13 Aboriginal heritage – Stage 1

13 Aboriginal heritage – Stage 1

This chapter provides an assessment of the potential impact on Aboriginal heritage sites and areas of archaeological potential as a result of Stage 1, and identifies mitigation measures to minimise these impacts. This chapter draws on information provided in Technical Paper 4 (Aboriginal cultural heritage assessment report).

13.1 Secretary's Environmental Assessment Requirements

The Secretary's Environmental Assessment Requirements relating to Aboriginal heritage, and where these requirements are addressed in this Environmental Impact Statement, are provided in Table 13-1.

Table 13-1: Secretary's Environmental Assessment Requirements – Aboriginal heritage Stage 1

Reference	Secretary's Environmental Assessment Requirement	Where addressed
6. Aboriginal Heritage		
6.1	Direct and/or indirect impacts (including cumulative impacts) associated with construction to the heritage significance of: a. Aboriginal places, objects and cultural heritage values, as defined under the *National Parks and Wildlife Act 1974* and in accordance with the principles and methods of assessment identified in the current guidelines; and	Section 13.5 to Section 13.14
	b. Aboriginal places of heritage significance, as defined in the Standard Instrument – Principal Local Environmental Plan.	
6.2	Where impacts to Aboriginal objects and/or places are proposed, consultation must be undertaken with Aboriginal people in accordance with the current guidelines.	Section 13.3.2
6.3	The assessment must consider requirements for: a. *in-situ* conservation of items and/or areas;	Section 13.16
	b. the need for further archaeological testing and/or detailed archaeological investigations;	
	c. measures to avoid, minimise and/or mitigate potential impacts	

13.2 Legislative and policy context

The main statutory protection of Aboriginal heritage is provided by the *National Parks and Wildlife Act 1974*. The following guidelines are relevant to the assessment of Aboriginal heritage:

- Code of Practice for Archaeological Investigation of Aboriginal Objects in New South Wales 2010 (Department of Environment, Climate Change and Water, 2010b) outlines the requirements for archaeological investigations of Aboriginal objects in NSW, and sets out:
  - Assessment steps to be undertaken for all archaeological investigations
  - Analytical steps to characterise the Aboriginal objects being investigated
  - When an Aboriginal Heritage Impact Permit is not required for test excavations
  - Minimum qualifications for persons undertaking archaeological investigations under the code in NSW
- Guide to Investigating, Assessing and Reporting on Aboriginal Cultural Heritage in NSW (Office of Environment and Heritage, 2011) provides a process for the investigation and assessment of Aboriginal cultural heritage including identifying values of Aboriginal cultural heritage, and the assessment of potential harm of a proposed activity on Aboriginal objects and declared Aboriginal places. Technical Paper 4 (Aboriginal cultural heritage assessment report) has been prepared in accordance with this guideline
- Aboriginal Cultural Heritage Consultation Requirements for Proponents 2010 (Department of Environment, Climate Change and Water, 2010a) outlines the requirements for proponents to consult with Aboriginal stakeholders during heritage assessment and/or applications for Aboriginal Heritage Impact Permit. The document describes the following four stages with mandatory timeframes:
  - Notification of project proposal and invitation to register interest (14 days for receipt of registrations)
  - Presentation of information about the proposed project
  - Gathering information about cultural significance (allowing 28 days for comments)
  - Review of draft cultural heritage assessment report (allowing 28 days for comments).

  Consultation carried out as part of the assessment has been conducted in accordance with this guideline
- The Burra Charter 2013 (Australia ICOMOS, 2013) provides guidance for the conservation and management of places of cultural significance (cultural heritage places). The Charter sets a standard of practice for those who provide advice, make decisions about, or undertake works to places of cultural significance, including owners, managers and custodians. The Burra Charter provides several significance criteria that attempt to define why a site is important. Such assessment recognises that sites may be important for different reasons to different people, and even at different times. Technical Paper 4 (Aboriginal cultural heritage assessment report) has been developed based on the five values of the Australia ICOMOS Burra Charter (Australia ICOMOS, 2013).

13.3 Assessment approach

13.3.1 Methodology

The Aboriginal heritage assessment comprised:

- A desktop review of archaeological literature and databases to identify listed Aboriginal sites and places including:
  - A search of the Aboriginal Heritage Information Management System (AHIMS) for listed Aboriginal sites, undertaken on 5 December 2019. The results for the AHIMS extensive search area (study area) is shown in Figure 13-1
  - A search of relevant local environmental plans for listed Aboriginal places
- Consultation with registered Aboriginal parties (described in Section 13.3.2)
- Field surveys undertaken in January, March, June and July 2019 at each construction site to identify visible surface evidence of Aboriginal heritage sites and landforms. Additional surveys were undertaken with representatives of the Deerubbin and Metropolitan Local Aboriginal Land Councils in November 2019 (refer to Section 13.3.2)
- Developing a predictive model to assist in determining archaeological potential
- Assessing the significance of the archaeological potential (refer to Section 13.5.3)
- Assessing the potential direct and indirect impacts of Stage 1
- Identifying mitigation measures to minimise the risk of impacting Aboriginal items or areas of Aboriginal cultural sensitivity
- Consultation with Sydney Metro Heritage Working Group to discuss the approach to the Aboriginal heritage assessment.

