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Aboriginal Archaeological and Cultural Heritage Assessment

Barangaroo: Stage 1

by

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Report to Casey & Lowe Pty Ltd
on behalf of Lend Lease

May 2010



Executive Summary

The Barangaroo Delivery Authority propose to redevelop Barangaroo at Millers Point. The aim of the redevelopment is to deliver a mixed use development of commercial, retail and residential buildings, as well as the creation of foreshore recreational space. Lend Lease is the selected development proponent for Stage 1 of the redevelopment.

To ensure that the Aboriginal cultural heritage significance of the subject area is not adversely impacted upon by the proposed development, Casey & Lowe on behalf of Lend Lease have commissioned this Aboriginal cultural heritage assessment.

This report concludes that the subject area has the potential to contain Aboriginal sub-surface cultural deposits and recommends that a program of sub-surface testing be undertaken prior to commencement of the redevelopment works.

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1.0 Introduction

1.1 Background

The Barangaroo Delivery Authority propose to redevelop the former Patrick Stevedores Container Shipping Terminal which is now known as the Barangaroo site. Barangaroo is part owned and currently controlled by the Barangaroo Delivery Authority (BDA). Lend Lease is the selected development proponent for Stage 1 of the redevelopment. The aim of the redevelopment is to deliver a mixed use development of commercial, retail and residential buildings, as well as the creation of foreshore recreational space.

The project is a “major project” to be determined under Part 3A of the *Environmental Planning & Assessment Act 2003*. To ensure that the Aboriginal cultural heritage significance of the subject area is not adversely impacted upon by the proposed redevelopment, Casey & Lowe on behalf of Lend Lease, have commissioned this Aboriginal cultural heritage assessment.

1.2 Location and Site Description

Barangaroo is an area of approximately 22 hectares which is situated at the north western edge of the Sydney Central Business District (Sydney CBD). Barangaroo is bound to the south by Darling Harbour and the King Street Wharf, to the east by Hickson Road, Millers Point and the Rocks, to the northeast by Walsh Bay and the harbour to the west. Barangaroo comprises Lots 1–6, DP 876514, Parish of St Phillip, in the Sydney Local Government Area. It contains a flat bitumen and concrete deck that formerly comprised the container shipping wharf. Most of the buildings have been removed from the site.

Figure 1 shows the location of Barangaroo on the 1:250,000 topographic map. Figure 2 shows the location of Barangaroo on the 1:25,000 topographic map.

Stage 1 of the Barangaroo redevelopment is located in the southern section of Barangaroo. It is an area bounded by Hickson Road at the east, Shelly Street to the south and the concrete wharf to the north and west. The construction of Blocks 1–4 forms the basis of the Barangaroo Stage 1 development. The footprints of the proposed Blocks 1–4 are shown in Figure 3.



Figure 1: Location of Barangaroo circled in yellow.
(1:250,000 Sydney Special ED2 – 1998 topographic map)

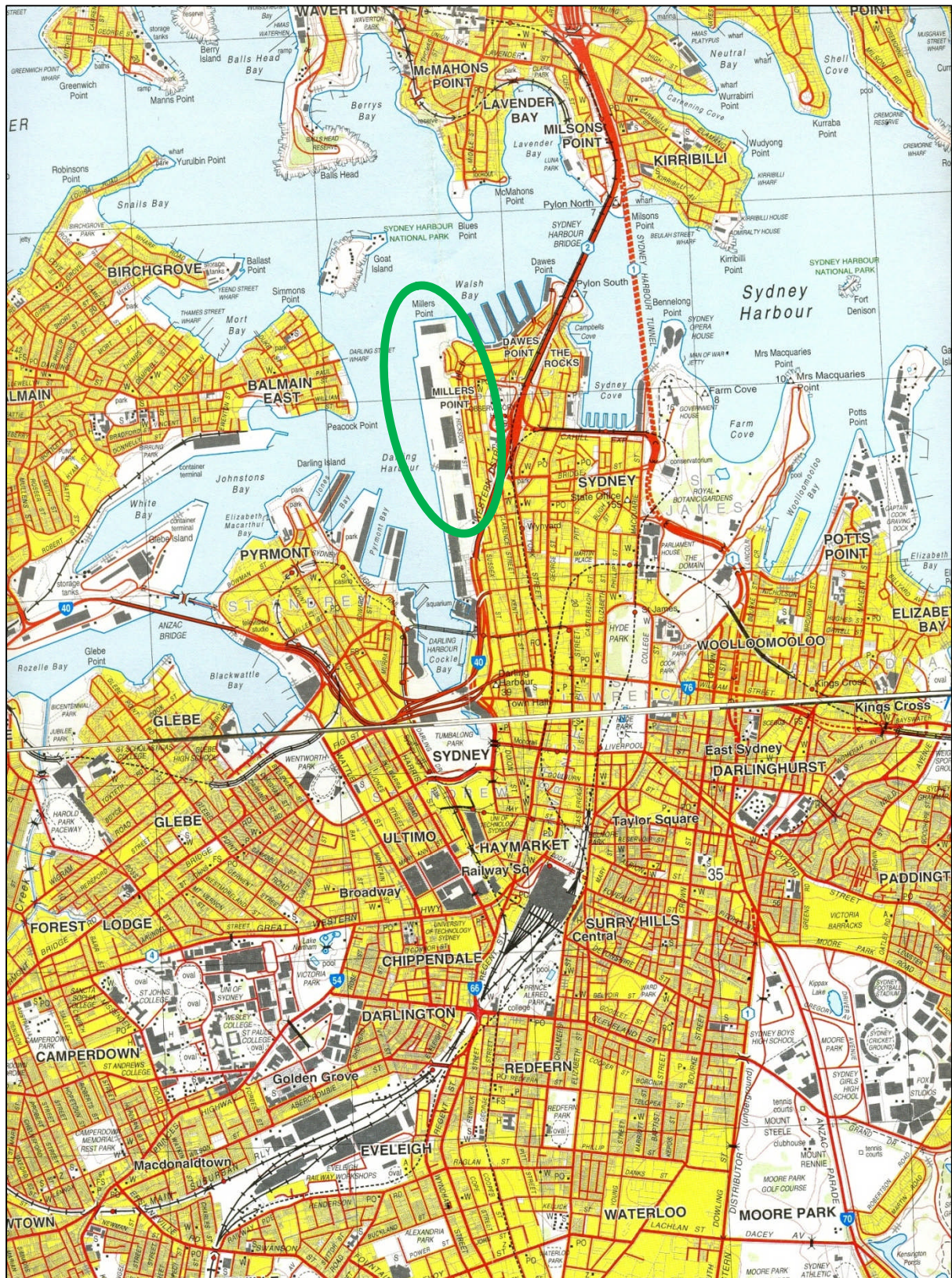


Figure 2: Location of Barangaroo circled in green
 (Composite map of the Parramatta River 1:25,000 9130-3N Third Edition topographic map and the Botany Bay 9130-3S Third Edition topographic map).



