation of Aboriginal archaeology is not required within Zone 4. An Archaeological Technical Report (ATR) and an Aboriginal Cultural Heritage Assessment Report (ACHAR) would be prepared by a qualified archaeologist with demonstrated expertise in Aboriginal archaeology in accordance with the *Code of Practice for Archaeological Investigation of Aboriginal Objects in NSW* (2012). The ATR and ACHAR would outline a methodology for the management of unexpected Aboriginal objects within Zone 4. Should unexpected Aboriginal objects or other archaeological evidence be identified in these areas during works, works would cease in the immediate area and the archaeologist contacted to assess the evidence. Additional investigation, such as salvage excavation, may be required. An archaeological watching brief, where an archaeologist is on call to investigate unexpected archaeological remains identified during ground works where an archaeologist is not present on site, should be implemented. Any Aboriginal archaeological works will require the involvement of and consultation with local Aboriginal stakeholders. All contractors will receive a Heritage Induction prior to undertaking works within the construction boundary of the CSLER.

3.4 City Centre Precinct (Circular Quay to Chalmers Street)

3.4.1 Environmental Context

Overview of the Local Environment

Geology and Soils

The City Centre precinct is characterised by a range of geological profiles and soil landscapes, as shown in Figures 3.1 and 3.2.

The northernmost section of the City Centre precinct (between Alfred Street and George Street at Essex Street) is dominated by man-made fill, introduced to the site in the early to mid-nineteenth century primarily as part of land reclamation activities to create Circular Quay (Figure 3.1). Prior to historical landscape modification, this area would have been located on tidal mudflats or on the transition between the tidal mudflats and the adjacent sandstone ridge.

Much of the central portion of the City Centre precinct (George Street at Essex Street to George Street at Market Street, and George Street at Wilmot Street to George Street at Hay Street) is located on the Gymea soil landscape, which is underlain by Hawkesbury sandstone (Figure 3.1). It is an erosional soil landscape and characterised by shallow to moderately deep soils, with frequent rock outcrops.[1]

The City Centre precinct route close to Town Hall (on George Street between Market and Wilmot Streets) traverses the Lucas Heights soil landscape, overlying Ashfield shale in this location (Figure 3.1). It is a residual soil landscape and typically found on ridge and plateau landforms such as that at Town Hall. Soils are generally moderately deep and rock outcrops are absent.[2]

Deep Creek soil landscape is identified at the southernmost section of the City Centre precinct (between George Street at Hay Street and Eddy Avenue) (Figure 3.2). Deep Creek soils are alluvial and tend to be deep (over 200cm). In the Haymarket area it is deposited over Holocene estuarine deposits (silty to peaty quartz sand, silt and clay).[3]

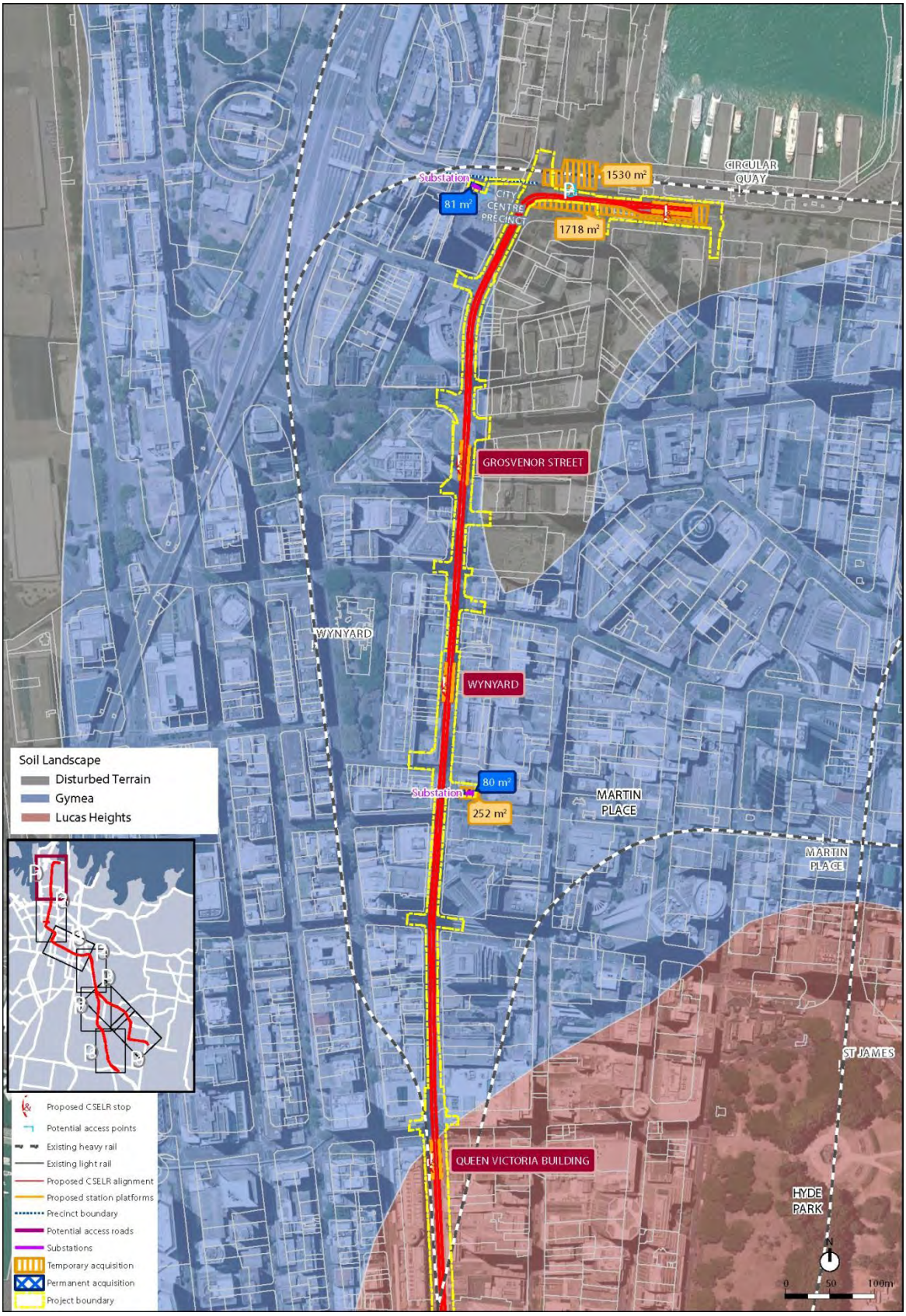


Figure 3.1 Soil landscapes in the vicinity of the City Centre precinct (north). (Source: Chapman, GA and CL Murphy, *Soil Landscapes of the Sydney 1:100 000 Sheet Map*, Department of Environment, Climate Change and Water, Sydney. Google Earth with PB/Transport for New South Wales base map and GML 2013 additions)

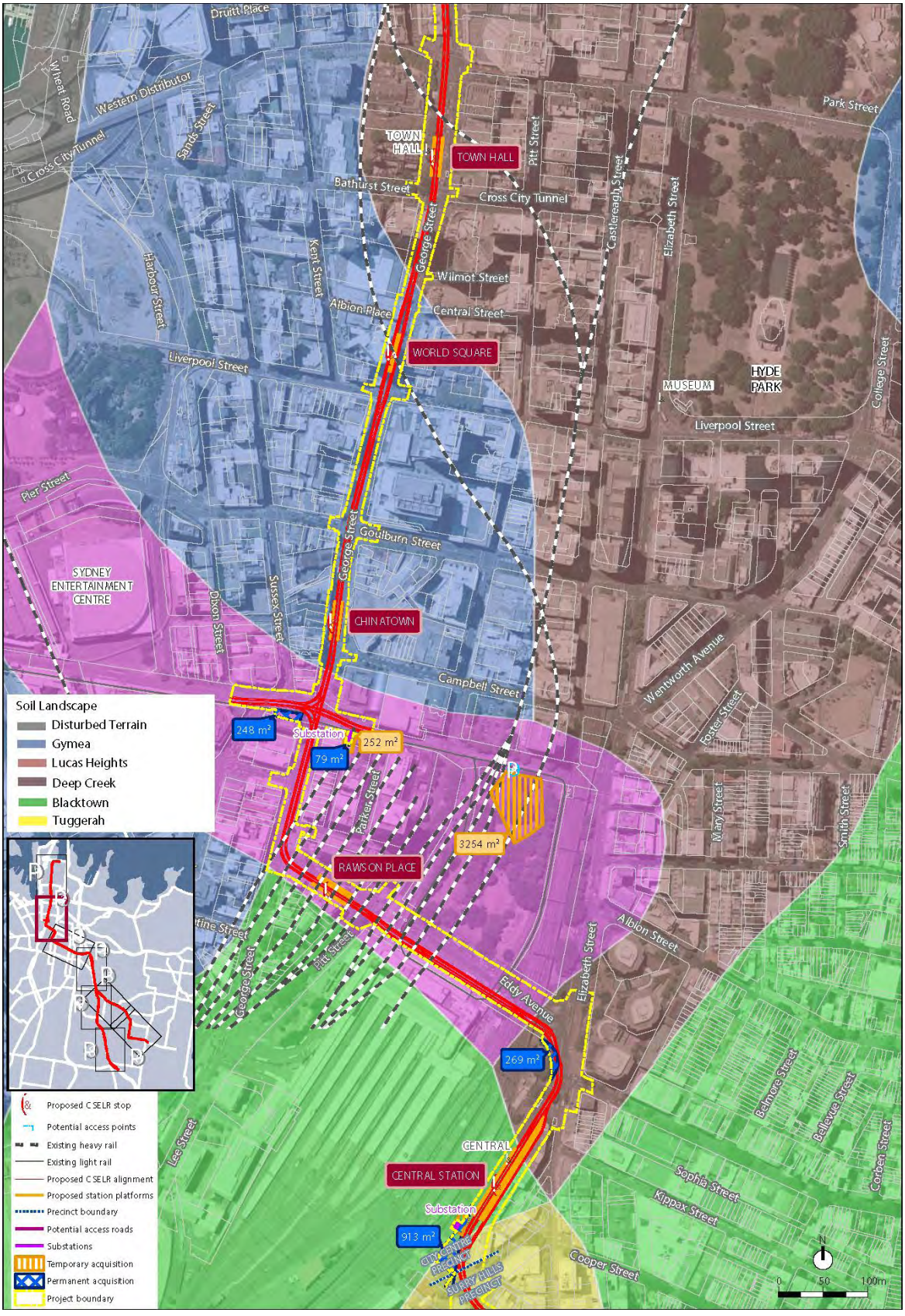


Figure 3.2 Soil landscapes in the vicinity of the City Centre precinct (south). (Source: Chapman, GA and CL Murphy, *Soil Landscapes of the Sydney 1:100 000 Sheet Map*, Department of Environment, Climate Change and Water, Sydney. Google Earth with PB/ Transport for New South Wales base map and GML 2013 additions)

Landforms and Landscape

The City Centre precinct route traverses a number of landforms between Circular Quay and Central Station. The natural landscape has been heavily modified since European settlement, but it is possible to reconstruct the original landforms through the CBD. At Alfred Street (Circular Quay) the natural landscape was dominated by the intertidal mudflats of Sydney Cove.

George Street between Circular Quay and Town Hall follows the mid-slope of the valley between the Tank Stream and the rocky ridge to the west (where York Street currently runs). Close to Circular Quay the slope from the ridge down to the foreshore was reasonably steep; however, the gradient became less steep closer to Town Hall.

The City Centre precinct route reaches the top of the ridge where Town Hall is located. From there, the route traverses the slope down to Haymarket, naturally a swampy mudflat associated with Darling Harbour, and up the slope towards Central Station.

Hydrology

The Tank Stream is the nearest freshwater source to the northern part of the City Centre precinct route. Originally the Tank Stream, which is formed by seepage springs in underlying sandstone in the vicinity of what is now Hyde Park, formed a definitive creek around King Street, before flowing into Circular Quay close to the intersection of Pitt and Alfred Streets.[4]

South of Town Hall, the City Centre precinct route runs through the Darling Harbour catchment. The area at Haymarket close to George Street was historically a swampy mudflat—close to the original shoreline of Darling Harbour.[5] An unnamed creek was recorded running from Surry Hills (close to Albion Street) northwest to Darling Harbour, traversing Belmore Park and then crossing George Street at Hay Street.

Both the Tank Stream and the unnamed creek at Darling Harbour would have provided a freshwater source for local Aboriginal people.

Flora and Fauna

Close to Circular Quay the natural environment would have reflected the transitional landforms of the site as the study area changed from the rocky ridge to the mudflats of the intertidal zone. The deep waters of Circular Quay are unlikely to have supported mangroves on the mudflats[6], and early European accounts and paintings do not mention mangroves on the mudflats of the cove.

Much of the City Centre precinct line runs part way up the slope between the Tank Stream valley to the east, and the Hawkesbury sandstone ridge to the west. The environment here would have consisted of open woodland of Scribbly Gum and *Eucalyptus racemosa*. A shrubby understorey may have been present, with *Leptospermum flavescens*, *Banksia oblongifolia* and *Callistemon citrinus*.[7]

The swampy area between Darling Harbour and Central Station would have supported a swamp forest dominated by swampy oak (*Casuarina glauca*), ti-tree (*Melaluca sp.*) and swamp mahogany (*Eucalyptus robusta*).[8] The landscape just beyond the mudflats supported scrub, giving way to forested ridges further upslope.[9]

The fauna of the CBD area, at the time of European settlement, is well documented and includes many species still present in other Sydney regions like that of the nearby Cumberland lowlands today. The various species included kangaroo, wallaby, wombat, echidna, flying fox, emus, quolls,

various native rats and mice, snakes and lizards.[10] Marine resources such as fish would have been plentiful and easily accessed from the northern part of the study area, although Watkin Tench, a military officer on the First Fleet, describes in 1788 the fish at Port Jackson less plentiful than at Botany Bay.[11] Tench mentions fish species such as:

> *bass, mullets, skate, soles, leather-jackets and many other species, all so good in their kind as to double our regret at their not being more numerous. Sharks of an enormous size are also found here.*[12]

The swampy marshland at Haymarket was noted for supporting a wide variety of waterbirds that may have been an important resource for the local Aboriginal population.[13]

Modern Land Use and Disturbance

The physical development in the vicinity of the City Centre precinct since European settlement has been characterised by successive phases of landscape modification (particularly land reclamation), building construction and demolition as urban development increased and intensified between 1788 and the present time. As the City Centre precinct route follows George Street (Sydney's oldest road) for much of its length, the land use and physical disturbance of this precinct is dominated by road construction activities.

The area close to Circular Quay (Alfred Street) was subject to small-scale land reclamation activities between 1788 and 1837; however, an official government program oversaw the large scale reclamation of the area between 1837 and 1855 for the construction of 'Semi-Circular Quay'.[14] Land reclamation activity to stabilise the swampy mudflats close to Darling Harbour also occurred close to the City Centre precinct route at Haymarket.

Other major disturbances are associated with excavation within the roadways for underground utilities and infrastructure, such as Town Hall railway station.

Historical activities such as road construction, road widening activities and building construction (such as the modification of the slope of Brickfield Hill), demolition, land reclamation and excavation for underground infrastructure may have disturbed natural soil and geological profiles, and perhaps some archaeological deposits.

Today the City Centre precinct route follows established roads (Alfred Street, George Street, Rawson Place, Eddy Avenue) (Figures 3.3–3.8). These roads are sealed and many utilities such as sewers, stormwater drains and electrical services have been installed within these roadways that would have caused localised disturbance to subsurface soil profiles (Figures 3.3 and 3.5). Preliminary desktop geotechnical information indicates that in some sections of the City Centre precinct less than 500mm of modern fill overlies residual soils and alluvium.[15]

Figure 3.3 Herald Square and Alfred Street, Circular Quay, facing George Street. (Source: GML 2013)

Figure 3.4 George Street, near Town Hall, facing north. (Source: GML 2013)

Figure 3.5 George Street, at Haymarket, facing north. (Source: GML 2013)

Figure 3.6 Rawson Place. (Source: GML 2013)

Figure 3.7 Belmore Park, facing sourth to Central Station. (Source: GML 2013)

Figure 3.8 Chalmers Street, facing north. (Source: GML 2013)

3.4.2 Archaeological Context

AHIMS Search

An extensive search of the Aboriginal Heritage Information Management System (AHIMS) database administered by the Office of Environment and Heritage (OEH) was undertaken on 19 June 2013 (Appendix A). Twenty-one registered sites were located within the 3km x 3km search area, centred on the route within the City Centre precinct. At many of these sites more than one 'site feature' is registered. Table 3.1 provides an overview of the different site features identified within the bounds of the AHIMS search, and their frequency.

Table 3.2 Frequency of site features at registered AHIMS sites within approximately 3km of the City Centre precinct.

Site Type or Feature	Frequency	Percentage
Artefact	8	31%
Shell/Midden	1	4%
Aboriginal Ceremony and Dreaming	1	4%
Burial	1	4%
Potential Archaeological Deposit (PAD)	15	57%
Total	**26**	**100%**

The AHIMS results suggest that artefacts (isolated or scatters) and potential archaeological deposits (PADs) are the most commonly recorded Aboriginal archaeological sites in the vicinity of the City Centre precinct.

The general patterning of the results indicates a variety of site types are present in the area. While the results are not a representative sample of archaeological sites in the region, they do reflect to some extent the diversity of ways past Aboriginal people used and lived in the local landscape. Many of the sites recorded were identified in similar natural environments to those present within the City Centre precinct.

The pattern revealed by the AHIMS search is likely to have been heavily skewed by the nature of urban development in Sydney's CBD. While it indicates that a range of Aboriginal archaeological sites are found in central Sydney and provides scientific evidence that Aboriginal people used this landscape in a range of ways, it is not necessarily closely demonstrative of specific patterns of Aboriginal landscape use. The extremely high level of ground disturbance caused by urban development has most certainly destroyed and/or damaged large amounts of Aboriginal archaeological evidence within the CBD. Many of the recorded sites have been identified and registered within the last 30 years; as large-scale modern development has encroached on less disturbed areas of land and the laws with respect to protection of Aboriginal objects have been tightened.

Ethnohistory

Most of the available ethnohistorical information available for the Aboriginal people who lived around Sydney's CBD comes from the writings of officials who travelled to New South Wales with the First Fleet; including Governor Arthur Phillip, Judge Advocate David Collins, Captain Lieutenant Watkin Tench and Lieutenant William Dawes. Dawes also recorded a large amount of vocabulary of Aboriginal people around Port Jackson, and included notes on pronunciation and grammar. Paintings and sketches were also produced by various artists. They depicted Aboriginal people,

camps, tools and weapons.[16] A wealth of information is contained in these documents, despite the European bias inherent in the recording of this data.

Much of the information presented below has been extrapolated from Val Attenbrow's 2002 seminal work on Aboriginal ethnohistory and archaeology at Sydney—*Sydney's Aboriginal Past: Investigating the archaeological and historical records*. It has been supplemented with some further research of primary and secondary sources. The account below focuses on the aspects of Aboriginal life that would have left physical evidence in order to develop an understanding of the likelihood of Aboriginal objects being present at the study area.

Accounts of Governor Arthur Phillip and Philip Gidley King identified the Gadigal (also spelt Cadigal) people as the inhabitants of the area between South Head and Darling Harbour. The Wangal were said to have occupied the land from Darling Harbour west to Rose Hill (Parramatta).[17] This indicates that the City Centre precinct was likely to have been located within Gadigal lands, and was close to the tribal boundary with the Wangal.

The Gadigal, and other nearby tribes, would have been among the first Aboriginal people to experience the effects of physical and social dislocation as a result of the arrival and settlement of the First Fleet at Sydney Cove. Furthermore, epidemics of smallpox dramatically affected the Aboriginal population in Sydney, and across Australia. In 1790 Bennelong estimated to Governor Phillip that over half of Sydney's original Aboriginal population had died as a result of the smallpox epidemic that broke out in 1789.[18] Other effects of European colonisation on local Aboriginal populations included loss of access to traditional lands and resources, intertribal conflict, starvation, and the breakdown of traditional cultural practices. The effects of such severe social dislocation may have dramatically altered some aspects of the lives of local Aboriginal people recorded by early European observers.

Subsistence Activities

The people that inhabited the coastal regions of the Port Jackson area had access to a wide range of natural resources, including terrestrial and marine flora and fauna. For coastal Aboriginal people, marine resources are most likely to have been a vital part of their diet. This is supported by the archaeological evidence gleaned from excavation in the CBD. Tench suggests fishing was their primary subsistence activity:

> *…[they] wholly depend for food on the few fruits they gather, the roots they dig up in the swamps, and the fish they pick up along shore or contrive to strike from their canoes with spears. Fishing, indeed, seems to engross nearly the whole of their time, probably from its forming the chief part of a subsistence…*[19]

Other marine resources such as shellfish and crustaceans were likely to have been frequently collected and eaten.

Although marine animals formed a substantial part of the diet of Aboriginal people who lived in and around the City Centre precinct, terrestrial animals such as kangaroos, possums, and various birds were also hunted and eaten regularly. The landscape was also manipulated by Aboriginal people through periodic burning of the undergrowth to encourage terrestrial animals such as kangaroos to graze, and thus facilitate hunting. Evidence of this is recorded in the vicinity of Sydney Cove and, despite the close proximity to marine resources, indicates that terrestrial animals were commonly used as a food resource.

Written accounts describe the use of a variety of edible plants in the Sydney region, including seeds, fruits and roots. While there are over 200 edible native plant species known in the Sydney region, it is difficult to reconstruct how important each was to the subsistence diet of Aboriginal people near the study area. This is largely a result of the discrepancies in recording this information, including the widely different names and descriptions given to different native plant species in the late eighteenth and early nineteenth centuries.

Material Culture

The material culture of local Aboriginal groups is also recorded to some extent in early historical accounts, and is reinforced by the archaeological record. Many of the tools were multi-purpose and portable, allowing groups to practice subsistence activities and cultural traditions across the landscape. Aboriginal people made and used a suite of stone tools, and this is one of the most ubiquitous forms of archaeological evidence across Australia. Following contact there are common examples of glass, and sometimes ceramic, being knapped in the same way as stone to form tools.

Many tools would have been made of organic materials and most, such as string bags or bark canoes, have not been preserved archaeologically (although some examples are found in museum and private collections). Some organic materials, such as shell and bone, survive better than others, and are well represented in the historical and archaeological records.

Fish hooks were the most common shell implement in the Sydney area; however, they are unique in Australia to the area between Port Stephens and the NSW/Victorian border, and all date within the last 1000 years. Some archaeologists have suggested that these were introduced by Pacific Islanders in the last millennium, although this has not been proven.[20] Historical accounts indicate that in the Port Jackson area—although both genders engaged in fishing—fish hooks were only used by women and spears were only used by men.

Patterns of Land Use

Many written European accounts and drawings record Aboriginal people who occupied the Port Jackson area—including the Gadigal—as camping, cooking, and fishing on the open shoreline, estuarine, river banks and rockshelters near water. Attenbrow's analysis of ethnohistorical evidence regarding landscape use indicates a focus of Aboriginal activity on valley bottoms and shorelines.[21] Attenbrow's Port Jackson Archaeological Project (see below) also demonstrated that archaeological sites were similarly patterned in a way that supports this focus.[22] She does, however, caution reliance on these patterns as they are skewed by archaeological preservational factors, as well as biases in what has been portrayed in the historical record.[23]

Relevant Local Aboriginal Archaeological Literature

Val Attenbrow 1991—Port Jackson Archaeological Project

In 1991 Val Attenbrow undertook a project to relocate registered DECCW sites (now known as AHIMS sites) as many were poorly recorded. Site survey was undertaken across the Port Jackson catchment, which Attenbrow divided into eight sub-catchments. Over 350 middens and archaeological deposits were relocated or newly identified. Attenbrow identified a number of patterns of site distribution associated with aquatic zones and geological formations within the catchment.

The northern section of the City Centre precinct is located within sub-catchment 8 (Sydney Harbour Bridge to South Head) of Attenbrow's Port Jackson archaeological project. This sub-catchment had

the smallest area (20.5km^2), and had freshwater, estuarine and ocean influenced aquatic zones. Twenty-two middens had been recorded in this broader sub-catchment (as at 2001).

Attenbrow's study revealed that 98 per cent of middens in the entire Port Jackson catchment were located on Hawkesbury sandstone, even though there is a greater area of Wianamatta shale landscapes within the project's study area. The number of middens varied drastically across the Port Jackson catchment—partly due to discrepancies in factors such as the land area of each sub-catchment and the intensity of residential and industrial development—however, it was clear that middens and deposits occurred in higher densities in sub-catchments that included an estuary.[24]

Godden Mackay 1998—Angel Place

Godden Mackay identified Aboriginal archaeological deposits at Angel Place, in Sydney's CBD, during their 1997–1998 program of historical archaeological investigations. Following the discovery, salvage excavation of the Aboriginal archaeological deposit was also undertaken as part of the archaeological works prior to redevelopment.

The Angel Place site was the first Aboriginal archaeological site to be identified at the Tank Stream as a result of development works. The assemblage comprised of 54 artefacts including flakes, cores and debitage. The range of artefact types indicated that the assemblage had been formed through on-site knapping processes of a range of raw stone materials, including silicified tuff, indurated mudstone, silcrete and quartz. The nature of the archaeological deposit suggested that the assemblage had not been formed during one isolated event. The deposit was more likely an example of repetitive stone tool manufacture and/or lithic reduction activities undertaken along the banks of the Tank Stream, and may have originally been part of a contiguous archaeological deposit that has been fragmented and largely destroyed by historical land disturbance.[25]

Dominic Steele Consulting Archaeology 2003—Quadrant Development Site

The Quadrant site, on the corner of Broadway and Mountain Street in Ultimo, was the subject of archaeological testing by Dominic Steele Consulting Archaeology in 2001 and 2002. Blackwattle Creek originally passed through the Quadrant site, which was also a natural swamp.

Excavation revealed that, in a portion of the site, natural soil profiles had been preserved beneath a capping of introduced fill laid in the historical period, although they were truncated and disturbed. The soil profiles present at this site comprised of a deep alluvial deposit, with the upper layers consisting of a Blacktown soil landscape. The Blacktown soil landscape is characterised by its poor drainage quality.[26]

An artefact scatter was identified during a program of testing. The scatter was identified as a background distribution of stone artefacts in a landscape only sporadically visited by Aboriginal people. Steele concluded that the limited Aboriginal archaeological evidence encountered at the Quadrant site was the product of two factors. The first was the significant disturbance across the site in the historical period. The second was the way past Aboriginal people were likely to have utilised the natural environment:

> *The poorly-drained nature of the landscape at the Quadrant site is one possible explanation for the absence of more substantial Aboriginal archaeological remains identified during the investigation program. It is reasonable to assume that Aboriginal people in the past may have exploited the various resources available within these environments, but it is unlikely people established long-term occupation sites on them.*[27]

Beyond the creekline and swamp, the report identified that more elevated portions of the site located on Hawkesbury Sandstone would have been more favourable for Aboriginal occupation, and activities may have had a more substantial archaeological signature. Steele notes that these locations have generally experienced such a degree of historical development that the natural A horizon soils capable of bearing artefacts and archaeological deposits have been removed or heavily disturbed.

Dominic Steele Consulting Archaeology 2006—KENS Site

The Kent, Erskine, Napoleon and Sussex Streets (KENS) site was subject to Aboriginal and historical archaeological excavation in 2003, prior to the redevelopment of the city block. The Aboriginal archaeological component of this project was carried out by Dominic Steele Consulting Archaeology.

