

## Chapter 20

### Aboriginal heritage





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## 20. Aboriginal heritage

Chapter 20 provides an assessment of the Aboriginal heritage items present at the Project site, as well as assessments of cultural heritage significance and potential impacts of the Moorebank Intermodal Terminal (IMT) Project (the Project) on heritage values. This chapter summarises the detailed Aboriginal Heritage Assessment prepared by Navin Officer Heritage Consultants Pty Ltd (NOHC), which is included in Technical Paper 10 – *Aboriginal Heritage Impact Assessment* in Volume 7 of this Environmental Impact Statement (EIS).

The assessment in Technical Paper 10 addresses the relevant Commonwealth Department of the Environment (DoE)'s Environmental Impact Statement (EIS) Guidelines and the Secretary for the NSW Department of Planning and Environment (NSW DP&E)'s Environmental Assessment Requirements (NSW SEARs) listed in Table 20.1.

Table 20.1 Relevant Commonwealth EIS Guidelines and NSW SEARs

Requirement	Where addressed
<b>Commonwealth EIS Guidelines under the Commonwealth <i>Environment Protection and Biodiversity Conservation Act 1999</i> (EPBC Act)</b>	
<ul style="list-style-type: none"> <li>Provide description of the existing environmental values including cultural values of the site which may be affected by the proposal.</li> </ul>	Summary in Chapter 2 – <i>Site context and environmental values</i> . Further details relating to Aboriginal cultural values in section 20.2 (this chapter).
<ul style="list-style-type: none"> <li>Identify, describe and map all places and items of indigenous cultural value.</li> </ul>	Section 20.2 (this chapter) and Technical Paper 10 – <i>Aboriginal Heritage Impact Assessment</i> (Volume 7).
<ul style="list-style-type: none"> <li>Describe the impacts the proposed action would have on Indigenous cultural values including the continuing practice of traditional beliefs and access to sites. Provide evidence of an understanding of potential impacts to Indigenous heritage values through appropriate consultation.</li> </ul>	Sections 20.1 to 20.4 (this chapter) and Technical Paper 10 – <i>Aboriginal Heritage Impact Assessment</i> (Volume 7).
<ul style="list-style-type: none"> <li>Outline the tenure history of the site (whether there have been any native title extinguishing events, and the potential for native title to continue to exist) and the expected future site tenure (such as rezoning, boundary realignments, new easements and subdivisions).</li> </ul>	Section 20.2.6 (this chapter) and Technical Paper 10 – <i>Aboriginal Heritage Impact Assessment</i> , Appendix I, Volume 7.
<b>NSW SEARs under the NSW <i>Environmental Planning and Assessment Act 1979</i> (EP&amp;A Act)</b>	
<ul style="list-style-type: none"> <li><i>Aboriginal heritage</i> (including cultural and archaeological significance), in particular, impacts to Aboriginal objects and potential archaeological deposits (PAD) should be assessed. Where impacts to Aboriginal heritage are identified the assessment shall:</li> </ul>	Section 20.4 (this chapter) and Technical Paper 10 – <i>Aboriginal Heritage Impact Assessment</i> (Volume 7).
<ul style="list-style-type: none"> <li>outline the proposed mitigation and management measures (including measures to avoid significant impacts and an evaluation of the effectiveness of the measures) generally consistent with the <i>Draft Guidelines for Aboriginal Cultural Heritage Impact Assessment and Community Consultation</i> (DEC 2005);</li> </ul>	Section 20.5 (this chapter) and Technical Paper 10 – <i>Aboriginal Heritage Impact Assessment</i> (Volume 7). Evaluation of the effectiveness of the measures is covered in Chapter 28 – <i>Environmental management framework</i> .
<ul style="list-style-type: none"> <li>be undertaken by a suitably qualified heritage consultant(s);</li> </ul>	The Technical Paper 10 – <i>Aboriginal Heritage Impact Assessment</i> in Volume 7 was prepared by Navin Officer Heritage Consultants.



Requirement	Where addressed
<ul style="list-style-type: none"> <li>demonstrate effective consultation with Aboriginal communities in determining and assessing impacts and developing and selecting options and mitigation measures (including the final proposed measures);</li> </ul>	Summary in Sections 20.1 (this chapter) with detailed discussion in section 5 of Technical Paper 10 – <i>Aboriginal Heritage Impact Assessment</i> (Volume 7).
<ul style="list-style-type: none"> <li>demonstrate that an appropriate archaeological assessment methodology, including research design (where relevant), has been undertaken to guide physical archaeological test excavations of areas of potential archaeological deposits. The full spatial extent and significance of any archaeological evidence shall be established and results of excavations are to be included;</li> </ul>	Summary in sections 20.1 and 20.2.4 (this chapter), with detailed excavation and field survey results in Technical Paper 10 – <i>Aboriginal Heritage Impact Assessment</i> (Volume 7).
<ul style="list-style-type: none"> <li>assess and document the archaeological and cultural significance of cultural heritage values of affected sites; and</li> </ul>	Summary in Sections 20.3 (this chapter) with detailed discussion in section 12 of Technical Paper 10 – <i>Aboriginal Heritage Impact Assessment</i> (Volume 7).
<ul style="list-style-type: none"> <li>develop an appropriate assessment methodology, including research design, in consultation with the Department and the Office of Environment and Heritage, to guide physical archaeological test excavations of the sites and areas of PAD identified in a manner that establishes the full spatial extent and significance of any archaeological evidence across each site/area of PAD, and include the results of these excavations.</li> </ul>	Section 3 of Technical Paper 10 – <i>Aboriginal Heritage Impact Assessment</i> (Volume 7).

## 20.1 Assessment approach

The cultural heritage significance and potential impacts on Aboriginal heritage values on the Project site were assessed by undertaking the following tasks:

- literature and database review;
- archaeological field survey of the Project site;
- subsurface testing;
- an Aboriginal consultation program; and
- significance and impact assessment.

These tasks are summarised below, with full details described in section 3 of the Technical Paper 10 – *Aboriginal Heritage Impact Assessment* in Volume 7.

### 20.1.1 Literature and database review

A literature and database review was carried out to determine whether known Aboriginal sites are located within the Project site. The review included a search of the Aboriginal Heritage Information Management System (AHIMS) maintained by the NSW Office of Environment and Heritage (OEH), and archaeological reports and theses held in the library of the School of Archaeology and Anthropology at the Australian National University. Sources of historical information included regional and local histories, heritage studies and parish maps of the area.

## 20.1.2 Field surveys and subsurface testing

### Field survey

The Aboriginal heritage field survey of the Project site took place over three occasions, due to the limited access to parts of the site at the time of the initial survey, and the subsequent incorporation of rail corridor options into the Project description. Aboriginal heritage field surveys of the Project site were conducted by NOHC on:

- 6 and 8 December 2010 – this survey focused on all components of the Project site east of the Georges River (main IMT site);
- 13 February 2013 – focusing on land owned and managed by Liverpool City Council (LCC) to the west of the Georges River, known as the Northern Powerhouse Land; and
- 8 May 2014 – focusing on land associated with the central and southern rail corridor options.

The surveys consisted of walking in systematic transects across all landforms within the Project site. The aim was to identify material evidence of Aboriginal occupation through surface artefacts and areas of archaeological potential associated with surface artefacts. Aboriginal representatives participated in these surveys and the subsequent subsurface testing (refer to section 20.1.3 for details of consultation with Aboriginal representatives).

Potential recordings fell into two broad categories:

1. Sites: Defined as any material evidence of past Aboriginal activity that remains within a context or place which can be reliably related to that activity. Evidence may consist of stone or shell artefacts situated on or in soil, marks located on or in rock surfaces, and scars on trees.
2. Potential archaeological deposits (PADs): A PAD is defined as any location where the potential for subsurface archaeological material is considered to be moderate or high, relative to the surrounding study area landscape.

### Subsurface testing

The findings of the literature reviews and field surveys were used to identify sites, PADs and archaeologically sensitive landforms for subsurface testing. Research questions were developed for the subsurface testing program in order to focus the results and the program towards answering specific questions. Subsurface testing was undertaken in September 2012 on the main IMT site and in July/August 2013 on the Northern Powerhouse Land. The subsurface testing program involved mechanical test pit excavations using a backhoe/excavator and by-hand test pit excavation (refer to section 3.6 of the Technical Paper 10 – *Aboriginal Heritage Impact Assessment* in Volume 7). The soil profiles at each test pit were also analysed to inform conclusions regarding the origin, integrity and likely age of archaeological deposits.

Additional subsurface testing is planned during 2014 to address areas of Moorebank representative sample area (MRS2) where access had not previously been possible. This would be completed and available for consideration with the submissions report.

### 20.1.3 Aboriginal consultation

Consultation with Aboriginal representatives began in 2010 and has continued through the various Project stages.

At the commencement of the Project in 2010, the (former) NSW Department of Environment, Climate Change and Water (DECCW)'s Interim (2005) *Guidelines for Aboriginal Consultation* were enacted, in response to requirements outlined by the (then) Department of Planning.

In 2012, the Moorebank Project Office (MPO) continued the Aboriginal consultation, adopting the *Aboriginal cultural heritage consultation requirements for proponents 2010* (NSW DECCW 2010) which replaced the December 2004 *Interim Community Consultation Requirements for Applicants*. This ensured that the consultation process was as thorough and up to date as possible. The 2010 Guidelines are consistent with and exceed the requirements of the 2005 Interim Guidelines, and therefore exceed the NSW SEARs for the Project.

#### Registered Aboriginal parties

Aboriginal parties were invited to register an interest in the Project through public notice and through direct invitation protocols as defined by the 2005 Interim Guideline and the 2010 Guidelines.

The following parties registered an interest in the Project:

1. Tharawal Local Aboriginal Land Council (TLALC);
2. Cubbitch Barta Native Title Claimants Aboriginal Corporation (CBNTCAC);
3. Darug Land Observations (DLO);
4. Darug Custodian Aboriginal Corporation (DCAC);
5. Darug Aboriginal Cultural Heritage Assessments (DACHA);
6. Darug Aboriginal Landcare Incorporated (DALI);
7. Banyadjaminga;
8. Gandangara Local Aboriginal Land Council (2010); and
9. Tocomwall Pty Ltd (2010).

Aboriginal representatives from the registered Aboriginal parties participated in both the field survey of the study area and the subsurface testing program.

Appendix 5 of Technical Paper 10 – *Aboriginal Heritage Assessment* in Volume 7 contains a record of the consultation that has so far taken place with Aboriginal representatives. This includes dates of communication through letters, emails and telephone calls, as well as participation in field survey and subsurface testing programs.



### Consultation on subsurface testing methodology

A site visit and presentation with NOHC was held on 26 September 2012. The purpose of this visit was to present the latest Project information to the registered Aboriginal parties, including the proposed subsurface testing methodology. A draft of the proposed methodology was distributed to all registered Aboriginal parties on 13 September 2012 with a comment period of 28 days. Responses were received from CBNTCAC, DALI, DCAC and DACHA.

The subsurface methodology was subsequently endorsed by the registered Aboriginal parties and by the NSW DP&E in collaboration with OEH.