Figure 3: Aerial photo showing the extent of Stage 1 development which comprises Blocks 1 - 4. The proposed footprint of individual Blocks 1 – 5 are outlined in red. Block 5 is a later development stage. The purple line indicates the location of the basement/carpark.
(courtesy Casey & Lowe)

1.3 Proposal

The development of Barangaroo has been divided into a number of Stages. This report is only concerned with Stage 1.

The proposal for Stage 1 is described below:

- The demolition of the existing buildings;
- Redevelopment of the Stage 1 site to provide for a mix of commercial, residential, tourist, retail and community spaces;
- At least 3ha of space for public recreation;
- Inclusion of basement car parking;
- Enlarged Southern Cove;

Figure 4 is a plan showing the area occupied by each development Block. It should be noted that Block 4 and the north-east corner of Block 3 contain extensive contamination requiring remediation, indicated by the blue hatched area on Figure 4.

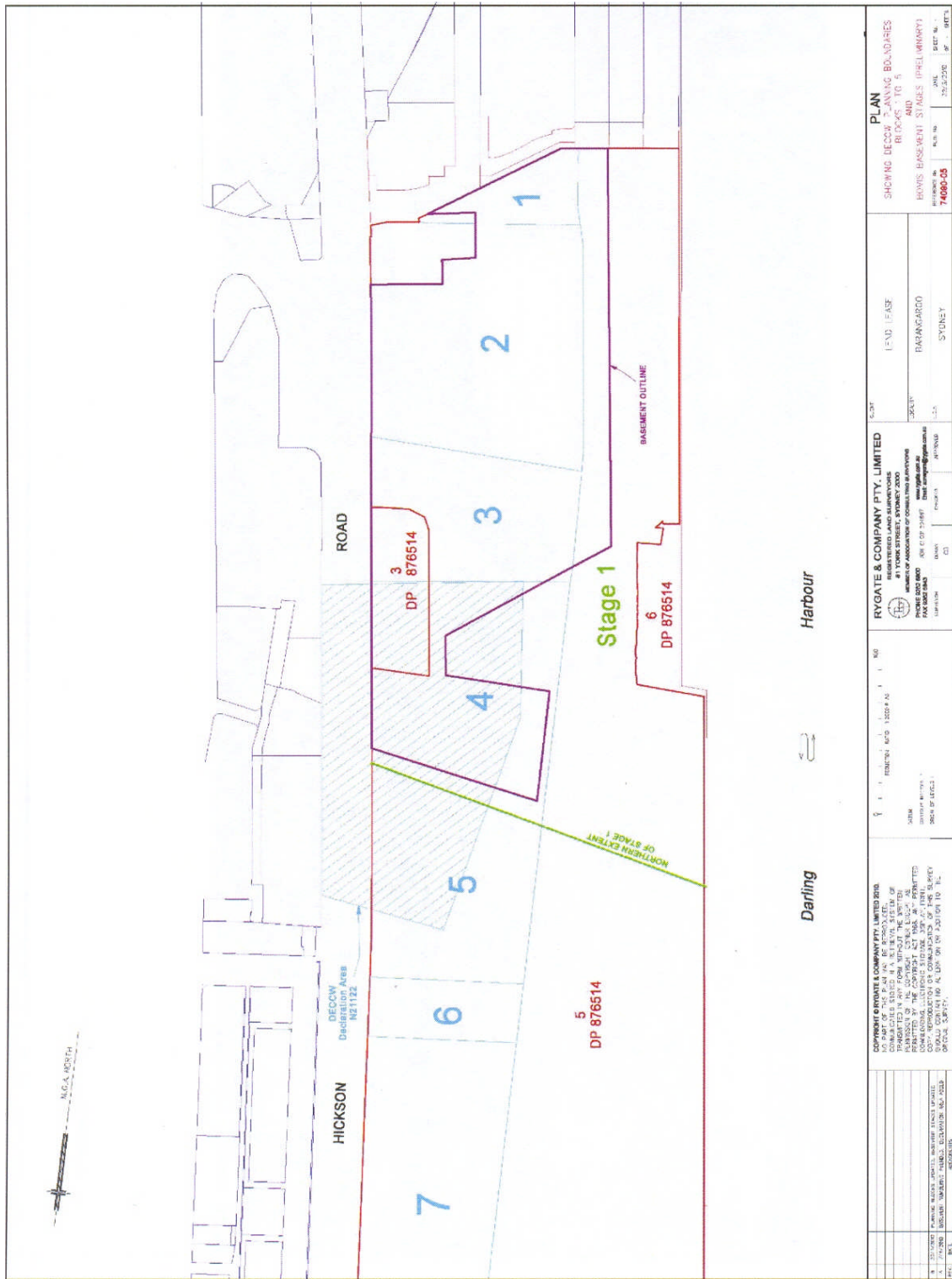


Figure 4: Plan showing the development blocks (Blocks 1–7, which are outlined in blue).

Stage 1 comprises the construction of Blocks 1–4.

Blocks 5–7 are a later development stage.

The purple outline is the footprint for the basement and underground car parking.

The blue hatched area indicates the area of contamination requiring remediation.

(courtesy of Casey & Lowe)

1.4 Aim of the project

The consultant was commissioned to:

- a) Undertake background research, including a search of the Department of Environment, Climate Change and Water (DECCW)'s Aboriginal Heritage Information Management System (AHIMS);
- b) Undertake an archaeological assessment of the subject land to determine whether any Aboriginal sites or places are located within the area of the proposal or have the potential to exist within the study area, and to record any such sites located. Such assessment to be undertaken in partnership with the Metropolitan Local Aboriginal Land Council as detailed in c) below;
- c) Consult with the Metropolitan Local Aboriginal Land Council to ascertain Aboriginal concerns and interests in respect of the subject land and the project;
- d) Assess the impact of the proposed development on Aboriginal cultural heritage and detail Aboriginal views and concerns in respect of the subject project;
- e) Provide management recommendations to enable the appropriate management of Aboriginal cultural heritage values within the study area.