A number of buried original (pre-1788) soil profiles were identified over the course of the archaeological excavation program. Archaeological testing and salvage across these profiles revealed that they had been truncated and somewhat disturbed by historical activity; however, excavation yielded a total of 952 artefacts across the site. A large proportion of the artefacts were broken by trampling or burning—this damage may have occurred during the early historical period. The assemblage did not provide a large amount of data about the range or nature of stone tool technologies. Analysis suggested that the assemblage dated to the Middle and Late Bondaian period (last 2,800 years), and the discovery of some flaked glass indicated the site's continued use following contact in 1788.

While the extant soil profiles and artefact assemblage were not particularly significant in terms of the nature of the stone tool technology identified, the site was important for the way it demonstrated that this part of the Sydney CBD—marginal to the early European settlement—was intensively used by Aboriginal populations prior to, and for a short time following, 1788. It also clearly illustrated processes of site taphonomy where early historical activities such as land clearing and increased traffic (humans and/or horses) had had a significant impact on the survival of the Aboriginal archaeological record.

The KENS site was also considered significant for its place in the Aboriginal cultural landscape as a rare site that contributes new insights into an understanding of the documented and potential Aboriginal archaeological resource within the Sydney CBD. The KENS site also demonstrated that Aboriginal archaeological sites could survive in places that had experienced multiple phases of historical development and disturbance.[28]

3.4.3 Aboriginal Archaeological Potential

Discussion

The Aboriginal archaeological potential of the City Centre precinct is likely to vary across its length. These variations are dependent on the way certain parts of the landscape were used by Aboriginal people, and how archaeological deposits may have been disturbed by modern activities.

The patterning of Aboriginal archaeological sites revealed by both the AHIMS search and relevant archaeological studies in the local area indicate that there is a concentration of Aboriginal sites along the foreshore of Port Jackson. Attenbrow's 1991 Port Jackson Archaeological Project indicates that higher densities of Aboriginal archaeological sites are often found close to the mouths of estuaries in the central Sydney area.[29]

A variety of site features and site types are represented in both the AHIMS data and other relevant examples of local literature. This range of site types is indicative of the different activities that were undertaken by Aboriginal people in the vicinity of the City Centre precinct. The evidence from similar site types nearby, and scientific and historical research, strongly suggests that Aboriginal people were not only collecting the diverse marine and terrestrial food resources available in the local area, but were processing them close to the City Centre precinct. Archaeological data also suggests that other activities were also carried out nearby, such as stone tool manufacture and use (and possibly the manufacture and use of tools made of organic materials that are less well preserved), burials, the creation of rock art and performing traditions that embedded Aboriginal culture and Dreaming across the landscape.

Ethnohistorical accounts of Aboriginal people and activities in and around the CBD support this patterning of archaeological data. Written accounts and illustrations record Aboriginal people extensively using foreshore and estuarine environments for a range of activities, such as subsistence resource collection and resource processing, including stone tool manufacture and food preparation. Historical accounts clearly describe coastal Aboriginal people in the central Sydney area as having a clear focus on marine resources, such as fish and shellfish. This is clearly reflected in the archaeological record—midden remains are indicators of what foods were eaten in the area, while tools found at archaeological sites were often made to be used in marine resource collection and processing (such as fish hooks).

While Aboriginal people clearly used the area around the City Centre precinct for an extensive range of activities from subsistence resource collection to ceremonial practices, some practices have more substantial archaeological signatures than others. Middens tend to be the most archaeologically visible site type in the Port Jackson catchment.[30] The nature of middens—as places where extensive amounts of shell and other material have been discarded, sometimes over hundreds of years—are often better preserved and more archaeologically obvious than other more ephemeral site types like open campsites. Their visibility is also a product of their common location on Hawkesbury sandstone geology, where they tend to be better preserved and more visible.

Although middens are often the most obvious Aboriginal archaeological deposit in the Sydney CBD area, the AHIMS results for the City Centre precinct showed that sites that recorded artefacts made up the second largest group of site types registered at 31 per cent, with potential archaeological deposits at 57 per cent. Other literature also demonstrates that a range of sites are sometimes preserved. For example, the excavations at Angel Place demonstrated that deposits indicative of stone tool manufacture exist in the Sydney CBD, independent of middens.

Analysis of Aboriginal Archaeological Potential

Some areas of the City Centre precinct have no Aboriginal archaeological potential. These areas are where large-scale excavation works within the current roadway would have removed any Aboriginal archaeological deposits. These areas are shown on Figures 3.8–3.9, and include the following underground structures:

- pedestrian walkway from the Queen Victoria Building (QVB) to Sydney Central Plaza (Myer) below George Street and Market Street;
- pedestrian walkway from Town Hall train station to the Galeries Victoria below George Street near Park Street;

- pedestrian walkway from Town Hall train station to the QVB below George Street and Druitt Street;
- Town Hall train station below George Street between Druitt Street and Bathurst Streets; and
- the Eastern Suburbs Rail station box below Chalmers Street at Central Station.

These areas have been defined as within Aboriginal Archaeology Management Zone 4.

As existing development and road surfacing across the site has modified and obscured the natural landforms and covered all natural ground surfaces, it is difficult to further define specific areas of Aboriginal archaeological potential. The data from other archaeological investigations undertaken in the CBD, such as those discussed above, indicate that some Aboriginal archaeological deposits survive in Sydney—even in highly developed locations. Some of these archaeological deposits have been subjected to varying levels of disturbance but still survive in small pockets of natural soil and/or at depth in truncated soil profiles. In other cases Aboriginal objects (stone tools) may be present in historical archaeological stratigraphic layers.

Given the high degree of landscape modification across the entire City Centre precinct, it is impossible to predict exactly where such areas of Aboriginal archaeological potential may be present. Preliminary desktop geotechnical information indicates that in some parts of the City Centre precinct residual soil profiles are likely to exist below modern fill. These areas have been defined as within Aboriginal Archaeology Management Zone 3.

Data gathered during investigative works (such as geotechnical profiles) may indicate the depth at which bedrock and/or natural soil profiles occur, or the extent to which historical development may have impacted on natural soil profiles. This information may allow the understanding areas of Aboriginal archaeological potential to be refined.

3.4.4 Impact Assessment

Construction of the CSELR within Zone 4 will not have an impact on Aboriginal archaeology.

Construction of the CSELR within Zone 3 may impact on Aboriginal archaeological evidence where excavation is proposed.

Areas defined as having the potential to contain Aboriginal objects, as shown in Figures 3.9–3.10, will be managed in accordance with the archaeological investigation and salvage recommendations identified for Zone 3—as outlined in *Table 3.1 Definition of Aboriginal archaeological management zones for the CSELR route.*

Figure 3.9 Aboriginal archaeological management zones within the City Centre precinct. (Source: Parsons Brinckerhoff and Transport for New South Wales with zones as defined by GML 2013)

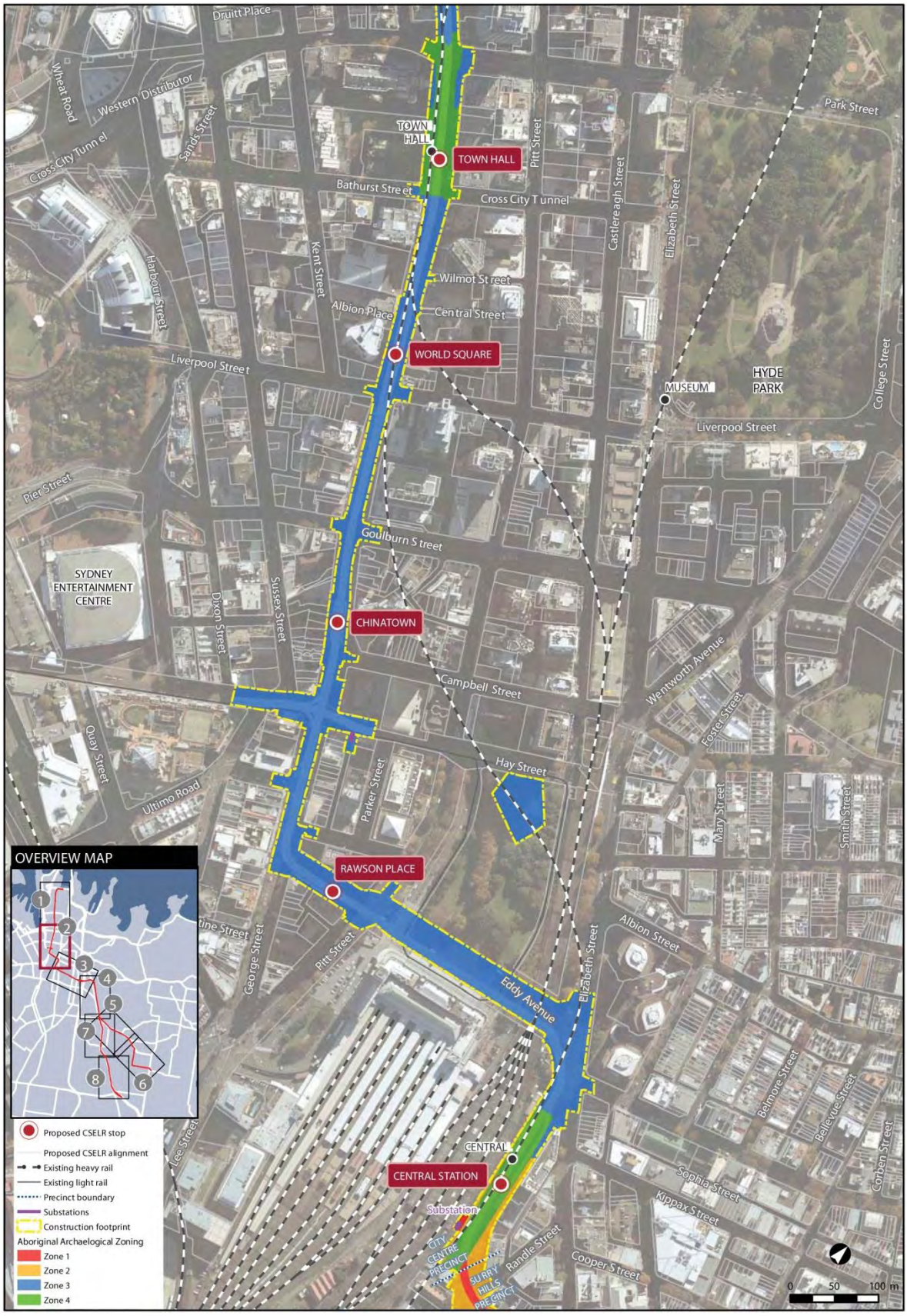


Figure 3.10 Aboriginal archaeological management zones within the City Centre precinct. (Source: Parsons Brinckerhoff and Transport for New South Wales with zones as defined by GML 2013)

3.5 Surry Hills Precinct (Devonshire Street to South Dowling Street)

3.5.1 Environmental Context

Overview of the Local Environment

Geology and Soils

The Surry Hills precinct portion of the route is dominated by two geological landscapes (Figure 3.11). Quaternary period sands—associated with Port Botany—underlie the Surry Hills precinct Devonshire Street at Chalmers Street and Devonshire Street at Waterloo Street. Hawkesbury sandstone sits below the Quaternary sands. The local geology changes to Ashfield shale between Waterloo Street and Crown Street. At Crown Street the Quaternary sands reappear, and continue to South Dowling Street.

The Quaternary sands were deposited by marine and aeolian actions during the Holocene, and are associated with sea level changes during this period. The distribution of Quaternary sands along the Surry Hills precinct route is mirrored by the distribution of the Tuggerah soil landscape. Tuggerah soils generally consist of fine to medium grained marine quartz sand, and are often deep (over 200cm).

The small portion of the Surry Hills precinct characterised by Ashfield shale geology is associated with the Blacktown soil landscape. This soil landscape is classed as residual, with shallow to moderately deep soils. Blacktown soils are common on rounded crests and ridges, such as the ridge running north to south through Surry Hills as traversed by the CSELR route in this area.

Landforms and Landscape

The CSELR route traverses a prominent ridge that runs from around the intersection of Albion and Bourke Streets in Surry Hills to the north of the Surry Hills precinct, and runs south. The Surry Hills precinct covers the lower, mid and upper slopes and crest of the ridge.

Hydrology

The western half of the Surry Hills precinct (to approximately Riley Street) is within the Darling Harbour catchment. The eastern portion of the CSELR route traverses the Alexandra Canal catchment. Aboriginal people occupying the land in the vicinity of the Surry Hills precinct would have had access to a number of freshwater streams that drained to the eastern and western side of the ridge into either catchment.

Flora and Fauna

The original vegetation in the Surry Hills precinct reflected the soil and geological landscapes of the region. The lower slopes were influenced by the underlying Quaternary sand geology. A varied heath, scrub and low forest community characterised these areas, and is known as the Eastern Suburbs Banksia Scrub. Dominant shrubs included *Banksia aemula*, *Xanthorrhoea resinosa, Monotoca elliptica*, *Eristemon australasius* and *Ricinicarpos pinifolius*.[31] The upper slopes of the ridge, underlain by Ashfield shale and Blacktown soils, supported a forest community of *Angophora costata* and *Eucalyptus pilularis*. This area was the easternmost extent of the Turpentine–Ironbark forest in the Sydney region.[32]

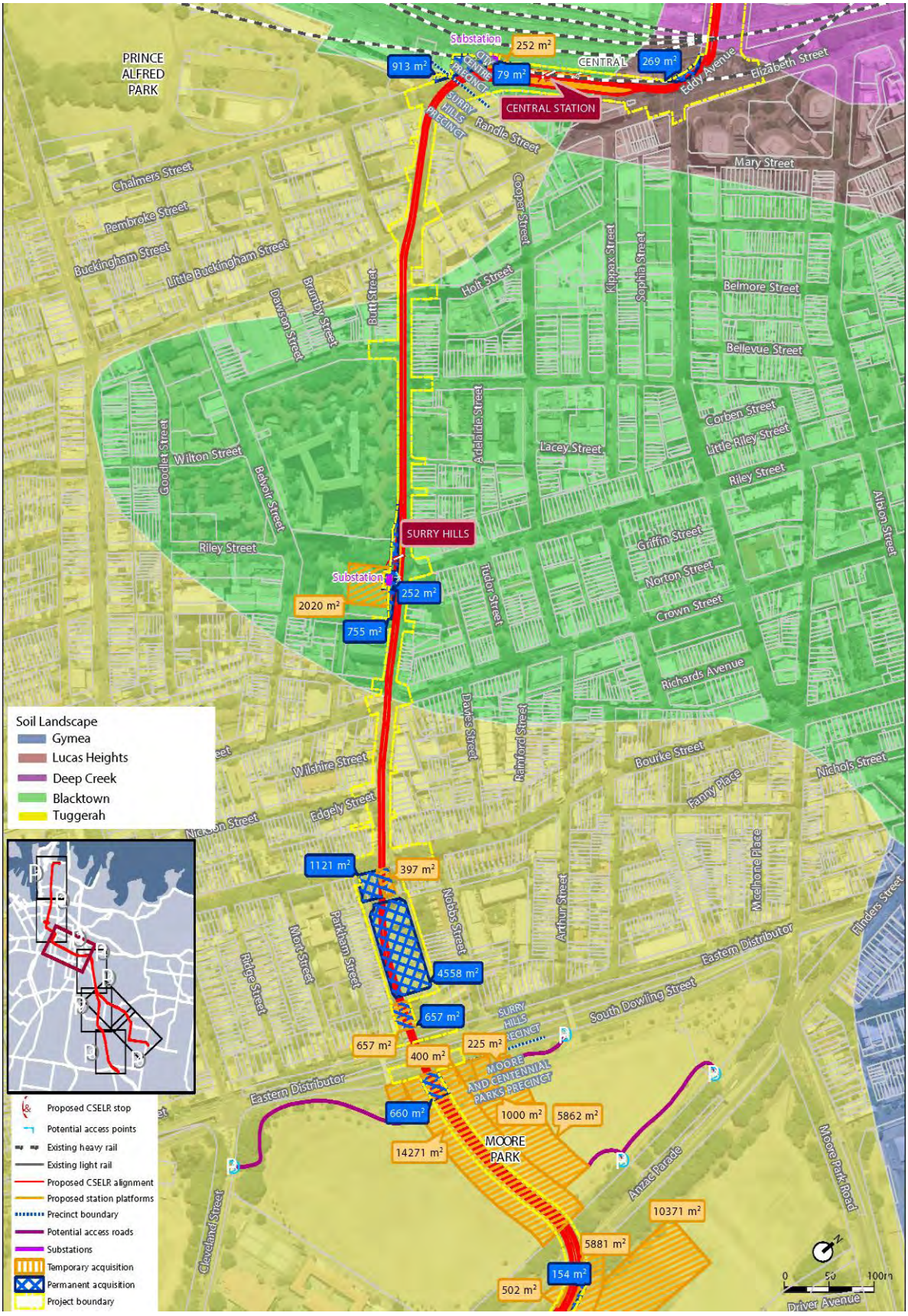


Figure 3.11 Soil landscapes in the vicinity of the Surry Hills precinct. (Source: Chapman, GA and CL Murphy, *Soil Landscapes of the Sydney 1:100 000 Sheet Map*, Department of Environment, Climate Change and Water, Sydney. Google Earth with PB/Transport for NSW base map GML 2013 additions)

As in much of the central Sydney region, animal species present around the Surry Hills precinct that would have been targeted by Aboriginal people included kangaroos, wallabies, echidnas, emus, goannas and wombats. Marine resources would have been collected from nearby Darling Harbour or other coastal access points.

Modern Land Use and Disturbance

The Surry Hills precinct, between Chalmers Street and the intersection of Devonshire Street and Bourke Street, follows the formalised roadway of Devonshire Street (Figures 3.12–3.13). Utilities plans of the CSELR route show that subsurface services (including electricity, sewer, gas, water and telecommunications services) are common within the study area. A high concentration of services are located beneath the northern footpath of Devonshire Street between Chalmers and Crown Streets. Other services run below the southern footpath, cut the road north to south, and run beneath the road along its length.

West of Devonshire Street, the CSELR route cuts through Wimbo Park, the residential development Olivia Gardens, and the car park of The Langton Centre before reaching South Dowling Street. Wimbo Park has been landscaped to some extent and appears to be built up from the level of Devonshire Street to create a flat lawn surface (Figures 3.14–3.15). Underneath Olivia Gardens a basement car park sits at least one storey below the adjacent street level (Figure 3.16). The Langton Centre car park sits level with South Dowling Street (Figure 3.17).

Preliminary desktop geotechnical information indicates that approximately 1m of modern fill may overlie residual soils along the Surry Hills precinct route.[33]

3.5.2 Archaeological Context

AHIMS Search

An extensive search of the AHIMS database was undertaken for the Surry Hills precinct on 19 June 2013 (Appendix A). Three sites were identified within a 1.5km x 1.5km search area centred on the Surry Hills precinct. The following site features were recorded—two sites with artefacts, one with shell/midden and one recorded as Aboriginal resource and gathering. The registered midden site, located close to Redfern Station on Tuggerah soils/Botany sands, indicates that midden sites with shell material may survive on similar landscapes in the vicinity of the Surry Hills precinct. The closest registered site is 1km from the CSELR route.

The lack of sites in close proximity to the Surry Hills precinct is likely to reflect the limited investigation of Aboriginal archaeology in the immediate area rather than any meaningful indication of the way the landscape was used by local Aboriginal people.

Ethnohistory

As for the City Centre precinct, the Aboriginal people who lived around the Surry Hills precinct are likely to have been the Gadigal. The Surry Hills precinct was also close to the tribal boundary with the Wangal, who inhabited the lands to the west. As discussed for the City Centre precinct, the Gadigal of the local area focused largely on collecting and hunting marine resources. Terrestrial animals and plant resources would still have played an important role in the subsistence of the Gadigal. The transitional environments of the lower slopes between the low-lying estuarine swamp behind Darling Harbour to the west, the Turpentine-Ironbark forest of the ridge top, and the sand

Figure 3.12 Devonshire Street facing east, close to Steel Street. (Source: GML 2013)

Figure 3.13 Devonshire Street facing east, close to Crown Street. (Source: GML 2013)

Figure 3.14 Wimbo Park facing southeast. (Source: GML 2013)

Figure 3.15 Wimbo Park facing northeast, showing raised level of landscaping. (Source: GML 2013)

Figure 3.16 Rear of Olivia Gardens facing west, showing entry to basement level car park. (Source: GML 2013)

Figure 3.17 Car park adjacent to The Langton Centre. (Source: GML 2013)

dune and wetland ecosystems to the east may have provided a diverse range of significant resources for the local population that was likely exploited.

A range of materials would have been employed in subsistence practices in the Surry Hills area, including the ubiquitous stone tools made and carried by Aboriginal people across the landscape. Many were multi-purpose. Following contact with Europeans, there are common examples of glass, and sometimes ceramic, being knapped in the same way as stone to form tools. A range of organic items would also have been crafted, such as string bags or canoes; however, such resources rarely survive archaeologically. Shell and bone—either as tools or as refuse—tend to survive more frequently than other organics; however, their survival is dependent on specific environmental conditions.

Ethnographic and archaeological evidence examined to date seem to illustrate a focus on utilizing coastal land and valley bottom locations in preference to other areas in the central Sydney area. This would place most of the focus of local Aboriginal land use in the immediate vicinity of Surry Hills, but closer to the coast. Reliance on these patterns, as they are skewed by archaeological preservational factors as well as biases in what has been portrayed in the historical record, should be cautioned.[34] It should be noted that the Surry Hills precinct was almost certainly used by local Aboriginal people to some extent, even if their primary focus was on the coast.

Local Aboriginal Archaeological Context

No Aboriginal archaeological studies have been undertaken in the immediate vicinity of the Surry Hills precinct, and few on matching landforms in the inner city area. One of the nearest Aboriginal archaeological investigations undertaken on a similar ridge landform with Ashfield Shale/Blacktown soils to date was at the University of Sydney in 2004 and 2005, and is discussed below.

Very few archaeological investigations have been undertaken on Tuggerah soil landscape, associated with the Botany Quaternary sands, in the inner city. Sand sheets in other areas of Sydney, such as Parramatta and Kurnell, have yielded significant Aboriginal archaeological sites. Some of these are discussed below for the Moore Park, Kensington and Randwick precincts and may be relevant to consider for the Surry Hills precinct.

Jo McDonald Cultural Heritage Management 2004 and 2005—Usyd Central

Jo McDonald Cultural Heritage Management undertook an Aboriginal heritage assessment of a portion of Sydney University's Camperdown and Darlington campuses as part of upgrades and construction during the Campus 2010 Project. A survey was conducted across the study area in 2004 and four areas of Potential Archaeological Deposit (PAD) were identified.

A program of archaeological testing was implemented at two of these PADs in 2005—the first on the former Geology Lawns (now the site of the Law Building), and the second at Maze Green, adjacent to the Old Darlington School. The Geology Lawns are located on a similar Ashfield Shale/Blacktown soil landscape to the ridge top of the Surry Hills precinct. Testing at the Geology Lawn revealed that a moderately disturbed A horizon survived below up to 160cm of introduced fill. One piece of flaked silcrete debitage was retrieved from this testing. Test pits on Maze Green, close to the Old Darlington School, revealed sediments that appeared to represent a still, shallow freshwater pond and may be associated with the natural swamp located here prior to significant landscape modification. No artefacts were retrieved from intact soil profiles, although one silcrete artefact was recovered from the disturbed overburden.

3.5.3 Aboriginal Archaeological Potential

Discussion

The Aboriginal archaeological potential of the Surry Hills precinct route is likely to vary across its length based on the different ways certain parts of the landscape were used by Aboriginal people, and how land has been disturbed by modern activities.

Surry Hills is away from the coastal focus of recorded Aboriginal sites; however, the absence of sites in the immediate area is likely to represent a lack of investigation and understanding of how these areas were used by Aboriginal people, as opposed to a true representation of a 'lack' of evidence of the use of the Surry Hills area. Activities such as stone tool manufacture, resource gathering and processing were likely to have been undertaken in the local area. Landscapes characterised by both Blacktown soils/Ashfield shale and Tuggerah soils/Botany sands are likely to have been used by Aboriginal people, although it is not possible to determine from the available archaeological background if there are differences in the way the areas were used that would influence the nature of the Aboriginal archaeological record in each area.

Analysis of Aboriginal Archaeological Potential

As the area in the vicinity of the Surry Hills precinct is largely archaeologically untested, it is difficult to predict specific locations of Aboriginal archaeological potential.

Modern disturbance along this route, associated with activities such as construction/demolition of previous buildings, road construction and service installation may have disturbed and/or removed some Aboriginal archaeological deposits. As in the City Centre precinct, it is possible that Aboriginal archaeological deposits may survive in highly developed locations in small pockets of remnant natural soil or in truncated soil profiles. In other cases Aboriginal objects (stone tools) may be present in historical archaeological stratigraphic layers.

Aboriginal archaeological deposits on the upper slopes of the Surry Hills precinct, where Blacktown soils are present, may survive in locations where modern disturbance has not extended right through upper soil horizons capable of bearing Aboriginal archaeological deposits and into culturally sterile B horizon clays. Preliminary desktop geotechnical information indicates that natural soils survive below modern fill. The upper slopes of the Surry Hills precinct, where Blacktown soils are present, are classed as Zone 3 (Figure 3.18).

Sand sheets, such as the Botany sands, are associated with Aboriginal archaeological deposits that can date back to the early Holocene or Pleistocene periods (older than 4000 BP). While the upper levels of these sands may be disturbed to some extent (which cannot be defined without additional geotechnical data), Aboriginal archaeological sites may be present in intact soil profiles. On deep sand deposits such as the Botany sands, Aboriginal archaeological deposits have the potential to be present several metres below the current ground surface. Areas of the Surry Hills precinct on Tuggerah soils (Botany sands) have been classed as Zone 1 or Zone 2, depending on impact (discussed below) (Figure 3.18).

The underground basement footprint of Olivia Gardens has been classed as Zone 4, as it has been subject to large-scale excavation that is likely to have removed any Aboriginal archaeological deposits within the impact zone of the CSELR (Figure 3.18).

Data gathered during investigative works (such as geotechnical profiles) may indicate the depth at which bedrock and/or natural soil profiles occur, or the extent to which historical development may

have impacted on natural soil profiles. This information may allow the understanding areas of Aboriginal archaeological potential within the Surry Hills precinct to be refined.

3.5.4 Impact Assessment

Construction of the CSELR within Zone 4 will not have an impact on Aboriginal archaeology.

Construction of the CSELR within Zone 3 may impact on Aboriginal archaeological evidence where excavation is proposed. Works in Zone 3 include construction of the CSELR track slab; construction of the Surry Hills Stop at Ward Park and use of Ward Park for additional facilities as a works depot and laydown area. Although some of these works will involve some excavation (at least to 750mm), these areas are classed as Zone 3 due to their Aboriginal archaeological potential (as discussed above). The proposed works within Zone 3 may impact on Aboriginal archaeological evidence; however, it is not currently possible to predict where Aboriginal archaeological evidence may survive in this area.

Areas of the Surry Hills precinct where extensive excavation is required (up to and over 750mm deep) are allocated as Zone 1. In these areas the proposed impact may extend into intact soil profiles with Aboriginal archaeological potential; however, this cannot be confirmed without additional geotechnical data. These areas within the Surry Hills precinct are shown on Figure 3.18 and include:

- construction of the CSELR track slab;
- regrading; and
- installation of the Moore Park substation.

Areas within Tuggerah soils where service installation, service relocation, tree removal and future landscaping works are proposed may also be considered as Zone 1; however, the scope of these works have not yet been defined and are thus not shown on Figure 3.18.

Use of the Surry Hills precinct as a works depot—if it will not involve removal of the existing ground surface and/or excavation—is unlikely to have an impact on the Aboriginal archaeological resource. These areas are also identified as within Zone 2 on Tuggerah soils, with Zone 3 on Blacktown soils (Figure 3.18).

Preliminary desktop geotechnical data indicates that residual soils are likely to exist below modern fill across the Surry Hills precinct.