Direct impacts may occur as a result of activities which disturb the ground surface including site preparation activities, and the installation of services and infrastructure. Indirect impacts may affect sites or features located within the proposed construction sites, or immediately beyond. Indirect harm may include impacts from vibration, increased visitation, increased erosion, or changing access to wild resources.

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

Further details on the Aboriginal heritage assessment methodology are provided in Technical Paper 4 (Aboriginal cultural heritage assessment report).

13.3.2 Aboriginal consultation

Aboriginal community consultation has been conducted in accordance with the Aboriginal cultural heritage consultation requirements for proponents 2010 (Department of Environment, Climate Change and Water, 2010a). Consultation was undertaken with Aboriginal Land Councils, Local Councils and Aboriginal stakeholders in May 2019 to identify Aboriginal people who may hold cultural knowledge relevant to determining the Aboriginal significance of Aboriginal objects and/or places within the Stage 1 study area. Advertisements were also placed in the Koori Mail and Sydney Morning Herald. A total of 59 Aboriginal stakeholder groups registered their interest in the consultation process.

Deerubbin Local Aboriginal Land Council representatives carried out a site survey for construction sites between, and inclusive of, the Westmead metro station construction site and the Clyde stabling and maintenance facility construction site which fall within the boundaries of Deerubbin Local Aboriginal Land Council. It was identified that further assessment should be undertaken within the Clyde stabling and maintenance facility construction site and within the Parramatta metro station construction site.

Metropolitan Local Aboriginal Land Council representatives carried out a site survey for construction sites between, and inclusive of, the Silverwater services facility and The Bays Station construction sites which fall within the boundaries of the Metropolitan Local Aboriginal Land Council. Representatives identified construction sites within the vicinity of water sources as containing potential for archaeological remains given the importance of water as a resource. It was also acknowledged that many of the construction sites had been heavily modified by current development. It was recommended that the telling of Aboriginal stories through heritage interpretation within the future stations should be a priority.

Further consultation would be undertaken with Aboriginal stakeholders during the exhibition of the EIS and any outcomes would be incorporated into the final version of Technical Paper 4 (Aboriginal Cultural Assessment Report).

13.4 Avoidance and minimisation of impacts

The potential for Aboriginal heritage impacts was considered throughout the design development process. This included:

- Avoiding direct impacts to previously recorded Aboriginal sites where possible
- Locating the majority of the Parramatta metro station construction site outside of the known extent of the Parramatta Sand Body, which is known to contain a higher level of archaeological potential (see Section 13.7)
- Development of a tunnel alignment that avoids potential impacts to Aboriginal archaeological remains through excavation below potential archaeological resources.

13.5 Project-wide impacts

13.5.1 Previously registered Aboriginal heritage sites

A total of 238 registered Aboriginal sites were identified across the extensive search areas. Of these, 18 sites have been listed as destroyed, deleted or 'not a site'. The location and distribution of these sites are shown in Figure 13-1 which highlights that:

- Most of the recorded Aboriginal sites are located within the Parramatta CBD area and surrounds
- With the exception of the Westmead metro station and Parramatta metro station construction sites, the construction sites are located away from areas with high concentrations of AHIMS sites.