2.0 Aboriginal Partnership

Aboriginal culture is dynamic and continuous. It includes the tangible and intangible and links people over time to their community and land. It is important to recognise that Aboriginal people have the right to protect, preserve and promote their cultural heritage. In recognition of that right, the Metropolitan Local Aboriginal Land Council (MLALC) was invited to take part in the project and participated fully in this cultural heritage assessment. The MLALC's representative, Mr Allen Madden, undertook a survey and cultural heritage assessment with the Consultant on Friday 16th April 2010.

Prior to the site survey and assessment being undertaken, the Metropolitan Local Aboriginal Land Council were contacted by phone to discuss the project and their participation. Maps were forwarded to MLALC which clearly outlined the location of the proposed development.

A copy of the draft report has been forwarded to MLALC for their comment and their response will be attached at Appendix A to the final report. The recommendations contained in this report have been formulated in consultation with the MLALC.

Mr Allen Madden of the MLALC has advised that he has been in discussion with the Barangaroo Delivery Authority about the need to include Aboriginal interpretation in the redevelopment of the site. They would like it included in this report that they wish to see interpretation of Aboriginal history included in the redevelopment.

3.0 Environmental Context

3.1 Topography

Barangaroo is located in the central portion of the Sydney Basin. The Sydney Basin is characterised by contrasting landscapes of rugged sandstone escarpments and gently undulating hills over shale (Herbert 1980: 21; Sydney 1:100,000 geological map).

The original topography of the area consisted of a steeply sloping foreshore with a gently rounded top (Austral 2010: 37) and the original shoreline is located in two small sections at the southern end of the study area and a larger portion in the north eastern section of the Barangaroo site.

Today, Barangaroo is the result of European activities including harbour reclamation for the construction of wharves and the construction of the shipping container terminal.

3.2 Geology

The geology of Sydney Harbour consists of the Wianamatta Group of shales which overlies Hawkesbury Sandstone. The Wianamatta Group consists of a lower formation of Ashfield Shale, which grades upwards into a fine sandstone siltstone laminate culminating in the overlying Bringelly Shale (Sydney 1:100,000 geological map).

The Wianamatta Group does not provide a good variety of lithic material suitable for stone tool manufacture. Within the Bringelly Shales are claystones, siltstones and laminate. These thin shales are not strong enough for use in stone tool manufacture. However, the Bringelly Shale also comprises tuff which is a highly siliceous fine grained material suitable for small tool manufacture. In addition the Hawkesbury Sandstone provides materials suitable for the manufacture of ground edge axes and surfaces suitable for engraved art. Hawkesbury Sandstone also weathers into overhangs and shelters suitable for habitation and protection from the elements. The quartz and claystone which weather from the sandstone also provide material for artefact manufacture.

3.3 Vegetation

The vegetation of the Sydney Basin would once have consisted mainly of dry sclerophyll or open woodland on the higher sections where the soils are sandy and well drained, whilst the slopes would have supported an open Sydney Turpentine Ironbark forest. The alluvial soils would have supported a river-flat forest, including various *Eucalypt* species and *Angophoras*. The open woodland species would have included *Eucalyptus siberi* (Silvertop Ash), *Eucalyptus piperita* (Sydney Peppermint), *Eucalyptus sclerophyllia* (Scribbly Gum), plus *Corymbia* with an understorey of *Banksia serrata* (Old Man Banksia), *Banksia spinulosa* (Hairpin Banksia), *Banksia integrifolia* (Coast Banksia) and various *Acacia* spp., including *Acacia longifolia*. Flowering shrubs would have included *Telopea speciosissima* (Waratah) and *Boronia serrulate* (Native Rose), whilst groundcover species would have included *Grevillia laurifolia* and *Persoonia chamaepitys*. Clumps of *Lomandra longifolia* would also have grown on headland areas. In addition, various heathland communities would have existed along coastal areas (Baker 1986).

Such vegetation would have provided a rich and varied food source. Flowers from the *Eucalyptus* and *Banksias* provide a rich nectar. *Acacia* pods can be eaten and the bark used medicinally. This vegetation also supported a variety of animal life associated with Aboriginal

diet. This included possums, various wallabies and other small marsupials, as well as birds and lizards. Bark and wood suitable for spears, shields, water and/or food vessels (coolamons) and other implements would have been available from large trees. (Low 1989).

However, the urbanisation of the Sydney Basin has ensured that the landscape and its vegetation has been dramatically altered and no longer resembles the pre-contact landscape.

3.4 Current Land Use and Disturbance

Settlement at Barangaroo began early in Sydney's colonial history. The first wharf was constructed in Cockle Bay in 1811 on the order of Governor Macquarie. From the 1830s development of the shore line to accommodate the shipping industry began and included wharf construction, land reclamation and the quarrying of the sandstone cliffs at the base of Observatory Hill (Casey & Lowe 2010).

The topography of the Millers Point promontory discouraged the residential settlement of the study area, however windmills for the production of wheat were constructed on the hill behind the promontory (now known as Observatory Hill) from 1797 (Casey & Lowe 2010).

The present study area is comprised of a bitumen and concrete deck forming the shipping container terminal which overlies portions of the original shore line in the north and south east of the study area and the remainder of the site overlies reclaimed land. The majority of the shipping container terminal buildings have been removed. To the west of the study area is Sydney Harbour, to the north east is Walsh Bay, to the east is Hickson Road, Millers Point and the Rocks, and to the south, the International Passenger Terminal, the King Street Wharf and Darling Harbour.

Due to the industrial uses of the area, Blocks 3 and 4 contain extensive contamination. The following contaminants are of concern:

- Polycyclic aromatic hydrocarbons (PAHs);
- Benzene, toluene, ethylene and xylenes (BTEX);
- Total petroleum hydrocarbons (TPHs);
- Ammonia;
- Phenol; and
- Cyanide.

Block 3 is located within the Other Remediation Area (South). The contamination in this area is considered such that a "comprehensive program of archaeological excavation, mapping and recording" will be possible (AECOM 2010: 4).

Block 4 is within the Voluntary Management Proposal (VMP) and Project Delivery Agreement (PDA) Remediation Works Area. AECOM (2010b: 3) have stated that the nature of contamination within the VMA and PDA Remediation Works Area prohibits hand excavation, machine excavation and wet sieving of any material from this area.

AECOM's (2010) report is attached at Appendix B.

Figure 5 below shows the remediation areas.