### Consultation on draft assessment report

A draft of the Aboriginal Heritage Assessment was sent to all registered Aboriginal parties on 25 January 2013 with a comment period of 28 days. Responses were received from DACHA, Tocomwall Pty Ltd, DALI (via phone) and DCAC. A further draft, including the assessment of the southern and central rail alignment options, was circulated in June 2014. No additional comment was received from the registered Aboriginal parties on this draft.

In addition, a copy of the *Moorebank Intermodal Terminal – Liverpool City Council Northern Powerhouse Land Aboriginal Subsurface Testing Report* (NOHC 2014a) (included as Appendix 11 of the Aboriginal Heritage Assessment in Volume 7) was distributed to all registered Aboriginal parties on 27 November 2013 with a comment period of 28 days. Responses were received from CBNTCAC, DACHA and DCAC.

Registered Aboriginal parties' comments and responses are shown in Table 5.1, section 5.3.3 of the Technical Paper 10 – *Aboriginal Heritage Assessment* in Volume 7.

### Cultural knowledge and values

Consultation with the registered Aboriginal parties regarding cultural knowledge and values has been an ongoing process. It has included formal invitations to contribute via written and verbal discussions during the field surveys (2010, 2013 and 2014), site visit (2012), excavation program (2012 and 2013), telephone conversations and the provision of drafts of the technical papers.

### Ongoing activities

Consultation with the registered Aboriginal parties will continue throughout the life of the Project and will include:

- consultation on the future care and management of recovered Aboriginal objects;
- methodologies for any future investigations; and
- finalisation of management and mitigation strategies subject to detailed design.

#### 20.1.4 Significance assessment

A significance assessment of general values identified within the Project site following the subsurface testing program was undertaken using the Burra Charter assessment criteria and Commonwealth assessment criteria (refer to Appendix 8 of Technical Paper 10 – *Aboriginal Heritage Impact Assessment* (Volume 7) for the full list of criteria). The significance assessment is summarised in section 20.3.

##### Burra Charter assessment

The Burra Charter of Australia defines cultural significance as 'aesthetic, historical, scientific or social value for past, present and future generations' (Australia ICOMOS 1987). The assessment of the cultural significance of a place is based on this definition, but often varies in the precise criteria used according to the analytical discipline and the nature of the site, object or place. In general, Aboriginal archaeological sites are assessed using five potential categories of significance:

- significance to contemporary Aboriginal people;
- scientific or archaeological significance;
- aesthetic value;
- representativeness; and
- value as an educational and/or recreational resource.

The cultural heritage assessments were made with full reference to the scientific, aesthetic, representative and educational criteria outlined in the Burra Charter. Reference to Aboriginal cultural values was also made where these values were communicated to the consultants by the registered Aboriginal parties. Aboriginal cultural significance can only be determined by the Aboriginal community (mainly achieved through a consultation process with the registered Aboriginal parties), and confirmation of this significance component is dependent on written submissions by the appropriate Aboriginal representative organisations.

##### Commonwealth assessment criteria

The Commonwealth Heritage List is a register of natural and cultural heritage places owned or controlled by the Australian Government. These may include places associated with a range of activities such as communications, customs, defence or the exercise of government. This list was established under the EPBC Act and nominations are assessed by the Australian Heritage Council.

To obtain a listing on the Commonwealth Heritage List, the item under consideration must satisfy a set of Commonwealth heritage criteria under section 341D of the EPBC Act (refer to section 12.2 of Technical Paper 10 – *Aboriginal Heritage Impact Assessment* in Volume 7 for a list of criteria). In many cases, items will be significant under only one or two criteria.

In addition to the heritage criteria, the Australian Heritage Council may also draw upon the use of threshold tests and Commonwealth heritage management principles to determine the level of significance of a heritage item. Commonwealth heritage management principles are listed in section 12.2 of Technical Paper 10 – *Aboriginal Heritage Impact Assessment* in Volume 7.

As with the Burra Charter assessment, Aboriginal cultural significance can only be determined by the Aboriginal community, and confirmation of this significance is dependent on written submissions by the appropriate representative organisations.

### 20.1.5 Cumulative assessment

In accordance with the NSW SEARs, this EIS includes a cumulative assessment of the cultural heritage impacts of the Project in combination with the development of the Sydney Intermodal Terminal Alliance (SIMTA) site and other planned developments within the surrounding region. The findings of the cumulative assessment are provided in Chapter 27 – *Cumulative impacts*.

## 20.2 Existing environment

This section provides a summary of the existing Aboriginal cultural heritage values of the Project site and wider local and regional context. Further details are provided in section 4 to section 11 of Technical Paper 10 – *Aboriginal Heritage Impact Assessment* in Volume 7.

### 20.2.1 Geomorphological context

The Project site is situated along the upper Georges River, which marks a transition zone between Wianamatta Shale country (which typifies the Cumberland Plain Woodland to the west) and Hawkesbury Sandstone terrain (which extends from the upper Georges River to the east).

The 1:100,000 Penrith sheet mapping shows the area is mostly capped by Tertiary alluvial clayey quartz sands, salty sands and clays and forms part of the Berkshire Park Soils Group (Hazleton and Bannerman 1990). This soils landscape unit generally overlies alluvium, often on elevated terraces, and comprises shallow clayey sand soils, with frequent ironstone pisoliths. The Berkshire Park Soils landscape is mapped on the Penrith sheet as being developed on the Tertiary terraces of the Hawkesbury/Nepean River System.

Landforms on the east side of the Georges River are lower in altitude than on the west, so flooding incidence is much higher. The geomorphology, hydrology and wetland habitats of the Georges River seen today have undergone much change since European settlement or earlier. The sediments in the river today reflect disturbance throughout the catchment since European settlement.

### 20.2.2 Aboriginal cultural context

The exact boundaries between the Aboriginal groups that existed in the Sydney region pre-European contact (i.e. pre-1788) are impossible to reconstruct because of the lack of reliable data available from that time. The pre-contact and contact territories of Aboriginal people in the Sydney region have been mapped by various interpreters (Capell 1970, Eades 1976, Kohen 1986 and 1988, Mathews 1901a and b, Ross 1988, Tindale 1974). These interpreters have attributed different linguistic and tribal boundaries and area sizes to the various Sydney region Aboriginal groups.

According to Tindale (1974), the Tharawal tribe was placed in the area south from Botany Bay and Port Hacking to the Shoalhaven River and inland to Campbelltown, Picton and Camden. To the west of this tribal area, Tindale placed the Gandangara tribe, and to the north of the Tharawal tribe, the Daruk tribe. Tindale also placed an Eora tribe, which was closely linked to the Tharawal tribe, extending from the northern shores of Port Jackson to the edge of the plateau overlooking the Hawkesbury River and south to Botany Bay and the Georges River. Tindale earlier referred to the Aborigines on the northern side of Botany Bay as the Kameraigal horde, while others refer to this group as the Cadigal or Biddigal.

### 20.2.3 Aboriginal archaeological context

#### The Sydney Basin and upper Georges River

Extensive archaeological research has been conducted in the Sydney basin, resulting in the recording of thousands of Aboriginal sites and a wide range of site types and features. The Aboriginal people have lived in the Sydney region for at least 20,000 years, occupying areas throughout the Sydney basin and the Blue Mountains foothills.

Previous studies have been conducted in the vicinity of the Project site and near the Georges River. Koettig and Hughes (1983) and Haglund (1984) conducted surveys along the proposed route of the East Hills–Glenfield Railway and at Glenfield. No Aboriginal sites were recorded in these areas; however, factors such as poor surface visibility may have contributed to the lack of identified sites. Boot (1990; 1992; 1993; 1994a, 1994b) carried out a series of archaeological investigations at Wattle Grove, along Anzac Creek and north of the East Hills Railway Line. Several scatters were identified along low ridgelines next to drainage lines or swampy areas.

The sandstone dominated terrain within the Holsworthy Military Area also contains a number of Aboriginal sites including rock shelters, pigment art sites, rock engravings and grinding groove complexes, which have been documented in a number of surveys and site investigations (Officer 1984, Sharp 1994, Sefton 1994, Axis Environmental/Australian Museum Business Services Consulting 1995 and McCotter 1995).

#### Project site

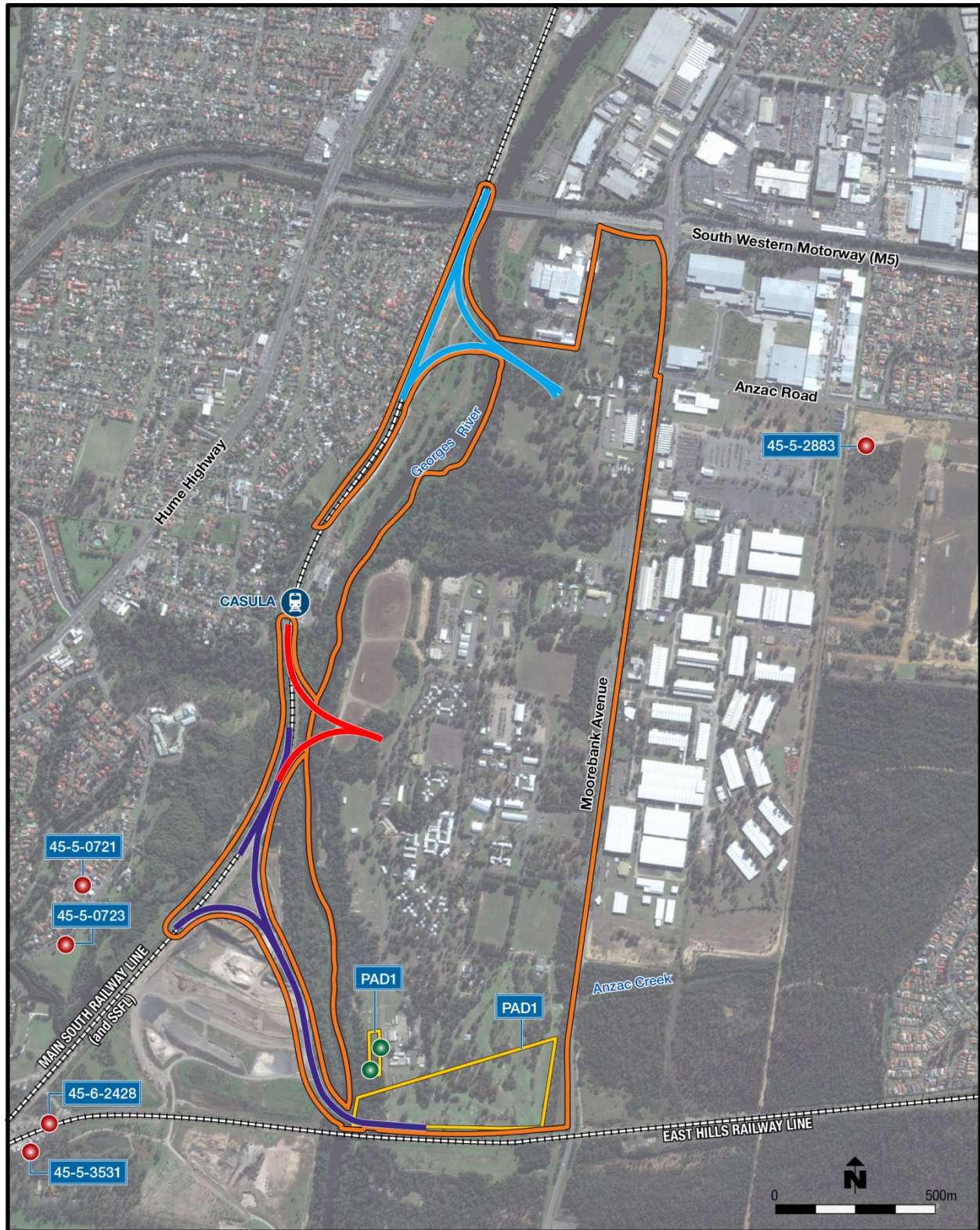
Previous archaeological investigations undertaken in the Project area include:

- an Environmental Management Plan compiled by Dames and Moore (1996);
- an archaeological survey conducted by Dallas and Steele (2004);
- an archaeological assessment for the Southern Sydney Freight Line (SSFL) Environmental Assessment (Cultural Heritage Connections 2006);
- a desktop review of the current Project site (NOHC 2011); and
- an Aboriginal cultural heritage assessment of the proposed Sydney Intermodal Terminal Alliance (SIMTA) IMT Project site (adjacent to the Project site) (Archaeological and Heritage Management Solutions Pty Ltd (AHMS) 2012).