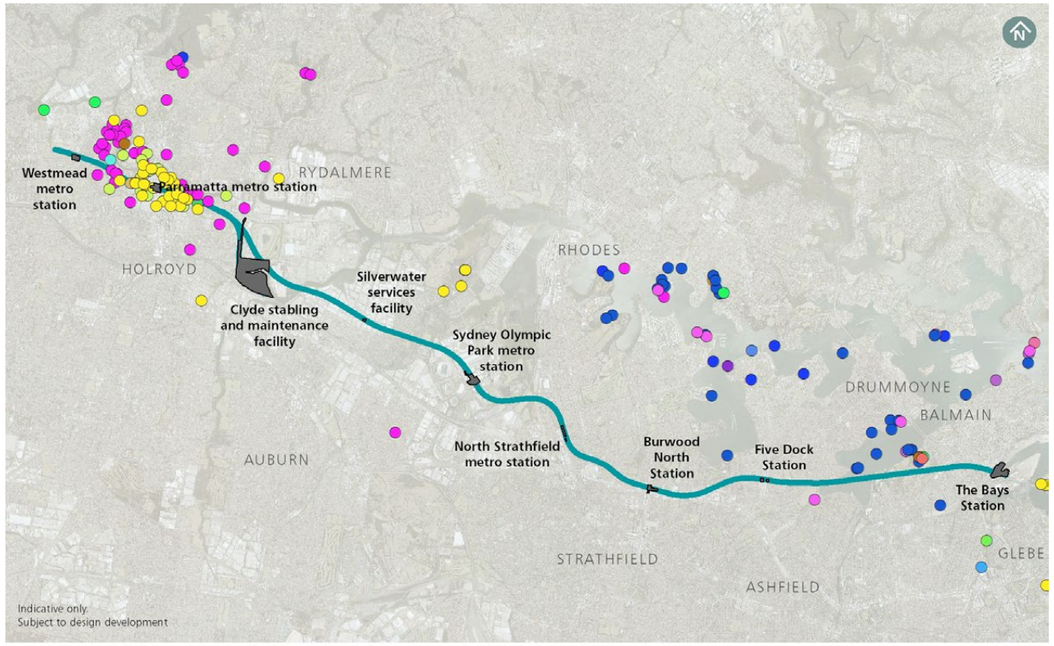

Figure 13-1: Distribution of AHIMS registered sites within the study area

13.5.2 Archaeological potential

While the study area may have been a site of Aboriginal occupation in the past, the likelihood of evidence of this occupation surviving to the present is largely dependent on the nature and extent of disturbance associated with historical construction works, including the durability of the material and the impact of the works. Historical subsurface disturbance such as the removal of topsoil and other bulk earthworks would have substantially lowered the potential for intact archaeological deposits in those areas. This is especially relevant in areas of relatively shallow residual soil, which includes the majority of Stage 1 construction sites. However, surviving portions of deeper soil profiles within Stage 1 may provide stratified evidence of occupation.

Archaeological data gathered in the study area has demonstrated the widespread and varying use of the area by Aboriginal people. Stage 1 is located across a broad range of contexts, including areas in close proximity to marine and estuarine resources, fresh water, varying terrestrial subsistence resources, and areas where sandstone platforms and overhangs may have originally occurred.

The distribution of recorded Aboriginal sites in built environments is largely limited to areas that have been subject to archaeological excavation and/or not impacted by development. The distribution of identified and recorded Aboriginal sites identifies that higher concentrations of stone artefacts tends to be associated with high order watercourses and creek confluences. Aboriginal sites are also associated with sandstone outcrops, including sandstone platforms where engravings are typically identified, and sandstone overhangs that were used for art, subsistence activities and artefact manufacture.

13.5.3 Significance assessment

An assessment of the cultural heritage significance of an item or place is required to form the basis of its management. In accordance with the former Office of Environment and Heritage guidelines and the Burra Charter, significance assessments are required to consider the social value, historic value, scientific value, and aesthetic value of an item or place.

Social values

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

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

Consultation carried out by Sydney Metro during development of Sydney Metro West identified the key people, event and themes related to cultural values within the study area. These are summarised in Table 13-2.

Table 13-2: Identified cultural values within the study area

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

Historical values

Sydney Metro will seek comment from registered Aboriginal stakeholders with respect to the historic cultural values identified the study area during the public exhibition of the environmental impact statement (refer to Section 13.3.2). The outcomes of this will be documented within the final version of Technical Paper 4 (Aboriginal Cultural Assessment Report).

Indicative archaeological (scientific) values

Scientific value refers to the importance of a landscape, area, place or object because of its rarity, representativeness and the extent to which it may contribute to further understanding and information.

The scientific value of potential Aboriginal archaeology has been considered for each construction site as discussed in sections 13.6 to 13.14.

Aesthetic values

Aesthetic value refers to the sensory value of place, which may include form, texture and colour, and can also include smell and sound elements associated with use or experience of a site (Australia ICOMOS, 2000).

Stage 1 largely comprises a heavily modified residential landscape, which includes substantial modification from its former landscape features. Areas of landscape significance near Stage 1 (such as the Parramatta River) are not considered to maintain a direct connection. Stage 1 is generally considered to contain low aesthetic significance.

13.5.4 Tunnel impacts

There is no potential for Aboriginal objects to be located within the tunnel alignment sections of the route as the tunnels would be excavated through bedrock.

13.5.5 Power supply routes

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

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

A summary of the indicative scientific significance of the power supply routes is provided in Table 13-3.

Table 13-3: Summary of indicative scientific significance of the power supply routes

Power supply route	Research potential	Scientific value	Representative value	Rarity value	Overall indicative significance assessment
Westmead	Low	Low	Low	Low	Low
Parramatta	Moderate	Moderate	Moderate	Moderate	Moderate
Clyde	Low	Low	Low	Low	Low
The Bays	Low	Low	Low	Low	Low

13.6 Westmead metro station

13.6.1 Archaeological context and recorded sites

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

Previous Aboriginal heritage assessments in the area have highlighted the significance of contexts closer to Parramatta River and those areas associated with the Parramatta Sand Body. The generally shallow residual soil across the raised shale and sandstone landform context of the Westmead metro station construction site are susceptible to significant disturbance from residential and commercial development, as well as construction of transport and service infrastructure.

The closest recorded Aboriginal site to the Westmead metro station construction site is an artefact site about 385 metres to the east, in Parramatta Park.