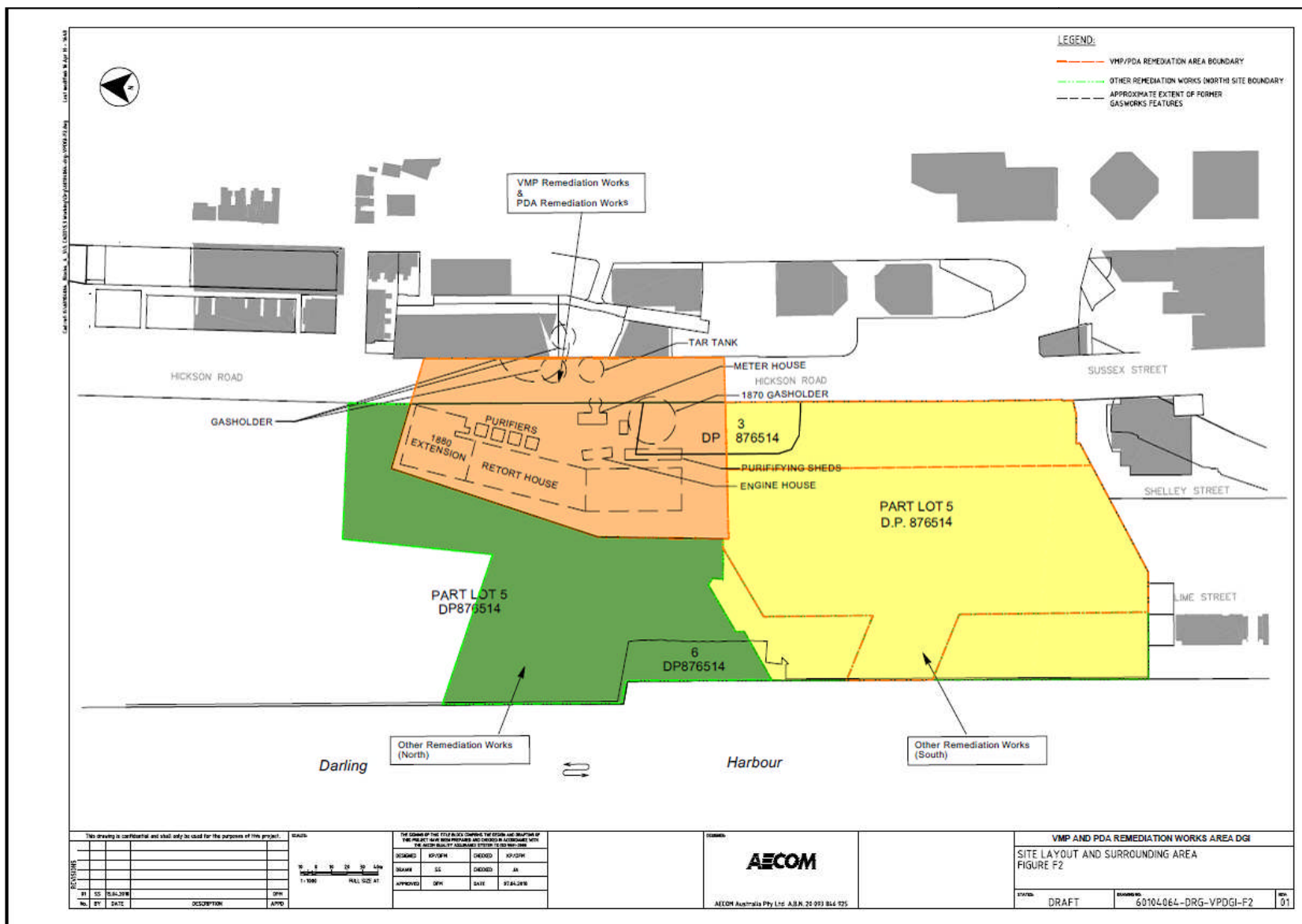


Figure 5: Showing the areas where remediation will be undertaken as part of Stage 1 redevelopment (courtesy of AECOM)

4.0 Archaeological Context

4.1 Sydney region

Many surveys have been undertaken in the Sydney region which indicate the richness of the archaeological resources and which provide information about Aboriginal occupation within the region. In particular, Attenbrow (2002) has excavated a range of sites within the Sydney Basin. The aim of her study was to identify local geographic variation and temporal changes in the subsistence patterns and material culture of the people of this area. She excavated sites at Balmoral Beach, Cammeray, Castle Cove, Sugarloaf Point (Lane Cove River), Darling Mills State Forest, Winston Hills, Vacluse and Cumberland Street in The Rocks. Dates for initial occupation vary from approximately 10,000 years BP at Darling Mills to approximately 450 years BP at Cumberland Street, The Rocks.

The oldest dated occupation for the Sydney region is 15,000 years BP from the Shaws Creek K2 rock shelter on the Nepean River (Kohen 1984; Nanson et al 1987). However these dates must be considered in association with environmental data related to sea level rises. The Sydney region that we know today is vastly different to the landscape of 15,000 years ago.

The period of maximum glaciation was 15,000 – 18,000 years BP. Therefore the date of the K2 rock shelter and Attenbrow's Darling Mills site indicate that Aboriginal people lived throughout a period of extreme environmental change. During this period, sea levels were up to 130m below current levels (Nutley 2006: 1). About 10,000 years ago as temperatures began rising at the end of the last ice age, the polar ice started melting and sea levels rose. The rising sea levels forced people to abandon coastal sites and move inland, with the result that the oldest coastal sites were inundated. By about 6,000 years ago, rising water levels had flooded the coastal plain forming the Sydney landscape that we know today. The vast majority of sites in the Sydney region date to around 5,000 years BP, after sea levels had stabilised. Whilst research into submerged indigenous sites is now being undertaken (Nutley 2006), there are few sites in the Sydney area that are known to date beyond 10,000 years BP. Therefore research undertaken to date has focused on subsistence patterns and cultural change, e.g. Attenbrow (2003).

Attenbrow's (2003) study of the "Sydney region" extended from the eastern coast to the Hawkesbury-Nepean River to the north and west and as far south as Picton (2002: xiii), which includes the resent study area. At the time of publication (2002), Attenbrow noted that approximately 4,340 Aboriginal sites had been registered with DECCW's Aboriginal Heritage Information Management System (AHIMS) in the Sydney region (Attenbrow 2002: 48). Middens and open campsites comprised just over half of the recorded sites (Attenbrow 2002: 48 – 49). From both the archaeological evidence and historical records she noted that the main focus of occupation was "on the valley bottoms and shorelines" (Attenbrow 2002: 47). In addition, the evidence indicates that occupation was greater on the coastal/estuarine environments rather than in the hinterland/freshwater environments and on the Hawkesbury sandstone rather than the Wianamatta shales (Attenbrow 2002: 51). Her work produced a great deal of information in respect of the people of the Sydney region, their social organisation and land use patterns. Her (2002: 152 – 155) analyses indicates that prior to 5,000 years ago occupation in the Sydney region was not intensive and was only by small groups of people. It was not until sea levels stabilised about 5,000 years ago that more intensive occupation began with many open sites being first occupied in the last 1,500 years.