These investigations have included some or all of the Project site.

The desktop review of the Project site (NOHC 2011) showed that while there were no previously recorded Aboriginal sites, there were areas of predicted sensitivity along the Georges River corridor, on adjacent terraces and along the tributary creek lines. The Aboriginal cultural heritage assessment for the SIMTA Project identified two potential archaeological deposits (PADs) within the Project site. These comprised a section of alluvial terrace at PAD1 and elevated flats adjacent to Anzac Creek at PAD2 (refer Figure 20.1).





- Project site boundary
- Northern rail access option
- Central rail access option
- Southern rail access option
- Potential archaeological deposit (PAD) recorded by AHMS 2012
- AHIMS site
- Possible artefact recorded by AHMS 2012

**Figure 20.1 The Project site relative to the location of potential Aboriginal archaeological sites, recorded by AHMS (2012) and the closest AHIMS registered sites**

### Aboriginal heritage information management system (AHIMS) search results

An AHIMS search conducted in 2010 revealed that there were no known recordings in the area surrounding or within the Project site. A subsequent AHIMS search undertaken on 15 November 2012 covered a greater area around the Project site (9 kilometres (km) east–west by 10 km north–south) and revealed 80 Aboriginal sites and one Aboriginal Place on the AHIMS register. A subsequent AHIMS search undertaken on 28 April 2014 to incorporate the central and southern rail corridor options revealed 24 Aboriginal sites. Around half of these were captured by the previous 2012 search.

In total, 91 registered AHIMS sites were recorded from around the Project site comprising:

- two grinding groove sites;
- six art sites;
- 10 scarred trees;
- 11 PADs; and
- 62 artefact occurrences.

The closest AHIMS registered sites to the Project site are shown on Figure 20.1.

The Aboriginal Place is the Collingwood Precinct, a traditional meeting place located 700 m north of the Project site, on the western side of the Georges River.

### Predictive modelling and archaeological sensitivity

Based on previous archaeological assessments and information from the AHIMS, the following predictive statements can be made about the nature of the surviving archaeological resources within the western and broader Sydney regions as they relate to the Project site:

#### *Site types*

- Site types likely to occur are scarred trees, open artefact scatters, isolated finds and PADs.
- Open artefact scatters are likely to be under-represented in surface surveys conducted in uncleared land.

#### *Site location criteria and trends*

- Major watershed ridgelines may contain higher site densities and/or greater occupation evidence due to their use as access routes.
- Open artefact scatters are unlikely to have survived in areas that have been quarried for gravel or heavily impacted by vehicles.
- Open artefact scatters and isolated finds are likely to occur on relatively well drained ground on the crests of major ridgelines and spurlines, and in valley floor contexts adjacent to water sources.
- Larger sites are most likely to be associated with permanent water sources.
- Aboriginal scarred trees may occur where old growth trees survive.



*PADs*

- Open sites containing artefacts are unlikely to be detected by surface survey due to the absence of or poor quality (i.e. highly disturbed) ground exposure, or subsequent burial by later sediments (especially during flooding and after fires).
- Open sites containing in situ subsurface material are most likely to occur in well drained, sedimentary aggrading landforms adjacent to streamlines.

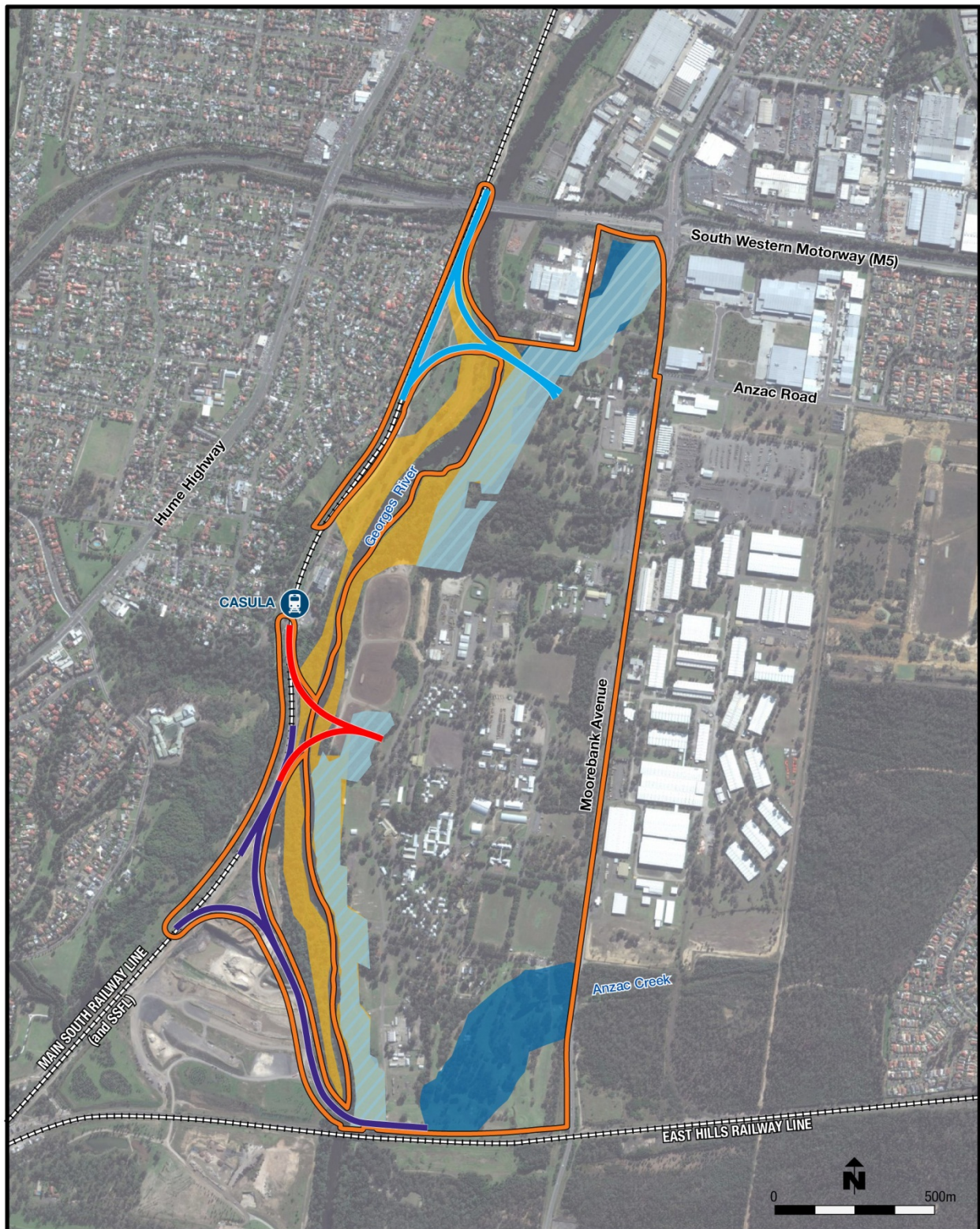
*Predicted Aboriginal archaeological sensitivity and potential*

Figure 20.2 shows the predicted Aboriginal archaeological sensitivity across the Project site. These areas were identified by plotting predicted archaeological potential based on landform variables, but did not include disturbed land surfaces (NOHC 2011). These zones were based on a generalised model of Aboriginal site location, which indicated that the majority of sites are situated on locally elevated, well drained and low gradient ground, close to a fresh or estuarine water source (with the majority of sites within 100 m of water sources).

Three zones of predicted Aboriginal archaeological potential are recognised within the Project site:

- The Georges River riparian corridor 100 m either side of the Georges River (inclusive of the 1890s eastern riverbank configuration);
- Minor tributary riparian zones 100 m either side of the tributary drainage lines (inclusive of the pre-European drainage alignment as best determined from historical mapping and 1943 aerial photography); and
- The elevated slopes and riverside margin of a locally elevated Tertiary alluvial terrace edge situated along a 100 m wide zone on the eastern side of the Georges River.

The likely incidence of Aboriginal sites along the Georges River riparian corridor is expected to be relatively high, given its value in prehistory as a source of food, camping locations, raw materials and fresh water.



- Project site boundary
- Northern rail access option
- Central rail access option
- Southern rail access option
- 100 m across Tertiary terrace edge (elevated ground adjacent to river corridor)
- 100 m either side of tributary drainage lines
- 100 m either side of Georges River

**Figure 20.2 Predicted Aboriginal archaeology sensitivity**



#### 20.2.4 Archaeological field survey results

All Aboriginal recordings from the 2010, 2013 and 2014 field surveys are shown in Figure 20.3 in relation to the indicative Project site and the proposed construction footprint.

##### Field survey results (2010) – main IMT site and adjacent lands

During the 2010 field survey of the main IMT site and adjacent lands, eight archaeological recordings were made. These consisted of five artefact occurrences (MA1–MA5), and three scarred trees of possible Aboriginal origin (MA6–MA8). In addition, three PADs (MA 9 (MAPAD1), PAD1 and PAD2) were identified and three archaeologically sensitive landform types were defined. These are summarised in Table 20.2.