13.6.2 Aboriginal sites recorded during investigations

No areas of surface visibility or intact ground surface were observed during the investigations of the Westmead metro station construction site. No Aboriginal sites were identified during the site inspection.

13.6.3 Impact assessment

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

The archaeological potential of the Westmead metro station construction site is low. The site has been subjected to substantial levels of surface disturbance, due to the construction of commercial and residential buildings and infrastructure. The site is also located on a crest landform away from major watercourses.

Table 13-4 assesses the indicative scientific significance of the Westmead metro station construction site. Any Aboriginal objects that might be located within the construction site are likely to be within a disturbed context and would therefore be considered to be of low overall scientific significance.

Table 13-4: Summary of indicative scientific significance of the Westmead metro station construction site

Research potential	Scientific value	Representative value	Rarity value	Overall indicative significance assessment
Low	Low	Low	Low	Low

13.7 Parramatta metro station

13.7.1 Archaeological context and recorded sites

The Parramatta metro station construction site is located across a flat landform context within the Parramatta CBD. Extensive commercial development has occurred across the construction site, which is intersected by Horwood Place.

The Parramatta River is located about 290 metres to the north, and Clay Cliff Creek is located about 465 metres to the south-east. Clay Cliff Creek is a significant freshwater watercourse in the Parramatta CBD area, and a tributary of Parramatta River.

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

Previous assessments of the nature and distribution of the Parramatta Sand Body indicate that it may overlap with the eastern portion of the Parramatta metro station construction site.

Previous archaeological investigations demonstrate that the former natural ground surface in the Parramatta metro station construction site may remain in situ, with varying degrees of truncation and mixing from historical activities. Previous investigations also suggest the potential for contact archaeology, but artefact density is likely to vary across the site.

One Aboriginal site is recorded within the Parramatta metro station construction site (AHIMS ID 45-6-3582), described as an area of potential archaeological deposit covering 48 Macquarie Street and 220-230 Church Street. The recorded item has been identified as having moderate to high archaeological (scientific) significance. The item, and the surrounding area, has also been identified as being significant to Aboriginal people.

13.7.2 Aboriginal sites recorded during investigations

No areas of surface visibility or intact ground surface were observed during the Stage 1 investigations. No Aboriginal sites were identified during the site inspection.

13.7.3 Impact assessment

One recorded area of archaeological potential is located within the Parramatta metro station construction site (AHIMS ID 45-6-3582). Stage 1 construction works could result in direct impact to this item, resulting in a total loss of value of the item.

A program of archaeological testing and salvage excavation, prepared in consultation with registered Aboriginal parties, would need to be undertaken at Parramatta metro station construction site (including AHIMS ID 45-6-3582) prior to works that may impact the natural ground surface beneath the extant built structures. If Aboriginal archaeological remains are recovered during this process, results would be incorporated into Aboriginal heritage interpretation for the Concept.

The assessed archaeological potential is moderate to high. The location of Parramatta, adjacent to a permanent watercourse, and with access to a wide range of natural resources, means that archaeological evidence of Aboriginal occupation could be extensive. Levels of previous disturbance are likely to vary across the site depending on the level of surface works undertaken, with historical construction activities potentially resulting in the disturbance or removal of archaeological record. However, the Parramatta Sand Body has the potential to contain a stratified deposit that documents long term Aboriginal occupation and changes in climatic and other environmental conditions.

Table 13-5 assesses the indicative scientific significance of the Parramatta metro station construction site. The works at the Parramatta metro station construction site are within an area of moderate-high archaeological potential and significance, and are therefore likely to impact Aboriginal objects.

Table 13-5: Summary of indicative scientific significance of the Parramatta metro station construction site

Research potential	Scientific value	Representative value	Rarity value	Overall indicative significance assessment
Moderate – high	Moderate – high	Moderate	Moderate	Moderate – high

13.8 Clyde stabling and maintenance facility

13.8.1 Archaeological context and recorded sites

The Clyde stabling and maintenance facility construction site is situated across flat terrain which is bisected by Duck Creek and A'Becketts Creek. Soil landscape mapping suggests the area is largely comprised of disturbed terrain associated with the infill of former estuarine lands.

The Clyde stabling and maintenance facility construction site is currently comprised of mixed industrial and urban services uses. Although the site has generally been subject to extensive landform modification associated with development of these uses, historical aerial photographs suggest that a small portion of the Clyde stabling and maintenance facility construction site has not been subject to substantial disturbance. This area of potentially less disturbance includes the grassed area within the western portion of the NSW Government owned Sydney Speedway site.

Previous archaeological assessments undertaken for sites near the Clyde stabling and maintenance facility have assessed the area as being 'grossly modified' by historical land use activities and concluded the area is heavily disturbed and that potential impacts to Aboriginal objects was considered to be negligible. While the majority of studies in the area have focused on the surrounding heavily modified landscapes, Aboriginal heritage assessments have identified the Duck River and Duck Creek junction as containing some archaeological sensitivity.