4.2 Sydney Harbour

The ethnographic data (Austal 2010:20) indicates that middens were once prominent around the foreshores of Sydney Harbour. From the early 1800s settlers began using the extensive middens to produce quicklime.

The 1883 publication *Aborigines of Australia* and the 1880 *Journal of the Royal Anthropological Institute* recorded a rock engraving at the area now known as Dawes Point Park, approximately 70m to the east of Barangaroo. The engraving was either of a whale or a shark with the figure of a man at its head. This engraving has since been destroyed, probably during the construction of the Sydney Harbour Bridge (AHIMS 45-6-0030).

In 1985 Lampert excavated a midden and camp site at Mort's Bond Store approximately 100m to the east of the study area. The site had been truncated by construction of the building and was in a highly disturbed condition. It contained shell and bone, as well as stone artefacts manufactured from red and grey silcrete, quartz, quartzite and chert. The artefacts were comprised of flakes, flaked pieces and cores. He hypothesised that the stone material was sourced from quarries on the Cumberland Plain (Lampert 1985).

An engraving was recorded "on upright surfaces in creek bed" at Goat Island (AHIMS 45-6-0811). These engravings include a whale, kangaroo and fish. Three disturbed middens have also been recorded on Goat Island (AHIMS 45-6-0811; 45-6-1957; 45-6-2382). Goat Island itself is extremely important, as it was recorded in 1798 as being owned by Bennelong, who played a significant role in early Aboriginal - European relations. It was also recorded as being used by Aboriginal people for imprisonment prior to European settlement. Deputy Judge Advocate David Collins was required by the Colonial Government "to observe, record and if possible reconcile the Aborigines". In 1798 he published details of Bennelong's relationship to Goat Island. This is the first official written account of ownership of land by an Aboriginal person (Gollan 1993).

A midden was recorded at Bennelong Point, approximately 1.25km to the east of Barangaroo. The shell from this midden had been collected by the convicts to burn into lime to provide building mortar (AHIMS 45-6-1615).

Another midden was uncovered during building works near the historic building "Lilyvale" on the corner of Cumberland and Essex Streets, The Rocks, approximately 0.5km east of Barangaroo. It had been highly disturbed by the construction of terrace houses in the 1830s and was subsequently destroyed by the construction of a hotel (AHIMS 45-6-1853).

During historic excavations in relation to the construction of the eastern distributor at Woolloomooloo, an artefact scatter was uncovered. The site was subsequently excavated by Brayshaw (AHIMS 45-6-2580). This site, which was located near a spring, contained four silcrete, four chert, two quartz artefacts plus one quartzite and one chalcedonic silica artefact. They were found at a depth of about one metre in "disturbed topsoil, overlain by fill" (AHIMS 45-6-2580: 2).

During historic excavations in respect of a development located approximately 1.5km to the south east of Barangaroo at William Street, an artefact scatter was uncovered. This was subsequently excavated and the artefacts included fine quartz debitage and cores, silcrete flakes and tuff cores and flakes (AHIMS 45-6-2651).

Development works at Angel Place, approximately 0.8km to the south east of Barangaroo, uncovered stone artefacts. This site was subsequently excavated by Steele who retrieved three broken flaked pieces in “partially disturbed topsoil mixed with alluvial silts” (AHIMS 45-6-2581). Steele also recorded a potential archaeological deposit (PAD) on George Street, opposite Wynyard Station (AHIMS 45-6-2796). Neither his assessment report nor subsequent excavation report were available from DECCW, therefore no further comment about his site can be made.

In 2002 Steele excavated a site on the corner of Broadway and Mountain Streets in relation to the Quadrant Development, approximately 2.5km to the south west of Barangaroo. He uncovered seven quartz and six silcrete artefacts.

Steele (2006) also undertook an assessment and excavations at a development site bound by Kent, Erskine, Napoleon and Sussex Streets, which became known as the KENS site and was located approximately 0.5km to the south east of Barangaroo. Steele retrieved a large assemblage of 952 artefacts which were predominantly manufactured from silcrete with some tuff and quartz artefacts (Steele 2006: 97). He interpreted the site as being occupied between 2,800BP to 1788. This site was located in a similar environmental context to the present study area, i.e. in a coastal environment near an original shoreline.

Archaeological excavations undertaken in 2009 at Darling Walk (Comber & Stening in preparation), approximately 1.7km to the south of Barangaroo, revealed a midden in a highly disturbed context. Ten stone artefacts were located and these comprised silcrete, chert and quartz flakes and flaked pieces. This site was located in a similar environmental context to Barangaroo, being predominantly reclaimed land with a small portion of original shoreline that had been significantly developed.

With the exception of the Darling Harbour midden the majority of these sites have been uncovered during historical archaeological excavations in relation to development proposals. The Darling Harbour midden was excavated as a result of management recommendations from an assessment (Comber & Stening in prep) prior to development. A few of the sites were recorded at contact. None have been recorded and analysed as a result of a systematic regional assessment. However, all of these sites are located in the coastline/estuarine environment on Hawkesbury Sandstone. These locations confirm Attenbrow’s model of coastal occupation, i.e., that occupation was greater in these environments and on the Hawkesbury Sandstone than in the hinterland/freshwater environments.

4.3 The Study Area

A search of the Department of Environment, Climate Change and Water (DECCW)’s Aboriginal Heritage Information Management System (AHIMS) indicates that no known Aboriginal sites have previously been recorded within or in the vicinity of the Barangaroo site.

4.4 Site Prediction

On the basis of the above environmental and archaeological information, it could be expected that subsurface archaeological deposits containing artefact scatters and/or middens may be located within the eastern portion of Barangaroo Stage 1 redevelopment,

near the original shoreline. The remainder of the site was originally harbour and has since been reclaimed. It is not expected that sites that may have existed prior to sea level rises would have survived the process of inundation (Nutley 2006) and later land reclamation activities. Within the eastern section of the study area, if any sites are located, it is expected that they will be in a disturbed context. Since the study area is completely covered in concrete and bitumen, such sites will no longer be visible. Scarred or carved trees are not expected, as the study area does not contain any remnant vegetation. Similarly rock shelters, paintings, engravings or axe grinding grooves are not expected, as the combination of colonial development, land reclamation and the construction of the shipping container terminal would have destroyed any such evidence.