Table 20.2 Summary of 2010 Aboriginal field survey results

Site	Description
MA1	<p>This recording consists of three surface artefacts on or adjacent to an approximate 90 m interval of roadway near the entrance to the Initial Employment Training Squadron Building. These are:</p> <ul style="list-style-type: none"> <li>• a banded grey-brown fine grained metamorphic sedimentary rock;</li> <li>• red silcrete possible flaked piece (recorded in AHMS 2012); and</li> <li>• poor quality grey chert/silcrete possible medial flake (recorded in AHMS 2012).</li> </ul> <p>The area was noted to be extensively disturbed by earthworks, importation of fill and gravel, and the installation of underground services.</p>
MA2	<p>This recording consists of a single artefact (banded grey fine grained metamorphic sedimentary rock) situated in a shallow scald within mown grass north of the entry gates to the SME. The area has undergone vegetation clearance, agricultural development, grading, soil removal and construction of surface drainage.</p>
MA3	<p>This recording consists of a single artefact located at the base of the cut and graded Tertiary terrace edge and is approximately 300 m south of MA4 (Figure 20.3). The area has been extensively disturbed by Defence-related earthworks and excavations. The artefact was a banded grey-grey green rhyolite multi-platform core.</p>
MA4	<p>This recording is a low density artefact scatter of three artefacts exposed on the edge of a Tertiary terrace and situated on a gravelled dirt track. The track slopes down onto river flats, which were highly disturbed by excavation and landscaping. The artefacts were:</p> <ul style="list-style-type: none"> <li>• red silcrete multi-platform core with at least three platforms;</li> <li>• red to light red quartzite bipolar flake; and</li> <li>• light yellow patinated fine grained tuff steep edge concave scraper.</li> </ul>
MA5	<p>This recording consists of three artefacts situated on the high side of an artificially benched slope atop the Tertiary terrace, and adjacent to the lower lying dirt pan. They are:</p> <ul style="list-style-type: none"> <li>• yellow brown broken flake;</li> <li>• yellow brown silcrete flake; and</li> <li>• light brown fine grained metamorphic rock.</li> </ul>
MA6	<p>The scarred tree is an old growth Eucalyptus in fair to good health, with a number of hollows and missing limbs. The scar was of an irregular and asymmetrical shape and was assessed to be of possible Aboriginal origin.</p>
MA7	<p>The scarred tree was recorded as a smooth barked Eucalyptus (Red gum). The tree is located close to a playing field and the Tertiary terrace edge, and is approximately 80–100 m from the river. The scar regrowth is irregular and the age of the tree and the scar may be post-European settlement. It was assessed to be of possible Aboriginal origin.</p>

Site	Description
MA8	The scarred tree was recorded as a rough barked Eucalyptus, becoming smooth barked two-thirds of the way up the trunk. The tree is located approximately 60 m from the river. The scar may have been caused by machinery during the cutting and benching of the area. A possible Aboriginal origin is supported by the possible age and symmetrical shape of the scar, the amount of scar regrowth and the tree type, as well as its proximity to the Georges River.
MA9 (MA PAD 1)	This recording consists of the banks and a fringing 50 m radius around a natural lake basin situated in the far northern portion of the Project site. This lake basin is situated close to the riparian corridor of the Georges River. It provides a strong basis for predicting evidence of past Aboriginal occupation along its original banks and surrounds.
PAD1 (MA10)	This potential archaeological deposit was described by AHMS (2012) as a river terrace running along the eastern side of the Georges River, based on the landform, the presence of intact soil profile and the presence of artefacts 5 and 6.
PAD2	This potential archaeological deposit was defined by AHMS (2012) as an area with a relatively low level of disturbance (despite its context within a golf course) with the presence of an intact soil profile. It is considered to have moderate archaeological potential.

### Field survey results (2013) – Northern Powerhouse Land west of Georges River

This survey covered the Northern Powerhouse Land west of the Georges River (refer to Figure 20.3). No previous Aboriginal archaeological recordings have been made in either the SSFL corridor or the LCC land.

One PAD was identified (MAPAD2) and is located on an archaeologically sensitive landform (refer to Figure 20.3). Disturbance within this PAD is moderate, and is mostly related to previous use as a golf course. The most common impacts on the original ground surface of this landform are earthworks, resulting in both cuttings into and capping of the PAD. As the deposit depth is considered to be more than 1 m, archaeological subsurface potential exists in both disturbed (cut into and capped) and undisturbed areas of this PAD. Overall, the potential for intact deposits at depth is considered moderate, while the potential for subsurface artefacts is moderate to high.

The adjacent Tertiary terrace to the south-west of this PAD (refer to 'archaeologically sensitive landform' in this area on Figure 20.3) is heavily impacted by both rail and road construction, and is considered too disturbed to contain archaeological deposits with research potential.

### Field survey results (2014) – Central and southern rail access options

No previous Aboriginal archaeological recordings occur within the areas that correspond to the central or southern rail access options.

Survey of the central rail access option included a walk-over of both the eastern and western banks. No surface evidence of Aboriginal occupation was observed; however, areas of potentially intact deposits were identified along the banks of the Georges River that may contain archaeological evidence. Given that the Georges River is understood to have been a focus of Aboriginal activity, the relatively undisturbed portions of the central rail access option are confirmed to be archaeologically sensitive (refer Figure 20.3).

Survey of the southern rail access option was restricted to the eastern bank, as access to the western bank was not provided by the landowner. The western bank (being the Glenfield Landfill) is likely to display low archaeological potential. No surface evidence of Aboriginal occupation was observed (on the eastern bank), but it was noted that there is potential for relatively intact deposits to occur at depth that may contain archaeological evidence.





- Project site boundary
- Northern rail access option
- Central rail access option
- Southern rail access option
- Archaeologically sensitive landform
- Potential archaeological deposit (PAD)
- Proposed construction footprint
- ▲ Scarred tree
- Artefact occurrence

**Figure 20.3 Location of all Aboriginal recordings, archaeologically sensitive landforms and testing areas relative to the Project site construction footprint**

### 20.2.5 Subsurface testing program results

Subsurface testing was undertaken at sites, PADs and archaeologically sensitive landforms identified during the 2010, 2013 and 2014 field survey and literature review (main IMT site). In total, 104 test pits across seven sites were excavated across the Project site. These included 59 test pits across the main IMT site during September 2012, and 45 test pits across MAPAD2 associated with the Northern Powerhouse Land during July and early August 2013. No test pits were excavated at MRSA2 due to environmental and occupational health and safety concerns in that area (presence of aggressive snakes). The results of the subsurface testing are summarised in Table 20.3. The predicted Aboriginal archaeology sensitivity following the subsurface testing program is illustrated in Figure 20.4.

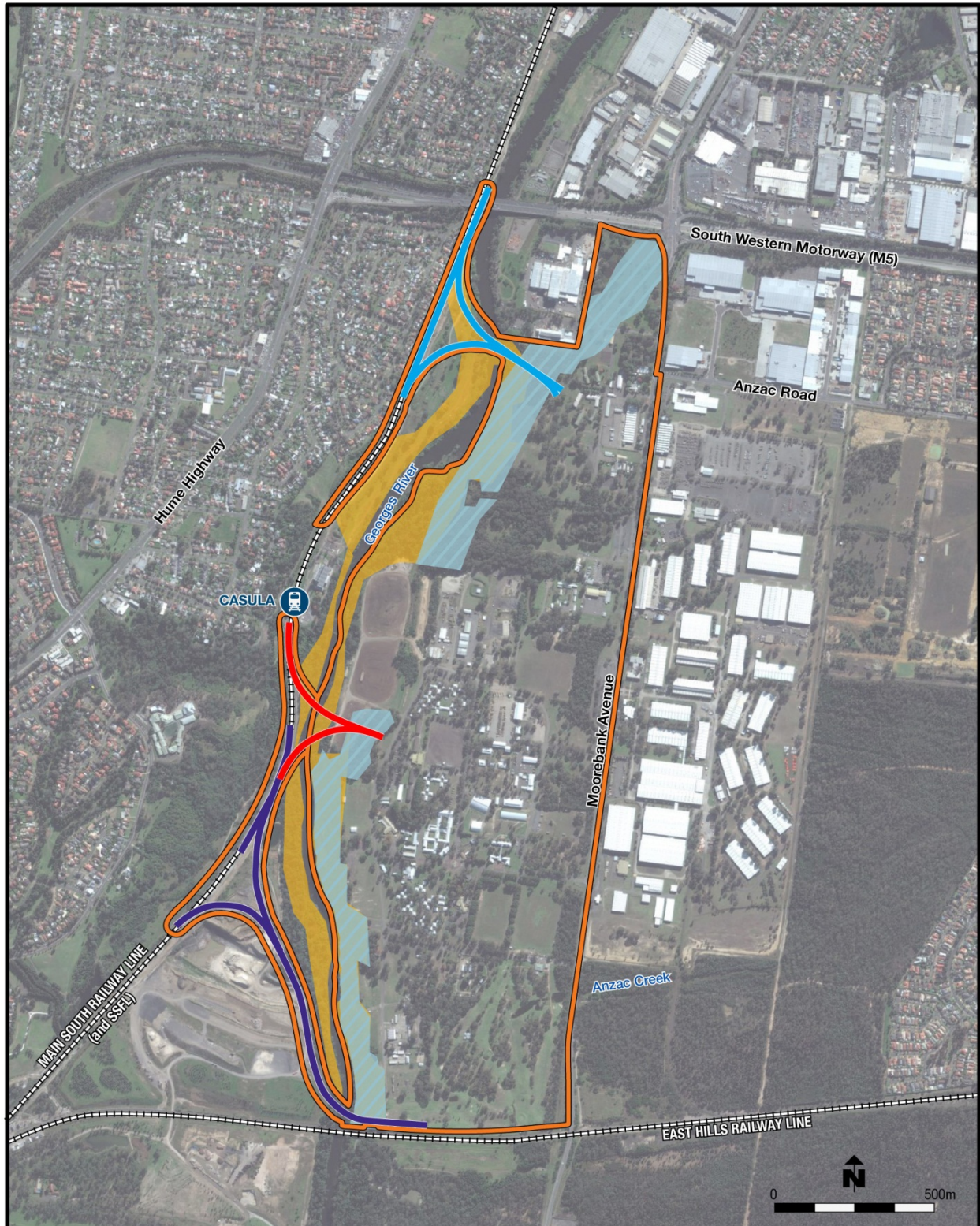
Details of the artefacts found are discussed further in section 10 of the Technical Paper 10 – *Aboriginal Heritage Impact Assessment* in Volume 7. The results showed that, relative to other parts of the Project site, subsurface archaeological deposits were more widely distributed and encountered within well-drained aggrading landforms along the Georges River riparian corridor.



Table 20.3 Results summary of subsurface testing

Site	No. of pits	No. of artefacts recovered	Artefact type (number)	Stone type	Notes/summary
MA1	4 (mechanical)	8	Flake (6) Flaked piece (1) Utilised flake (1)	Quartz Silcrete Siltstone	This site is highly disturbed; it has relatively low richness and is an example of the variable Aboriginal occupation along the Tertiary terrace bordering the eastern side of the Georges River.
PAD2	21 (by hand)	0	-	-	Testing in this area has not revealed any evidence for Aboriginal occupation. This location is no longer considered a potential archaeological site.
MA5	11 (9 mechanical, 2 by hand)	110	Backed artefact (5) Flake (74) Flaked piece (17) Fragment (2) Hammerstone (1) Retouched flake (8) Utilised flake (3)	Chert Dolerite Fine Grain Igneous 1 Fine Grain Siliceous Indurated mudstone Limestone Quartz Quartzite Silcrete	Testing has revealed that this site may be an example of an intact deposit that reflects sporadic activity through time, inclusive of acts such as stone knapping that produce localised concentrations in artefact distribution.
MA9 (MA PAD 1)	10 (by hand)	130	Core (11) Flake (72) Flaked piece (35) Hammerstone (2) Hammerstone fragment (2) Retouched flake (4) Utilised core (1) Utilised flake (3)	Basalt Chert Dolerite Fine Grain Igneous 1 Fine Grain Siliceous Indurated mudstone Porcelain Quartz Quartzite Silcrete	The unnamed lake adjacent to MA9, and the associated up-slope terrace edge, appear to have been a focus of past Aboriginal occupation within the Project site.
MA 10 (MRSA1)	6 (by hand)	16	Backed artefact (1) Core (1) Flake (11) Flaked piece (2) Retouched flake (1)	Quartz Quartzite Silcrete	This site has a moderate degree of richness and is an example of the variable Aboriginal occupation along the Tertiary terrace bordering the eastern side of the Georges River.