The closest recorded Aboriginal site to the Clyde stabling and maintenance facility construction site is AHIMS ID 45-6-2554, an artefact site recorded about 450 metres to the north-west.

13.8.2 Aboriginal sites recorded during investigations

The proposed Clyde stabling and maintenance facility construction site is located across a mixed industrial and urban services environment. Observations of the construction site indicated that the majority of the site was comprised of a heavily disturbed industrial environment.

13.8.3 Impact assessment

No identified Aboriginal sites would be impacted by the proposed works at the Clyde stabling and maintenance facility construction site.

The majority of the construction site has been assessed as having low potential for archaeological as the site has been substantially disturbed by former development.

A small portion of the NSW Government owned Sydney Speedway has been identified as relatively intact landform based on the lack of historical development. In this portion of the site, it is considered that there is a low-moderate potential for Aboriginal objects related to intact or redeposited soils to be present. The archaeological deposit may consist of an intact former ground surface located in close proximity to significant local watercourses, Duck Creek and A'Becketts Creek. Aboriginal sites may be associated with this area of archaeological potential. If intact natural profiles with the potential to contain significant archaeological deposits are encountered in this location, archaeological test excavation (and salvage when required) would be carried out. If Aboriginal archaeological remains are recovered during this process, results would be incorporated into Aboriginal heritage interpretation for the Concept.

Table 13-6 assesses the indicative scientific significance of the Clyde stabling and maintenance facility construction site. The works at the Clyde stabling and maintenance facility construction site are likely to impact areas of low-moderate archaeological potential and moderate archaeological significance. Works may therefore impact unknown Aboriginal objects.

Table 13-6: Summary of indicative scientific significance of the Clyde stabling and maintenance facility construction site

Research potential	Scientific value	Representative value	Rarity value	Overall indicative significance assessment
Low – moderate	Moderate	Moderate	Moderate – high	Moderate

13.9 Silverwater services facility

13.9.1 Archaeological context and recorded sites

The Silverwater services facility construction site is located on a gently sloped landform associated with a low-lying shale ridgeline. The construction site is located within the vicinity of several watercourses including Duck River and Haslams Creek.

The construction site is within an industrial and commercial area with the construction site formerly used as a warehouse facility. Historical aerial photographs indicate the former warehouse was demolished between 2007 and 2009. Following this, fill material was placed across the surface of the site with additional fill stockpiled in the north east corner. There is also evidence that excavation was undertaken related to pipe installation.

Archaeological implications of the soil landscape within the construction site are that the residual Blacktown soils represent a moderately deep soil with limited erosion characteristics in areas with ground cover, so unless removed or disturbed through commercial/road/infrastructure development or by extreme erosion events, archaeological material is likely to remain relatively intact.

The closest recorded Aboriginal site to the Silverwater services facility construction site is AHIMS ID 45-6-2786, potential archaeological deposit about 1.5 kilometres to the north-east in the Millennium Parklands, Sydney Olympic Park.

13.9.2 Aboriginal sites recorded during investigations

The Silverwater services facility construction site is comprised of a vacant lot with evidence of earthworks and filling across the site. No Aboriginal sites were identified during the site investigation.

13.9.3 Impact assessment

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

The combination of landform context and likely disturbance indicates the overall archaeological potential of the Silverwater services facility construction site is low. The construction of warehouse facilities across the construction site, as well as recent demolition and pipeline works is likely to have significantly impacted or removed the former ground surface context. The construction site is 770 metres away from its closest water source and does not exhibit other archaeologically sensitive landscape features.

Table 13-7 assesses the indicative scientific significance of the Silverwater services facility construction site. Any Aboriginal objects that might be located within the impact area are likely to be within a disturbed context and would therefore be considered to be of low archaeological significance.

Table 13-7: Summary of indicative scientific significance of the Silverwater services facility construction site

Research potential	Scientific value	Representative value	Rarity value	Overall indicative significance assessment
Low	Low	Low	Low	Low

13.10 Sydney Olympic Park metro station

13.10.1 Archaeological context and recorded sites

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

The Sydney Olympic Park metro station construction site has been heavily modified for commercial development. Large-scale landform modification is evident around the periphery of the existing buildings and structures, with raised accessways and landscaped set-backs for each building.

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

The closest recorded Aboriginal site to the Sydney Olympic Park metro station construction site is about 1.8 kilometres to the south-west in Phillips Park, Lidcombe.

13.10.2 Aboriginal sites recorded during investigations

Areas of surface visibility were observed within modified garden areas in the vicinity of commercial buildings. No Aboriginal sites were identified during the site investigation.

13.10.3 Impact assessment

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

The combination of landform and likely disturbance indicates that the overall archaeological potential of the Sydney Olympic Park metro station construction site is low. The Sydney Olympic Park metro station construction site is located on a crest landform context away from major watercourses. The construction of commercial structures across the construction site, as well as associated road and underground services, is likely to have significantly impacted or removed the former ground surface context.