Areas defined as having the potential to contain Aboriginal objects, as shown in Figure 3.18, will be managed in accordance with the archaeological investigation and salvage recommendations identified for Zone 1, Zone 2 and Zone 3—as outlined in *Table 3.1 Definition of Aboriginal archaeological management zones for the CSELR route.*

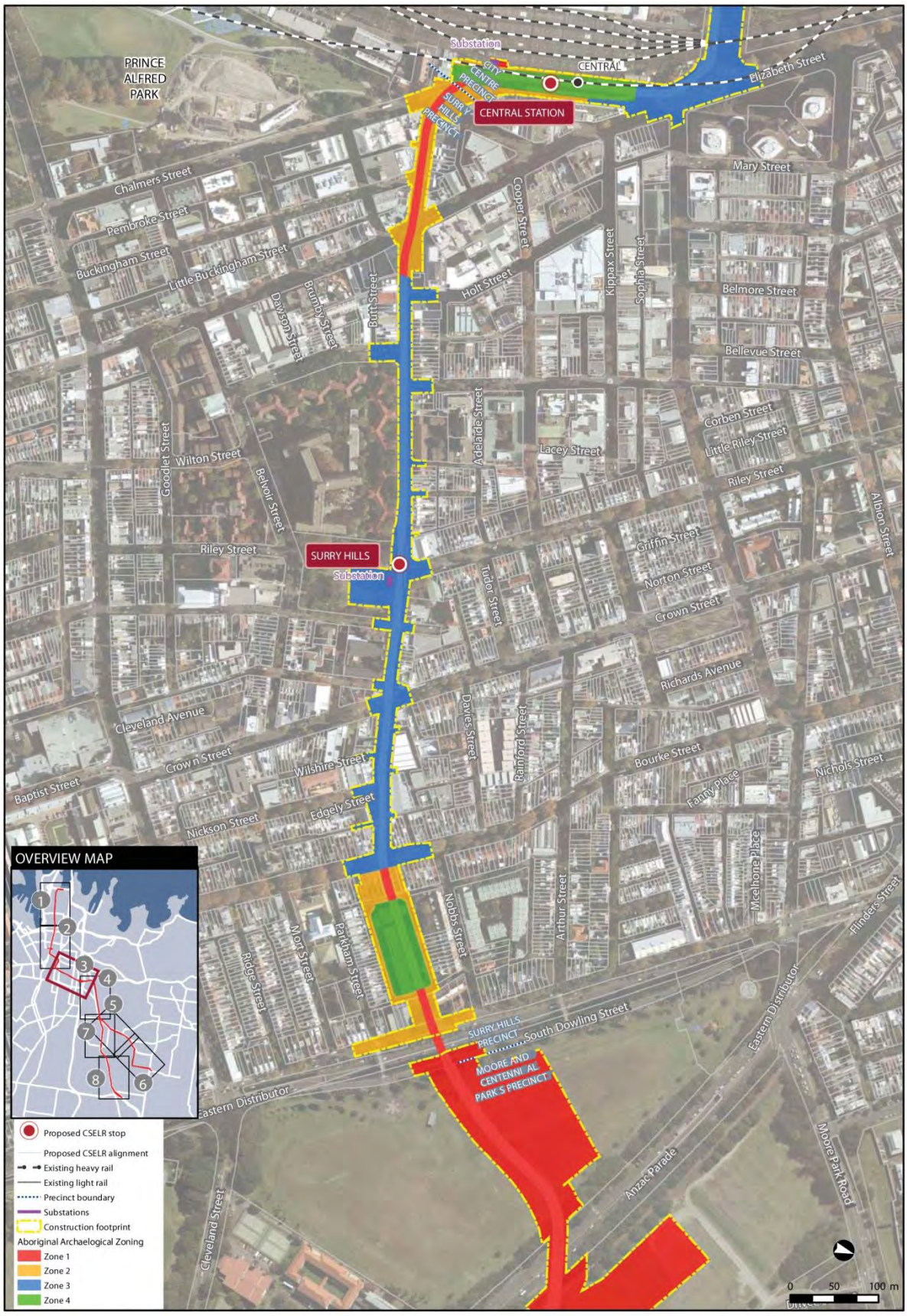


Figure 3.18 Aboriginal archaeological management zones within the Surry Hills precinct. (Source: Parsons Brinckerhoff and Transport for New South Wales with zones as defined by GML 2013)

3.6 Moore Park Precinct (South Dowling Street to Alison Road)

3.6.1 Environmental Context

Overview of the Local Environment

Geology and Soils

The Moore Park precinct is underlain by Quaternary marine sands, deposited by marine and aeolian actions during the Holocene, and are associated with sea level changes since the last Ice Age. Various borehole logs in these areas indicate that the sand deposits may be several metres thick and underlain by older clays and silts of estuarine origin. The marine sand sequence is interspersed with lenses and layers of peat, peaty sands, silts and clay that become more common in the lower part of the sequence. Hard, iron-cemented layers, locally known as 'Waterloo Rock' may be encountered in the upper layers of the formation.[35]

Tuggerah soils are located along this section of the route and generally consist of fine to medium grained marine quartz sand, often deep (over 200cm) (Figure 3.19).[36]

Landforms and Landscape

The Moore Park precinct is located within the large complex of undulating sand dunes which extend with a north to south orientation from Botany Bay in the east to Sheas Creek in the west.[37] These landforms have been classed by Chapman and Murphy as gently undulating to rolling coastal dune fields, with local relief to 20m and a slope gradient of between 1 per cent and 10 per cent.[38]

An extensive wetland system—including the Lachlan Swamps—is associated with the dune field, and is located at the southernmost extent of the Moore Park precinct route.[39]

The original topography of this sand dune system has been greatly altered by modern development.

Hydrology

Originally the sand dune system was also interspersed with a complex of wetlands, such as Lachlan Swamps within Centennial Park.[40] Run-off accumulated in freshwater wetlands either along major drainage lines or in dune swales, and would have been less permanent than today.[41] The Moore Park precinct terminates at the beginning of the Lachlan Swamp system. This would have been an important freshwater and resource zone.

Flora and Fauna

The sand dune and wetland environment around the Moore Park precinct is characterised by Eastern Banksia scrub vegetation communities on the sand and freshwater sedge swamp communities within the wetlands.[42]

The Eastern Banksia scrub is comprised of a varied heath, scrub and low forest community dominated by shrubs such as *Banksia aemula*, *Xanthorrhoea resinosa, Monotoca elliptica*, *Eristemon australasius* and *Ricinicarpos pinifolius*.[43] The freshwater sedge swamp is characterised by 'patches of tall emergent sedges, fringed with zones of shorter sedges and occasional shrubs'.[44]

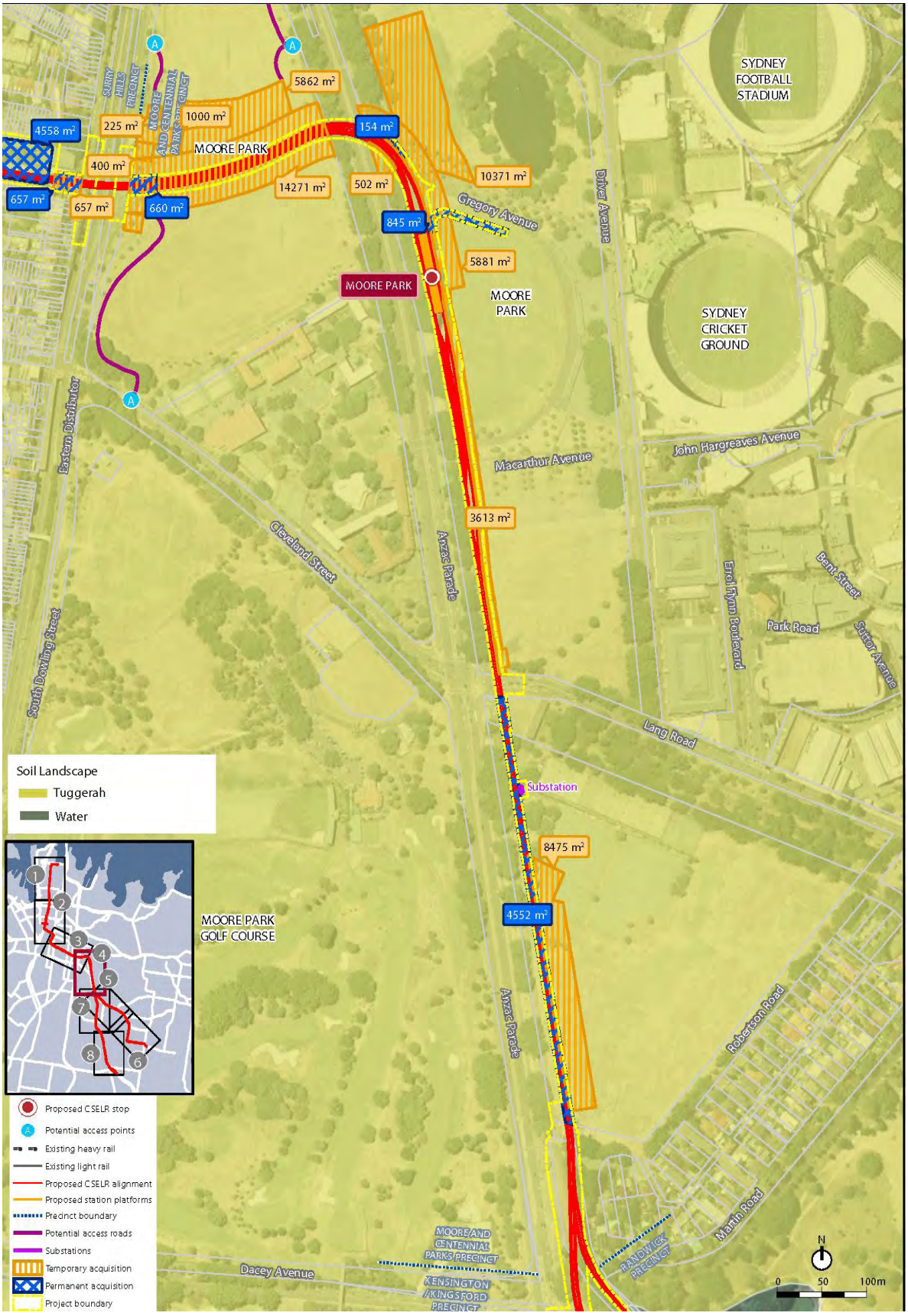


Figure 3.19 Soil landscapes in the vicinity of the City Centre precinct. (Source: Chapman, GA and CL Murphy, *Soil Landscapes of the Sydney 1:100 000 Sheet Map*, Department of Environment, Climate Change and Water, Sydney. Google Earth with PB and Transport for NSW base map and GML 2013 additions)

Plant species likely to have been present in the vicinity of the Moore Park precinct that would have been used by local Aboriginal people include *Melaleuca spp.*, *Banksia spp*. and *Xanthorhoea spp.* (particularly *Xanthorrhoea resinifera*). Other local food plants in the vicinity of the Moore Park precinct include the lilly pilly (*Acmena smithii*), various roots and tubers (such as *Blechnum catilagineum*, *B. indicum*, *Eleocharis sphacelata*, *Phragmites autralis*, *Triglochin microtuberosum*, *T. rheophilum*, and *Typha orientalis*), native cherry (*Exocarpus cupressiformis*) and the native currant (*Leptomeria acida*).[45] The freshwater wetlands would have been inhabited by a diverse range of animals that would have been used by Aboriginal people, including waterbirds, eels, tortoises, freshwater mussels, shellfish and fish.[46]

Modern Land Use and Disturbance

The Moore Park precinct crosses South Dowling Street and the Eastern Distributor at its western extent. The Eastern Distributor, constructed in the 1990s, is located below the elevation of South Dowling Street and the surrounding land. The results of Aboriginal archaeological test excavations undertaken for the Eastern Distributor (discussed below with regard to the local archaeological context) indicate that extensive amounts of fill (up to 1.5m) sit over areas of Moore Park West. It concludes that the top 1m–2m of soils at Moore Park west may be highly disturbed.[47]

The westernmost extent of the Moore Park precinct passes over South Dowling Street and the Eastern Distributor before entering playing fields in Moore Park associated with the adjacent Sydney Boys and Sydney Girls High Schools. This part of Moore Park appears to have been heavily modified as most of the land was levelled for playing fields, with artificial mounds formed at the western end of the park (Figure 3.20). Stormwater drainage channels are also evident across the park (Figure 3.21).

After the Moore Park precinct route crosses Anzac Parade, the route turns south and travels along the edge of Moore Park to the intersection of Anzac Parade and Alison Road. In this area Moore Park also appears to have been modified to some extent, with levelling for playing fields and installation of stormwater drainage evident (Figures 3.22–3.23).

Historical disturbances that may have impacted the potential for Aboriginal archaeological evidence to survive within the Moore Park precinct include construction of air raid shelters during World War II and landscape levelling and filling to create the flat playing fields present along much of the route.

Preliminary desktop geotechnical information indicates that between 1m and 4m of fill sits across Moore Park to the west of Anzac Parade.

Figure 3.20 Moore Park west facing west, with raised mounds. (Source: GML 2013)

Figure 3.21 Moore Park west facing east, showing stormwater drainage channels and drain. (Source: GML 2013)

Figure 3.22 Moore Park on the east side of Anzac Parade, facing north. (Source: GML 2013)

Figure 3.23 Moore Park on the east side of Anzac Parade, facing south. (Source: GML 2013)

The lack of sites in close proximity to the Moore Park precinct is likely to reflect the limited investigation of Aboriginal archaeology in the immediate area rather than any meaningful indication of the way the landscape was used by local Aboriginal people. As much of the search area is reserved as part of the Centennial Parklands, there has been limited development that would have triggered the need for Aboriginal archaeological investigations in the immediate vicinity.

Ethnohistory

The lands occupied by the Gadigal people extended from Sydney Cove to the northern shore of Botany Bay in the south, thus the Moore Park precinct would have been inhabited by the same group as in the City Centre precinct. The dune fields and wetlands of the Botany Basin may have provided a diverse range of significant resources that was likely exploited by the local population. Ethnographic sources provide little specific information regarding how the dune and wetland areas such as those found around the Botany Basin were used by Aboriginal people. Tench records that local Aboriginal people 'depend for food on the few fruits they gather, the roots they dig up in the swamps'[48] and this region of the Gadigal lands may have been an important area for gathering these resources. Animals would also have been hunted, and freshwater aquatic resources would have been collected in the wetlands.

As for the other nearby precincts, a range of materials would have been employed in subsistence practices in the Botany Basin area, including the ubiquitous stone tools made and carried by Aboriginal people across the landscape. Many were multi-purpose. Following contact with Europeans, there are common examples of glass (and sometimes ceramic) being knapped in the same way as stone to form tools. A range of organic items would also have been crafted, such as string bags or canoes; however, such resources rarely survive archaeologically. Shell and bone—either as tools or as refuse—tend to survive more frequently than other organics; however, their survival is dependent on specific environmental conditions.

A series of pathways crossed the region between Port Jackson and Botany Bay, connecting different parts of Gadigal lands, as well as to areas beyond for hunting, resource collection, trade, social and ceremonial visits. Aboriginal people moved regularly through country between permanent settlements, as recorded by colonial writers into the 1800s.[49]

Following the widespread dispossession and the great losses suffered by local clans with the introduction of European diseases, only very small groups or individual Aboriginal people were recorded as living in the local area. Mahroot was an Aboriginal man who described himself as belonging to the 'Botany Bay Tribe' and, in the 1840s, was recorded living around the northern shore of Botany Bay with around 50 other Aboriginal people. Only three were recorded as speaking the same language as Mahroot, suggesting that the group was a merged party of survivors from the Sydney region.[50] Another Aboriginal man known as King Billy Timbery, who lived at La Perouse, operated the toll gate at Lachlan Reserve (now Centennial Parklands). Elders within the La Perouse community have also provided personal accounts of camping and collecting food in Centennial Park in the 1930s. The permanent freshwater supply of the Lachlan swamps was a focus of this activity.[51]

Local Aboriginal Archaeological Context

The following discussion of Aboriginal archaeological context is relevant to the Moore Park, Randwick and Kensington/Kingsford precincts, and part of the Surry Hills precinct, of the CSELR.

A small number of Aboriginal archaeological studies have been undertaken within the Botany Basin sand dune environment, such as that present at the Moore Park, Randwick and Kensington precincts. A limited amount of archaeological research has been undertaken in the immediate area. The literature discussed below is drawn from other investigations within the dune environment in the Botany Basin and on nearby sand sheets. Sand sheets in Sydney are well known as they tend to be geomorphological features many thousands of years old and yield very early dates for Aboriginal occupation in the region. For example, excavations in 2005 at the Parramatta sand terrace returned a date of 30,735 ± 407 BP, one of the oldest dates of Aboriginal occupation in the Sydney region.[52] Other examples dating to between 6000 and 10,000 years BP have been retrieved within the Botany Basin and are discussed below. They are also associated with significant archaeological site types, such as burials.[53]

The landscape of the Sydney region and the Botany Basin has changed significantly over the last 60,000 years as the climate fluctuated and sea levels rose and fell accordingly. This would have significantly altered the nature of resources available to local Aboriginal people in the immediate area. Val Attenbrow established a speculative landform history of the Botany Basin in a report on Centennial, Moore and Queens Parks in 2002 (Table 3.3), and outlined the way the local area's environment may have changed over the last 60,000 years.[54]

Table 3.3 Speculative landform history in Botany Basin. (Source: Adapted from Australian Museum Business Services, 2002, pre-colonial Aboriginal land and resource use in Centennial, Moore and Queens Parks—assessment of historical and archaeological evidence for Centennial Park and Moore Park Trust Conservation Management Plan, pp10–11)

Period (years BP)	Sea Level (m below present)	Width of land exposed on continental shelf east of current coast	Possible landform changes in the Botany Basin
60,000–40,000	Fluctuating from 30m to 80m to 45m to 60m to 45m.	Changing from 1km to 8km to 2km to 3km to 2km.	Underlying sandstone exposed. Forest, woodlands and freshwater creeks. Estuarine reaches extend further north than at present.
40,000–30,000	Fluctuating from 45m to 70m to 50m.	Changing from 2km to 5km to 2km.	Sandhills forming. Sands may be mobile and wetlands may be forming. Estuarine conditions retract southwards.
30,000–18,000	Falling from 50m to 140m.	Increasing from 2km to 13km.	Sandhills and vegetation stabilise and wetlands formed. Freshwater environment.
18,000–6000	Rising from 140m to the present level.	Decreasing from 12km to the current coastline.	Sandhills and vegetation stabilise and wetlands formed. Totally freshwater until sometime around 8000 BP when sea level reaches the mouth of Sheas Creek.
6000 to present	Within ±2m of present level.	Current coastline.	Northern coastline of Botany Bay extends southwards. Length of estuarine conditions decrease in streams running into Botany Bay. Present configuration for the last 4000 years.

Early Aboriginal Archaeological Investigations

Archaeological investigations into the Aboriginal history in the southeastern Sydney area have been undertaken for over 100 years. While often not investigated as scientifically as modern archaeological excavations, records of their findings reveal important evidence of Aboriginal occupation of the area. A small silcrete flake collected in 1902 from the Sydney Cricket Ground is kept at the Australian Museum.[55]

The construction of the Alexandra Canal in the 1890s yielded some interesting evidence of Aboriginal occupation in the Botany Basin. The excavation for the canal resulted in a 5 metre sediment section being exposed, which provided important evidence of the geomorphological and environmental changes in the local area. The stratigraphy and archaeological features were recorded in detail by Robert Etheridge of the Australian Museum at the time of discovery.[56] Three Aboriginal hatchets were discovered close to the Rickety Street Bridge. Dugong bones with evidence of Aboriginal butchering on them were also discovered nearby in an estuarine deposit with abundant shell material. The dugong bones were recently radiocarbon dated to 5520 ± 70 BP, and Etheridge's report records that Aboriginal artefacts were present above and below the bones. Tree stumps from a burnt and buried eucalypt forest were preserved in the lowest observed layer, and are evidence of an early terrestrial layer. The presence of the dugong remains indicate that the Sydney region experienced warmer waters for a period during the Holocene, and provides further evidence about fluctuating sea levels.[57]

An engraved rock art site was recorded on Darvall Street in 1899. The site included figures such as two boomerangs, part of a kangaroo or wallaby and a 'stone tomahawk' and was, in the late

nineteenth century, noted as worn by cart traffic over the engraving.[58] It was destroyed in the twentieth century by roadworks.

Crew 1991—Botany Wetlands Archaeological Survey

David Crew prepared an assessment of Aboriginal archaeology within the Botany Wetlands in 1991. The report concluded that the Botany Wetlands area, which is within the Lachlan Swamps system that extends across the CSELR study area to Centennial Park, would have been:

> *an important fresh-water [sic] resource area in close proximity to the sheltered Botany Bay estuary. The water areas are flanked by sand dunes that rise over 25m above sea level which would have provided suitable occupation areas.*[59]

Crew reports that Aboriginal skeletal remains were identified within the Botany Wetlands (at Eastlakes Golf Course) in 1982. The report identifies that Aboriginal archaeological evidence—particularly previous occupation sites and burials—have the potential to survive in less disturbed dunes where large amounts of sand have not been removed in the historical period and are stabilised by vegetation.

Godden Mackay and Austral Archaeology 1995—Prince of Wales Hospital Excavation

Aboriginal archaeological evidence was identified during historical archaeological excavation at the Prince of Wales Hospital (PoW) 1995.[60] Three hearths, characterised by clusters of burnt sandstone manuports (stone moved by human activity) arranged in a roughly circular shape, were identified during works. One of the hearths (Feature 203) was dated using Carbon 14 dating and thermoluminscence, which returned dates of 7860 ± 50 BP and 8400 ± 800 BP respectively. Residue analysis on a hearth stone, also from Feature 203, suggests that an aquatic animal—probably a freshwater fish as indicated by high amounts of a particular fatty acid—was cooked at this hearth.

A number of sandstone manuports not clearly associated with a defined hearth were also identified. These sandstone pieces are considered manuports and thus associated with the Aboriginal occupation of the area based on the 'assumption that pieces of stone in an aeolian sand dune can have no method of transport other than human'.[61]

A small number (10) of flaked stone artefacts were also identified at the PoW site. All were of a white, banded indurated stone of unknown source. The excavation report notes the absence of silcrete as unusual.

Godden Mackay and Austral suggest that, given the very small amount of flaked stone at the PoW site, 'this site was formed under conditions of high [human] mobility, perhaps the result of short-term forays, and represents a different settlement and subsistence pattern to that observed at contact and in the archaeological record during the last 3000 years'.[62]

Godden Mackay 1997—Eastern Distributor

Godden Mackay (in association with Brayshaw Heritage Consultants) undertook archaeological monitoring of trial construction pits prior to the construction of the Eastern Distributor along the western edge of Moore Park in 1997.[63] Some of the test pits were located in areas close to the Moore Park precinct. The investigations yielded no evidence of Aboriginal occupation, and indicated that this section of Moore Park had been generally highly disturbed. Test pits indicated that between 40cm and 150cm of introduced fill was spread across the western edge of Moore

Park. All test pits were excavated only to a maximum depth of 2.2 metres. The pH of natural soils encountered stood close to neutral, which increases the possibility that organic materials could be preserved.

The report also details the results of geotechnical investigations undertaken in the vicinity of the Moore Park precinct for the construction of the Eastern Distributor. Fill was indicated to extend in some parts along Moore Park's western end between 1m and 4.7m deep. Dune sands were found to be 15m to 20m thick south of the Moore Park precinct (south of Charles Street, Redfern). Freshwater swamp peat and lake deposits are particularly noted in A horizon 1m–3m thick which is 13m–17m below the current ground level close to Charles Street; and rising to 5m below the current ground level close to Maddison Street.

Australian Museum Business Services 2002—Centennial, Moore and Queens Parks Assessment

Australian Museum Business Services (AMBS) prepared an assessment of historical and archaeological evidence for Aboriginal land and resource use in Centennial, Moore and Queens Parks to inform the preparation of the Centennial Parklands Conservation Management Plan in 2002.[64]

A number of previously identified Aboriginal sites within the parklands were discussed, including (now destroyed) rock engravings at Darvall Street, and a rock shelter in Queens Park with 27 white human hand stencils. One artefact is held in the Australian Museum collection from the Sydney Cricket Ground. No new sites were identified during the course of the project.

AMBS suggest it is possible that Aboriginal archaeological evidence survives at depth beneath areas that are presently ponds, landfill, buildings and other structures. Areas of sandstone outcropping at elevation are prone to periodic exposure/covering. Currently, covered outcrops may have been engraved in the past during periods of exposure.[65]

AMBS prepared a matrix of archaeological sensitivity for within the parklands based on soil landscape analysis. Relevant sections are reproduced below in Table 3.4.

Table 3.4 Archaeological sensitivity within Centennial Parklands according to soil group analysis map. (Source: AMBS, January 2002, Pre-colonial Aboriginal land and resource use in Centennial, Moore and Queens Parks—assessment of historical and archaeological evidence for Centennial Parklands Conservation Management Plan, prepared for Conybeare Morrison & Partners, p 12)

Area/Soil group	Description	Potential Archaeological Evidence	Potential to be Present: Surface	Potential to be Present: At Depth
Tuggerah: • Northern area with outcrops.	North–south oriented dunes; deep soils greater than 200 cm—with rock outcrops.	PAD Engraved images Grinding grooves	Low	Low
• Areas with buildings, roads and tracks, etc.	North–south oriented dunes; deep soils greater than 200 cm.	PAD	Nil	Low to medium beneath the level of disturbance if it does not extend to bedrock or pre-human land surface.
• Remainder.	North–south oriented dunes; deep soils greater than 200 cm.	PAD	Nil	Low to medium.

Area/Soil group	Description	Potential Archaeological Evidence	Potential to be Present: Surface	Potential to be Present: At Depth
Aquatic ponds/boggy soils	Freshwater ponds and boggy soils.	PAD	Nil	Low to medium, depending on age and depth.
Playing areas modified with fill/Known areas of fill	Imported fill overlying?	PAD	Nil	Low to medium potential for PAD beneath if the level of disturbance does not extend to bedrock or pre-human land surface.

Jo McDonald Cultural Heritage Management and GML + JMcDCHM 2005–2013—Discovery Point

In 2005 JMcDCHM excavated an area southwest of Tempe House at Discovery Point and recovered datable Aboriginal cultural material.[66] Subsequent excavation undertaken by GML + JMcDCHM (2011–2013) further excavated the sand terrace at this location.

Three phases of archaeological activities occurred through the course of this work; backhoe testing to water table depth across the proposed car park to establish whether intact cultural material was present; controlled hand excavated test pits once stone artefacts were identified by backhoe; and open area salvage excavation to retrieve an adequate sample of cultural materials for analysis. Intact remnant ground surfaces were located in a number of backhoe trenches. The intact natural soil horizon generally consisted of black sand of varying thickness and a narrow band of light grey sand, underlain by mottled sand/coffee rock. The majority of cultural lithics were recovered from the light grey sand layer. The grey sand in the southern part of the study area sat at least 1.5m above the water table.[67]

Three hundred and eighty-nine artefacts were recovered in the testing and salvage from the 2004 excavation. The excavations across the study area showed that the site constituted an extensive, low density artefact scatter. Thus, it was suggested that Discovery Point was a place people visited repeatedly, for short time periods, over many thousands of years.

A charcoal feature identified during open excavation at Discovery Point, uncovered from within a cultural layer of mottled brown sand, was radiocarbon dated. The date that was retrieved from this charcoal feature of 9376 ± 61 BP (Wk-16167) calibrated to 10,700 BP (95.4 per cent probability) is the earliest date for an occupation site in the eastern coastal strip of the Sydney Basin. This date likely referred to an earlier silicified tuff assemblage (characterised by relatively sparse deposition rates, non-blade technology and stone rationing behaviour).