Site	No. of pits	No. of artefacts recovered	Artefact type (number)	Stone type	Notes/summary
MRSA3	7 (mechanical)	0	-	-	Testing in this area has not revealed any evidence of Aboriginal occupation. This location has been confirmed as an area of very low archaeological potential.
MRSA2	Nil	-	-	-	This location was unable to be tested due to environmental constraints; this site remains an area to be tested during future investigations.
MAPAD2	45 (8 mechanical, 37 by hand)	14	Core (1) Flake (11) (4 complete, 7 incomplete) Flaked piece (7)	Fine Grain Siliceous Quartz Silcrete	Due to the depth of the Unit 1 deposits (i.e. over 1.2 m deep and beyond the safe work depth), it was not possible to fully test their nature using the existing test excavation methodology. The area of archaeological potential identified as MAPAD2 therefore remains.



- Project site boundary
- Northern rail access option
- Central rail access option
- Southern rail access option
- 100 m across Tertiary terrace edge (elevated ground adjacent to river corridor)
- 100 m either side of Georges River

**Figure 20.4 Predicted Aboriginal archaeology sensitivity following the subsurface testing program**



The subsurface testing program sought to answer the research questions outlined in Table 20.4. A more detailed analysis of the excavation results is provided in Appendices 3 and 4 of the Technical Paper 10 – *Aboriginal Heritage Impact Assessment* in Volume 7.

Table 20.4 Response to research questions

Research question	Response
What do the test results indicate about the past Aboriginal occupation of the Project site and the Sydney region?	<ul style="list-style-type: none"> <li>Aboriginal occupation appears to be focused upon the Tertiary terrace edge, where intact deposits occur.</li> <li>The upper catchment of Anzac Creek (PAD2) does not appear to have been a focus of Aboriginal occupation.</li> <li>Favoured locations for repeated and/or longer term encampments were along the Georges River.</li> <li>Frequent Aboriginal activity has been recorded at MA9 (freshwater lake within a Tertiary terrace bordering Georges River). Excavation results from this site indicate a relatively continuous, moderate to high density distribution of artefacts with a diverse range of artefact and material types present.</li> <li>Aboriginal occupation along the Tertiary terrace bordering the eastern side of the Georges River appears to have been variable. It is not clear whether the variation in artefact numbers and richness across MA1, MA5, MA9 and MA10 reflects Aboriginal use of the landscape (i.e. that only certain areas were occupied) or if the difference reflects the level of preservation of sites across the terrace.</li> <li>The lower lying landforms adjacent to the Georges River, such as the floodplain area tested at Moorebank Aboriginal potential archaeological deposit (MAPAD2), may not have been a focus of Aboriginal occupation. The results of the test excavation program did not reveal any evidence of areas of high use or focused activity.</li> <li>Given that the extent of fluvial deposition of sands inhibited the opportunity to test the lower floodplain deposits at MAPAD2, the extent of archaeological material within and below the 1836 floodplain is still largely unknown.</li> <li>Additional testing is required to establish the geomorphic and archaeological nature of the Unit 1 deposits at MAPAD2.</li> </ul>
How do the test results compare with other local and regional archaeological results and models?	<ul style="list-style-type: none"> <li>The survey and test results are broadly in keeping with the local and regional predictive models.</li> <li>The site types recorded included scarred trees, isolated finds, artefact scatters and PADs, as per the predictive model.</li> <li>While surface occurrences of artefacts were recorded during survey, the excavation results have shown that subsurface archaeological deposits are more widely distributed than the surface evidence would suggest. This is exactly as predicted by the local site model.</li> <li>The most extensive and diverse archaeological deposits were encountered within well-drained aggrading landforms, in a valley, in association with permanent water sources. Again, this follows local and regional models.</li> <li>The results of the test excavations have demonstrated that an absence of surface artefacts is not necessarily indicative of an absence of artefacts in a subsurface context; this is in keeping with the predictions of the local site model.</li> <li>As stated above, at MAPAD2 the test excavation program was unable to satisfactorily test the nature of the Unit 1 (pre-European floodplain) deposits. Additional testing is required to establish the geomorphic and archaeological nature of the Unit 1 deposits at MAPAD2.</li> </ul>

Research question	Response
Does the subsurface archaeological resource accurately reflect the predictions on which the sensitive landform mapping is based?	<ul style="list-style-type: none"> <li>The subsurface test results were in keeping with the predicted sensitive landform mapping: archaeological sensitivity was greatest within the Tertiary terrace bordering the river corridor.</li> <li>Landforms further removed from the river corridor were found to be of low archaeological sensitivity.</li> <li>Refer to Figure 20.3 for the location of areas of predicted sensitivity following the testing program.</li> <li>At this stage, access constraints including issues relating to workplace health and safety (WHS) have inhibited effective testing within relatively undisturbed sections of the river corridor that may be affected by Project.</li> <li>The only test area where results were markedly different from those predicted was PAD2. The absence of any artefacts across the 21 test pits excavated in this area suggests that the margins of this minor tributary were not the target of Aboriginal activity. Instead, Aboriginal occupation appears to have been focused further to the west, within landforms closer to the Georges River.</li> <li>The results of the test excavations have demonstrated that an absence of surface artefacts is not necessarily indicative of an absence of artefacts in a subsurface context; this is in keeping with the predictions of the local site model.</li> <li>As stated above, at MAPAD2 the test excavation program was unable to satisfactorily test the nature of the Unit 1 (pre-European floodplain) deposits. Additional testing is required to establish the geomorphic and archaeological nature of the Unit 1 deposits at MAPAD2.</li> </ul>
Based on the test excavation results, how can the local predictive model be refined or corrected?	<ul style="list-style-type: none"> <li>Minor tributaries appear more likely to have been a focus of Aboriginal activity if they are associated with other resource zones (e.g. the Georges River riparian corridor).</li> <li>A broader and more detailed analysis of site variation within Tertiary terraces bordering the Georges River is necessary in order to clarify whether the variation in assemblage size and richness observed during the current test excavation program relates to Aboriginal activity or post depositional site disturbance. Open area excavation would be required to investigate this further. This is outside the scope of the current heritage assessment process, and would instead form a component of mitigation works undertaken prior to construction (refer to section 20.5.2).</li> <li>At MAPAD2 sandy deposits at or below 10 m AHD within the Casula-Moorebank section of the Georges River riparian corridor are likely to be the result of sedimentation processes that post-date the Liverpool Weir (1836). The archaeological potential of these deposits is therefore limited.</li> <li>Given that the current test excavation methodology did not enable sufficient testing of the Unit 1 deposits (inferred pre-European floodplain surface) below the sandy Unit 2 deposits, the test excavation results have not been able to indicate any refinements or changes to the predictive model with regard to the nature of Aboriginal use of the Georges River riparian corridor. However, they have refined our understanding of the depth at which potential archaeological deposits relating to Aboriginal use of the river corridor may occur.</li> <li>Additional testing is required to establish the geomorphic and archaeological nature of the Unit 1 deposits at MAPAD2.</li> </ul>

Source: Tables 11.1 and 11.2, Technical Paper 10 – *Aboriginal Heritage Impact Assessment* (Volume 7)

### 20.2.6 Tenure history of the Project site

The tenure history of the Project site is presented in Volume 2, Appendix K of this EIS. In particular, the extinguishment of native title has been assessed over all parcels of land that make up the main IMT site (refer to Figure 2.3 in Chapter 2 – *Site context and environmental values*) including:

- SME site;
- Moorebank Avenue;
- Northern Commonwealth Land;
- Georges River (Moorebank section);
- Bapaume Road; and
- Northern Council Land.

Native title can be extinguished on the following principles:

- Grant of a freehold estate to the Commonwealth or a private party prior to the enactment of the Commonwealth *Racial Discrimination Act 1975* (RD Act) on 31 October 1975 is a 'previous exclusive possession act' which is confirmed as extinguishing native title by the Commonwealth *Native Title Act 1993* (NT Act) and the NSW *Native Title (New South Wales) Act 1994* (NT NSW Act).
- The valid construction or establishment of a road by the Crown prior to 23 December 1996 is a 'previous exclusive possession act' (public work) which is confirmed by the NT Act and the NT NSW Act as extinguishing native title.

In terms of the rail access options, native title has been extinguished over all lots with the exception of Lot 17 DP 881265 (potentially required for temporary occupation for the construction of the northern rail access option) as well as Lot 20 DP 1132574 (potentially required for temporary occupation for the construction of the central rail access option). For these two lots it is possible that native title still exists, and construction of a rail access on this land would require validation under the NT NSW Act. Essentially, the validation process under the NT NSW requires that the NSW Native Title Service Provider (NTSCORP) be provided with the opportunity to comment on the Project. Depending on which rail access option is selected, MIC would undertake this process during detailed design.

## 20.3 Significance assessment

The following sections provide a discussion of general values and significance identified at each site and across the Project site as a whole. A summary of the significance assessments for all recorded sites is provided in Table 20.5, including assessment against the Burra Charter significance values and the Commonwealth Heritage List criteria (refer to Appendix 8 of the Aboriginal Heritage Assessment (Volume 7) for the full list of criteria). Further details of the significance of the Project site's Aboriginal heritage values against the Commonwealth Heritage List criteria are provided in section 12.3.7 of the Technical Paper 10 – *Aboriginal Heritage Impact Assessment* in Volume 7. Figure 20.5 shows areas within the Project site assessed as meeting the threshold for inclusion on the Commonwealth Heritage List.

Note: Moorebank representative sample area 2 (MRSA2) has not been assessed for its significance as this location is not yet confirmed as an Aboriginal site, nor is it a PAD. However, further archaeological subsurface testing is planned in 2014 to address this.