Table 13-8 assesses the indicative scientific significance of the Sydney Olympic Park metro station construction site. Any Aboriginal objects that might be located within the impact area are likely to be within a disturbed context and would therefore be considered to be of low archaeological significance.

Table 13-8: Summary of indicative scientific significance of the Sydney Olympic Park metro station construction site

Research potential	Scientific value	Representative value	Rarity value	Overall indicative significance assessment
Low	Low	Low	Low	Low

13.11 North Strathfield metro station

13.11.1 Archaeological context and recorded sites

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

The northern construction site consists mainly of a raised artificial embankment and cleared landing created during construction of the North Strathfield underpass portion of the Northern Sydney Freight Corridor project. The southern construction site is a paved facilities area that was also constructed for the North Strathfield underpass.

Tidally influenced areas are located about 300 metres to the west of the North Strathfield metro station construction site. This area has however been heavily modified and partially in-filled for industrial and residential development.

Previous archaeological investigations in the broader area indicate the potential for previous significant disturbance to archaeologically sensitive areas from historical land-use activities, including reclamation and construction of built infrastructure.

The closest recorded Aboriginal site to the North Strathfield metro station is AHIMS ID 45-6-2324, a shell site located about 2.2 kilometres to the north-east.

13.11.2 Aboriginal sites recorded during investigations

The North Strathfield metro station construction site consists of modified flat surfaces used for access to the rail corridor, car parking, and stockpiling. No Aboriginal sites were identified during the site investigation.

13.11.3 Impact assessment

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

The combination of landform context and likely disturbance indicates that the overall archaeological potential of the North Strathfield metro station construction site is low. The North Strathfield metro station construction site is located on a crest landform context away from major watercourses. The construction of commercial structures across the construction site, as well as associated road and underground services, is likely to have significantly impacted or removed the former ground surface context.

Table 13-9 assesses the indicative scientific significance of the North Strathfield metro station construction site. Any Aboriginal objects that might be located within the impact area are likely to be within a disturbed context and would therefore be considered to be of low archaeological significance.

Table 13-9: Summary of indicative scientific significance of the North Strathfield metro station construction site

Research potential	Scientific value	Representative value	Rarity value	Overall indicative significance assessment
Low	Low	Low	Low	Low

13.12 Burwood North Station

13.12.1 Archaeological context and recorded sites

Burwood North Station construction site is divided into two sites (northern construction site and southern construction site) which are both located at the eastern base of a low-lying sandstone and shale ridgeline, immediately west of a low-lying area that would likely have consisted of tidally influenced estuarine lowlands prior to in-filling and levelling to create playing fields and open recreational space. The tidally influenced watercourse through the low-lying area has been canalised, directing water north into Canada Bay from Parramatta Road near the intersection with Luke Avenue.

Areas near the Burwood North Station construction sites may contain archaeological evidence relating to Aboriginal land-use activities, including areas adjacent to watercourses and foreshore areas, such as Canada Bay and the former tidally influenced area to the east and north-east, prior to reclamation and creation of St Luke's Park, and areas that have not been heavily developed and modified.

However, previous archaeological investigations in the area indicate the potential for significant disturbance to archaeologically sensitive areas from historical land-use activities, including reclamation and construction of built infrastructure.

The closest recorded Aboriginal site to the Burwood North Station construction sites is about 1.5 kilometres to the north-east, on the foreshore of Hen and Chicken Bay.

13.12.2 Aboriginal sites recorded during investigations

No areas of surface visibility or intact ground surface were observed during the investigation of the Burwood North Station construction sites. No Aboriginal sites were identified during the site investigation.

13.12.3 Impact assessment

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

The combination of landform context and likely disturbance indicates the overall archaeological potential of the Burwood North Station construction sites is low.

The construction of commercial structures and associated infrastructure across the construction sites is likely to have impacted or removed the former ground surface context.

Prior to the current phase of commercial development across the northern and southern construction sites, the area consisted of 20th century detached houses. Construction of early 20th century houses on detached blocks is not likely to have significantly modified the natural landform context, with disturbance generally limited to foundation excavation, drainage, and landscaping activities. The subsequent phase of commercial development is likely to have significantly impacted natural soil contexts.

An exception to this potential disturbance is the existing car park of the Pine Inn within the northern construction site. The rear car park extends across a former residential block to Burton Street, however the impacts to the original ground surface associated with demolition of the former residential structure and ground preparation for construction of the car park is unknown. As such, there is potential for undisturbed natural ground to remain underneath the sealed car park surface.

Table 13-10 assesses the indicative scientific significance of the Burwood North Station construction sites. Any Aboriginal objects that might be located within the impact area are likely to be within a disturbed context and would therefore be considered to be of low archaeological significance.