Dominic Steele Consulting Archaeology May 2006—Randwick Racecourse Assessment

Dominic Steele Consulting Archaeology prepared an assessment of Aboriginal heritage values of Randwick Racecourse to inform a conservation management plan for the site.[68] The site has undergone widespread environmental and landscape modification; however, a high dune rises over 20m above the rest of the racecourse in the southeast corner of the site (corner of Wansey Road and High Street). Given the high levels of disturbance experienced across most of the racecourse, it was assessed that it would be unlikely that surface or immediately subsurface Aboriginal archaeological evidence would be present across most of Randwick Racecourse. Archaeological

evidence may survive in deeper sand dune contexts, which may be several thousands of years old. The remnant dune in the southeast corner was identified as having high Aboriginal archaeological sensitivity.

3.6.3 Aboriginal Archaeological Potential

The natural landscape of the Moore Park precinct has been extensively modified since 1788 to create the modern park landscape. As indicated by both the historical background (Section 2.0) and investigations undertaken in 1996 for the construction of the Eastern Distributor; some areas of the Moore Park precinct have been extensively filled—probably in order to stabilise naturally swampy areas. Other parts of the precinct have experienced extensive excavation to create level open spaces.

Preliminary desktop geotechnical information indicates that the subsurface profile on the SCELR route east of Anzac Parade is anticipated to be 'Botany Basin sediments{that will] vary in total depth, with a general profile of fill/disturbed material at surface underlain by a sequence of loose and dense sands'.[69] At this stage (without clarification from geotechnical testing) it is difficult to predict the areas with high levels of disturbance, or areas with higher levels of Aboriginal archaeological potential. The Moore Park precinct is largely archaeologically untested so it is difficult to predict locations of Aboriginal archaeological potential. Despite this, deep sand sheets, such as within the Moore Park precinct, are often associated with subsurface Aboriginal archaeological deposits.

As a result of the significant landscape modifications, it is likely that along much of the precinct the upper stratigraphic levels have been disturbed to some extent. Without geotechnical data it is not possible to determine precise locations of disturbance, or how deep this disturbance extends. Previous investigations undertaken in Moore Park west for the Eastern Distributor indicated that disturbance and/or introduced fill is present 1m–2m below the current ground surface in some areas, and this is supported by the preliminary data from desktop geotechnical analysis.

Given the likely depth of Botany sands within the Moore Park precinct, it is possible that intact soil profiles remain at depth, below the extent of modern disturbance. These deeper intact soil profiles may have potential for Aboriginal archaeological evidence to be present, such as stone objects and/or hearths. Organic remains such as middens or burials may be present, if environmental conditions permit; for example, if pH is close to neutral or within anaerobic/waterlogged conditions, as have been found in nearby sand sheet contexts.

Data gathered during investigative works (such as geotechnical profiles) may indicate the depth at which bedrock and/or natural soil profiles occur, or the extent to which historical development may have impacted on natural soil profiles. This information may allow the understanding areas of Aboriginal archaeological potential within the Moore Park precinct to be refined.

As the whole Moore Park precinct is assumed to have some level of Aboriginal archaeological potential, it is allocated as either Zone 1 or Zone 2, depending on the nature of the impacts (discussed below).

3.6.4 Impact Assessment

Areas of the Moore Park precinct where extensive excavation is required (up to and over 750mm deep) are allocated as Zone 1. In these areas the proposed impact is likely to extend into intact soil

profiles with Aboriginal archaeological potential. These areas within Moore Park precinct are shown on Figure 3.24 and include:

- construction of the CSELR track slab;
- the cut-and-cover tunnel across Moore Park west and Anzac Parade;
- installation of two crane pads adjacent to the tunnel route;
- regrading of the area around the sunken Moore Park stop and associated landscaping works;
- construction of the Moore Park stop and associated infrastructure (such as a stop shelter); and
- installation of the Moore Park substation.

Areas where service installation, service relocation, tree removal and future landscaping works are proposed may also be considered as Zone 1; however, the scope of these works have not yet been defined and are thus not shown on Figure 3.24.

Other areas of Moore Park precinct identified as the locations of additional facilities, such as laydown areas, plant and equipment storage, and construction depot facilities have been identified as Zone 2 (Figure 3.24).

Use of the Moore Park precinct as a works depot—if it will not involve removal of the existing ground surface and/or excavation—is unlikely to have an impact on the Aboriginal archaeological resource. These areas are also identified as within Zone 2 (Figure 3.24).

Areas defined as having the potential to contain Aboriginal objects, as shown in Figure 3.24, will be managed in accordance with the archaeological investigation and salvage recommendations identified for Zone 3—as outlined in *Table 3.1 Definition of Aboriginal archaeological management zones for the CSELR route.*

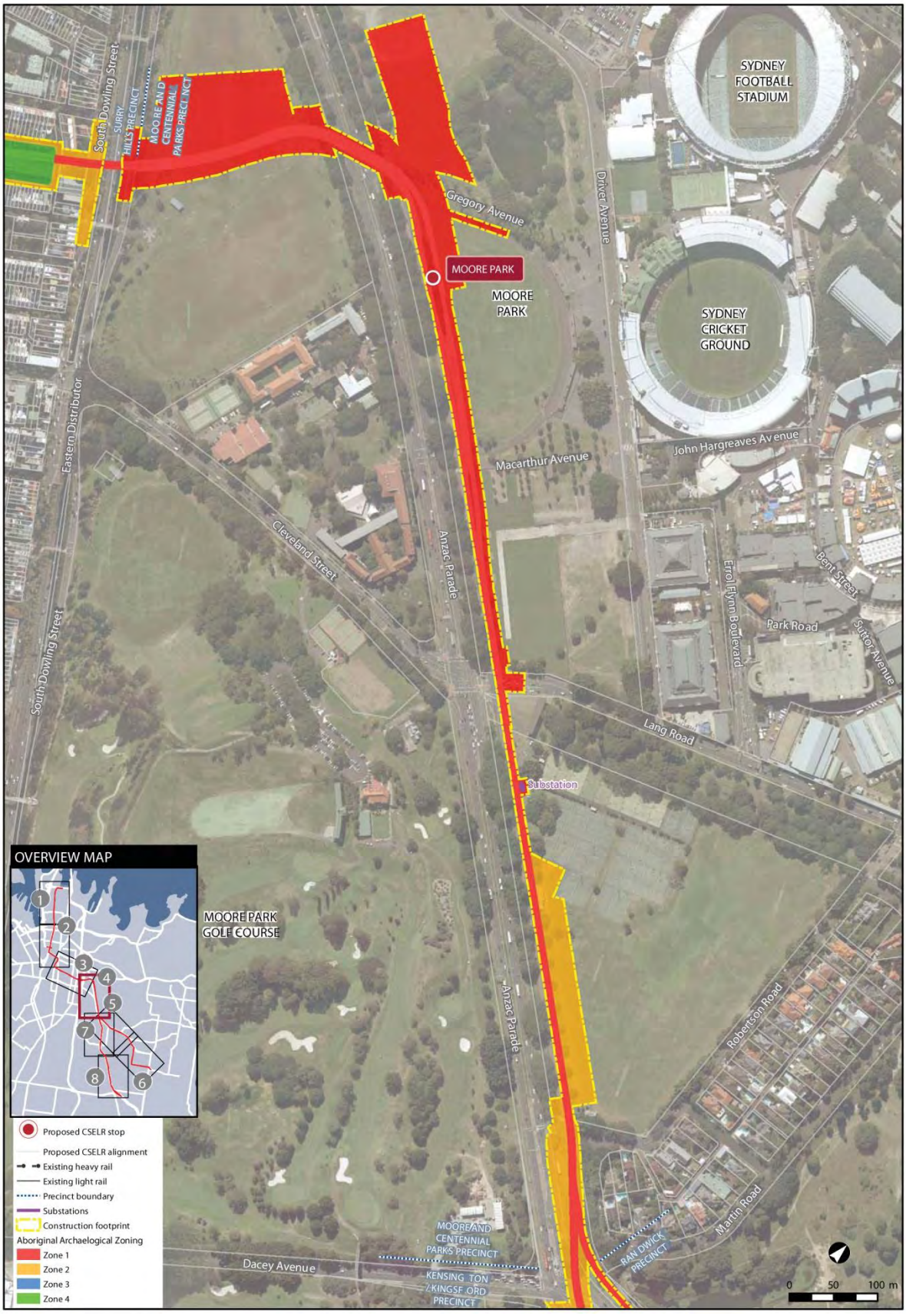


Figure 3.24 Aboriginal archaeological management zones within the Moore Park precinct. (Source: Parsons Brinckerhoff and Transport for New South Wales with zones as defined by GML 2013)

3.7 Kensington/Kingsford Precinct (Alison Road to the University of New South Wales)

3.7.1 Environmental Context

Overview of the Local Environment

Geology and Soils

The Kensington/Kingsford precinct falls completely within a Quaternary sand geological landscape and is characterised by the Tuggerah soil landscape (Figures 3.25–3.26). Tuggerah soils generally consist of fine to medium grained marine quartz sand, and are often deep (over 200cm).[70] These sand dune fields were deposited by marine and aeolian actions during the Holocene, and are associated with sea level changes since the last Ice Age. Early historical records describe the area as dominated by vegetated sand dunes, and several show these sand hills in the vicinity of Randwick Racecourse (Figure 2.85).

Landforms and Landscape

The Kensington/Kingsford precinct is located within the large complex of undulating sand dunes which extend with a north to south orientation from Botany Bay in the east to Sheas Creek in the west.[71] These landforms have been classed by Chapman and Murphy as gently undulating to rolling coastal dune fields, with local relief to 20m and a slope gradient of between 1 per cent and 10 per cent.[72]

An extensive wetland system—including the Lachlan Swamps—is associated with the dune field, and is located at the northernmost extent of the Kensington precinct route, close to the Centennial Parklands and Randwick Racecourse.[73]

The original topography of this sand dune system has been greatly altered by modern development.

Hydrology

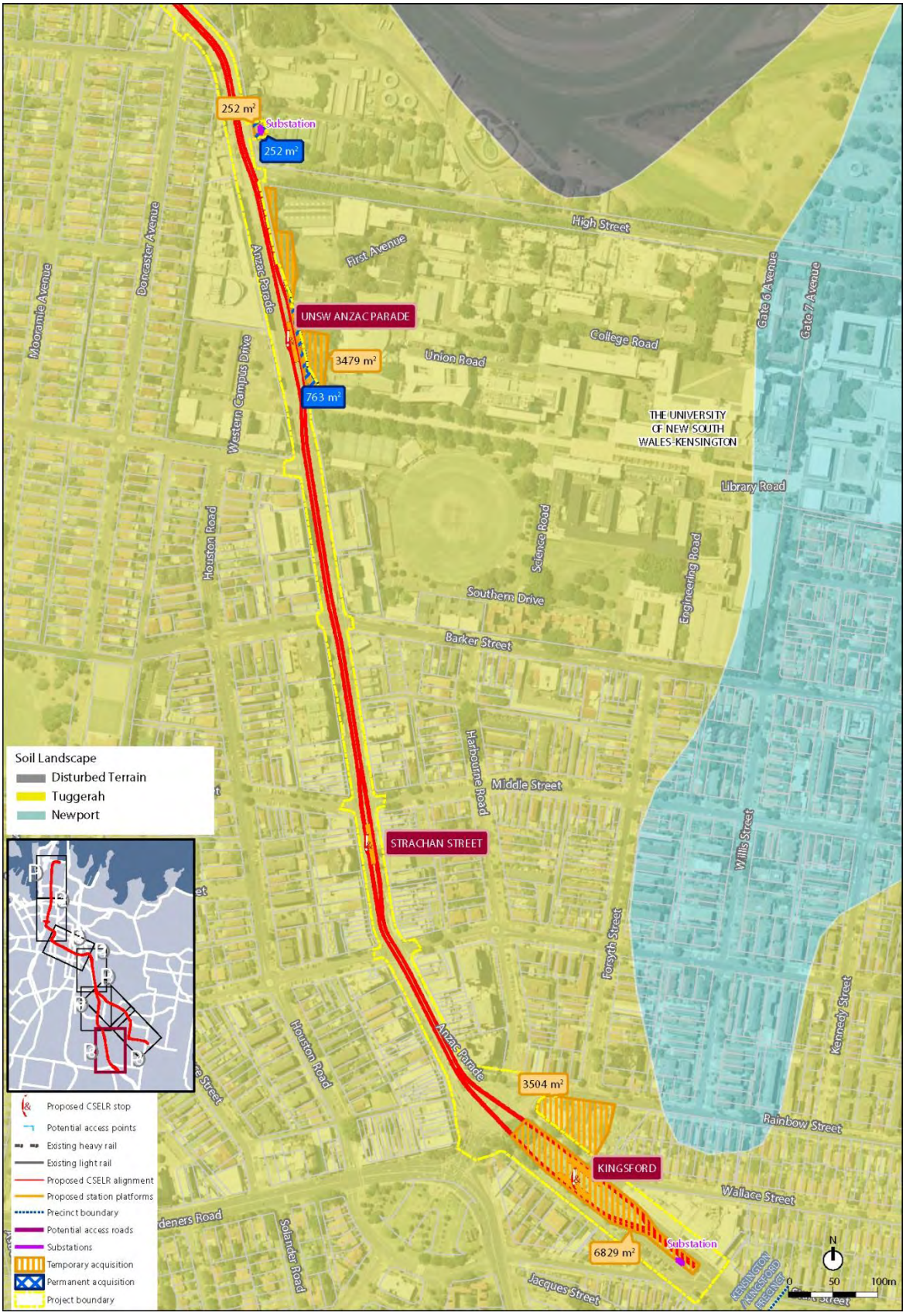
Originally the sand dune system was also interspersed with a complex of wetlands, such as Lachlan Swamps within Centennial Park. Run-off accumulated in freshwater wetlands either along major drainage lines or in dune swales, and would have been less permanent than today.[74] The Lachlan Swamp system was located at the head of the Kensington precinct. This would have been an important freshwater and resource zone. Other semi-permanent freshwater swamps would have occurred at low-lying points along, or close to, the Kensington precinct.

Fauna and Flora

The sand dune and wetland environment around the Kensington precinct is characterised by Eastern Banksia scrub vegetation communities on the sand and freshwater sedge swamp communities within the wetlands.[75]

The Eastern Banksia scrub is comprised of a varied heath, scrub and low forest community dominated by shrubs such as *Banksia aemula*, *Xanthorrhoea resinosa, Monotoca elliptica*, *Eristemon australasius* and *Ricinicarpos pinifolius*.[76] The freshwater sedge swamp was characterised by 'patches of tall emergent sedges, fringed with zones of shorter sedges and occasional shrubs'.[77]

Figures 3.25 Soil landscapes in the vicinity of the Kensington precinct (north). (Source: Chapman, GA and CL Murphy, *Soil Landscapes of the Sydney 1:100 000 Sheet Map*, Department of Environment, Climate Change and Water, Sydney. Google Earth with PB and Transport for NSW base map and GML 2013 additions)



3.26 Soil landscapes in the vicinity of the Kensington precinct (south). (Source: Chapman, GA and CL Murphy, *Soil Landscapes of the Sydney 1:100 000 Sheet Map*, Department of Environment, Climate Change and Water, Sydney. Google Earth with PB and Transport for NSW base map and GML 2013 additions)

Plant species likely to have been present in the vicinity of the Kensington precinct that would have been used by local Aboriginal people include *Melaleuca spp.*, *Banksia spp*. and *Xanthorhoea spp.* (particularly *Xanthorrhoea resinifera*). Other local food plants in the vicinity of the Moore Park precinct include the lilly pilly (*Acmena smithii*), various roots and tubers (such as *Blechnum catilagineum*, *B. indicum*, *Eleocharis sphacelata*, *Phragmites autralis*, *Triglochin microtuberosum*, *T. rheophilum*, and *Typha orientalis*), native cherry (*Exocarpus cupressiformis*) and the native currant (*Leptomeria acida*).[78]

The Eastern Banksia scrublands are likely to have included kangaroos, wallabies, possums, bandicoots, fruit bats (grey-headed flying foxes) and a range of birds, snakes and lizards. The freshwater wetlands would have been inhabited by a diverse range of animals that would have been used by Aboriginal people, including waterbirds, eels, tortoises, freshwater mussels, shellfish and fish.[79]

Modern Land Use and Disturbance

The Kensington/Kingsford precinct diverges from the Randwick precinct at the intersection of Alison Road and Anzac Parade. The route crosses through Tay Reserve (Figure 3.27) and follows the established roadway of Anzac Parade to Kingsford (Figure 3.28). The topography of the Kensington/Kingsford precinct is generally flat. The route crosses the western border of the University of New South Wales, opposite the National Institute of Dramatic Art (Figure 3.29). At Kingsford the route cuts across a large roundabout (Figure 3.30) and a small landscaped park (Wilson Place) at the intersection of Bunnerong Road and Anzac Parade (Figure 3.31). The Kensington/Kingsford precinct terminates at the current car park area in the Anzac Parade median strip, opposite the Souths Juniors Club (Figure 3.32).

Information for the Kensington precinct presented in the preliminary desktop geotechnical report is limited, and data on the level of fill and modern disturbance across the precinct is unavailable.[80]

3.7.2 Archaeological Context

AHIMS Search

An extensive search of the AHIMS database was undertaken for the Kensington/Kingsford precinct on 19 June 2013 (Appendix A). One site was identified within a 3km x 3km search area centred on the Kensington/Kingsford and Randwick precincts. The identified site is at the Prince of Wales Hospital, approximately 1.5km from the Kensington/Kingsford precinct, and is recorded as having artefacts and hearths as site features. The Prince of Wales site is discussed in more detail in the 'Local Aboriginal Archaeological Context' section below.

The lack of sites in close proximity to the Kensington/Kingsford precinct is likely to reflect the limited investigation of Aboriginal archaeology in the immediate area, rather than any meaningful indication of the way the landscape was used by local Aboriginal people. As much of the search area was developed prior to the introduction of legislation protecting Aboriginal objects, there has been limited recent development that would have triggered the need for Aboriginal archaeological investigations in the immediate vicinity.

Figure 3.27 Tay Reserve facing north to the intersection of Anzac Parade and Alison Road. (Source: GML 2013)

Figure 3.28 Anzac Parade at Kensington. (Source: GML 2013)

Figure 3.29 Open space at the University of New South Wales in the vicinity of the proposed light rail stop. (Source: GML 2013)

Figure 3.30 Roundabout at the intersection of Anzac Parade, Gardeners Road, Bunnerong Road and Rainbow Street, Kingsford. (Source: GML 2013)

Figure 3.31 Wilson Place at the intersection of Bunnerong Road and Anzac Parade, Kingsford. (Source: GML 2013)

Figure 3.32 Car parking area in the Anzac Parade median strip, Kingsford. (Source: GML 2013)

Ethnohistory

The ethnohistorical background outlined above for the Moore Park precinct also applies to the Kensington/Kingsford and Randwick precincts; and should be read in conjunction with this assessment of Aboriginal archaeological potential for the Kensington/Kingsford precinct.

Local Aboriginal Archaeological Context

The Aboriginal heritage literature reviewed above for the Moore Park precinct also provides an overview of the local Aboriginal archaeological context for the Kensington/Kingsford precinct. These studies refer to archaeological investigations of sand dune environments within the Botany Basin and nearby sand sheets. The local Aboriginal archaeological context as outlined for the Moore Park precinct should be referred to for the Kensington/Kingsford and Randwick precincts.

3.7.3 Aboriginal Archaeological Potential

The natural landscape of the Kensington precinct has been extensively modified since 1788 to create the modern park landscape. The historical background presented in Section 2.0 suggests that some areas of the Kensington precinct have been extensively filled—probably in order to stabilise naturally swampy areas. Other parts of the precinct have had a lot of earthmoving to cut down on the site to create level open spaces.

At this stage (without clarification from geotechnical testing) it is difficult to predict the areas with high levels of disturbance, or areas with higher levels of Aboriginal archaeological potential. The Kensington precinct is largely archaeologically untested so it is difficult to predict locations of Aboriginal archaeological potential. Despite this, deep sand sheets, such as within the Kensington precinct, are often associated with subsurface Aboriginal archaeological deposits.

As a result of the significant landscape modifications, it is likely that along much of the precinct the upper stratigraphic levels have been disturbed to some extent. Without geotechnical data it is not possible to determine precise locations of disturbance, or how deep this disturbance extends.

Given the likely depth of Botany sands within the Kensington precinct, it is possible that intact soil profiles remain at depth, below the extent of modern disturbance. The preliminary desktop geotechnical information suggests that the Botany Sands extend up to 20m deep in this precinct.[81] These deeper intact soil profiles may have potential for Aboriginal archaeological evidence to be present, such as stone objects and/or hearths. Organic remains such as middens or burials may be present, if environmental conditions permit (for example, if pH is close to neutral or within anaerobic/waterlogged conditions), as have been found in nearby sand sheet contexts.

Data gathered during investigative works (such as geotechnical profiles) may indicate the depth at which bedrock and/or natural soil profiles occur, or the extent to which historical development may have impacted on natural soil profiles. This information may allow the understanding areas of Aboriginal archaeological potential within the Kensington precinct to be refined.

Tay Reserve may have Aboriginal archaeological deposits within upper stratigraphic layers dating to the nineteenth century, as it was known to be used by Aboriginal people in the historical period. As identified in Section 2.0, the nineteenth century toll house on the site was staffed and occupied by an Aboriginal man known as King Billy Timbery. A historical archaeological assessment prepared for the reserve in 2004 states that:

> *The occupation of the tollhouse by an Aboriginal toll collector could be expected to be recognised in the archaeological record if representative remains [ie stone objects] were identified. These remains would be cultural refuse and debris that would be able to provide evidence for ethnicity. Such evidence could be expected to be found in day-to-day refuse.*[82]

Tay Reserve has been allocated as Zone 1 as there is potential for Aboriginal archaeological deposits to be present in both upper levels disturbed by historical activity, and in lower pre-1788 intact soil deposits.

As the whole Kensington precinct is assumed to have some level of Aboriginal archaeological potential, it is allocated as either Zone 1 or Zone 2, depending on the nature of the impacts (discussed below).

3.7.4 Impact Assessment

Areas of the Kensington precinct where extensive excavation is required (up to and over 750mm deep) are allocated as Zone 1. In these areas the proposed impact is likely to extend into intact soil profiles with Aboriginal archaeological potential. These areas within the Kensington precinct are shown on Figures 3.32–3.33, and include:

- construction of the CSELR track slab;
- construction of the Carlton Street, Todman Avenue, UNSW Anzac Parade, Strachan Street and Kingsford stops and associated infrastructure (such as stop shelters); and
- installation of the Dacey Avenue, Royal Randwick Racecourse and Anzac Parade substations; and
- regrading.

Areas where service installation, service relocation, tree removal and future landscaping works are proposed may also be considered as Zone 1; however, the scope of these works have not yet been defined and are thus not shown on Figures 3.33–3.34.

Other areas of Kensington precinct identified as the locations of additional facilities, such as laydown areas, plant and equipment storage and construction depot facilities, have been identified as Zone 2 (Figures 3.33–3.34).

Use of the Kensington precinct as a works zone—if it will not involve removal of the existing ground surface and/or excavation—is unlikely to have an impact on the Aboriginal archaeological resource. These areas are also identified as within Zone 2 (Figures 3.33–3.34).

Areas defined as having the potential to contain Aboriginal objects, as shown in Figure 3.33—3.34, will be managed in accordance with the archaeological investigation and salvage recommendations identified for Zone 1 and Zone 2—as outlined in *Table 3.1 Definition of Aboriginal archaeological management zones for the CSELR route.*

Figure 3.33 Aboriginal archaeological management zones within the Kensington precinct (north). (Source: Parsons Brinckerhoff and Transport for New South Wales with zones as defined by GML 2013)

Figure 3.34 Aboriginal archaeological management zones within the Kensington precinct (south). (Source: Parsons Brinckerhoff and Transport for New South Wales with zones as defined by GML 2013)

3.8 Randwick Precinct (Alison Road to High Cross Park)

3.8.1 Environmental Context

Overview of the Local Environment

Geology and Soils

The Randwick precinct falls completely within a Quaternary sand geological landscape and is characterised by the Tuggerah soil and the Newport soil landscape (Figures 3.35–3.36). These sand dune fields were deposited by marine and aeolian actions during the Holocene, and are associated with sea level changes since the last Ice Age. Early historical records describe the area as dominated by vegetated sand dunes, and several show these sand hills on the southeastern edge of Randwick Racecourse, on the line of the CSELR route (Figure 2.85).

Tuggerah soils generally consist of fine to medium grained marine quartz sand, and are often deep (over 200cm).[83] The Newport soil landscape dominates the raised plateau at the eastern end of the Randwick precinct. The Newport soil landscape is predominantly found on exposed coastal areas close to the Botany lowlands. These windblown sands are often shallow; however, sometimes overly deep podzolic soils.[84]

Landforms and Landscape

The Randwick precinct is located within the large complex of undulating sand dunes which extend with a north to south orientation from Botany Bay in the east to Sheas Creek in the west.[85] These landforms have been classed by Chapman and Murphy as gently undulating to rolling coastal dune fields, with local relief to 20m and a slope gradient of between 1 per cent and 10 per cent.[86] Large dunes were specifically recorded along the Randwick precinct route, at the eastern boundary of Randwick Racecourse. These dunes remain visible in the landscape, although they have been developed and modified to some extent (Figure 2.93). From Randwick Racecourse, the topography of the precinct rises to a raised plateau above the coast.

An extensive wetland system—including the Lachlan Swamps—is associated with the dune field, and is located at the northernmost extent of the Randwick precinct route, close to the Centennial Parklands and Randwick Racecourse.[87]

The original topography of this sand dune system has been greatly altered by modern development.

Hydrology

Originally the sand dune system was also interspersed with a complex of wetlands, such as Lachlan Swamps, within Centennial Park.[88] Run-off accumulated in freshwater wetlands either along major drainage lines or in dune swales, and would have been less permanent than today.[89] The Lachlan Swamp system was located at the head of the Randwick precinct. This would have been an important freshwater and resource zone. Other semi-permanent freshwater swamps would have occurred at low-lying points along, or close to, the Randwick precinct.