Table 20.5 Summary of significance assessments of each Aboriginal recording

Site	Burra Charter significance (as defined in Chapter 11 of the Aboriginal Heritage Assessment, Volume 7)	Commonwealth Heritage List Criteria (as defined in Chapter 11 of the Aboriginal Heritage Assessment, Volume 7)
MA1	Low archaeological significance at a local level.	This site meets the threshold for listing on the Commonwealth Heritage List under criterion i.
MA2	Low archaeological significance at a local level.	This site meets the threshold for listing on the Commonwealth Heritage List under criterion i.
MA3	Low archaeological significance at a local level.	This site meets the threshold for listing on the Commonwealth Heritage List under criterion i.
MA4	Low archaeological significance at a local level.	This site meets the threshold for listing on the Commonwealth Heritage List under criterion i.
MA5	Moderate to high archaeological significance at a local level; moderate to high representative level at a local level.	This site meets the threshold for listing on the Commonwealth Heritage List under criteria c, d, and i, with potential for g.
MA6	High Aboriginal cultural value.	This site meets the threshold for listing on the Commonwealth Heritage List under criteria g and i. Potential for significance against criterion c.
MA7	High Aboriginal cultural value.	This site meets the threshold for listing on the Commonwealth Heritage List under criteria g and i. Potential for significance against criterion c.
MA8	High Aboriginal cultural value.	This site meets the threshold for listing on the Commonwealth Heritage List under criteria g and i. Potential for significance against criterion c.
MA9 (MAPAD1)	Moderate to high archaeological significance at a local level; moderate to high representative level at a local level.	This site meets the threshold for listing on the Commonwealth Heritage List under criteria c, d and i with potential for g.
MA10 (MRSA1)	Moderate to low archaeological significance at a local level. Requires further investigation at western end to fully determine significance.	This site meets the threshold for listing on the Commonwealth Heritage List under criterion i. Potential significance against criteria c and g.  The site requires further investigation at the western end to fully determine significance.
MAPAD2 (Unit 1)	Potentially of high scientific, educational, natural, representative and Aboriginal cultural value at local, state and national levels.	The site requires further investigation to fully determine significance.  Potential significance against criteria a, b, c, d, g and i.
MAPAD2 (Unit 2)	Potentially of high scientific, educational, natural, representative and Aboriginal cultural value at local, state and national levels.	The site requires further investigation to fully determine significance.  Potential significance against criteria a, b, c, d, f, g and h.
MA11	Low archaeological significance at a local level.	This site does not meet the threshold for listing on the Commonwealth Heritage List.
MA12	Low archaeological significance at a local level.	This site meets the threshold for listing on the Commonwealth Heritage List under criteria b, c, d, g and i.
MA13	Low to moderate archaeological significance at a local level.	This site meets the threshold for listing on the Commonwealth Heritage List under criteria b, c, d, g and i.

Source: Table 12.1, Technical Paper 10 – *Aboriginal Heritage Impact Assessment* in Volume 7

### 20.3.1 Significance of the Project site

The archaeological field survey and subsurface testing demonstrated that the areas of greatest Aboriginal significance and archaeological research value are the landforms immediately along and bordering the Georges River. This means the riparian corridor, and the landforms bordering the corridor, were favoured locations for repeated and/or longer term encampment. The remainder of the Project site is of low heritage significance due to the effects of European land use. Vegetation clearance, land surface modification, building construction, modification and removal have greatly compromised the integrity of any ephemeral archaeological traces that may exist in the area.

The majority of the Project site is not assessed to be of Aboriginal heritage significance. However, the undisturbed portions of the river corridor and Tertiary terrace are assessed to be of moderate to high significance at local and regional levels due to the research potential that exists in these areas. The Georges River corridor and terraces are also relatively unique examples of such archaeological resources in the context of the broader southern Sydney region. These landforms have significance against Commonwealth Heritage List criteria b, c, d, g and i. Hence, the Georges River corridor and terraces meet the threshold for listing on the Commonwealth Heritage List.

These elements are illustrated in Figure 20.5.

### 20.3.2 Significance of recorded surface sites

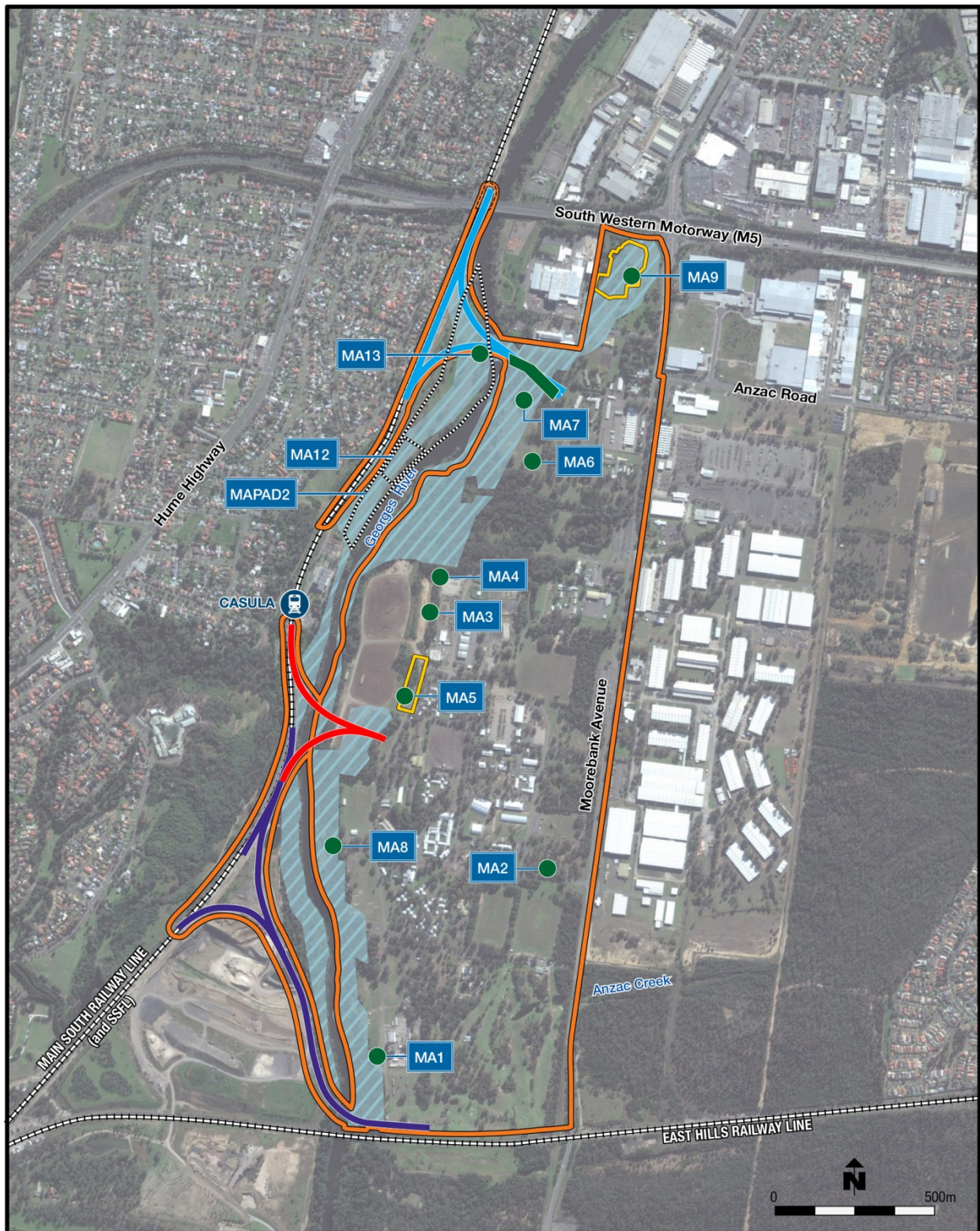
The majority of Aboriginal sites identified within the Project site are surface scatters of artefacts and/or areas of archaeological deposit (MA1–5 and MA9–10). Three scarred trees of possible Aboriginal origin (MA6–8) and a representative sample area (MRSA2) were also identified in the area.

The surface artefacts at MA1–MA4 comprise small, low density surface scatters, which were determined to have negligible archaeological potential due to their site locations and/or the extent of disturbance at the sites, and were therefore assessed to be of low scientific significance.

The three scarred trees of possible Aboriginal origin, if confirmed, have the potential to be of moderate to high scientific and educational value. There is some uncertainty about the origin of the scars at MA6, MA7 and MA8 and their scientific and educational value has not yet been determined. This requires further assessment during the detailed design of the Project by a specialist in eucalypts. However, Aboriginal consultation has indicated that these trees are sites of high significance to the Aboriginal community.

All sites (apart from MA11) meet the threshold for listing on the Commonwealth Heritage List.





**Figure 20.5 Location of sites that meet the threshold for listing on the Commonwealth Heritage List (CHL)**

- Project site boundary
- Northern rail access option
- Central rail access option
- Southern rail access option

**Sites that meet the threshold for CHL listing**

- Sites that meet the threshold for CHL listing under Criteria b, c, d, g and i
- Sites that meet the threshold for CHL listing under Criteria c, d, g and i
- Sites that meet the threshold for CHL listing under Criterion i (Aboriginal cultural values)
- Georges River corridor and terraces that meet the threshold for CHL listing under Criteria b, c, d, g and i

### 20.3.3 Significance of the deposits

#### East of the Georges River

Test excavations have revealed archaeological deposits are present at MA1, MA5, MA9 (MAPAD1) and MA10 (MRSA1). The archaeological significance of the deposits within the Project site was assessed in the context of their geomorphology. Subsurface testing confirmed the presence of undisturbed deposits with a moderate to high incidence of artefacts within the Tertiary terrace at MA5. The area to the east of the Tertiary terrace was also found to be of low archaeological potential.

The archaeological significance of the deposits within the Project site is summarised as follows:

- Archaeological deposits at MA1 (south-western side of the construction footprint) are assessed to be of low archaeological significance.
- Archaeological deposits at MA5 (Tertiary terrace, western side of the construction footprint) and MA9 are assessed to be of moderate to high archaeological and representative significance.
- Archaeological deposits at MA10 are assessed to be of moderate to low archaeological significance.
- Sites MA5 and MA9 meet the threshold for listing on the Commonwealth Heritage List in terms of their archaeological research value and Aboriginal cultural value.

The test excavation program within the Northern Powerhouse Land has demonstrated that, while the archaeological significance of the upper 120–150 cm of deposits is generally low, these deposits are likely to have significance in terms of being a representative example of environmental changes that resulted from European settlement, in particular the construction of the Liverpool Weir. The deposits have the potential to be significant in terms of their scientific value, natural value, educational value, representativeness and social value (importance to the Aboriginal community and the broader Australian community) at local, state and national levels. Similar deposits may be present within the central and southern rail access option study areas.

### 20.3.4 Aboriginal cultural value

An assessment of the Aboriginal cultural value of the Project site can only be made by the Aboriginal community. The registered Aboriginal parties for the Project have pointed to a number of sites of particular cultural value and have also commented on the overall value of the area.

Verbal and written advice from representatives of the CBNTCAC, DCAC and DALC has indicated that the recorded scarred trees (MA6-8) have cultural significance. Representatives of the DACHA, CBNTCAC, DCAC and DALC have also advised that site MA9 (MAPAD1) is culturally significant. Overall, the registered Aboriginal parties have stated that the Project site and surrounds have cultural value and significance.

CBNTCAC stated that:

‘There are areas within the proposed development that have cultural significance to Cubbitch Barta.’