Table 13-10: Summary of indicative scientific significance of the Burwood North Station construction sites

Research potential	Scientific value	Representative value	Rarity value	Overall indicative significance assessment
Low	Low	Low	Low	Low

13.13 Five Dock Station

13.13.1 Archaeological context and recorded sites

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

The closest watercourse is Iron Cove Creek, located about 615 metres to the south of the Five Dock Station construction sites. Iron Cove Creek is canalised in this area. There is also a canalised watercourse that flows north into Kings Bay via an infilled estuarine area about one kilometre to the west.

Previous archaeological investigations carried out for the M4 East Motorway generally indicate the land has been subject to significant disturbance from residential development, and construction of transport and service infrastructure, and therefore has low ground integrity.

The closest recorded Aboriginal site to the Five Dock Station construction sites is a midden site recorded on the foreshore of Hen and Chicken Bay, and about 770 metres to the north-west.

13.13.2 Aboriginal sites recorded during investigations

No areas of surface visibility or intact ground surface were observed during the investigation of the Five Dock Station construction sites. No Aboriginal sites were identified during the site investigation.

13.13.3 Impact assessment

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

The Five Dock Station construction sites are located on a crest landform context away from watercourses. For these reasons, the assessed archaeological potential is low.

The construction of buildings and associated infrastructure across the construction sites is likely to have impacted or removed the former ground surface context. The relatively shallow residual soil at the Five Dock Station construction sites are susceptible to minor surface disturbance associated with building or road construction. The former ground surface is likely to have been significantly impacted by works at the site.

Table 13-11 assesses the indicative scientific significance of the Five Dock Station construction sites. Any Aboriginal objects that might be located within the impact area are likely to be within a disturbed context and would therefore be considered to be of low archaeological significance.

Table 13-11: Summary of indicative scientific significance of the Five Dock Station construction sites

Research potential	Scientific value	Representative value	Rarity value	Overall indicative significance assessment
Low	Low	Low	Low	Low

13.14 The Bays Station

13.14.1 Archaeological context and recorded sites

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

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

Within areas of reclaimed land, the natural soil has typically been removed, buried, or greatly disturbed. Geotechnical investigations however have shown that when infilling has occurred, the natural foreshore soils can be preserved at considerable depths of up to 2.8 metres below current ground level.

The closest recorded Aboriginal site to The Bays Station construction site is AHIMS ID 45-6-2278, a PAD site located approximately 650 metres to the east.

Numerous Aboriginal sites are recorded around the less disturbed sandstone foreshores of Sydney Harbour, including the northern margin of Balmain Peninsula, Balls Head, and the foreshore of Cremorne and Mosman. Site types include shell midden in both open and closed (shelter) contexts, and art (pigment or engraved) features.

The White Bay area has been subject to significant landform modification, including the almost complete reduction of Glebe Island and a large program of reclamation to modify the shoreline and create new level ground for the Glebe Island Container Terminal and the former White Bay Power Station.

The lack of recorded Aboriginal sites associated with the White Bay and Johnstons Bay foreshores may be a result of the heavily modified nature of the shoreline in this area, and the subsequent lack of natural ground surface exposures. Particularly, large-scale modification of the foreshore area has the potential to remove, mix, or bury archaeological remains beneath layers of fill. Previous archaeological assessments in the area therefore confirm the potential effects of historical landform modification activities on the archaeological record.

13.14.2 Aboriginal sites recorded during investigations

The Bays Station construction site is largely located within a modified flat landform adjacent to the White Bay foreshore. The majority of the construction site is comprised of hardstand and grassed areas. A large earth stockpile is located in the southern portion of the construction site. No Aboriginal sites were identified during the site investigation.

13.14.3 Impact assessment

There is no archaeological potential for Aboriginal remains within much of The Bays Station construction site, including the entirety of the northern and eastern parts of the construction site. This assessment is due to much of the site being reclaimed land, and while there may have been Aboriginal remains on the south-eastern parts of the construction site, within the natural foreshore of Glebe Island, extensive quarrying and land modification would have destroyed the archaeological potential.

The White Bay region would have been a suitable location for Aboriginal occupation, surrounded by valuable marine and plant resources, close to reliable water sources, near ridges and cliffs, and close to raw materials suitable for the construction of stone tools. Despite these environmental landscape factors that could suggest high potential, the preservation of in situ artefactual deposits associated with Aboriginal occupation is dependent on the degree of ground disturbance in the area since European colonisation.

Extensive historical occupation after European colonisation of Sydney has resulted in phases of demolition, construction, land clearance and modification which has had a significant impact on Aboriginal cultural heritage. However, there is also potential for reclamation fills during the 19th and 20th centuries to be present, and archaeological research has demonstrated that particular soils, particularly alluvial deposits and sand bodies, may retain archaeological and artefactual deposits if found intact. While there is still potential for Aboriginal archaeological remains to be found out of context in these disturbed areas and retain their cultural value, their scientific research potential is diminished.