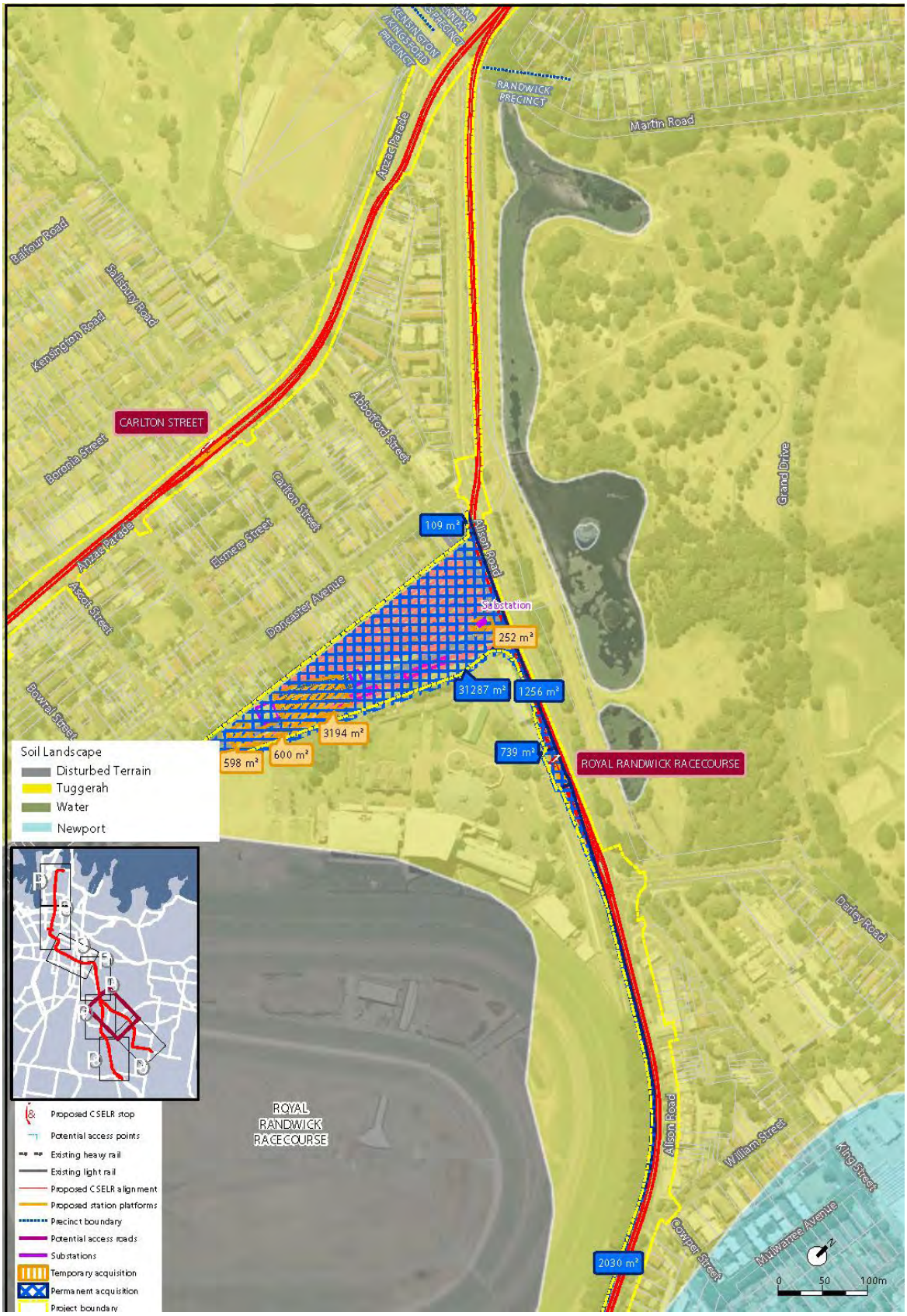


Figure 3.35 Soil landscapes in the vicinity of the Randwick precinct (north). (Source: Chapman, GA and CL Murphy, *Soil Landscapes of the Sydney 1:100 000 Sheet Map*, Department of Environment, Climate Change and Water, Sydney. Google Earth with PB and Transport for NSW base maps and GML 2013 additions)

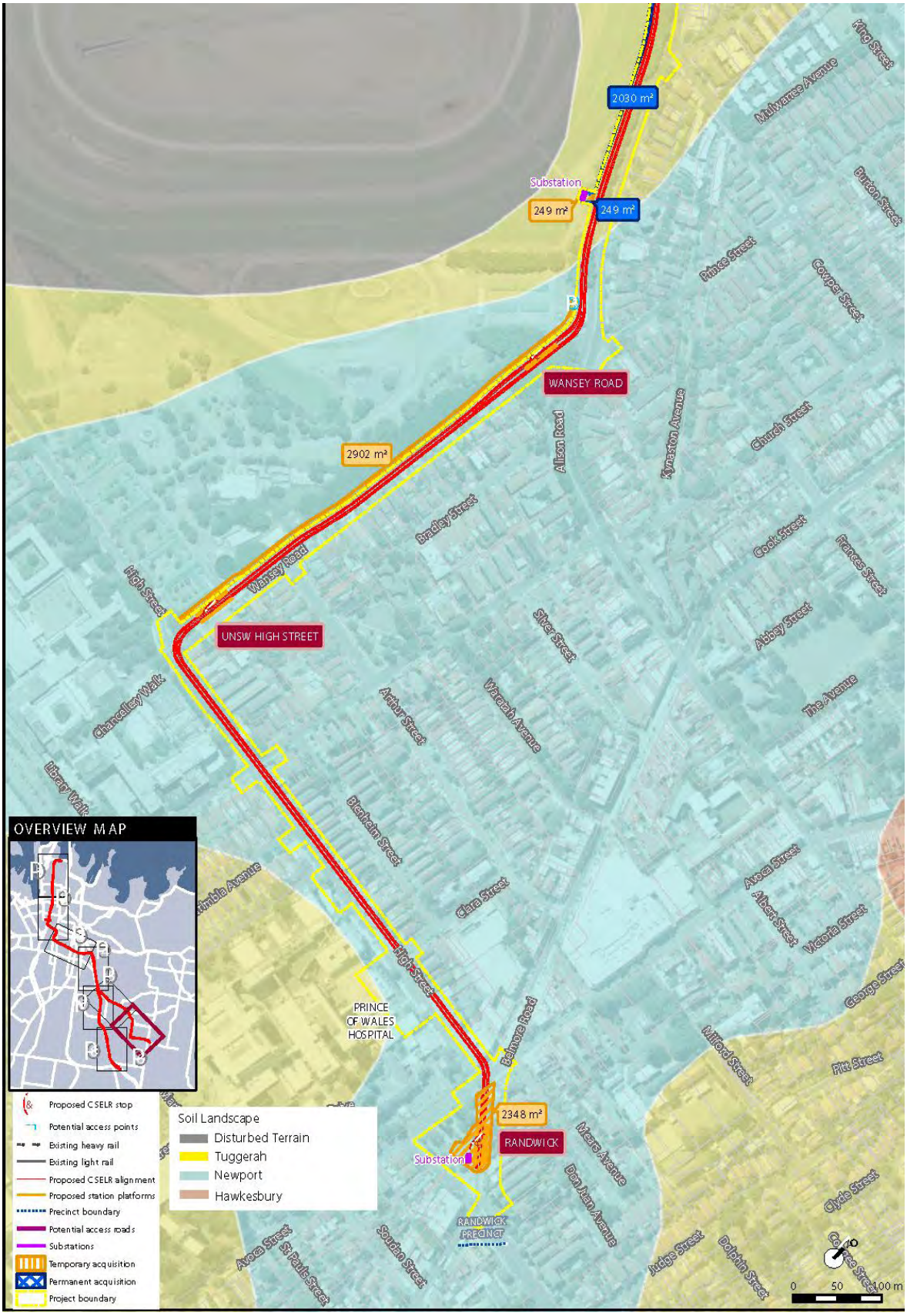


Figure 3.36 Soil landscapes in the vicinity of the Randwick precinct (south). (Source: Chapman, GA and CL Murphy, *Soil Landscapes of the Sydney 1:100 000 Sheet Map*, Department of Environment, Climate Change and Water, Sydney. Google Earth with PB and Transport for NSW base maps and GML 2013 additions)

Flora and Fauna

The sand dune and wetland environment around the Randwick precinct is characterised by Eastern Banksia scrub vegetation communities on the sand and freshwater sedge swamp communities within the wetlands.[90]

The Eastern Banksia scrub is comprised of a varied heath, scrub and low forest community dominated by shrubs such as *Banksia aemula*, *Xanthorrhoea resinosa, Monotoca elliptica*, *Eristemon australasius* and *Ricinicarpos pinifolius*.[91] The freshwater sedge swamp was characterised by 'patches of tall emergent sedges, fringed with zones of shorter sedges and occasional shrubs'.[92]

Plant species likely to have been present in the vicinity of the Randwick precinct that would have been used by local Aboriginal people include *Melaleuca spp.*, *Banksia spp*. and *Xanthorhoea spp.* (particularly *Xanthorrhoea resinifera*). Other local food plants in the vicinity of the Moore Park precinct include the lilly pilly (*Acmena smithii*), various roots and tubers (such as *Blechnum catilagineum*, *B. indicum*, *Eleocharis sphacelata*, *Phragmites australis*, *Triglochin microtuberosum*, *T. rheophilum*, and *Typha orientalis*), native cherry (*Exocarpus cupressiformis*) and the native currant (*Leptomeria acida*).[93]

The Eastern Banskia scrublands are likely to have included kangaroos, wallabies, possums, bandicoots, fruit bats (grey-headed flying foxes) and a range of birds, snakes and lizards. The freshwater wetlands would have been inhabited by a diverse range of animals that would have been used by Aboriginal people, including waterbirds, eels, tortoises, freshwater mussels, shellfish and fish.[94]

Modern Land Use and Disturbance

The Randwick precinct follows Alison Road from its intersection with Anzac Parade. It runs along the northern border of Randwick Racecourse (Figure 3.37) until the intersection of Alison Road and Wansey Road. A stabling yard is also proposed at the northwest corner of Randwick Racecourse, currently occupied by a car park area (Figure 3.38).

The Randwick precinct follows Wansey Road upslope to its intersection with High Street (Figure 3.39). This hill has been interpreted as a reasonably intact sand dune in a recent Aboriginal archaeological assessment of Randwick Racecourse.[95] At High Street the route turns east and follows the established road to its intersection with Avoca Street and Belmore Park. The Randwick precinct terminates at High Cross Park (Figure 3.40).

Information for the Randwick precinct presented in the preliminary desktop geotechnical study is limited, and data regarding the level of fill across the precinct is unavailable.[96]

Figure 3.37 Randwick precinct route at Randwick Racecourse. (Source: GML 2013)

Figure 3.38 Proposed location of stabling yard, Randwick Racecourse. (Source: GML 2013)

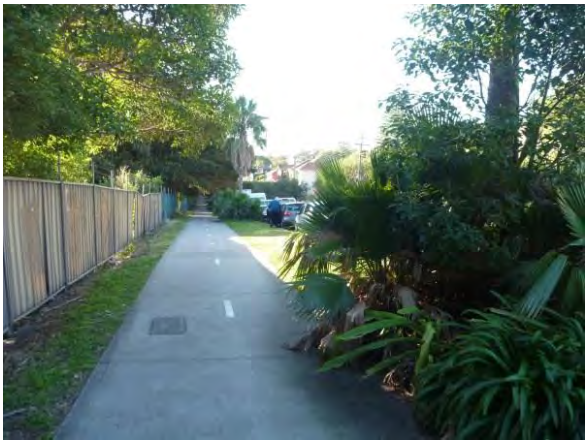


Figure 3.39 View downslope to the north, along Wansey Road. (Source: GML 2013)

Figure 3.40 High Cross Park, Randwick. (Source: GML 2013)

3.8.2 Archaeological Context

AHIMS Search

An extensive search of the AHIMS database was undertaken for the Randwick precinct on 19 June 2013 (Appendix A). One site was identified within a 3km x 3km search area centred on the Kensington and Randwick precincts. The identified site is at the Prince of Wales Hospital, approximately 0.1km from the Randwick precinct, and is recorded as having artefacts and hearths as site features. The Prince of Wales site is discussed in more detail in the 'Local Aboriginal Archaeological Context' section below.

The lack of sites in close proximity to the Randwick precinct is likely to reflect the limited investigation of Aboriginal archaeology in the immediate area rather than any meaningful indication of the way the landscape was used by local Aboriginal people. As much of the search area was developed prior to the introduction of legislation protecting Aboriginal objects, there has been limited recent development that would have triggered the need for Aboriginal archaeological investigations in the immediate vicinity.

Ethnohistory

The ethnohistorical background outlined above for the Moore Park precinct also applies to the Kensington/Kingsford and Randwick precincts, and should be read in conjunction with this assessment of Aboriginal archaeological potential for the Randwick precinct.

Local Aboriginal Archaeological Context

The Aboriginal heritage literature reviewed above for the Moore Park precinct also provides an overview of the local Aboriginal archaeological context for the Randwick precinct. These studies refer to archaeological investigations of sand dune environments within the Botany Basin and nearby sand sheets. The local Aboriginal archaeological context as outlined for the Moore Park precinct should be referred to for the Kensington/Kingsford and Randwick precincts.

3.8.3 Aboriginal Archaeological Potential

The natural landscape of the Randwick precinct has been extensively modified since 1788 to create the modern park landscape. As indicated by the historical background (Section 2.0) and the 2006 Aboriginal archaeological assessment of Randwick Racecourse, some areas of the Randwick precinct have been extensively filled—probably in order to stabilise naturally swampy areas.[97] Other parts of the precinct have been extensively excavated to create level open spaces. While much of the precinct has experienced significant landscape modification, the Randwick Racecourse Aboriginal archaeological assessment also identifies that the high dune in the southeast corner of the racecourse as a remnant landscape that has high Aboriginal archaeological potential.[98]

At this stage (without clarification from geotechnical testing) it is difficult to predict the areas with high levels of disturbance, or areas with higher levels of Aboriginal archaeological potential. The Randwick precinct is largely archaeologically untested so it is difficult to predict locations of Aboriginal archaeological potential. Archaeological excavations undertaken in 1995 at Prince of Wales are a notable exception, where Aboriginal archaeological evidence dating to c8000 BP was discovered.[99] In addition, deep sand sheets such as those within the Randwick precinct are often associated with subsurface Aboriginal archaeological deposits.

As a result of the significant landscape modifications, it is likely that along much of the precinct the upper stratigraphic levels have been disturbed to some extent. Without geotechnical data it is not possible to determine the precise locations of disturbance, or how deep this disturbance extends.

Given the likely depth of Botany sands within the Randwick precinct, it is possible that intact soil profiles remain at depth, below the extent of modern disturbance. These deeper intact soil profiles may have potential for Aboriginal archaeological evidence to be present, such as stone objects and/or hearths. Organic remains such as middens or burials may be present, if environmental conditions permit (for example, if pH is close to neutral or within anaerobic/waterlogged conditions), as have been found in nearby sand sheet contexts.

Data gathered during investigative works (such as geotechnical profiles) may indicate the depth at which bedrock and/or natural soil profiles occur, or the extent to which historical development may have impacted on natural soil profiles. This information may allow the understanding areas of Aboriginal archaeological potential within the Randwick precinct to be refined.

As the whole Randwick precinct is assumed to have some level of Aboriginal archaeological potential, it is allocated as either Zone 1 or Zone 2, depending on the nature of the impacts (discussed below).

3.8.4 Impact Assessment

Areas of the Randwick precinct where extensive excavation is required (up to and over 750mm deep) are allocated as Zone 1. In these areas the proposed impact is likely to extend into intact soil profiles with Aboriginal archaeological potential. These areas within Randwick precinct are shown on Figures 3.41–3.42, and include:

- construction of the CSELR track slab;
- regrading of the remnant dune landscape around Wansey Road CSELR track, the Wansey Road stop and associated landscaping works;
- construction of the Randwick Racecourse, Wansey Road, UNSW High Street and Randwick stops and associated infrastructure (such as stop shelters); and
- installation of the Randwick Racecourse Stabling, Randwick Racecourse and Randwick substation.

Areas where service installation, service relocation, tree removal and future landscaping works are proposed may also be considered as Zone 1; however, the scope of these works have not yet been defined and are thus not shown on Figures 3.41–3.42.

Other areas of Randwick precinct identified as the locations of additional facilities, such as laydown areas, plant and equipment storage and construction depot facilities have been identified as Zone 2 (Figures 3.41–3.42).

Use of the Randwick precinct as a works depot—if it will not involve removal of the existing ground surface and/or excavation—is unlikely to have an impact on the Aboriginal archaeological resource. These areas are also identified as within Zone 2 (Figures 3.41–3.42).

Works within the proposed Randwick Racecourse Stabling Yard have not yet been defined; however, will involve excavation for the construction of track and associated infrastructure. As the extent of works has not yet been defined, it is assumed that the area will be defined as Zone 1. Once the scope of works has been defined further refinements to this zoning may be possible, and some areas may be allocated as Zone 2.

Areas defined as having the potential to contain Aboriginal objects, as shown in Figure 3.41—3.42, will be managed in accordance with the archaeological investigation and salvage recommendations identified for Zone 1 and Zone 2—as outlined in *Table 3.1 Definition of Aboriginal archaeological management zones for the CSELR route.*

Figure 3.41 Aboriginal archaeological management zones within the Randwick precinct (north). (Source: Parsons Brinckerhoff and Transport for New South Wales with zones as defined by GML 2013)

Figure 3.42 Aboriginal archaeological management zones within the Randwick precinct (south). (Source: Parsons Brinckerhoff and Transport for New South Wales with zones as defined by GML 2013)

3.9 Rozelle Precinct

3.9.1 Environmental Context

Geology and Soils

Chapman and Murphy identify the Rozelle Stabling/Maintenance Depot as being characterised by 'disturbed terrain' and dominated by large amounts of introduced fill.[100] At Rozelle, it is likely to be associated with the reclamation of the creek/estuary valley in order to create developable land. The edges of the study area may be within the Gymea soil landscape, underlain by Hawkesbury sandstone. Shallow to moderately deep soils (30cm–100cm) dominate; however, sandstone outcrops are common within the Gymea soil landscape. Some steep slopes are present, and there is a high soil erosion hazard.[101]

Landforms and Landscape

The Rozelle Stabling/Maintenance Depot is located at the base of a valley running between sandstone ridges. The Rozelle study area extends part way up the northern slope, and to the shoreline at White Bay/Rozelle Bay.

Hydrology

Nearby freshwater creeks include Whites Creek and Johnstons Creek. Whites Creek runs parallel to the southern border of the precinct between Hutchinson Street and Bayview Crescent, and Johnstons Creek enters Rozelle Bay approximately 500m southeast of the study area. An original drainage line may also have run through the base of the valley that the Rozelle Stabling/Maintenance Depot occupies.

Fauna and Flora

The natural environment at the Rozelle Stabling/Maintenance Yard would have reflected the transitional landforms of the site as the study area changed from the upper rocky ridges to the estuary at their base. Mangroves may have grown in the estuary where the creeks ran into Rozelle Bay. Other swampy forest plants such as swampy oak (*Casuarina glauca*), ti-tree (*Melaluca sp.*) and swamp mahogany (*Eucalyptus robusta*).[102] The environment up the sandstone slopes here would have consisted of open woodland of Scribbly Gum and *Eucalyptus racemosa*. A shrubby understorey may have been present, with *Leptospermum flavescens*, *Banksia oblongifolia* and *Callistemon citrinus*.[103]

The fauna of the Rozelle area is likely to have been similar to that of the CBD area. The various species that would have been present include kangaroo, wallaby, wombat, echidna, flying fox, emus, quolls, various native rats and mice, snakes and lizards.[104] Marine resources such as fish and shellfish would have been plentiful and easily accessed from the small bays and shorelines on Port Jackson that border the eastern end of the study area. Watkin Tench, a military officer on the First Fleet, describes in 1788 the fish at Port Jackson less plentiful than at Botany Bay.[105] Tench mentions fish species such as:

> *bass, mullets, skate, soles, leather-jackets and many other species, all so good in their kind as to double our regret at their not being more numerous. Sharks of an enormous size are also found here.*[106]

The area is also likely to have supported a variety of waterbirds that may have been an important resource for the local Aboriginal population.

Modern Land Use and Disturbance

The Rozelle precinct has undergone significant landscape modification, including reclamation of the estuary and significant cutting of the sandstone ridge face (particularly on the northwest side of the site) (Figures 3.43 and 3.44).

Historically the site was established in 1916 as the Rozelle rail yard, and was reclaimed to provide a site for marshalling of goods trains. A large amount of train infrastructure and work sheds remain on the site (Figure 3.45). Today the Lilyfield stop of the Sydney Light Rail is within the Rozelle Precinct (3.46).

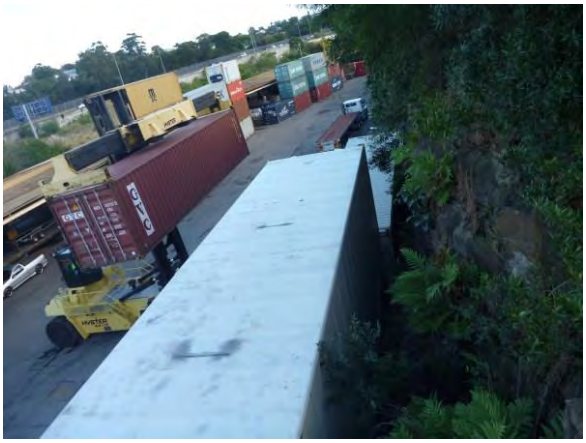


Figure 3.43 Heavily modified sandstone rock face on the northern boundary of the Rozelle precinct. (Source: GML 2013)

Figure 3.44 Sandstone rock face with subsurface tank cut into it. (Source: GML 2013)

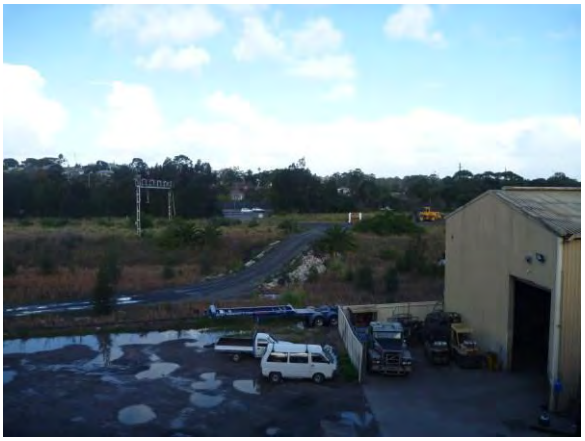


Figure 3.45 View south over the Rozelle precinct. (Source: GML 2013)

Figure 3.46 Lilyfield stop of the existing light rail network. (Source: GML 2013)

3.9.2 Archaeological Context

AHIMS Search

An extensive search of the AHIMS database was undertaken for the Rozelle precinct on 8 July 2013 (Appendix A). Six sites were identified within a 3km x 3km search area centred on the Rozelle precinct. Five of the identified sites are located at Callan Park, approximately 1km from the Rozelle precinct, and are recorded as consisting of shell middens, rock shelters and rock engravings. These sites are discussed in more detail in the 'Local Aboriginal Archaeological Context' section

below. One site, recorded as consisting of a rock shelter with associated shell midden, is located approximately 50m from the Rozelle precinct on the rocky ridge above the now reclaimed estuary.

The lack of sites in close proximity to the Rozelle precinct is likely to reflect the limited investigation of Aboriginal archaeology in the immediate area rather than any meaningful indication of the way the landscape was used by local Aboriginal people. As much of the search area was developed prior to the introduction of legislation protecting Aboriginal objects, there has been limited recent development that would have triggered the need for Aboriginal archaeological investigations in the immediate vicinity.

Ethnohistory

Early European accounts suggest that the Wangal people occupied the land from Darling Harbour or Long Cove west to Rose Hill (Parramatta).[107] This indicates that the Rozelle precinct was likely to have been located within Wangal lands, and was close to the tribal boundary with the Cadigal.

Other elements of ethnohistory of the Rozelle precinct would be similar to that discussed above for the City Centre precinct. The people that inhabited the coastal regions of the Port Jackson area had access to a wide range of natural resources, including terrestrial and marine flora and fauna. Marine resources, such as fish, shellfish and crustaceans were likely to have been a vital part of the diet of coastal Aboriginal people, and would have been frequently collected and eaten. Terrestrial animals such as kangaroos would have also been hunted.

The material culture of the local Aboriginal people would have consisted of a complex suite of specialised stone tools, fish hooks made of shell, and other products made of organic resources.

Many written European accounts and drawings record Aboriginal people who occupied the Port Jackson area—including the Gadigal—as camping, cooking, and fishing on the open shoreline, estuarine, river banks and rock shelters near water. Attenbrow's analysis of ethnohistorical evidence regarding landscape use indicates a focus of Aboriginal activity on valley bottoms and shorelines.[108] Attenbrow's Port Jackson Archaeological Project (see below) also demonstrated that archaeological sites were similarly patterned in a way that supports this focus.[109] She does, however, caution reliance on these patterns as they are skewed by archaeological preservational factors, as well as biases in what has been portrayed in the historical record.[110]

Local Aboriginal Archaeological Context

Few Aboriginal archaeological studies have been undertaken in the immediate vicinity of the Rozelle precinct. The following review of Aboriginal archaeological context focuses on the local archaeological evidence and its context within relevant literature prepared for similar landscapes within the inner Sydney area.

Val Attenbrow 1991—Port Jackson Archaeological Project

In 1991 Val Attenbrow undertook a project to relocate registered DECCW sites (now known as AHIMS sites) as many were poorly recorded. Site survey was undertaken across the Port Jackson catchment, which Attenbrow divided into eight sub-catchments. Over 350 middens and archaeological deposits were relocated or newly identified. Attenbrow identified a number of patterns of site distribution associated with aquatic zones and geological formations within the catchment.

The Rozelle precinct is located within sub-catchment 7 (Concord to Sydney Harbour Bridge) of Attenbrow's Port Jackson archaeological project. This sub-catchment had an area of 50km^2 with freshwater and estuarine aquatic zones. Twenty middens had been recorded in this broader sub-catchment (as at 2001).

Attenbrow's study revealed that 98% of middens in the entire Port Jackson catchment were located on Hawkesbury sandstone, even though there is a greater area of Wianamatta shale landscapes within the project's study area. The number of middens varied drastically across the Port Jackson catchment—partly due to discrepancies in factors such as the land area of each sub-catchment and the intensity of residential and industrial development—however, it was clear that middens and deposits occurred in higher densities in sub-catchments that included an estuary.[111]

Callan Park Aboriginal Archaeological Sites

A number of Aboriginal archaeological sites on the Iron Cove shorefront of Callan Park have been registered on the AHIMS database in the 1980s and early 1990s. These sites form a complex of shell middens, rock shelters and engraving sites that can be conceived as a focus of Aboriginal activity. These sites have been disturbed by modern activities, and there is some conjecture about the validity of some of the recorded middens; however, others appear to have been minimally disturbed.[112] Identified shell species include Sydney Cockle (*Anandara trapezia*), Sydney Rock Oyster (*Saccostrea commercialis*) and Hercules Club Whelk (*Pyrazus ebeninus*).

This cluster of sites approximately 1km from the Rozelle precinct indicates that Aboriginal people utilised the shorefront areas of the Rozelle Peninsula for a range of activities. While the landscape differs slightly in that the Callan Park sites are located on the open water of Iron Cove (the Rozelle Precinct would have been a smaller estuarine area), it is likely that both environments were used in resource collection and other activities.

3.9.3 Aboriginal Archaeological Potential

Given the extensive disturbance to the sandstone ridge and estuarine valley portions of the study area, it is unlikely that intact Aboriginal archaeological deposits or sites remain intact. Any Aboriginal archaeological evidence in the Rozelle precinct is likely to be highly disturbed by modern activities.

There is some potential for rock engravings to be present on unmodified sandstone outcrops; however, much of the visible sandstone at the site is heavily modified. No rock shelters were identified during the visual inspection. It is likely that most rock shelters within the Rozelle precinct (similar to the registered rock shelter located nearby) were destroyed when the sandstone ridge was cut to create the railway marshalling yards in the early twentieth century. The surface of some sandstone outcrops is not visible as they are physically inaccessible or obscured from view by soil, vegetation or asphalt. Many of these areas also appear to be heavily modified. Although no unmodified areas of sandstone outcropping were identified during the visual inspection; if any such areas were present on the site, there would be some potential for features such as rock engravings or axe grinding grooves to be present. These areas have been identified as Zone 3.

Without geotechnical information it is difficult to accurately define the nature of the existing soils at the Rozelle precinct. Available historical information and the visual inspection, suggests that most of the site has been reclaimed from the estuary where Whites Creek and Johnstons Creek enter Rozelle Bay. Any archaeological sites that may have been located in this area, such as middens or artefact scatters, are unlikely to have survived the processes of twentieth-century, large-scale,

organised land reclamation intact. There is some possibility that isolated cultural material such as stone objects or midden material may survive highly disturbed beneath, or within, reclamation fill. It is not possible to accurately predict if such material is present, or where such material may be located. These areas have been identified as Zone 3.