DCAC stated that:

'The area is significant to our people due to the area and also the resources that would have been in this area. The interesting aspect of this project is the discrepancy of the boundaries of our people(s) areas such as this if investigated sufficiently can give us some answers that our people need. Our group has discussed the boundaries of the Darug people many times and agree that we had large areas that were shared areas; the Georges River would also have been shared.'

and

'This area is highly significant to the Darug people due to the evidence of continued occupation. within this development there is a complex of highly significant sites, this is an Aboriginal (Darug) landscape. The Georges River is part of the landscape that is traditionally known as a border for our traditional area, our group believes that areas that border our boundaries are large shared areas, as this area is the significance for us is very high.'

## 20.4 Impact assessment

This impact assessment was based on the proposed development footprint (the Full Build of the Project at 2030) and is a worst case assessment of the Project. Impacts on Aboriginal sites will occur from direct ground disturbance, indirect ground disturbance and removal of trees.

Most of the Aboriginal sites identified on the Project site are located adjacent to the Georges River and therefore the main impacts would occur during Phase A–C, when these areas are disturbed.

However, during Early Works some site disturbance would occur as a result of contaminated land remediation, some utility terminations and diversions and establishment of the conservation area. These works will be concentrated in the portion of the Project site that has already been subject to extensive modification and clearance as a result of the use of the site by the SME. The impacts during Early Works and the construction phases are discussed below.

Salvage of archaeological deposits elsewhere on the Project site (i.e. areas adjacent to Georges River) would be undertaken prior to the commencement of Phase A as further discussed in section 20.5.

### 20.4.1 Impacts on Aboriginal recordings

During construction and full operation of the Project, there would be impacts on Aboriginal sites within and adjacent to the proposed construction footprint. Table 20.6 summarises the nature and extent of potential impacts on recorded Aboriginal sites that would result from the three current indicative IMT site layouts (northern, central and southern rail option layouts).

Table 20.6 Impacts on recorded sites

Site number	Rail access option	Location	Degree of harm	Consequence of harm
Georges River corridor and terraces	Northern	Partly within construction footprint on western bank	Partially impacted	Potential destruction of part of site
	Central	Partly within construction footprint on eastern and western banks	Partially impacted	Potential destruction of part of site
	Southern	Partly within construction footprint on eastern and western banks	Partially impacted	Potential destruction of part of site
MA1	Northern	Partly within construction footprint	Partially impacted	Potential destruction of part of site
	Central	Partly within construction footprint	Partially impacted	Potential destruction of part of site
	Southern	Within conservation zone	Not impacted	Nil
MA2	Northern	Within construction footprint	Directly impacted	Potential destruction of whole or part of site
	Central	Within construction footprint	Directly impacted	Potential destruction of whole or part of site
	Southern	Within construction footprint	Directly impacted	Potential destruction of whole or part of site
MA3	Northern	Within conservation zone	Not impacted	Nil
	Central	Within conservation zone	Not impacted	Nil
	Southern	Within conservation zone	Not impacted	Nil
MA4	Northern	Within conservation zone	Not impacted	Nil
	Central	Within conservation zone	Not impacted	Nil
	Southern	Within construction footprint	Directly impacted	Potential destruction of whole or part of site
MA5	Northern	Within construction footprint	Directly impacted	Potential destruction of whole or part of site
	Central	Within construction footprint	Directly impacted	Potential destruction of whole or part of site
	Southern	Within construction footprint	Directly impacted	Potential destruction of whole or part of site
MA6	Northern	Within conservation zone	Not impacted	Nil
	Central	Within construction footprint	Directly impacted	Potential destruction of whole or part of site
	Southern	Within construction footprint	Directly impacted	Potential destruction of whole or part of site
MA7	Northern	Within conservation zone	Not impacted	Nil
	Central	Within conservation zone	Not impacted	Nil
	Southern	Within construction footprint	Directly impacted	Potential destruction of whole or part of site
MA8	Northern	Within conservation zone	Not impacted	Nil
	Central	Within conservation zone	Not impacted	Nil
	Southern	Within conservation zone	Not impacted	Nil

Site number	Rail access option	Location	Degree of harm	Consequence of harm
MA9	Northern	Within construction footprint	Directly impacted	Potential destruction of whole or part of site
	Central	Within construction footprint	Directly impacted	Potential destruction of whole or part of site
	Southern	Within construction footprint	Directly impacted	Potential destruction of whole or part of site
MA10	Northern	Within construction footprint	Directly impacted	Potential destruction of whole or part of site (deposit is likely to extend north and south beyond the construction footprint)
	Central	Within conservation zone	Not impacted	Nil
	Southern	Within construction footprint	Directly impacted	Potential destruction of whole or part of site (deposit is likely to extend north and south beyond the construction footprint)
MA11	Northern	Within construction footprint	Directly impacted	Potential destruction of whole or part of site
	Central	Within conservation zone	Not impacted	Nil
	Southern	Within conservation zone	Not impacted	Nil
MA12	Northern	Within construction footprint	Directly impacted	Potential destruction of whole or part of site
	Central	Within conservation zone	Not impacted	Nil
	Southern	Within conservation zone	Not impacted	Nil
MA13	Northern	Within construction footprint	Directly impacted	Potential destruction of whole or part of site
	Central	Within conservation zone	Not impacted	Nil
	Southern	Within conservation zone	Not impacted	Nil
MRSA2	Northern	Within construction footprint	Directly impacted	Potential destruction of whole or part of site
	Central	Within construction footprint	Directly impacted	Potential destruction of whole or part of site
	Southern	Within construction footprint	Directly impacted	Potential destruction of whole or part of site
MAPAD2	Northern	Within construction footprint	Directly impacted	Potential destruction of whole or part of the site
	Central	Within conservation zone	Not impacted	Nil
	Southern	Within conservation zone	Not impacted	Nil

Source: Table 13.1, Technical Paper 10 – *Aboriginal Heritage Impact Assessment* in Volume 7

#### 20.4.2 Impacts on Aboriginal heritage across the Project site

As discussed in section 20.3, the riparian corridor along the Georges River was assessed to be of moderate to high significance at local and regional levels. The Project's main construction footprint is located in areas initially considered to be of low archaeological potential, which were subsequently assessed to be of no heritage significance.

While the majority of identified Aboriginal recordings would be directly affected, the areas of highest sensitivity would be largely conserved. The Project would affect less than a quarter of the Tertiary terraces within the Project site that are identified to be archaeologically sensitive (refer Figure 20.2). The Project would affect an even smaller portion of the Georges River riparian corridor since the main construction footprint is outside the boundary of this corridor. Three scarred trees of possible Aboriginal origin (MA6, MA7 and MA8) have the potential to be of moderate to high scientific and educational value. Sites MA5 and MA9 are also identified as being of moderate to high archaeological significance and/or Aboriginal cultural value. The distribution of impacts across these sites associated with the three concepts is presented below.

##### Northern rail access option

The northern rail access option would result in direct impacts on the greatest number of sites (10); however, it should be noted there would be no direct impacts on the three identified scarred trees (MA6, MA7 and MA8) or on artefact occurrences MA3 and MA4. All other sites and sensitive landforms would have direct, albeit partial, impacts on the Georges River riparian corridor.

##### Central rail access option

The central rail access option would result in direct impacts on six sites and portions of the eastern and western banks of the Georges River. There would be no direct impacts on scarred trees MA7 and MA8 or on artefact occurrences MA1, MA3, MA4, MA10, MA11, MA12 and MA13. There would be direct impacts on scarred tree MA6, isolated find MA2 and portions of MA5, MA9, MRSA2 and MAPAD2. There would also be limited impacts within areas of potentially intact deposits on both sides of the Georges River.

##### Southern rail access option

The southern rail access option would result in direct impacts on eight sites and very limited portions of identified sensitive landforms within the Georges River riparian corridor. There would be no direct impacts on scarred tree MA8 or artefact occurrences MA1, MA3, MA10, MA11, MA12 and MA13. There would be direct impacts on scarred trees MA6 and MA7, artefact occurrences MA2, MA4 and MA5, and portions of MA9, MA10 and MRSA2. Impacts within the Georges River riparian corridor would largely be within areas of previous disturbance, particularly on the west bank. This option has the lowest potential for disturbance of any intact subsurface deposits along the Georges River corridor.

Proposed management and mitigation measures are identified below.



## 20.5 Management and mitigation

As the impacts of the Project on Aboriginal heritage have the potential to result in the loss of some heritage values, a range of mitigation strategies would be considered and implemented during the detailed design, Early Works, construction and subsequent phases of the Project. These strategies are outlined below.

### 20.5.1 Mitigation strategies

The following categories of mitigation measures are considered appropriate to manage the impacts of the Project:

- Creation of conservation areas;
- Development of an Aboriginal heritage interpretation strategy for the Project;
- Additional testing of archaeological deposits;
- Specialist analysis of scarred trees;
- Salvage of archaeological deposits;
- Surface salvage of Aboriginal objects; and
- Care and management of recovered artefacts.

As a general principle all of these works would be completed as part of the Early Works development phase.

#### Conservation areas

The indicative IMT site layout for the Project has proposed a conservation, or 'buffer', zone between the Georges River and the main construction footprint. This zone includes the majority of the eastern river bank and lower flats, and the scarred tree at MA8. The buffer would conserve the predicted archaeological resource of the banks and lower flats, and the scarred tree. Despite this, the conservation zone only includes limited portions of the riverside terrace margin and the northern lake basin. These inclusions are not enough to protect the known archaeological deposits and sites of moderate or greater significance on these landforms, notably MA5 and MA9 and potentially MA4, MA6 and MA7, if the central or southern rail corridor option is adopted.

Opinions provided by registered Aboriginal parties during the site visit and the ensuing fieldwork indicated that site MA9 (MAPAD1) is considered to be an area of cultural significance. The in situ conservation of this area was identified by the registered Aboriginal parties as their preferred option for site MA9.

Consideration will be given at the detailed design stage to the in situ conservation of all sites of moderate to high or greater significance. The optimal strategy for realising this objective would be to extend the boundaries of the vegetation buffer to include these areas. Other options would be conservation within the development area by reserving and delineating the site area as open space and maintaining minimal disturbance. All sites would be identified on relevant construction plans and demarcated by physical fencing during the construction phase of the Project so that no inadvertent impacts occur.

In particular, during detailed design, the possibility of establishing a 20 m buffer along the eastern edge of the identified PAD at MA9 (MAPAD1) would be considered. However, if avoidance of impacts on MA9 was found to be impracticable, salvage excavations within affected portions of the site would be necessary.

The scarred trees at MA6 and MA7 have similarly been identified by the registered Aboriginal parties as items of Aboriginal significance that should be considered for conservation. If avoidance of impacts on MA6 and MA7 was found to be impracticable, appropriate mitigation strategies would be developed in consultation with the Aboriginal community.

### Interpretation

The Project contains both tangible and intangible Aboriginal cultural values. Physical conservation and salvage strategies can mitigate impacts on the tangible resources (such as Aboriginal objects and archaeological deposits), but can be ineffective in addressing intangible values that are related to place, custodial practice, history and memory. However, such values can be maintained through recognition, the telling of stories and the use of names.

In order to address impacts on intangible values, it is proposed to develop an Aboriginal heritage interpretation strategy for the Project.