There is low to moderate archaeological potential for Aboriginal remains to be preserved in the south-western part of the construction site, where infilling associated with the land reclamation may have preserved intact archaeological deposits. In the area of the natural estuarine foreshore of White Bay, Aboriginal occupation would not have occurred, however if preserved alluvial soils are found intact, they could provide further evidence about the resources available to Aboriginal people in the area. Furthermore, the area immediately beyond the marsh areas, where the White Bay Hotel was later built, would have been an area of high likelihood for Aboriginal occupation. The construction of the White Bay Hotel would have disturbed the ground surface, however, there remains a moderate potential for reclamation fills from this period to be present, and these fills would be rich in artefacts. If intact natural profiles with the potential to contain significant archaeological deposits are encountered in this location, archaeological test excavation (and salvage when required) would be carried out. If Aboriginal archaeological remains are recovered during this process, results would be incorporated into Aboriginal heritage interpretation for the Concept.

Table 13-12 assesses the indicative scientific significance of The Bays Station construction site. The Bays Station construction site includes an identified area of low to moderate archaeological potential and an area of moderate archaeological significance, and construction works therefore may impact unknown Aboriginal objects.

Table 13-12: Summary of indicative scientific significance of The Bays Station construction site

Research potential	Scientific value	Representative value	Rarity value	Overall indicative significance assessment
Low – moderate	Moderate	Moderate	Moderate – high	Moderate

13.15 Cumulative impacts

Potential cumulative impacts were considered for assessment based on the likely interactions of Stage 1 with other projects and plans that met the adopted screening criteria. The approach to assessment and the other projects considered are described further in Appendix G (Cumulative impacts assessment methodology – Stage 1).

A cumulative impact takes into consideration incremental impacts to Aboriginal cultural heritage values resulting from past, present and foreseeable future actions in a particular area or region. Where Aboriginal objects are identified in association with intact contexts, such as the intact foreshores at The Bays Station construction site, the cumulative impacts in the local setting would be higher. This is because the recorded Aboriginal archaeological resource in these areas is generally very limited. The identification of Aboriginal objects associated with intact contexts would possibly demonstrate high research potential, rarity values and representative values in the local setting, and potentially in a regional context depending on the nature of the archaeological resource.

A review of other projects that could affect Aboriginal objects or areas of archaeological potential identified the potential for cumulative impacts to occur at the following Stage 1 construction sites:

- Parramatta metro station and the proposed power supply route
- The Bays Station.

Parramatta metro station

Areas of high archaeological potential within Parramatta are largely associated with areas near watercourses and the mapped extent of the Parramatta Sand Body. A large area of high potential is located within the Parramatta CBD approximately bound by the Parramatta River in the north and Hunter Street in the south. High levels of redevelopment within this area, including development of Parramatta Square, Parramatta Leagues Club and Parramatta Light Rail, has resulted in the continued reduction of the potential archaeological resource. Further proposed development including the New Powerhouse Museum, as well as development at 89 George Street, 116 Macquarie Street and 7 Charles Street would, if carried out, result in further depletion of this resource.

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

The Bays Station

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

There are a number of other projects near The Bays Station construction site. While most of these assessments have not identified Aboriginal heritage within their assessment areas, the environmental impact assessment of the Western Harbour Tunnel and Warringah Freeway Upgrade project has identified areas of Aboriginal archaeological potential.

A Preliminary Aboriginal Heritage Assessment was also prepared to inform The Bays Precinct Urban Transformation, and identified areas of Aboriginal archaeological potential near The Bays Station construction site.

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

13.16 Management and mitigation measures

13.16.1 Approach to management and mitigation

Aboriginal heritage impacts from Stage 1 would be managed in accordance with the Construction Environmental Management Framework. Of relevance, the Construction Environmental Management Framework includes heritage management objectives to minimise impacts on items or places of heritage value, avoid accidental impacts on heritage items, and maximise workers' awareness of Aboriginal and non-Aboriginal heritage.

The Construction Environmental Management Framework also requires the preparation and implementation of a Heritage Management Plan, including as a minimum:

- Procedures for undertaking any recordings of heritage items prior to works commencing
- Procedures for unexpected heritage finds
- Heritage monitoring requirements.

More details of the Construction Environmental Management Framework are provided in Chapter 27 (Synthesis of the Environmental Impact Statement).

13.16.2 Mitigation measures

The mitigations measures that would be implemented to address potential Aboriginal heritage impacts are described in Table 13-13.

Table 13-13: Mitigation measures – Aboriginal heritage Stage 1

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

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

13.16.3 Interactions between mitigation measures

Mitigation measures in other chapters that are relevant to the management of Aboriginal heritage impacts include:

- Chapter 12 (Non-Aboriginal heritage), specifically measures which address the management of interaction of Aboriginal and non-Aboriginal archaeological resources
- Chapter 20 (Contamination - Stage 1), specifically measures which address the management of contamination during Aboriginal archaeological investigations.

Together, these measures would minimise the potential Aboriginal heritage impacts of Stage 1.

There are no mitigation measures identified in the assessment of other environmental aspects that are likely to affect the assessment of Aboriginal heritage impacts.