Data gathered during investigative works (such as geotechnical profiles) may indicate the depth at which bedrock and/or natural soil profiles occur, or the extent to which historical development may have impacted on natural soil profiles. This information may allow the understanding areas of Aboriginal archaeological potential within the Rozelle precinct to be refined.

3.9.4 Impact Assessment

Construction of the CSELR within Zone 3 may impact on Aboriginal archaeological evidence where excavation is proposed.

Areas defined as having the potential to contain Aboriginal objects, as shown in Figure 3.47, will be managed in accordance with the archaeological investigation and salvage recommendations identified for Zone 3—as outlined in *Table 3.1 Definition of Aboriginal archaeological management zones for the CSELR route.*

Figure 3.47 Aboriginal archaeological management zones within the Rozelle precinct. (Source: Parsons Brinckerhoff and Transport for New South Wales with zones as defined by GML 2013)

3.10 Endnotes

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32 ibid, pp 43–44.
33 Coffey Geotechnics, op cit.
34 Attenbrow, 2002 op cit, pp 98–99.
35 ibid, pp 36.
36 Chapman and Murphy, op cit, pp 94–95.
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38 Chapman and Murphy, op cit, pp 94–95.

[39] Benson and Howell, op cit, pp 90–92.
[40] AMBS op cit, p 5; Benson and Howell, op cit, p 90.
[41] Chapman and Murphy, op cit, p 95; Benson and Howel, op cit, p 92.
[42] Benson and Howell, op cit, pp 90–91.
[43] ibid.
[44] Benson and Howell, op cit, p 92.
[45] AMBS, op cit, pp 6–7.
[46] ibid, p 8.
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4.0 Historical Archaeology

4.1 Preamble

This section assesses the key areas of historical archaeological potential within the CSELR study area, and the impact that the construction of the CSELR will have on known and/or potentially significant historical archaeological resources. Management recommendations for the mitigation of impacts on the known and potential historical archaeological resource have been developed in order to assist with the minimisation of impacts, and in order to ensure that historical archaeology is dealt with in the most efficient and pragmatic manner possible, across the extent of the CSELR route.

4.2 Historical Archaeological Management in NSW

Historical archaeological investigations of archaeological sites identified as having Local or State significance are required to be undertaken in accordance with NSW Heritage Council policies, which ensure that disturbance of sites and 'relics' occurs in accordance with appropriate professional assessment, standards and procedures.

The provisions of the Heritage Act require archaeological investigations to be undertaken in accordance with a Section 140 approval or an endorsed exemption under S139(4) of the Act, or if a site is listed on the NSW State Heritage Register (SHR), archaeological investigations must be undertaken in accordance with a Section 60 approval or an endorsed Section 57(2) exemption.

The CSELR, as a declared State Significant infrastructure (SSI) Project does not require a consent to be issued under the Heritage Act. However, in accordance with the Director General's Requirements for the EIS, issued on 5 August 2013, the archaeological investigation is expected to be undertaken in accordance with the current NSW Heritage Council Guidelines.

The key Heritage Council policy documents that provide the context for this historical archaeological assessment include the:

- Heritage Council of NSW, 1993, *Historical Archaeological Sites: Investigation and Conservation Guidelines.*
- NSW Heritage Office, 1996, *Archaeological Assessments: Archaeological Assessment Guidelines.*
- NSW Heritage Office, 2001, *Assessing Heritage Significance.*
- NSW Heritage Office, 2003, *How to Prepare Archival Records of Heritage Items*.
- NSW Heritage Office, 2006, *Historical Archaeology Code of Practice.*
- Heritage Branch of the Department of Planning, 2009, *Assessing Heritage Significance for Historical Archaeological Sites and 'Relics'.*

The *Assessing Heritage Significance for Historical Archaeological Sites and 'Relics'* (2009) guidelines state that the Heritage Council requirements for archaeological research now reflect a broader approach to understanding and managing an archaeological site.

The 2009 guidelines provide clear advice as to the importance of establishing a predictive level of significance for the archaeological resource expected to be found during excavations, because the potential significance of the archaeological resource will be the driver for the management of that resource. In particular, the 2009 guidelines note that:

> *The main aim in assessing significance is to produce a succinct statement of significance, which summarises the heritage values of a place, site or item. The statement will then become the basis for management choices that will affect the item's future. For archaeological sites that have been assessed as containing 'relics' understanding the significant values is critical, because these sites are a non-renewable resource…the identified values of the site or 'relics' (the heritage significance) will help determine which management options are most appropriate. (Assessing Heritage Significance for Historical Archaeological Sites and 'Relics' 2009:10)*

As a result, the Heritage Council usually expects that the original research design and the assessed significance of the excavated site and its 'relics' are to be revisited throughout the archaeological investigation and post-excavation reporting. This will ensure that any changes in the original site assessment will be recorded and that the findings from the work can contribute to an ongoing process of building knowledge about particular site types, preservation conditions in specific areas and other future management information (*Assessing Heritage Significance for Historical Archaeological Sites and 'Relics'* 2009:15).

4.1.1 Methodology

The focus of this historical archaeological assessment has been to identify key areas along the CSELR route that are likely to contain significant historical archaeological resources that may be impacted upon by the CSELR project. The historical archaeological assessment presented below draws on the following sources:

- a site inspection of the CSELR route;
- review of the State Heritage Inventory for known local and State listed sites;
- the history prepared for the CSELR project (Section 2.0 of this report);
- a review of relevant historical archaeological background documentation, where readily available; and
- identification of previous major works that would have impacted on historical archaeological resources in the vicinity of the CSELR route.

The assessment does not provide a detailed review of all potential archaeological resources across the entire route, but rather uses the information extrapolated from the above-mentioned sources in order to initially determine where the key archaeological resources may exist.

This information has been synthesized in order to identify the types of historical archaeology that may be present along the CSELR route. A preliminary review of the significance of the anticipated historical archaeological resource has then been undertaken. Three historical archaeological management zones (based on known or potential significance) have then been defined, each with their own set of management and mitigation measures tailored to the significance of the archaeology likely to be present.

The CSELR route has then been broken down into discrete historical archaeology management units. The units are identified according to the expected nature and significance of the historical archaeology present in particular areas to ensure a pragmatic approach to managing the resource. Each unit has been allocated with a management zone to indicate how the archaeology of the area would be managed during the course of the CSELR project.

Further detail on the assessment process is outlined below.

Historical Archaeological Zones

In order to manage the various levels of archaeological significance that may occur across the extent of the CSELR route appropriately and pragmatically, three archaeological zones have been developed to ensure a clear and consistent approach is applied to the management of the archaeological resource along the CSELR route. The archaeological zones have been developed to respond to our existing knowledge of known or potential archaeological significance, and are named as follows:

- Zone 1: State Significant Archaeological Resource—known or potential;
- Zone 2: Locally Significant Archaeological Resource—known or potential;
- Zone 3: No Archaeological Resource Present.

Historical Archaeological Management Units

Each precinct has been divided into a number of discrete Historical Archaeological Management Units (HAMUs). Each unit has been allocated according to the nature of the potential archaeological resource in an area. These units have then been allocated a particular archaeology zoning based on the significance of the potential archaeology. This zoning will allow the varying nature and significance of the archaeological resource to be managed pragmatically and consistently throughout the course of the CSELR project.

Each unit, and the associated zoning, is named and mapped for the CSELR route, as outlined in Figures 4.4–4.12.

Some archaeological units along the CSELR route have been previously assessed and, where possible, existing information such as previous statements of significance for these areas have been included. Specific mitigation measures have also been designed to be consistent with previous management recommendations found in documents such as conservation management plans, particularly for State significant resources such as the Tank Stream.

Most historical archaeological management units within the CSELR route, however, have been subject to very little or no previous historical archaeological assessment and/or archaeological investigation. Therefore, some of these units may benefit from preliminary archaeological testing and a reassessment of their potential archaeological significance once the detailed impacts for the CSELR route have been determined. Recommendations with respect to preliminary archaeological testing have been made, where relevant, for each of the individual archaeological units. A preliminary assessment of historical archaeological significance of these units has been made, which briefly addresses the criteria outlined in the NSW Heritage Branch guideline *Assessing Significance for Historical Archaeological Sites and 'Relics'*.[1]

Management and Mitigation Strategies

Archaeological resources would be managed in accordance with their significance. The identified level of significance can influence the degree of impact that may be acceptable or the level of investigation and recording that may be required.

Historical archaeological management units identified as containing known or potential State significant relics will require the highest level of management, including the need—in some circumstances—to redesign in order to avoid and/or mitigate possible impacts on fabric. Units with State significant archaeology may also benefit from preliminary archaeological testing once the detailed impacts of the CSELR route have been determined in order to locate and further understand the integrity and extent of the actual resource, allowing for appropriate planning for the mitigation of impacts.

Locally significant archaeological resources, whilst still important, will be able to be managed in a greater variety of ways and are less likely to require any redesign of proposed impacts, depending on the extent, nature and intactness of the resource found.

Some historical archaeological management units may benefit from more detailed archaeological assessment as part of the management of historical archaeological resource in the next stage of the project. More detailed assessment will also help refine management strategies to ensure impacts are appropriately mitigated once final impacts are determined.

Management and mitigation strategies—developed to address the likely significance of the identified historical archaeological resource—are identified for each archaeological zone, and are described in detail below in Section 4.2. Some historical archaeological units also require specific mitigation and management strategies tailored to the anticipated nature of archaeological resource in that area. Where this is the case, these strategies are included as specific points in the mitigation strategies for each archaeological unit in Section 4.3.

4.1.2 Structure

Section 4.2 defines the general historical archaeological zones that are allocated across the CSELR route. Table 4.1 outlines each zone, with a discussion of the anticipated nature of the archaeological resource, examples of the archaeology likely to be present within that zone, the identified mitigation measures and the likely impact on the construction program.

Sections 4.3–4.8 contain the historical archaeological assessment for each precinct of the CSELR route. Each identified historical archaeological management unit is assessed in a table format that outlines the following information:

- name of the historical archaeological management unit (HAMU);
- archaeological zoning;
- known heritage listings for archaeological items, where applicable;
- significance, including a preliminary statement of significance;
- heritage impact assessment; and
- an outline of mitigation measures, including any specific management requirements.

4.2 Definition of Historical Archaeological Management Zones

The following table provides a preliminary summary of the three archaeological management zones, including the anticipated nature of the historical archaeological resource, mitigation measures, and highlights where allowance will need to be made in the construction program for historical archaeological works to be undertaken, and some preliminary examples based on background research undertaken to date.

Given that the archaeological management zones have been designed to address the needs of each of the identified archaeological management units in a uniform way and across the whole of the CSELR route; flexibility has been built into the management recommendations for each of these zones, where possible. This is to allow for the possible presence of varying levels of significant archaeological resources within one zone type and for the occurrence of unexpected relics of significance across the zones.

These three archaeological management zones are applied across the CSELR route.

Zone 1: State Significant Historical Archaeological Resource—(known 'relics' and/or potential to contain)	
Nature of Archaeological Resource	• Archaeological site listed on the State Heritage Register; known to have State significance and/or an area with the potential to contain 'relics' of State significance. • High to exceptional research potential, depending on the level of intactness of the resource. • Meets NSW Heritage Significance criteria and/or Archaeological Significance criteria for State (or higher) significance (as defined by the relevant NSW Heritage Division publications). • Likely to also contain Locally significant archaeological resources.
Examples of State Significant Historical Archaeology	• First Fleet Park. • Tank Stream (also identified as a working State Heritage listed Sydney Water infrastructure item). • Potential burials, for example around Town Hall (Sydney's Old Burial Ground) and Devonshire Street (former cemetery).
Mitigation Measures	• Impact and/or removal is generally unacceptable for archaeological resources listed on the State Heritage Register and/or identified as being highly intact. • All contractors to receive a heritage induction. • An excavation director who meets the NSW Heritage Branch requirements for directing State significant archaeological investigations must monitor the works. • In situ retention of the archaeological resource is likely required, unless it is highly disturbed and/or of a fragmentary nature—or if the impacts are assessed by the excavation director to be minor in nature. • A Work Method Statement or Archaeological Research design will be prepared by a qualified historical archaeologist in accordance with Heritage Division requirements, prior to the commencement of works. The Work Method Statement or Archaeological Research Design will outline a methodology for the investigation, salvage and/or conservation of archaeological resources. • An archaeological testing program would be implemented in this HAMU to test the location, extent, integrity and nature of State significant (Zone 1) archaeological resources. The testing program would be undertaken in accordance with an approved archaeological Work Method Statement or Archaeological Research Design. • The results of the testing program would further refine the Work Method Statement or Archaeological Research Design for the investigation, salvage and/or conservation of archaeological resources. • Works which may impact, disturb or destroy relics within Zone 1 HAMUs will be monitored by the excavation director to ensure unacceptable impacts do not occur. • The NSW Heritage Division and Transport for NSW to be notified when intact State significant relics are discovered. • Public engagement such as media releases; public open days during the works program; and/or post-works heritage interpretation may be warranted. • Post-excavation reporting, artefact analysis and conservation of relics would be required if relics are found.
Likely requirements for the construction program	• Redesign, scope change and/or construction methodology change is likely to be required so as not to impact on Zone 1 archaeological resources. • Archaeological constraints and archaeological program likely to cause delays due to the significance of the archaeological resource, particularly in circumstances where unexpected State significant resources are found. • Budget and time allowance will be required for monitoring; and possibly open area excavation, any associated post-excavation analysis and reporting. The nature and intactness of the archaeological resource may warrant interpretation.

Zone 2: Locally Significant Historical Archaeology —(known 'relics' and/or potential to contain)	
Nature of Archaeological Resource	• Known archaeological sites of Local significance (ie listed on the LEP or State Heritage Inventory as Locally significant); and/or areas with the potential to contain 'relics' of Local significance. • Still has the possibility to contain unexpected State significant relics not identified by previous research. • Meets the NSW Heritage Significance criteria and/or Archaeological Significance criteria threshold for Local significance (or, in unexpected cases, State significance).
Examples of Locally Significant Historical Archaeology	• Evidence of former early nineteenth-century terraces, commercial premises—footings, basements, rubbish dumps, etc. • Evidence of former road alignments in the CBD. • Remains of nineteenth and twentieth-century tram infrastructure, such as tram tracks and signal boxes.
Mitigation Measures	• Impact and/or removal is likely to be acceptable if appropriate mitigation measures are followed. • All contractors to receive a heritage induction. • A Work Method Statement or Archaeological Research design will be prepared by a qualified historical archaeologist in accordance with Heritage Division requirements, prior to the commencement of works. The Work Method Statement or Archaeological Research Design will outline a methodology for the investigation, monitoring and/or salvage of archaeological resources. • Archaeological monitoring can be led by the State significant excavation director/local excavation director for works within Zone 2 areas, followed by open area excavation as required (which depends on the nature, extent and integrity of the archaeological resource to be impacted, and the level of impact proposed). • If unexpected State significant relics are discovered in Zone 2 areas—such relics may need to be managed in accordance with the Zone 1 requirements. The excavation director is to determine if the unexpected relics are likely to be reassessed as State significant, and then determine appropriate mitigation (ie manage as Zone 1 or Zone 2). • The NSW Heritage Division and Transport for NSW is to be notified when intact State significant relics are discovered. • Public engagement such as heritage interpretation and/or public open days may be warranted, depending on the nature and significance of the archaeological resource. • Post-excavation reporting, artefact analysis and conservation is required if relics are found.
Likely requirements for the construction program	• The archaeological program is likely to cause some delays/costs which will vary according to the actual integrity, nature and extent of the resource to be impacted, and the level of impact proposed. • Budget and time allowance will be required for monitoring, and possibly open area excavation, any associated post-excavation analysis and reporting. The nature and intactness of the archaeological resource may warrant interpretation.

Zone 3: No Archaeological Resource Present	
Nature of Archaeological Resource	• Known areas of major physical disturbance likely to have removed all historical archaeological remains.
Examples of Areas with No Anticipated Historical Archaeology	• George Street above Town Hall railway station box. • George Street above pedestrian connections to the QVB and the Galeries Victoria. • Areas where extensive underground service and utility trenches have been installed. • Areas of land for which there is no previous known non-Aboriginal uses, and/or evidence in the historical records that demonstrate prior use of land.
Mitigation Measures	• Works in Zone 3 unlikely to have an archaeological impact. • All contractors to receive a heritage induction. • Archaeologist on call to investigate any unexpected discoveries of archaeological remains identified during ground works.
Likely requirements for the construction program	• Works in Zone 3 unlikely to be delayed by archaeological constraints, except in the case of unexpected discoveries. • Works can proceed with caution.

4.3 City Centre Precinct

HAMU	Tank Stream—see (1) on Figure 4.4
Zone	Zone 1—State Significant Archaeological Resource—known or potential
Additional Management Requirements	The State Heritage Register listing defines a 3m buffer zone from all surfaces of the Tank Stream. The CMP states that the buffer zone is important as a physical and structural support to the Tank Stream conduit, as follows: *The general principle, established by the experience in similar cases, indicates that the following buffer zones are required, (measured from all sides of the conduit):* • *A zone of 1m should be absolutely prohibited for any new development,* • *A zone of 3m should generally be prohibited for new development, and any works within this zone should be overseen by a suitably qualified structural engineer,* • *A zone of 10m should be considered structurally highly sensitive, and works within this zone should be approved by a suitably qualified structural engineer.*[2]
Listings for Archaeological Items	State Heritage Register—Item # 00636 Sydney Water S170 Register—Tank Stream Stormwater Chanel No. 29—Item # 4573709 Sydney LEP 2012—Tank Stream including tunnels and tanks—I1656
Archaeological Potential	Known archaeological potential: *The Aboriginal and early colonial archaeological resource relating to the Tank Stream's history as an open running stream is likely to be extremely patchy and its survival purely a matter of good fortune. It is not possible to predict on the basis of current historical or archaeological knowledge where such deposits may survive. Where such evidence is present it will be significant both as sources of information that is otherwise very rare in Sydney—evidence of Aboriginal life in Sydney Harbour, and the very earliest periods of colonial Sydney—and for its tangible link with the Tank Stream and its place in Australia's own historical development.* *The rarity of the sites and their uncertain occurrence requires that ground disturbance in areas of potential should be done with an aim to minimise the risk of incidental loss, i.e. through open area rather than sondage exposure.* *Other evidence of occupation of the stream banks before it was channelled are of probable local significance.*[3] Physical Description: *…[the] Tank Stream runs directly north, through access chamber AC 03, to AC 02 located approximately 100m to the north of the interception chamber, on the north side of Alfred Street. In this section, the profile reverts to semi-elliptic stone arch about 3000mm in width, while the height varies between c1100 and c1400mm. The bottom was formed as shallow v-shape [sic] flattened in the central area.*[4] The section of the Tank Stream in the vicinity of the CSELR route is described in the Tank Stream Conservation Management Plan as dating to 1860. Prior to the construction of this section in 1860, other works associated with the Tank Stream were linked to the construction of Semi-Circular Quay in the 1850s. This required the Tank Stream to be extended north of Bridge Street (Figure 4.1).[5]
Significance Level	State
Statement of Significance	*The Tank Stream is significant because it was the reason the First Fleet settlement was established in Sydney Cove, and therefore influenced the future shape of Sydney over two centuries. It is linked in the public mind with the period of first European settlement and retains value as an iconic representation of that period and is interpreted as a metaphor of the period of contact and early urban settlement in*

	Australia. *The Tank Stream itself has retained an identity through the functional changes from being a fresh water supply, through subsequent use as combined sewer and stormwater drain to its current function as a stormwater drain. It is an important survivor of the first period of organised and integrated water management in an Australian city. The stone-cut water tanks, which may survive archaeologically, are important symbols of the reliance upon water in the colony, both in absolute terms and as an indication of the fragility of the European presence in Australia.* *The surviving fabric documents mid-nineteenth century sanitation design and construction, and subsequent changes in methods and also the theory of urban wastewater management. This evidence is preserved in the drain enclosing the Tank Stream, in physical evidence of change, and may also be present archaeologically in buried parts of the Tank Stream line.* *The archaeological evidence of the Tank Stream has the potential to contain deposits that can contain information about pre-human and pre-urban environments in Sydney, Aboriginal occupation and early non-indigenous occupation of Sydney. The fabric enclosing the watercourse demonstrates one of the most comprehensive collections of hydrological technology in Australia.* *The sections of the former Tank Stream south of King Street that survive have potential for retaining evidence of the earliest periods of its human use, although this is likely to have been severely compromised by development. The swampy source of the stream may provide evidence of past environmental conditions.*[6]
Heritage Impact Assessment	The exact location and depth of the Tank Stream and associated archaeological deposits are not precisely known in the vicinity of the CSELR route. Any proposed impacts to the Tank Stream and/or within its 3m buffer zone would be considered unacceptable. The proposed CSELR route on Alfred Street crosses the subsurface path of the Tank Stream. As track construction has been defined as having a potential impact of 2m deep, it is likely that proposed works associated with the construction of the CSELR would impact on the Tank Stream's buffer zone, and potentially on the State Heritage Registered fabric of the Tank Stream itself. The proposed CSELR would have a major adverse impact on the Tank Stream.
Mitigation Measures	Mitigation measures as outlined for Zone 1 historical archaeology would apply. Additional Measures: • The Tank Stream would be protected by the construction of a subterranean bridging structure that would allow the CSELR to cross the item, but not physically impact on it. This would be developed in consultation with Sydney Water, City of Sydney, NSW Heritage Division; as well as a suitably qualified structural engineer, heritage consultant and archaeologist. • The Tank Stream is a working, State Heritage listed Sydney Water owned infrastructure item, and cannot be impacted. Relics are likely to be associated with the Tank Stream. It would be managed in accordance with the policies outlined in the Tank Stream CMP. • Consultation with Sydney Water, City of Sydney, NSW Heritage Division; as well as a suitably qualified structural engineer, heritage consultant and archaeologist is required to ensure ongoing conservation and protection of the Tank Stream throughout the CSELR works program.

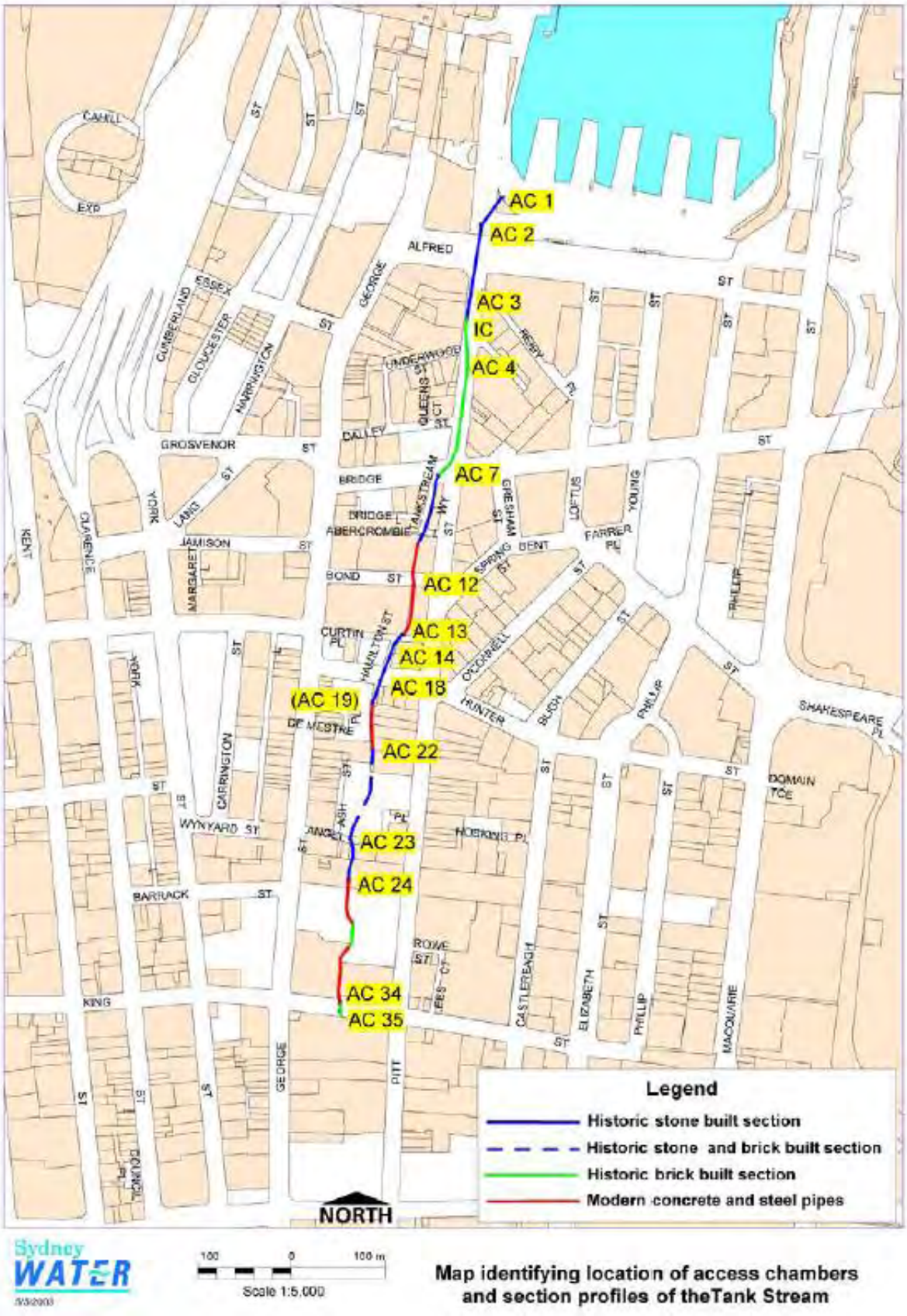


Figure 4.1 Location of the Tank Stream and associated access chambers. (Source: Sydney Water, Tank Stream Conservation Management Plan, p 32)

HAMU	Alfred Street/Herald Square—see (2) on Figure 4.4
Zone	Zone 1—State Significant Archaeological Resource—known or potential.
Listings for Archaeological Items	No listings specifically reference significance of potential historical archaeological resource, although the Central Sydney Archaeological Zoning Plan 1992 assumes all roadways to have historical archaeological potential.
Archaeological Potential	There is high potential for archaeological evidence of Local significance to be present, including: • Evidence of land reclamation activities associated with the formal construction of Circular Quay. This may include phases of harbour infill and/or seawalls constructed to stabilise introduced fill. • Evidence of nineteenth-century development dating to both before or after the construction of Circular Quay. May include structural remains with brick/stone/wooden foundations; postholes; yard/work surfaces; underfloor deposits; demolition deposits; landscape modification; deeper subsurface features (eg wells, privies and drains). • Evidence of the early alignment of Alfred Street (between Macquarie and Pitt Streets, or of its extension to George Street), such as sandstone kerbs, drains, early road surfaces, or structural remains indicating the alignment of the street. • Metal tracks and wooden sleepers in the former roadway associated with the Circular Quay tram lines. Structural remains such as brick/stone/wooden/concrete foundations or postholes of tram sheds on Alfred Street may also be present. • Evidence of nineteenth and early twentieth-century services such as drains, sewerage, water and gas services constructed of stone, brick, ceramic, metal or wood. Archaeological remains of the Queens Wharf Sewer (c1851) were identified at Herald Square during upgrade works to George Street in the 1990s.[7] There is low to moderate potential for archaeological evidence of State significance to be present: • Archaeological evidence of the natural environment, including original soil profiles (such as evidence of tidal mudflats and the Tank Stream estuary) or natural landforms, such as the shoreline of Sydney Cove. • Evidence of early nineteenth-century development on the east side of George Street, fronting George Street and Sydney Cove/Tank Stream estuary, such as structural remains with brick/stone/wooden foundations; postholes; yard/work surfaces; underfloor deposits; demolition deposits; landscape modification; deeper subsurface features (eg wells, privies, drains); and artefact scatters/rubbish pits. • Evidence of maritime industries undertaken on Sydney Cove/Tank Stream foreshore, such as structural remains of wharves or jetties (including timber supports, posts or postholes, iron bolts, modification of bedrock, stonework); yard/work surfaces; and artefact scatters/rubbish pits.
Significance Level	Local, predominantly. Some evidence (particularly archaeological remains dating to before the formalisation of Circular Quay in the mid-nineteenth century) may be of State significance; however, this would depend on the nature, extent and integrity of the resource.
Potential Significance	Preliminary assessment against NSW Heritage criteria for assessing significance related to archaeological sites and relics: Archaeological Research Potential: • May have high research potential to provide information that cannot be derived from other sources or sites. Associations with individuals, events or groups of historical importance: • May have historical associations, given location at Circular Quay—a continuous focus of economic, social and cultural activity. Aesthetic or technical significance: • Archaeological remains in this HAMU may have aesthetic/technical significance, for example for evidence of landscape modification/reclamation in this area. Substantial structural remains may have some interpretable qualities of aesthetic and/or technical significance. Ability to demonstrate the past through archaeological remains: • May be able to demonstrate the significant historical and physical development of Circular Quay.