5.0 Site Inspection

5.1 Methodology

This project was conducted in three stages, which were background research, site inspection and report production, as detailed below.

Stage 1: Background Research

Prior to the field component of this project, the Aboriginal Heritage Information Management System of the Department of Environment and Climate Change was consulted. Site data, associated documents and archaeological survey reports held in this database were reviewed. Environmental information relating to Aboriginal land use was also researched. Such research facilitated the understanding of the potential nature of the sites and site patterning in the region, which enabled the predictive statement to be made. It also provided an archaeological and environmental context within which a significance assessment could be made if any Aboriginal sites were located during the field survey.

Stage 2: Field Survey

The archaeological site inspection and field assessment was undertaken on Friday 16th April 2010 with the following people present:

- Jillian Comber, Archaeologist, Comber Consultants
- Tory Stening, Archaeologist, Comber Consultants
- Mr Allen Madden, Site Officer, Metropolitan Local Aboriginal Land Council

The nature of the development was discussed and the site inspected by all of the above.

Stage 3: Report Preparation

After completing the site inspection, a draft report was prepared and provided to Casey & Lowe, Lend Lease and the Metropolitan Local Aboriginal Land Council. On receipt of their comments this report will be finalised and a final copy provided to each of the above.

5.2 Effective Survey Coverage

Ground surface visibility, which refers to the amount of bare ground visible during the field survey, was nil. As previously mentioned the existing site comprises a flat bitumen and concrete deck

The visibility of some site types, such as open artefact scatters, is dependent on ground visibility and exposure. The National Parks and Wildlife Service's guidelines suggest that this information is to be presented in a table which quantifies and details the local detectability (NPWS 1997:17).

However as the study area is a bitumen and concrete deck obscuring the original ground surface this table will not be used.

5.3 Results

No known sites were recorded within the study area. As the study area is developed, there was no surface visibility. However, the possibility that subsurface artefacts still remain despite later disturbance must be considered.

The background research, as contained in this report, provides information to enable an assessment to be made as to whether any sub-surface Aboriginal archaeological deposits could remain.

The excavation undertaken by Steele (2006) at the development site bound by Kent, Erskine, Napoleon and Sussex Streets, which became known as the KENS site was located in a similar environmental context as Barangaroo, i.e. in a coastal environment near an original shoreline. The KENS site is only 0.5km to the south east of Barangaroo. Steele retrieved a large assemblage of 952 artefacts (Steele 2006: 97).

The excavation undertaken by Comber and Stening (in preparation) at Darling Harbour also provides relevant data to enable a comparative analysis to be made. That excavation was located in a similar context to the present study area, i.e. a foreshore area which had been developed during the early European settlement of the Colony and which was later the subject of reclamation and ongoing development.

Therefore, it is possible that sub-surface Aboriginal archaeological deposits may also remain within the present study area in the form of stone tools or remnant midden material. Given the proximity of known sites around the Sydney Harbour foreshore, a program of subsurface testing should be undertaken prior to construction of the proposed development. Such testing should be undertaken in the area where the original shoreline was located. Testing in the areas of reclaimed land is not necessary. Figure 6 below shows the proposed footprint of the basement and underground car parks, and the shoreline as mapped in 1822. This plan indicates the area where testing should be undertaken. Figure 7 shows a more detailed plan of Stage 1 Barangaroo redevelopment overlaid with the 1822 map which shows the shoreline.

The location of the contaminated soils must be taken into account when determining an appropriate testing strategy. A research design and management plan should be developed prior to the commencement of such testing, clearly outlining the location of the contaminants and an appropriate testing methodology.

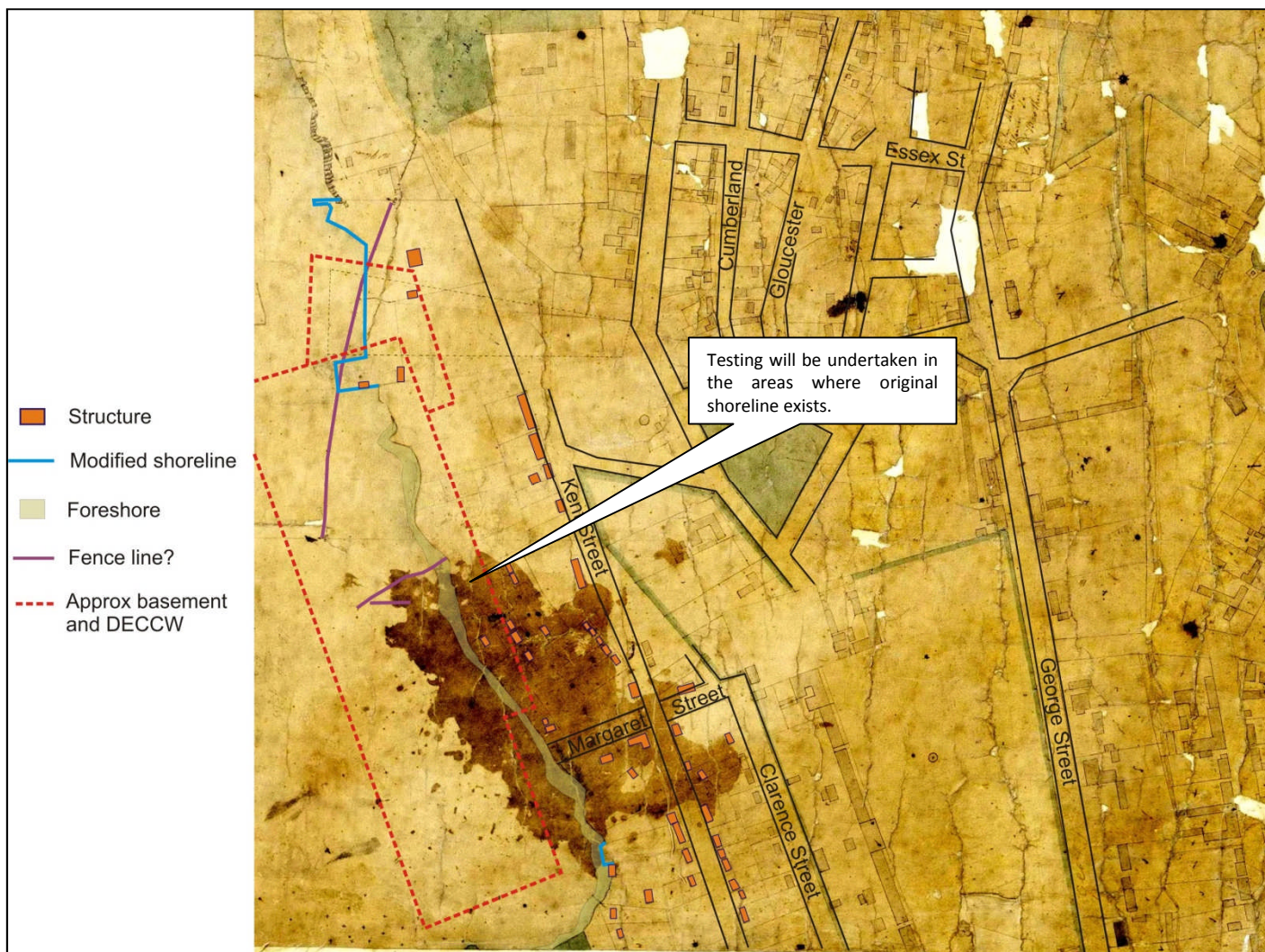
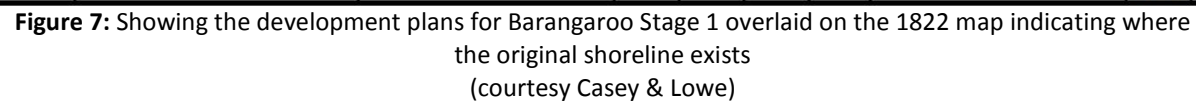