The strategy may consider the inclusion of commemorative signage within the Project site, and/or the development of a visitor's pamphlet detailing the past Aboriginal use of the area and the Project site's current connection with local Aboriginal people. This information can also be included on websites and other public documents. The appropriate naming of elements within the Project site, such as roads and buildings, could also be a way of acknowledging the past Aboriginal use and current connection to the site.

The interpretation strategy would be developed in close consultation with the registered Aboriginal parties for the Project and would be mindful not to draw attention to the physical location of vulnerable sites within the Project site. The strategy would also consider combining both European and Aboriginal interpretation within the Project site.

### Additional testing of archaeological deposits

Work health and safety (WHS) and land access constraints prevented archaeological testing within MRSA2, the western component of MA10 and sections of the Georges River corridor affected by the central and southern rail access options.

Based on the results from the Technical Paper 10 – *Aboriginal Heritage Impact Assessment* in Volume 7, in particular results from the subsurface testing of the Tertiary terrace, the full scope of salvage excavations would need to be informed by a program of archaeological subsurface testing within MRSA2 and the western component of MA10 and, if affected, the central and southern sections of the Georges River corridor. The extent of such testing and salvage would be determined during detailed design when the exact nature of the development impact could be defined.

### Specialist analysis of the scarred trees

Three scarred trees were identified within the Project site. Of these, MA8 is outside the proposed construction footprint and would not be affected, whereas MA7 is adjacent to the proposed construction footprint and MA6 is within it. The archaeological evidence, gathered through field survey, regarding the origin of the scars at these recordings is inconclusive. The appropriate management strategy for these recordings is dependent upon their status as Aboriginal objects. During consultation with the registered Aboriginal parties, the CBNTCAC, DCAC and DALI all emphasised the high cultural significance of these trees. The DCAC also highlighted the importance of giving the Aboriginal community the right to decide appropriate levels of investigation and mitigation. Further consultation with the Aboriginal community would be undertaken regarding management of these trees. Options that might be presented to the Aboriginal community include:

- exploring the opportunities that exist within the detailed design phase for conservation of MA6 and MA7;
- if conservation is not practicable, consulting with the registered Aboriginal parties regarding alternative mitigation options (relocation and preservation of a portion of the tree, development of interpretive strategies); and
- engaging a suitably qualified specialist in eucalypts of the Sydney region and dendrochronology to formally assess the age of the trees and their scars.

### Salvage of archaeological deposits

MA5 and MA9 (refer to Figure 20.3) contain archaeological deposits of moderate to high archaeological/scientific significance. In addition geomorphological analysis indicates that sequence preservation is demonstrated at these sites, i.e. the layering of the soil deposits over time (and any associated artefacts) remains intact. These sites would be directly affected by the Project. To mitigate Project impacts, an archaeological salvage program would be required.

MA1 comprises disturbed deposits with isolated pockets of relatively undisturbed archaeological deposits containing low areal incidence of artefacts. The research value at this site is low, as it is assessed to be of low archaeological/scientific significance. This site would be directly affected by the Project. However, given the limited research potential at this site, no further mitigation measures are warranted at MA1.

The eastern component of MA10 (MRS1) comprises sections of disturbed deposits as well as areas of relatively undisturbed archaeological deposits. The research value across the eastern portion of this site is low (due to low areal incidence of artefacts) and is assessed to be of low archaeological/scientific significance. This site will be directly affected by the Project. No further mitigation measures are warranted across the eastern portion of MA10, where testing has already been conducted.

A salvage plan would be prepared prior to completion of salvage works. Salvage of archaeological deposits would be undertaken during Early Works, prior to any impacts in these areas.

### Surface salvage of Aboriginal objects

Recordings MA1, MA2, MA3, MA4 and MA5 all include surface artefacts and all would be directly affected by the Project. To mitigate Project impacts, an archaeological salvage program would be required. Again, salvage would be undertaken during Early Works, prior to any impacts in these areas.

### Care and management of recovered artefacts

Aboriginal objects would be repositioned in the landscape ('returned to country') within reserved open space, in as close a position as possible (while remaining feasible and safe) to their original find locations. Suitable locations would include sections of the Georges River riparian corridor that would not be affected by the construction footprint (refer to Figure 20.5). Ongoing consultation with the registered Aboriginal parties would be necessary in order to secure agreement on the exact location(s). This would also be informed by the subsequent detailed design stage of the Project. The location of the newly repositioned artefacts would be lodged with the AHIMS, administered by OEH.

### 20.5.2 Proposed mitigation measures

As the impacts of the Project on Aboriginal heritage have the potential to result in the loss of some heritage values, a range of mitigation strategies would be considered and implemented during the detailed design, construction and subsequent phases of the Project. These strategies are outlined below.

#### Detailed design and Early Works

Given that the majority of the impacts on Aboriginal heritage items would occur in Phases A–C, it is important that analysis and salvage is undertaken prior to construction of Phase A. Therefore, the following mitigation measures would be considered and implemented during the detailed design and Early Works development phases of the Project.

- Where practicable, options would be explored to conserve moderate to high significance sites in situ.
- An Aboriginal heritage interpretation strategy for the Project would be developed in close consultation with the registered Aboriginal parties. The strategy may consider combining both European and Aboriginal interpretation within the Project site.
- If the northern rail access option is selected, the mitigation measures outlined in the Northern Powerhouse Land Aboriginal archaeology assessment (NOHC 2014a addendum report) should be implemented and consideration given to potential historical heritage implications. This includes further data gathering to fill the knowledge gaps regarding MAPAD2 and would involve:
  - > desktop study (of geotechnical borehole data and levels);
  - > drilling to recover undisturbed sediment core (for assessment and dating and as an archive sequence); and
  - > subsurface bulk sample retrieval (using augered mud bucket) to assess preservation conditions and artefact presence/absence at depth.
- Information recovered from future investigations at MAPAD2 would be incorporated into an Aboriginal heritage interpretation strategy for the Project as a whole, developed in close consultation with the registered Aboriginal parties.
- If the central rail access option is selected, a program of Aboriginal subsurface archaeological investigation should be undertaken. The testing program would need to assess the upper metre of deposits as well as deposits at depth.



- If the southern rail access option is selected, a combined geotechnical and archaeological assessment should be undertaken to assess the nature of any deposit and the need for further archaeological investigation and/or salvage.
- Options for avoidance of impacts at MA6 and MA7 would be explored during the detailed design phase. If impacts cannot be avoided, consultation would be undertaken with the registered Aboriginal parties regarding options for specialist investigations (e.g. a suitably qualified specialist in eucalypts of the Sydney region and dendrochronology may be engaged to formally assess the age of the trees and their scars) and culturally appropriate mitigation strategies.
- An archaeological salvage excavation program would be implemented to conserve archaeological deposits of moderate to high archaeological/scientific significance located within the construction footprint (items recorded at MA5 and MA9). Consideration would be given to conserving both sites in situ, within open space reserves, or an extension of the proposed conservation zone.
- A surface salvage program would be carried out to conserve surface artefacts located within the construction footprint (items recorded at MA1, MA2, MA3 and MA4). Salvage of surface artefacts would be undertaken prior to any impacts in these areas.
- No further archaeological investigations are warranted at MRSA3 or PAD2.

#### Construction

- The Unanticipated Discoveries Protocol described in Appendix 9 of the Technical Paper 10 – *Aboriginal Heritage Impact Assessment* in Volume 7 would be followed in the event that historical items or relics or suspected burials are encountered during construction works.

#### Operation and ongoing

Consultation would be ongoing with the registered Aboriginal parties throughout the life of the Project and would include:

- consultation on the future care and management of recovered Aboriginal objects;
- methodologies for any future investigations; and
- finalisation of management and mitigation strategies subject to detailed design.

### 20.5.3 Effectiveness of mitigation measures

Various measures to avoid and mitigate impacts have been considered, but options are very limited in terms of altering the development area within the Project site.

The majority of the Project site is within landscape units identified as having low archaeological and/or cultural significance. The mitigation measures proposed above have been developed with a focus on mitigating impacts in those areas of greatest heritage significance.

The mitigation strategies have been developed to ensure the long-term security of Aboriginal objects within the Project site through specialist investigations, artefact collection and comprehensive programs of subsurface testing and salvage excavations within archaeologically sensitive areas. These measures will maximise information yielded from affected sites, as well as ensuring retention of such information for future generations.

Any direct impact on Aboriginal heritage resulting from the Project would effectively be offset by the physical salvage of Aboriginal objects within the Project site and the interpretation of the archaeological record recovered during future phases of investigation. The Aboriginal interpretation strategy would also mitigate against the loss of the intangible cultural values associated with the Project site. The detailed design phase of the Project may present additional opportunities to identify areas for conservation, thus further mitigating any impacts.

## 20.6 Summary of key findings

In summary, the key findings of the Aboriginal heritage assessment are as follows (also refer to Table 20.7 below):

- The impact assessment was based on the proposed development footprint (the Full Build of the Project at 2030) as a worst case assessment of the Project.
- The riparian corridor along the Georges River was assessed to be of moderate to high Aboriginal heritage significance at local and regional levels. Part of this area would be disturbed during Project Phases A and C, during construction of the rail access connection. However, the Project's main construction footprint is outside the boundary of this corridor.
- The Project's main construction footprint (including for Early Works) is located in areas initially considered to be of low Aboriginal archaeological potential, which were subsequently assessed to be of no Aboriginal heritage significance.
- While the majority of identified Aboriginal recordings within the Project footprint would be directly affected, the areas of highest sensitivity would be largely conserved.
- The Project would affect less than a quarter of the Tertiary terraces within the Project site that are identified to be archaeologically sensitive. Depending on the rail access option selected, the Project would directly affect between six and ten Aboriginal sites. All three options would also directly affect parts of the Georges River corridor west bank due to work for the proposed rail access connection to the SSFL.
- Impacts to Aboriginal sites would occur from direct ground disturbance, indirect ground disturbance (e.g. vehicle movements) and removal of trees – and would mainly occur during Project Phase B and the Early Works.

Table 20.7 Summary of Aboriginal heritage impacts associated with the Project for the development footprint, without mitigation, for each rail access option

Impact	IMT layout and associated rail access connection option		
	Northern	Central	Southern
Disturbance or destruction of Georges River corridor terraces	•	•	•
Disturbance or destruction to Aboriginal artefacts (MA1, MA2, MA3, MA4, and/or MA5)	•	•	•
Disturbance or impact to scarred trees of possible Aboriginal original	-	•	•
Disturbance or impact to MA9 (lake basin is situated close to the riparian corridor of the Georges River)	•	•	•
Disturbance or destruction of PADs (MA10 and/or MAPAD2)	•	-	•
Disturbance or destruction to MRSA2	•	•	•

Key: • = impact, - = no impact

Key measures proposed to manage and/or mitigate impacts on Aboriginal heritage include:

- avoiding the development of riparian land through establishment of the conservation area (predicted to be of high sensitivity for Aboriginal heritage);
- further exploring options to conserve moderate to high significance sites in situ;
- developing an Aboriginal heritage interpretation strategy in consultation with stakeholders, particularly registered Aboriginal parties;
- archaeological and surface salvage programs –to be undertaken during Early Works;
- application of an Unanticipated Discoveries Protocol during construction; and
- ongoing consultation with registered Aboriginal parties over the life of the Project.