Heritage Impact Assessment	Proposed CSELR works within the Alfred Street/Herald Square HAMU include: • construction of Circular Quay stop; • construction of the CSELR track; • service relocation; • tree removal; • public domain and landscaping works; • installation of catenary support poles; • re-grading; and • additional facilities such as use as a laydown area and site parking. Construction of the Circular Quay stop and CSELR track slab will involve excavation to at least 750mm below the current ground surface. The track slab width at Circular Quay is approximately 7.5m wide at its smallest point. Works associated with the construction of the Circular Quay stop (platform, shelter and catenary support poles) and associated track slab will extend over an area of at least 45m x 20m. Excavation for the stop shelter and associated infrastructure would involve deeper excavation than for the track slab. These works are likely to have a major adverse impact on the potential historical resource. Other ground disturbance activities within the Alfred Street/Herald Square HAMU (such as service relocation, tree removal, regrading and public domain and landscaping works) would have localised impacts on the historical archaeological resource. These works are likely to have a moderate adverse impact on the potential historical archaeological resource, depending on the extent and nature of the proposed works. Use of Alfred Street/Herald Square HAMU as a works depot, laydown area and/or parking area—where it will not involve removal of the existing ground surface and/or excavation (eg for service installation)—is unlikely to have an impact on the historical archaeological resource. The proposed works in the Alfred Street/Herald Square HAMU is likely to impact on State and Locally significant historical archaeological resources.
Mitigation Measures	Mitigation measures as outlined for Zone 1 (State significant) historical archaeology would apply. Additional Measures: • Works in this HAMU are likely to require some open area excavation and archival recording during site works, and post-excavation analysis and reporting. The nature and intactness of the archaeological resource may warrant interpretation.

HAMU	First Fleet Park—see (3) on Figure 4.4
Zone	Zone 1—State Significant Archaeological Resource—known or potential.
Additional Management Requirements	The 2010 Conservation Management Strategy[8] establishes a number of policies aimed at protecting the cultural significance of First Fleet Park. A selection of policies relevant to the historical archaeological resource are outlined below: Policy 9—Current and Potential Future Use—Proposals for use of First Fleet Park which require an unacceptable degree of intervention for upgrading to ordinance compliance, or result in a high degree of degradation of grounds should be avoided. Policy 16—New Work Policies—The introduction of new elements should be undertaken in such a manner that it does not result in a lessening of the cultural significance of the place. Policy 17—New Work Policies—The extension of alteration of existing services in First Fleet Park is acceptable in the context of reuse, but should not have a detrimental impact on the significance of the space, or the archaeological resource as a whole.
Listings for Archaeological Items	First Fleet Park is registered on the following lists: State Heritage Register—Sydney Cove West Archaeological Precinct—Item # 01860. Sydney Harbour Foreshore Authority S170 Register—First Fleet Park. The George Street footpath/road corridor immediately west of the First Fleet Park boundary is not specifically identified on heritage registers for its archaeological potential.
Archaeological Potential	High archaeological potential. *Archaeological potential of First Fleet Park has been assessed as high. Extant remains are likely to include early to late nineteenth-century residential and commercial premises, seawalls, and features associated with Queens Wharf. Further features such as reclamation fills, wharfage, and other landscape elements can be expected. Solid structural remains such as masonry walls have a higher likelihood of survival than timber structures in this area.* *The archaeological resource is likely to yield important information about the early colony and its development not available from other sources. These types of remains are also part of the history of the harbour and reflect the growing importance of the port of Sydney from the 1830s onwards.*[9] Given the proximity of the George Street footpath/road corridor immediately to the west of the First Fleet Park boundary, it is assumed for the purposes of this assessment that the historical archaeological potential of this area is similar to that of First Fleet Park itself.
Significance Level	State
Statement of Significance	The following Statement of Significance is reproduced from the Sydney Cove West Archaeological Precinct listing on the State Heritage Inventory: *The Sydney Cove West Archaeological Precinct is a site of exceptional archaeological significance as evidence of some of the earliest colonial and maritime infrastructure of the convict settlement of Australia.* *The site has outstanding and unique historical significance for the identified, predictive and potential archaeology of: the first Government naval dockyards established in Australia (1797) that were improved and enlarged by Governor Macquarie (1818–22); the Commissariat Stores buildings constructed by Governor Macquarie (1810 and 1812); the seawall constructed for Circular Quay (1840s–1850s); the first public wharf built in the colony (c.1798); the colony's first market place (c.1807–11), the first post office (c.1811), the Colonial Storekeepers Building (1823) and one of the colony's earliest commercial and residential precincts that included the residences and premises of important early emancipists Mary Reiby and Isaac Nichols (dating from c.1798). The site may also contain remains associated with pre-1788 Aboriginal occupation of the area.* *The site has state significance as a convict landing place. The general area for the landing of the First Fleet is likely to have been the western foreshores of Sydney Cove, somewhere north of the former Maritime Services Board building. The Third Fleet are known to have landed at the Hospital Wharf in*

1791.

Sydney Cove West Archaeological Precinct has state significance for its associations with Governor John Hunter, who established the colonial dockyard in 1797; with the military administrator Lieutenant Colonel Joseph Foveaux who commissioned and started the Commissariat Stores building in 1809; with Governor Macquarie who completed the 1810 and commissioned the 1812 Commissariat Stores buildings and improved and enlarged the dockyard in 1818–22 with additional premises and four new docks; with significant early emancipists Isaac Nichols and Mary Reiby who built their residences, warehouse and the colony's first post office on the site of First Fleet Park between 1798 and 1811; with the convicts of the Third Fleet who disembarked at Hospital Wharf in 1791, and with Lieutenant-Colonel George Barney, colonial engineer, for the construction of this section of Circular Quay between 1844 and 1859.

Sydney Cove is the iconic marker of European settlement of Australia, and a site of historical significance for earliest contact of the Aboriginal people with European colonisers and of consequent Aboriginal dispossession. The site has social significance for the people of Australia as both a site of dispossession and of settlement, being one of the earliest sites of European settlement of the colony of NSW, and a site of over 200 years of continuous European occupation.

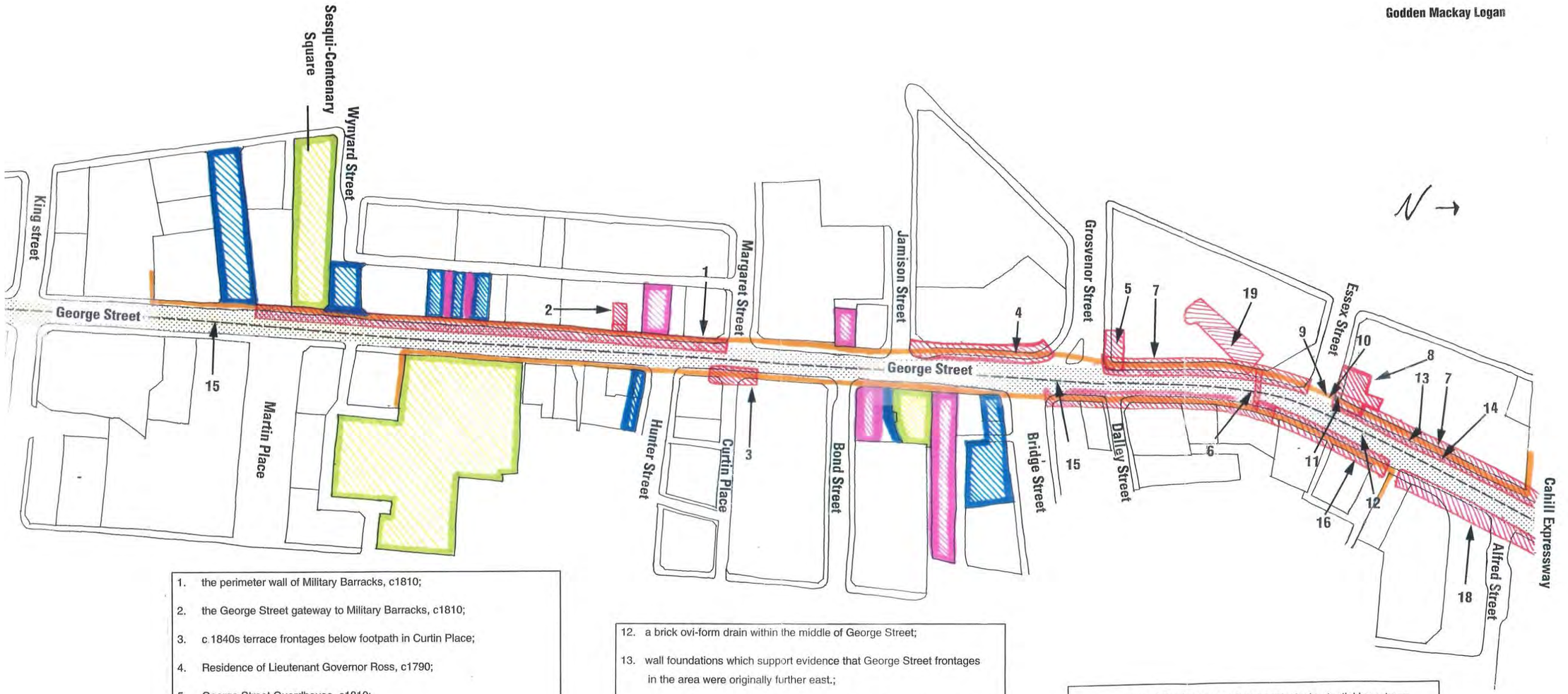
The site has social significance for the public debate of 1939 following the demolition of the Commissariat Stores buildings that fostered the beginnings of a public awareness of the heritage of NSW and the formation of the National Trust of Australia, after World War II, in 1949.

The site has high research potential through the large extant archaeological remains on the site. Sites containing earliest 19th century (and potentially late 18th century) archaeological remains are very rare in Australia. The Sydney Cove West Archaeological Precinct is a very rare archaeological resource due to the extent of late twentieth century disturbance of most early sites of this nature. It is potentially capable of answering questions about the earliest years of European settlement in Australia and represents a finite, rare and endangered resource.[10]

Heritage Impact Assessment	First Fleet Park is proposed as the site of a temporary works depot. The works depot would necessitate the occupation of a large area of the park for an extended period. Among other heritage values, the park is listed on the SHR for its exceptionally significant historical archaeological resource. The works depot is likely to consist of a number of temporary sheds, including ablutions blocks and lunch rooms. Proposed ground works associated with the works depot, including installation of these sheds have not yet been defined. Compaction associated with the installation of demountable sheds or movement of heavy vehicles may also impact subsurface archaeological remains. Excavation within First Fleet Park for the installation of services will occur within existing service trenches, so as not to disturb historical archaeological resources. This would have a neutral impact. Any modifications outside of existing trenches (or other excavation) would be likely to have a major adverse impact on the potential historical archaeological resource. Other impacts associated with compaction may have a minor to major adverse impact on the potential historical archaeological resource, dependent on establishing an appropriate works protocol. The proposed works in the First Fleet Park HAMU is likely to impact on State and Locally significant historical archaeological resources.
Mitigation Measures	Mitigation measures as outlined for Zone 1 historical archaeology would apply. Additional Measures: • The potential historical archaeological resource would be managed in accordance with the policies outlined in the First Fleet Park Conservation Management Strategy. • Consultation with the Sydney Harbour Foreshore Authority is required. • Ground disturbance works within First Fleet Park HAMU would be avoided. Services, if required, would be above ground or installed within existing service trenches. • The subsurface archaeological remains within First Fleet Park would be protected from compaction or movement of vehicles over the park's ground surface. This may involve use of geotextile fabric or similar. Advice would be sought from a relevant expert as to the exact nature of these protection measures. • The scope of appropriate ground works within First Fleet Park HAMU would be developed in consultation with a suitably qualified archaeologist and SHFA to ensure the impact on the archaeological resource is as minor as possible. • An archaeological testing program would be implemented in this HAMU to test the location, extent, integrity and nature of State significant (Zone 1) archaeological resources. The testing program would be undertaken in accordance with an approved archaeological Work Method Statement or Archaeological Research Design to be prepared by a qualified historical archaeologist, in accordance with Heritage Division requirements, prior to the commencement of works. • The results of the testing program would further refine the Work Method Statement or Archaeological Research Design for the investigation, salvage and/or conservation of archaeological resources.

HAMU	George Street North (between Alfred and Market Streets)—see (4) on Figure 4.4
Zone	Zone 1—State Significant Archaeological Resource—known or potential.
Listings for Archaeological Items	No listings specifically reference significance of potential historical archaeological resource within the road corridor, although the Central Sydney Archaeological Zoning Plan 1992 assumes all roadways to have historical archaeological potential.
Archaeological Potential	Known archaeological sites and high archaeological potential. A number of archaeological sites were specifically identified during works associated with the George Street North Upgrade Project in the late 1990s to early 2000s (Figure 4.2).[11] These sites are shown on Figure 4.2 and range in date from the late eighteenth century (associated with the early colony) to the tram tracks from the late nineteenth century. Some notable examples of State significance include: • the c1792 Colonial Storehouse; • the residence of Lieutenant Governor Ross c1790; • the Old Sydney Gaol; • the George Street Guardhouse c1810; and • the c1810 George Street gateway to the military barracks and its perimeter wall (near Wynyard). Potential historical archaeological evidence of historical significance may include: • early nineteenth century drains crossing George Street; • remains of the nineteenth century residence and retail premises fronting George Street, particularly where George Street has been widened; • macadam and woodblock paving along the length of George Street north; and • metal tracks and wooden sleepers in the centre of George Street, associated with the George Street tram line. Some of these sites may have been previously disturbed by installation of services, construction of roadways and paths, and installation of the earlier tram network. Archaeological investigations in the late 1990s; however, indicated that substantial archaeological evidence—particularly structural remains—were present. Some remains were present directly below road base fills. It was concluded that some of the remains identified during these works dated to as early as the 1830s.[12]
Significance Level	Most archaeological remains expected to be present within the George Street North HAMU would be of Local significance. Some remains, if present, may be of State significance; however, this would be dependent on the nature and integrity of any archaeological evidence identified.
Potential Significance	Preliminary assessment against the NSW Heritage Criteria for Assessing Significance related to Archaeological Sites and Relics: Archaeological Research Potential: • May have high research potential to provide information that cannot be derived from other sources or sites. Associations with individuals, events or groups of historical importance: • May have historical associations as located on Sydney's main thoroughfare and focus of economic, cultural and civic development. Aesthetic or technical significance: • Archaeological remains in this HAMU may have aesthetic/technical significance for evidence of historical development on George Street. Substantial structural remains may have some interpretable qualities of aesthetic and/or technical significance. Ability to demonstrate the past through archaeological remains: • May be able to demonstrate the significant history and physical changes in Sydney's CBD.
Heritage Impact Assessment	Proposed CSELR works within the George Street North HAMU include: • construction of the Grosvenor Street and Wynyard stops; • construction of the CSELR track; • service relocation; • tree removal;

	• installation of catenary support poles at stops; • installation of the Circular Quay substation behind the Four Seasons Hotel; and • public domain and landscaping works. Construction of the Grosvenor Street and Wynyard Street stops and CSELR track slab will involve excavation to at least 750mm below the current ground surface. The track slab width within the George Street North HAMU is approximately 7.5m wide at its smallest point. Works associated with the construction of the Grosvenor Street and Wynyard stops (platform, shelter and catenary support poles) and associated track slab will extend over an area of at least 45m x 15m (for each stop). Excavation for the stop shelter and associated infrastructure would involve deeper excavation than for the track slab. These works are likely to have a major adverse impact on the potential historical resource. Proposed works associated with the installation of the Haymarket substation have not been defined at this stage. It is assumed that ground disturbance works including excavation for the substation and associated services would have to occur. These works would have a major adverse impact on the potential historical archaeological resource, depending on the extent and nature of the proposed works. Other ground disturbance activities within the George Street North HAMU (such as service relocation, regrading, tree removal, public domain and landscaping works) would have localised impacts on the historical archaeological resource. These works are likely to have a moderate to major adverse impact on the potential historical archaeological resource, depending on the extent and nature of the proposed works. Use of the George Street North HAMU as a construction zone—where it will not involve removal of the existing ground surface and/or excavation—is unlikely to have an impact on the historical archaeological resource. The proposed works in the George Street North HAMU is likely to impact on State and Locally significant historical archaeological resources.
Mitigation Measures	Mitigation measures as outlined for Zone 1 historical archaeology would apply. Additional Measures: • Works in this HAMU are likely to require some open area excavation and archival recording during site works, and post-excavation analysis and reporting. The nature and intactness of the archaeological resource may warrant interpretation.



1. the perimeter wall of Military Barracks, c1810;
2. the George Street gateway to Military Barracks, c1810;
3. c 1840s terrace frontages below footpath in Curtin Place;
4. Residence of Lieutenant Governor Ross, c1790;
5. George Street Guardhouse, c1810;
6. drain running east-west across George Street, c1828;
7. 19th century residences & retail premises between Grosvenor & Cahill Expressway overpass;
8. Old Sydney Gaol;
9. brick ovi-form drain, corner of Essex and George Streets;
10. stone wall foundations in the gutter area on corner of George and Essex Streets;
11. wall built up inside a bedrock cut, possibly part of the Commercial Hotel cellars;
12. a brick ovi-form drain within the middle of George Street;
13. wall foundations which support evidence that George Street frontages in the area were originally further east.;
14. 2.5m of a sandstone slab drain running east-west across George Street,
15. metal tracks and wooden sleepers associated with the George Street tram line, down the middle of the road.
16. 19th century residence and retail premises on east side of George Street, south of Blue Anchor Lane;
17. macadam and woodblock paving along the whole of the study site;
18. houses and retail premises lining George Street prior to the extension of Alfred Street (just beyond the northern study site boundary);
19. c 1792 Colonial storehouse for spirits and salted provisions.

The following areas of archaeological potential have been identified in the Archaeological Zoning Plan for Sydney City.

- Area of archaeological potential (AAP)
- Area of archaeological potential (partially disturbed) (AAP-PD)
- Area of archaeological potential (deeper subsurface features) (AAP-DSF)

Areas of archaeological potential identified during the course of the study

Figure 4.2 Proposed George Street Upgrade Project site showing areas of archaeological potential to be monitored. Note that the Archaeological Zoning Plan for Central Sydney (1992) considers all roads, laneways and plazas as areas of archaeological potential, in the absence of evidence to the contrary. (Source: GML, December 1998, George Street North Upgrade Project (Stage IV) Archaeological Assessment and Research Design, prepared for Department of Public Works and Services, Figure 6.1, p 63)

HAMU	Martin Place—see (5) on Figure 4.4
Zone	Zone 2—Locally Significant Archaeological Resource; known or potential.
Listings for Archaeological Items	No listings specifically reference significance of potential historical archaeological resource within Martin Place, although the Central Sydney Archaeological Zoning Plan 1992 assumes all roadways to have historical archaeological potential.
Archaeological Potential	Moderate–high archaeological potential. Buildings within what is now Martin Place were demolished in the 1930s to create Martin Place. Archaeological evidence of the following may be present: • Evidence of nineteenth and early twentieth-century development, including structural remains with brick/stone/wooden foundations; postholes; yard/work surfaces; underfloor deposits; demolition deposits; landscape modification; deeper subsurface features (eg wells, privies, drains); artefact scatters/rubbish pits. • Archaeological evidence of the natural environment, such as natural soil profiles associated with the original course of the Tank Stream. • Evidence of nineteenth and early twentieth-century services, such as drains, sewerage, water and gas services constructed of stone, brick, ceramic, metal or wood. • Evidence of the early alignment of George Street and St Martins Lane, such as sandstone kerbs, drains, early road surfaces (such as macadam and/or woodblock surfaces) and structural remains indicating the alignment of the street. Some of these archaeological sites or features may have been previously disturbed by installation of modern services, construction of roadways and paths, and installation of the earlier tram network.
Significance Level	Local
Potential Significance	Preliminary Assessment against the NSW Heritage Criteria for Assessing Significance related to Archaeological Sites and Relics: Archaeological Research Potential: • May have high research potential to provide information about the development and creation of Martin Place that cannot be derived from other sources or sites, dependent on the nature and extent of the archaeological remains. Associations with individuals, events or groups of historical importance: • May have historical associations as Martin Place was only created as a pedestrian plaza in the 1930s, and is a focus of economic, social, cultural and civic activity. Aesthetic or technical significance: • No clear indication in historical records to date if archaeological remains would have aesthetic/technical significance. Substantial structural remains may have some interpretable qualities of aesthetic and/or technical significance. Ability to demonstrate the past through archaeological remains: • May be able to demonstrate the historical and physical development of Martin Place, including phases of commercial development and then demolition to create Martin Place.
Heritage Impact Assessment	Martin Place is proposed as the location of a new substation. The Martin Place substation would be located within an existing AusGrid tub, however ground disturbance works, including excavation would be required for the installation of the substation. The pit around the existing tub may be enlarged, and associated services will be installed. Details of these works are to be confirmed. These works would have a moderate to major adverse impact on the potential historical archaeological resource, depending on the extent and nature of the proposed works. The proposed works in the Martin Place HAMU are likely to impact on Locally significant historical archaeological resources.
Mitigation Measures	Mitigation measures as outlined for Zone 2 historical archaeology would apply. Additional Measures: • Works in this HAMU are likely to require some open area excavation and archival recording during site works, as well as post-excavation analysis and reporting. The nature and intactness of the archaeological resource may warrant interpretation.

HAMU	Underground Tunnels—see (6) on Figures 4.4 and 4.5
Zone	Zone 3—No Historical Archaeological Resource Present
Listings for Archaeological Items	No listings specifically reference significance of potential historical archaeological within the roadway above the underground tunnels.
Archaeological Potential	Nil potential. These areas are where large-scale excavation works within the current roadway would have removed historical archaeological deposits. The footprints of the following underground structures are included within this zone, and have nil archaeological potential: • the pedestrian walkway from the Queen Victoria Building to Sydney Central Plaza (Myer) below George Street and Market Street; • the pedestrian walkway from Town Hall train station to the Galeries Victoria below George Street, near Park Street; • the pedestrian walkway from Town Hall train station to the QVB below George Street and Druitt Street; • Town Hall train station below George Street between Druitt Street and Bathurst Street; and • the Eastern Suburbs railway box below Chalmers Street at Central Station.
Significance Level	No historical archaeological significance.
Potential Significance	Preliminary Assessment against the NSW Heritage Criteria for Assessing Significance related to Archaeological Sites and Relics: Archaeological Research Potential: • No research potential as the entire historical archaeological resource is expected to have been removed. Associations with individuals, events or groups of historical importance: • No historical archaeological remains expected to survive that would have historical associations; however, the general area may have historical associations. Aesthetic or technical significance: • No historical archaeological remains expected to survive that would have aesthetic/technical significance. Ability to demonstrate the past through archaeological remains: • No historical archaeological remains expected to survive that would be able to demonstrate the past.
Heritage Impact Assessment	Proposed works within the Underground Tunnels HAMU include: • construction of the Town Hall and Central Station stops, and part of the Queen Victoria Building stop; • construction of the CSELR track; • service relocation; • re-grading; • installation of catenary support poles at stops; • public domain and landscaping works; and • tree removal. These works within the Underground Tunnels HAMU are unlikely to have an impact on historical archaeological resource along these parts of the CSELR route as no historical archaeological resource is anticipated to be present. The works within this zone have been assessed as having a neutral impact with respect to archaeology.
Mitigation Measures	Mitigation measures as outlined for Zone 3 historical archaeology would apply.

HAMU	Queen Victoria Building—see (7) on Figure 4.4
Zone	Zone 2—Locally Significant Archaeological Resource; known or potential.
Listings for Archaeological Items	No listings specifically reference significance of potential historical archaeological resource associated with the Queen Victoria Building HAMU, although the Central Sydney Archaeological Zoning Plan 1992 assumes all roadways to have historical archaeological potential.
Archaeological Potential	Moderate archaeological potential for the following: • Evidence of nineteenth and early twentieth-century development, including structural remains with brick/stone/wooden foundations; postholes; yard/work surfaces; underfloor deposits; demolition deposits; landscape modification; deeper subsurface features (eg wells, privies, drains); artefact scatters/rubbish pits. • Evidence of the early alignment of George Street, such as sandstone kerbs, drains, early road surfaces (macadam and/or woodblock surfaces) and structural remains indicating the alignment of the street. • Evidence of nineteenth and early twentieth-century services, such as drains, sewerage, water and gas services constructed of stone, brick, ceramic, metal or wood. • Metal tracks and wooden sleepers in the centre of George Street, associated with the George Street tram line. Low potential for early market remains (c1811–1890s) including structural remains with brick/stone/wooden foundations; postholes; yard/work surfaces; demolition deposits; deeper subsurface features (eg wells, privies, drains); artefact scatters/rubbish pits. Some of these sites or features may have been previously disturbed by installation of services, construction of roadways and paths, and installation of the earlier tram network.
Significance Level	Local, predominantly. In the unlikely event that archaeological remains associated with the c1811–1890s market were identified, they may be assessed as State significant, depending on the nature and intactness of the archaeology.
Potential Significance	Preliminary Assessment against the NSW Heritage Criteria for Assessing Significance related to Archaeological Sites and Relics: Archaeological Research Potential: • Remains of the market, if identified, may have high research potential. Other archaeological evidence may have low–moderate research potential, depending on the nature and extent of the remains. Associations with individuals, events or groups of historical importance: • May have historical associations due to proximity to major centres of activity such as the market and other commercial, civic and cultural enterprises. Aesthetic or technical significance: • No clear indication in historical records to date if archaeological remains would have aesthetic/technical significance. Ability to demonstrate the past through archaeological remains: • Remains of the market may be able to demonstrate the historical and physical development of this area prior to the construction of the Queen Victoria Building in the late nineteenth century.
Heritage Impact Assessment	Proposed CSELR works within the Queen Victoria Building HAMU include: • construction of Queen Victoria Building stop; • construction of the CSELR track; • service relocation; • installation of catenary support poles at the stop; and • public domain and landscaping works. Construction of the Queen Victoria Building stop and CSELR track slab will involve excavation to at least 750mm below the current ground surface. The track slab width at Queen Victoria Building is approximately 7.5m wide at its smallest point. Works associated with the construction of the Queen Victoria Building stop (platform, shelter and catenary support poles) and associated track slab will extend over an area of at least 45m x 15m. Excavation for the stop shelter and associated infrastructure would

	involve deeper excavation than for the track slab. These works are likely to have a moderate adverse impact on the potential historical resource. Other ground disturbance activities within the Queen Victoria Building HAMU (such as service relocation, installation of catenary support poles and public domain and landscaping works) will have localised impacts on the historical archaeological resource. These works are likely to have a minor to moderate adverse impact on the potential historical archaeological resource, depending on the extent and nature of the proposed works. Use of the Queen Victoria Building HAMU as a construction zone—where it will not involve removal of the existing ground surface and/or excavation—is unlikely to have an impact on the historical archaeological resource. The proposed works within the Queen Victoria Building HAMU are likely to impact on Locally significant historical archaeological resources.
Mitigation Measures	Mitigation measures as outlined for Zone 2 historical archaeology will apply. Additional Measures: • In the unlikely event that remains associated with the previous market are identified and assessed as State significant, this archaeology would be managed in accordance with Zone 1 mitigation measures.