Figure 6: Plan showing the footprint of the proposed basement and underground carpark of Barangaroo Stage 1 and the shoreline as mapped in 1822.
(courtesy of Casey & Lowe)



6.0 Legislation

6.1 National Parks and Wildlife Act 1974

The National Parks and Wildlife Act 1974 (NPW Act) provides statutory protection for all Aboriginal artefacts or “Aboriginal objects” within New South Wales. The Department of Environment, Climate Change and Water (DECCW) is the State Government agency responsible for the implementation and management of this Act.

Part 6 of the NPW Act provides provision for the protection of all “Aboriginal objects” which are defined as “any deposit, object or material evidence (not being a handicraft made for sale) relating to the Aboriginal habitation of ... New South Wales...”.

In particular, Section 90 (Part 6 of the NPW Act) states that it is illegal to knowingly destroy, deface, or damage an Aboriginal object without first obtaining the written consent of the Director-General.

Section 87 (Part 6 of the NPW Act) details the provisions for the issue of written consent to impact upon an Aboriginal object. According to DECCW policies, such permission may be issued for research or other purposes, once a detailed assessment of the object has been undertaken which clearly outlines the justification for such disturbance and once satisfactory consultation has been undertaken with the relevant Aboriginal community or people.

As it is possible that Aboriginal “objects” may be disturbed during the redevelopment of Barangaroo, it would normally be necessary to apply for a permit under Part 6 of the Act. However, the proponent has advised that this is a “Part 3A” project and therefore it will not be necessary to apply for a S87 or S90 permit from DECCW. However, the proponent will be undertaking consultation with DECCW.

6.2 Part 3A, Environmental Planning and Assessment Act, 1979

This project will be assessed under Part 3A of the *Environmental Planning and Assessment Act 1979*. Part 3A consolidates the assessment and approval regime for all major projects and provides a streamlined process. The Minister for Planning is the consent authority for the site under Part 3A. A separate approval from DECCW is not required.

The Barangaroo development site currently has a Part 3A concept plan approval. This Aboriginal archaeological assessment report forms part of the Environmental Assessment Lend Lease is completing for the Project Approval under Part 3A.

While Aboriginal archaeology has not been specifically identified in the Director-General’s Requirements or the commitments, excavations undertaken by Comber Consultants at the nearby Darling Walk site where the remains of a midden were located, suggest that this site may also contain Aboriginal “objects” as defined by the *National Parks and Wildlife Act 1974*. To ensure that these Aboriginal objects are covered by the Part 3A Project Approval, a research design and management plan will be undertaken.

7.0 Recommendations

The following recommendations are made on the basis of:

- Legal requirements under the terms of the *National Parks and Wildlife Act 1974* (as amended) which states it is an offence to damage or destroy an Aboriginal object without first gaining the consent of the Director of the NSW National Parks and Wildlife Service or obtaining planning approval under Part 3A of the *Environmental Planning and Assessment Act 1979*;
- Discussions with representatives of the Metropolitan Local Aboriginal Land Council;
- Research into the archaeological record for the general area and the Barangaroo site in particular;
- Results of the assessment as outlined in this report.

IT IS THEREFORE RECOMMENDED THAT:

1. A program of Aboriginal archaeological sub-surface testing should be undertaken prior to the redevelopment of Barangaroo Stage 1. Prior to commencement of the testing, a research design and archaeological management plan should be prepared which clearly sets out the methodology to be followed. This document should also consider issues of contaminated soils, the impact of remediation on the archaeological resource and mitigation measures.
2. Such a program of sub-surface testing should be undertaken in partnership with the Metropolitan Local Aboriginal Land Council.
3. If any Aboriginal “objects” (as defined under the *National Parks and Wildlife Act 1974*) are located during the course of the testing program, the Metropolitan Local Aboriginal Land Council should apply for a Care Agreement with the Department of Environment, Climate Change and Water to enable them to keep the objects.
4. The program of sub-surface testing should be coordinated with Casey & Lowe, the archaeologists undertaking testing in respect of the historical archaeology.
5. If, during the course of the redevelopment, any previously undetected Aboriginal “objects”, artefacts or sites are uncovered, work must cease in the vicinity of that object, artefact or site and further advice sought from the archaeologist who undertook the program of sub-surface testing.
6. Interpretation of the Aboriginal history of the site should be included in the redevelopment proposals.