HAMU	Town Hall—see (8) on Figure 4.5
Zone	Zone 1—State Significant Archaeological Resource; known or potential; and Zone 2—Locally Significant Archaeological Resource; known or potential.
Listings for Archaeological Items	No listings specifically reference significance of potential historical archaeological resourcewithin the roadway close to Town Hall; although the Central Sydney Archaeological Zoning Plan 1992 assumes all roadways to have historical archaeological potential.
Archaeological Potential	There is low potential for outlying burials associated with the Old Sydney Burial Ground (pre-1820) that were not exhumed or destroyed during the construction of the Town Hall or Town Hall station to be present within Town Hall HAMU. There is low–moderate potential for historical archaeological remains of Local significance to be present associated with the following: • Early alignment of George Street, such as sandstone kerbs, drains, early road surfaces (macadam and/or woodblock surfaces) and structural remains indicating the alignment of the street. • Evidence of nineteenth and early twentieth-century services, such as drains, sewerage, water and gas services constructed of stone, brick, ceramic, metal or wood. • Metal tracks and wooden sleepers in the centre of George Street, associated with the George Street tram line. Archaeological resources in this zone may be highly disturbed or destroyed by the large-scale earthworks undertaken for the construction of the Town Hall station and associated underground tunnels. Some sites or features may also have been previously disturbed by installation of services, construction of roadways and paths, and installation of the earlier tram network.
Significance Level	If archaeological evidence of burials was identified, it would be of State significance. Other archaeological evidence as outlined above would be of Local significance.
Potential Significance	Preliminary Assessment against the NSW Heritage Criteria for Assessing Significance related to Archaeological Sites and Relics: Archaeological Research Potential: • Remains of the burial ground, including burials, may have high research potential. Other archaeological evidence may have low–moderate research potential, depending on the nature and extent of the remains. Associations with individuals, events or groups of historical importance: • May have historical associations due to proximity to major centres of activity such as the burial ground, Town Hall and other commercial, civic and cultural enterprises. Aesthetic or technical significance: • No clear indication in historical records to date if archaeological remains would have aesthetic/technical significance. Ability to demonstrate the past through archaeological remains: • Remains of the market may be able to demonstrate the historical and physical development of this area, including from the burial ground or Town Hall phases of development.
Heritage Impact Assessment	Proposed CSELR works within the Town Hall HAMU include: • construction of the CSELR track; • construction of the Town Hall stop; • installation of catenary support poles; • service relocation; and • public domain and landscaping works. Construction of the CSELR track slab will involve excavation to at least 750mm below the current ground surface. The track slab width within the Town Hall HAMU is approximately 7.5m wide at its smallest point. The construction of the CSELR track slab is concentrated in the centre of the George Street roadway, which may have experienced the highest levels of disturbance to potential burials (due to activities such as construction and/or removal of the previous tram tracks). Works associated with the construction of the Town Hall stops (platform, shelter and catenary support poles) and associated track slab will extend over an area of at least 45m x 15m. Excavation for the stop shelter and associated infrastructure would involve

	deeper excavation than for the track slab. These works are likely to have a moderate to major adverse impact on the potential historical resource. Other ground disturbance activities within the Town Hall HAMU (such as service relocation, tree removal, installation of catenary support poles and public domain and landscaping works) will have localised impacts on the historical archaeological resource. These works are likely to have a moderate to major adverse impact on the potential historical archaeological resource, depending on the extent and nature of the proposed works. Use of the Town Hall HAMU as a construction zone—where it will not involve removal of the existing ground surface and/or excavation—is unlikely to have an impact on the historical archaeological resource.
Mitigation Measures	Mitigation measures as outlined for Zone 1 historical archaeology would apply. Additional Measures: • If skeletal remains are identified they would be managed in accordance with Zone 1 strategies and, at a minimum, managed in accordance with the Heritage Division guideline *Skeletal Remains: Guidelines for Management of Human Skeletal Remains*, and exhumed and reinterred at an appropriate location. If identified, consultation with the Heritage Division would be required.

HAMU	George Street South (between Bathurst Street and Rawson Place, including Haymarket Substation)—see (9) on Figure 4.5
Zone	Zone 2—Locally Significant Archaeological Resource; known or potential.
Listings for Archaeological Items	No listings specifically reference significance of potential historical archaeological resource within the roadway of George Street South, although the Central Sydney Archaeological Zoning Plan 1992 assumes all roadways to have historical archaeological potential.
Archaeological Potential	Moderate archaeological potential for the following: • Evidence of nineteenth and early twentieth-century development, including structural remains with brick/stone/wooden foundations; postholes; yard/work surfaces; underfloor deposits; demolition deposits; landscape modification; deeper subsurface features (eg wells, privies, drains); artefact scatters/rubbish pits. • Evidence of nineteenth and early twentieth-century services, such as drains, sewerage, water and gas services constructed of stone, brick, ceramic, metal or wood. • Evidence of the early alignment of George Street, such as sandstone kerbs, drains, early road surfaces (macadam and/or woodblock surfaces) and structural remains indicating the alignment of the street. Evidence associated with the 1830s modification of the slope of Brickfield Hill, such as redeposited natural soils, may also be present. • Metal tracks and wooden sleepers in the centre of George Street, associated with the George Street tram line. Low archaeological potential for the following: • Evidence of late eighteenth and early nineteenth-century brickmaking activities, such as brick kilns, structural remains with brick/stone/wooden foundations; postholes; yard/work surfaces; landscape modification; deeper subsurface features (eg wells, privies, drains); artefact scatters/rubbish pits. • Evidence of the corn/hay/cattle markets at Haymarket markets. • Archaeological evidence of the natural environment, including original soil profiles (such as evidence of the swampy area behind Darling Harbour) or natural landforms. Some of these sites may have been previously disturbed by the installation of services, construction of roadways and paths, and the installation of the earlier tram network.
Significance Level	Local. In the unlikely event that archaeological evidence associated with early brickmaking activities or the corn/hay/cattle markets were identified, they may be assessed as being of State significance, depending on the nature and intactness of the archaeology.
Potential Significance	Preliminary Assessment against the NSW Heritage Criteria for Assessing Significance related to Archaeological Sites and Relics: Archaeological Research Potential: • Archaeological remains in this HAMU, such as evidence of the markets or brickfields, may have high research potential. Other archaeological evidence may have low–moderate research potential, depending on the nature and extent of the remains. Associations with individuals, events or groups of historical importance: • May have historical associations due to proximity to major centres of activity such as the markets, brickfields, Chinatown and other commercial, civic and cultural elements. Aesthetic or technical significance: • No clear indication in historical records to date if archaeological remains would have aesthetic/technical significance. Substantial structural remains may have some interpretable qualities of aesthetic and/or technical significance. Ability to demonstrate the past through archaeological remains: • Remains of the market may be able to demonstrate the historical and physical development of this area, including the historical development of Sydney south of Town Hall.
Heritage Impact Assessment	Proposed CSELR works within the George Street South HAMU include: • construction of the CSELR track; • construction of the World Square and Chinatown stops;

	• installation of the Haymarket substation in Parker Lane; • installation of catenary support poles; • service relocation; • regrading; • tree removal; and • public domain and landscaping works. Construction of the CSELR track slab will involve excavation to at least 750mm below the current ground surface. The track slab width within the George Street South HAMU is approximately 7.5m wide at its smallest point. The construction of the CSELR track slab is concentrated in the centre of the George Street roadway. Works associated with the construction of the World Square and Chinatown stops (platform and shelter) and associated track slab will extend over an area of at least 45m x 15m (for each stop). Excavation for the stop shelter and associated infrastructure would involve deeper excavation than for the track slab. These works are likely to have a moderate to major adverse impact on the potential historical resource. Other ground disturbance activities within the George Street South HAMU (such as service relocation, tree removal, installation of catenary support poles and public domain and landscaping works) would have localised impacts on the historical archaeological resource. These works are likely to have a moderate to major adverse impact on the potential historical archaeological resource, depending on the extent and nature of the proposed works. Proposed works associated with the installation of the Haymarket substation have not been defined at this stage. It is assumed that ground disturbance works including excavation for the substation and associated services would have to occur. These works would have a moderate to major adverse impact on the potential historical archaeological resource, depending on the extent and nature of the proposed works. Use of the George Street South HAMU as a construction zone—where it will not involve removal of the existing ground surface and/or excavation—is unlikely to have an impact on the historical archaeological resource. The proposed works within the George Street South likely to impact on Locally significant historical archaeological resources.
Mitigation Measures	Mitigation measures as outlined for Zone 2 historical archaeology would apply. Additional Measures: • Works in this HAMU are likely to require some open area excavation and archival recording during site works, as well as post-excavation analysis and reporting. The nature and intactness of the archaeological resource may warrant interpretation. • In the unlikely event that remains associated with early brickmaking or the corn/hay/cattle market are identified and assessed to be State significant, this archaeology would be managed in accordance with Zone 1 mitigation measures.

HAMU	Rawson Place—see (10) on Figure 4.5
Zone	Zone 2—Locally Significant Archaeological Resource; known or potential.
Listings for Archaeological Items	No listings specifically reference significance of potential historical archaeological within the roadway of Rawson Place, although the Central Sydney Archaeological Zoning Plan 1992 assumes all roadways to have historical archaeological potential.
Archaeological Potential	High archaeological potential for the following: • Evidence of nineteenth-century development. Rawson Place was created in 1901, and involved the demolition of a number of structures, including the Christ Church St Lawrence Infants and Primary School and a number of two-storey commercial buildings facing George Street. Archaeological evidence may include structural remains with brick/stone/wooden foundations; postholes; yard/work surfaces; underfloor deposits; demolition deposits; landscape modification; deeper subsurface features (eg wells, privies, drains); artefact scatters/rubbish pits. • Evidence of nineteenth and early twentieth-century services, such as drains, sewerage, water and gas services constructed of stone, brick, ceramic, metal or wood. • Evidence of the early alignment of George Street, Pitt Street and Rawson Place, such as sandstone kerbs, drains, early road surfaces (macadam and/or woodblock surfaces) and structural remains indicating the alignment of the street. • Metal tracks and wooden sleepers in the centre of Rawson Place and the Pitt Street intersection, associated with the previous tram line. Some of these sites may have been previously disturbed by installation of services, construction of roadways and paths, and installation of the earlier tram network.
Significance Level	Local
Potential Significance	Preliminary Assessment against the NSW Heritage Criteria for Assessing Significance related to Archaeological Sites and Relics: Archaeological Research Potential: • Archaeological remains in this HAMU, such as remains of the previous structures in the current line of Rawson Place, may have moderate–high research potential. Other archaeological evidence may have low–moderate research potential, depending on the nature and extent of the remains. Associations with individuals, events or groups of historical importance: • May have historical associations as it was the location of institutions such as the Christ Church St Lawrence's Infants and Primary School, and was in close proximity to other institutions and major activity centres. Aesthetic or technical significance: • No clear indication in historical records to date if archaeological remains would have aesthetic/technical significance. Substantial structural remains may have some interpretable qualities of aesthetic and/or technical significance. Ability to demonstrate the past through archaeological remains: • Remains of the previous development at Rawson Place may demonstrate the historical and physical development of this area.
Heritage Impact Assessment	Proposed CSELR works within the Rawson Place HAMU include: • construction of the CSELR track; • construction of the Rawson Place stop; • installation of catenary support poles; • service relocation; • regrading; • tree removal; and • public domain and landscaping works. Construction of the CSELR track slab will involve excavation to at least 750mm below the current ground surface. The track slab width within the Rawson Place HAMU is approximately 7.5m wide at its smallest point. The construction of the CSELR track slab is concentrated in the south and centre of the Rawson Place roadway and Pitt Street intersection. Works associated with the construction of the Rawson Place

	Stop (platform and shelter) and associated track slab will extend over an area of at least 45m x 15m. Excavation for the stop shelter and associated infrastructure would involve deeper excavation than for the track slab. These works are likely to have a moderate to major adverse impact on the potential historical resource. Other ground disturbance activities within the Rawson Place HAMU (such as service relocation, tree removal, installation of catenary support poles and public domain and landscaping works) would have localised impacts on the historical archaeological resource. These works are likely to have a major adverse impact on the potential historical archaeological resource, depending on the extent and nature of the proposed works. Use of the Rawson Place HAMU as a construction zone—where it will not involve removal of the existing ground surface and/or excavation—is unlikely to have an impact on the historical archaeological resource. The proposed works in the Rawson Place HAMU is likely to impact on Locally significant historical archaeological resources.
Mitigation Measures	Mitigation measures as outlined for Zone 2 historical archaeology would apply. Additional Measures: • Works in this HAMU are likely to require some open area excavation and archival recording during site works, as well as post-excavation analysis and reporting. The nature and intactness of the archaeological resource may warrant interpretation.

HAMU	Eddy Avenue—see (11) on Figure 4.5
Zone	Zone 1—State Significant Archaeological Resource; known or potential.
Listings for Archaeological Items	No listings specifically reference significance of potential historical archaeological within the roadway of Eddy Avenue, although the Central Sydney Archaeological Zoning Plan 1992 assumes all roadways to have historical archaeological potential.
Archaeological Potential	Some of these sites may have been previously disturbed by the installation of services, construction of roadways and paths, and the installation of the earlier tram network. Significant modifications to the local landscape associated with the construction of Central Station may have disturbed and/or destroyed some nineteenth-century archaeological evidence. Low–moderate archaeological potential for the following: • Evidence of nineteenth-century buildings such as Carters' Barracks, the Convent of the Good Samaritan, the Sydney Female Refuge and/or the tram depot building. Archaeological evidence may include structural remains with brick/stone/wooden foundations; postholes; yard/work surfaces; underfloor deposits; demolition deposits; landscape modification; deeper subsurface features (eg wells, privies, drains); artefact scatters/rubbish pits. • Evidence of nineteenth and early twentieth-century services, such as drains, sewerage, water and gas services constructed of stone, brick, ceramic, metal or wood. • Evidence of the early alignment of Burial Ground Road/Garden Road and/or Eddy Avenue, such as sandstone kerbs, drains, early road surfaces (macadam and/or woodblock surfaces) and structural remains indicating the alignment of the street. • Metal tracks and wooden sleepers along Eddy Avenue, associated with the previous tram line. There is low potential for outlying burials to be present associated with the Devonshire Street Cemetery (post-1820) that were not exhumed or destroyed during the construction of Central Station.
Significance Level	Archaeological remains of Carters' Barrack or human burials, if present, would be of State significance. Other archaeological evidence within the Eddy Avenue HAMU may be of Local significance.
Potential Significance	Preliminary Assessment against the NSW Heritage Criteria for Assessing Significance related to Archaeological Sites and Relics: Archaeological Research Potential: • Archaeological remains in this HAMU, such as remains of Carters' Barracks may have high–exceptional research potential. Other archaeological evidence may have low–high research potential, depending on the nature and extent of the remains. Associations with individuals, events or groups of historical importance: • May have historical associations due to proximity to institutions and landmarks such as Devonshire Street Cemetery, Carters' Barracks, Central Station and Belmore Park. Aesthetic or technical significance: • No clear indication in historical records to date if archaeological remains would have aesthetic/technical significance. Substantial structural remains may have some interpretable qualities of aesthetic and/or technical significance. Ability to demonstrate the past through archaeological remains: • Remains of the previous development at Eddy Avenue may demonstrate the historical and physical development of this area.
Heritage Impact Assessment	Proposed CSELR works within the Eddy Avenue HAMU include: • construction of the CSELR track; • installation of catenary support poles; • service relocation; • tree removal; and • public domain and landscaping works. Construction of the CSELR track slab will involve excavation to at least 750mm below the current ground surface. The track slab width within the Eddy Avenue HAMU is approximately 7.5m wide at its smallest point. The construction of the CSELR track slab is concentrated on the southern side of Eddy Avenue, closest to the Central Station building. These works are likely to have a moderate to major adverse

	impact on the potential historical resource. Other ground disturbance activities within the Eddy Avenue HAMU (such as service relocation, tree removal, installation of catenary support poles and public domain and landscaping works) would have localised impacts on the historical archaeological resource. These works are likely to have a moderate to major adverse impact on the potential historical archaeological resource, depending on the extent and nature of the proposed works. Use of the Eddy Avenue HAMU as a construction zone—where it will not involve removal of the existing ground surface and/or excavation—is unlikely to have an impact on the historical archaeological resource. The proposed works in the Eddy Avenue HAMU are likely to impact on State and Locally significant historical archaeological remains.
Mitigation Measures	Mitigation measures as outlined for Zone 1 historical archaeology would apply. Additional Measures: • If skeletal remains are identified would be managed in accordance with Zone 1 strategies and, at a minimum, managed in accordance with the Heritage Division guideline *Skeletal Remains: Guidelines for Management of Human Skeletal Remains*, and exhumed and reinterred at an appropriate location. If identified, consultation with the Heritage Division would be required.

HAMU	Belmore Park—see (12) on Figure 4.5
Zone	Zone 1—State Significant Archaeological Resource; known or potential.
Listings for Archaeological Items	Belmore Park is identified on the Central Sydney Archaeological Zoning Plan 1992 and on the State Heritage Inventory as an area of historical archaeological potential.
Archaeological Potential	The 2012 Belmore Park Heritage Study[13] includes a historical archaeological assessment. The assessed location of certain features and elements is illustrated in Figure 4.3. According to this previous assessment, there is high potential for the following to be present: • Evidence of Pitt Street Presbyterian Church, manse and school (1850s–1901) including structural remains with brick/stone/wooden foundations; postholes; yard/work surfaces; underfloor deposits; demolition deposits; landscape modification; deeper subsurface features (eg wells, privies, drains). • Remains of the WWII slit air raid shelters, including excavation cuttings/fillings, linings and occupation deposits. The Belmore Park Heritage Study also outlines low potential for the following to be present: • Evidence of an unidentified building fronting Old Burial Ground Road/Garden Road (1850s–1880s), including structural remains with brick/stone/wooden foundations; postholes; yard/work surfaces; underfloor deposits; demolition deposits; landscape modification; deeper subsurface features (eg wells, privies, drains). • Remains of the tram car shed close to Eddy Avenue (1880s), likely to be primarily structural remains with brick/stone/wooden foundations and/or postholes. • Metal tracks and wooden sleepers crossing Belmore Park associated with the tram line (1880s–1990s). • Remains of Belmore Park facilities, such as a fountain (1870s) which may have associated structural remains (postholes/stone or concrete foundations and/or service pipes), and the structural remains of 1930s draught tables. There is also low–moderate archaeological potential for the following: • Evidence of nineteenth and early twentieth-century services, such as drains, sewerage, water and gas services constructed of stone, brick, ceramic, metal or wood. • Evidence of earlier layouts of Belmore Park. • Evidence of the early alignment of Burial Ground Road and/or Eddy Avenue, such as sandstone kerbs, drains, early road surfaces (macadam and/or woodblock surfaces) and structural remains indicating the alignment of the street. Some of these sites may have been previously disturbed by installation of services, construction of roadways and paths, and installation of the earlier tram network. Significant modifications to the local landscape associated with the construction of Central Station may have disturbed and/or destroyed some nineteenth-century archaeological evidence.
Significance Level	Archaeological remains of Carters' Barracks, if present, would be of State significance. Other archaeological evidence within the Belmore Park zone may be of Local significance.
Potential Significance	The following statement of historical archaeological significance for Belmore Park is drawn from the Belmore Park Heritage Study: *Archaeological remains associated with the Carters' Barracks are likely to survive at the site. These elements, if they survive, may have high archaeological significance at a State level. Archaeological remains associated with the Pitt Street Presbyterian manse and school and deeper evidence relating to the air raid shelters are likely to survive intact. These elements, if they survive, may have moderate archaeological significance at a Local level. Other archaeological elements associated with the development of the park from the 1870s would have low archaeological significance.*[14]

Heritage Impact Assessment	Belmore Park is proposed as the site of a construction works depot. The works depot would necessitate the occupation of a large area of the park for an extended period. The works depot is likely to consist of a number of temporary sheds, including ablutions blocks and lunch rooms. Proposed ground works associated with the works depot, including installation of these sheds, have not yet been defined; however, it is assumed it may involve subsurface installation of services and tree removal. Such ground works would likely disturb the potential historical archaeological resource, and may have a moderate impact on the potential historical archaeological resource. The area may also be used for the storage of materials and heavy equipment. Compaction associated with the installation of demountable sheds or movement of heavy vehicles would likely impact subsurface archaeological remains. This compaction may have a minor to moderate adverse impact on the historical archaeological resource.
Mitigation Measures	Mitigation measures as outlined for Zone 1 historical archaeology would apply. Additional Measures: • The subsurface archaeological remains within Belmore Park would be protected from compaction or movement of vehicles over the park's ground surface. This may involve use of geotextile fabric or similar. Advice would be sought from a relevant expert as to the exact nature of these protection measures.

Figure 4.3 Location of former site elements based on historical plans (please note some variation between element locations is due to the inaccuracies of some plans). (Source: Figure 4.1 from Godden Mackay Logan Pty Ltd, Belmore Park Heritage Study, prepared for City of Sydney Council, 2012. Based on City of Sydney Council plan with GML overlay.)

HAMU	Elizabeth Street—see (13) on Figures 4.5
Zone	Zone 2—Locally Significant Archaeological Resource; known or potential.
Listings for Archaeological Items	No listings specifically reference significance of the potential historical archaeological resource within the roadway of Elizabeth Street, although the Central Sydney Archaeological Zoning Plan 1992 assumes all roadways to have historical archaeological potential.
Archaeological Potential	There is low–moderate potential for historical archaeological remains of Local significance to be present associated with the following: • Early alignment of Elizabeth Street, such as sandstone kerbs, drains, early road surfaces (macadam and/or woodblock surfaces) and structural remains indicating the alignment of the street. • Evidence of nineteenth and early twentieth-century services, such as drains, sewerage, water and gas services constructed of stone, brick, ceramic, metal or wood. • Metal tracks and wooden sleepers associated with the Elizabeth Street tram line. There is low potential for historical archaeological remains of Local significance to be present associated with the following: • Albion Brewery (1826–1860s), including structural remains with brick/stone/wooden foundations; postholes; yard/work surfaces; demolition deposits; deeper subsurface features (eg wells, privies, drains). There is high potential for historical archaeological remains to be present within the Elizabeth Street Park. A course of a brick wall or structure was identified within the park during the site inspection; however, it is not clear what these remains may relate to, or what significance they may be. Archaeological resources in this zone may be highly disturbed or destroyed by the large-scale earthworks undertaken for the construction of Central Station. Some sites or features may also have been previously disturbed by installation of services, construction of roadways and paths, and installation of the earlier tram network.
Significance Level	Local
Potential Significance	Preliminary Assessment against the NSW Heritage Criteria for Assessing Significance related to Archaeological Sites and Relics: Archaeological Research Potential: • Archaeological remains in this HAMU may have moderate research potential. Other archaeological evidence may have low research potential, depending on the nature and extent of the remains. Associations with individuals, events or groups of historical importance: • May have historical associations due to the proximity to institutions and landmarks such as Central Station and the Albion Brewery. Aesthetic or technical significance: • No clear indication in historical records to date if archaeological remains would have aesthetic/technical significance. Substantial structural remains may have some interpretable qualities of aesthetic and/or technical significance. Ability to demonstrate the past through archaeological remains: • Remains of the previous development at Elizabeth Street HAMU may demonstrate the historical and physical development of this area.
Heritage Impact Assessment	Proposed CSELR works within the Elizabeth Street HAMU include: • construction of the CSELR track; • installation of catenary support poles; • service relocation; • tree removal; and • public domain and landscaping works. Construction of the CSELR track slab will involve excavation to at least 750mm below the current ground surface. The track slab extends less than 5m within the Elizabeth Street HAMU. These works are likely to have a minor adverse impact on the potential historical resource. Other ground disturbance activities within the Elizabeth Street HAMU (such as service relocation, tree

	removal, installation of catenary support poles and public domain and landscaping works) would have localised impacts on the historical archaeological resource. These works are likely to have a minor to moderate adverse impact on the potential historical archaeological resource, depending on the extent and nature of the proposed works. Use of the Elizabeth Street HAMU as a construction zone—where it will not involve removal of the existing ground surface and/or excavation—is unlikely to have an impact on the historical archaeological resource.
Mitigation Measures	Mitigation measures as outlined for Zone 2 historical archaeology would apply.

HAMU	Chalmers Street—see (14) on Figure 4.5
Zone	Zone 1—State Significant Archaeological Resource; known or potential.
Listings for Archaeological Items	No listings specifically reference significance of the potential historical archaeological resource within Chalmers Street HAMU, although the Central Sydney Archaeological Zoning Plan 1992 assumes all roadways to have historical archaeological potential.
Archaeological Potential	There is low potential for outlying burials to be present associated with the Devonshire Street Cemetery (post-1820) that were not exhumed or destroyed during the construction of Central Station. There is low–moderate potential for historical archaeological remains to be present associated with the following: • Evidence of nineteenth century development demolished for the construction of Central Station and Chalmers Streets, including structural remains with brick/stone/wooden foundations; postholes; yard/work surfaces; underfloor deposits; demolition deposits; landscape modification; deeper subsurface features (eg wells, privies, drains); artefact scatters/rubbish pits. • Early alignment of Chalmers Street, such as sandstone kerbs, drains, early road surfaces (macadam and/or woodblock surfaces) and structural remains indicating the alignment of the street. • Evidence of nineteenth and early twentieth-century services, such as drains, sewerage, water and gas services constructed of stone, brick, ceramic, metal or wood. • Metal tracks and wooden sleepers in the centre of George Street, associated with the George Street tram line. Archaeological resources in this zone may be highly disturbed or destroyed by the large-scale earthworks undertaken for the construction of Central Station, including the nearby Eastern Suburbs railway box and associated underground tunnels, and the construction of Chalmers Street. Some sites or features may also have been previously disturbed by the installation of services, construction of roadways and paths, demolition of previous structures, and the installation of the earlier tram network.
Significance Level	If archaeological evidence of burials were identified, it would be of State significance. Other archaeological evidence as outlined above would be of Local significance.
Potential Significance	Preliminary Assessment against the NSW Heritage Criteria for Assessing Significance related to Archaeological Sites and Relics: Archaeological Research Potential: • Archaeological remains in this HAMU, such as evidence associated with Devonshire Street Cemetery, may have high research potential. Other archaeological evidence may have low–moderate research potential, depending on the nature and extent of the remains. Associations with individuals, events or groups of historical importance: • May have historical associations due to proximity to institutions and landmarks such as the Devonshire Street Cemetery and Central Station. Aesthetic or technical significance: • No clear indication in historical records to date if archaeological remains would have aesthetic/technical significance. Ability to demonstrate the past through archaeological remains: • Remains of the previous development at Chalmers Street HAMU may demonstrate the historical and physical development of this area, such as the processes involved in the major groundworks associated with the construction of Central Station.
Heritage Impact Assessment	Proposed CSELR works within the Chalmers Street HAMU include: • construction of the CSELR track; • construction of the Central Station stop • installation of the Chalmers Street substation; • installation of catenary support poles; • service relocation; • regrading; • tree removal; and