8.0 References

- AECOM** 2010 Remedial Action Plan: Other Remediation Works (South) Area, Hickson Road, Millers Point, NSW.
- ATTENBROW, V.** 2002 *Sydney's Aboriginal Past*, UNSW Press, Sydney.
- BAKER, M.** 1986 *Native Plants of the Sydney Region*, Three Sisters Productions, Winmalee.
- CASEY & LOWE** 2010 Non-Indigenous Archaeological Assessment Barangaroo Stage 1. Unpublished report to Lend Lease.
- COMBER, J. & STENING, T.** In preparation Darling Walk, Darling Harbour: Aboriginal Archaeological Excavation Report. Unpublished report to Casey & Lowe Pty Ltd on behalf of Lend Lease Bovis.
- GOLLAN, V.** 1993 Colonisation and the Law: the role of British law in the dispossession of Aborigines 1788-1840. Unpublished PhD Thesis, Sydney University.
- HERBERT, C.** 1980 *Geology of the Sydney 1:100,000 Sheet 9130*. Geological Survey of NSW, Department of Mineral Resources.
- KOHEN, J.** 1984 Shaw's Creek KII Rockshelter: a prehistoric occupation site in the Blue Mountains piedmont, eastern New South Wales. In *Archaeology in Oceania* 19 (2):57-73.
- LAMPERT, R.J.** 1985 Excavation Report on Mort's Bond Store. Unpublished Report to Department of Environment and Planning.
- LOW, T.** 1989 *Bush Tucker: Australia's Wild Food Harvest*, Angus & Robertson, Pymble.
- NANSON, G.C., YOUNG, R.W. & STOCKTON, E.** 1987 Chronology and palaeoenvironment of the Cranebrook Terrace (near Sydney) containing artefacts more than 40,000 years old. In *Archaeology in Oceania* 22(2):72-8.
- NUTLEY, D.** 2006 *The Last Global Warming? Archaeological Survival in Australian Waters*, Flinders University Maritime Archaeology Monograph Series, No. 10
- ROSS, A. and ATTENBROW, V.** 1990 Aboriginal Site Survey: Bradley's Head. Report to NSW Government.
- STEELE, D.** 2002 Aboriginal Archaeological Excavation, Quadrant Development Site, Broadway & Mountain Streets, Sydney, NSW, containing NPWS Site 45-6-2629. Unpublished report to College Square Residential Pty Ltd.
- STEELE, D.** 2006 Final Aboriginal Archaeological Excavation Report. The KENS Site (Kent, Erskine, Napoleon and Sussex Streets), Sydney, NSW, containing

DECC Site 45-6-2647 and associated areas of PAD. Unpublished report to Leighton Contractors Pty Ltd.

Photographs



Photograph 1:

Looking east within the northern portion of Barangaroo at the area within the original shoreline, indicated by the red arrow.



Photograph 2:

Looking south within the northern portion of Barangaroo. The area is the foreground and surrounding the sandstone outcrop is within the original shoreline. The area in the background is the location of Stage 1. The locations of areas within the original shoreline are approximately indicated by the red arrows.



Photograph 3:

Facing east looking across Barangaroo towards Hickson Road. The location of the original shoreline is approximately indicated by the red arrow.



Photograph 4:

Facing south looking across the area designated for Stage 1 of development. The approximate area of the original shoreline is indicated by the red arrow.



Photograph 5:

Facing east looking across Barangaroo towards Hickson Road. The approximate area of the original shoreline is indicated by the red arrows.



Photograph 6:

Looking south east across Barangaroo towards Hickson Road and the CBD. The area where the original shoreline was is indicated by the arrow.



Photograph 7:

Looking north east across Barangaroo. The location of the area within the original shoreline is indicated by the red arrow.



Photograph 8:

Looking south east towards the southern boundary of Barangaroo.



Photograph 9:

Looking north east at the northern section of Barangaroo. The sandstone outcrop seen in the middle left of the photo is in the region where the original shoreline is located, indicated by the red arrow. This is the area where the public domain and parkland will be created.

Appendix A

Response from:

Metropolitan Local Aboriginal Land Council

(to be included in final report)

Appendix B

Report from:

AECOM

dated 18 May 2010

18 May 2010

Mr Warwick Bowyer

Lend Lease (Millers Point) Pty Ltd
30 The Bond
30 Hickson Road
Millers Point
NSW 2000

Dear Warwick,

Barangaroo Stage 1- Archaeological Assessment : Environmental conditions encountered during Data Gap Investigations within VMP and PDA Remediation Works Area and Other Remediation Works (South) Area

AECOM Australia Pty Ltd (AECOM) has been engaged by Lend Lease (Millers Point) Pty Ltd (LL) to undertake Data Gap Investigations (DGIs) and remediation design works for the Stage 1 Barangaroo project in accordance with the Professional Services Agreement (PSA) between the parties dated 20 November 2009.

LL has requested that AECOM provide information regarding encountered Site conditions within the Voluntary Management Proposal (VMP) and Project Delivery Agreement (PDA) Remediation Works Area and Other Remediation Works (South) Area (refer attached figure) for provision to the LL appointed archaeologists (Casey and Lowe) in order that they can:

- Determine a preferred, and where appropriate, approach to the undertaking of preliminary test pit exploratory works, subsequent archaeological excavation, recovery and recording of potential archaeological deposits (both of a European and Indigenous nature) during the proposed ex-situ remediation works, noting that the remediation area is likely to be contaminated; and
- Document the preferred approach in the Archaeological Assessment and Research Design reports associated with Barangaroo Stage 1.

Relevant information relating to the above considerations is provided in the following sections.

1.0 VMP and PDA Remediation Works Area

In May 2009, the NSW Environment Protection Authority (EPA) determined that the land encompassed by the former Millers Point gasworks was contaminated in such a way as to present a **significant risk of harm (SROH) to human health and the environment**. As a consequence the EPA declared the Site to be a remediation site (Declaration Number 21122; Area Number 3221) under section 9 of the Contaminated Land Management Act 1997.

The land to which the declaration applies is described as:

- Part Lot 5 and Part Lot 3 in Deposited Plan (DP) 876514, Hickson Road, Millers Point.
- The part of Hickson Road adjacent to:
 - 30-34 Hickson Road being Lot 11, DP 1065410;
 - 36 Hickson Road being Lot 5, DP 873158 and Lot 12, DP 1065410; and
 - 38 Hickson Road being SP72797, Millers Point in the City of Sydney Local Government Area.

1.1 Nature of contamination

The EPA declaration notes that the VMP and PDA Remediation Works Area is contaminated with gasworks waste and particularly waste tar resulting from the historical use of the land as a gasworks plant. The chemical composition of gasworks waste includes the following contaminants of potential concern (CoPC):

- polycyclic aromatic hydrocarbons (PAHs);
- benzene,
- toluene, ethylbenzene and xylenes (BTEX);

- total petroleum hydrocarbons (TPHs);
- ammonia;
- phenol; and
- cyanide.

Groundwater has been found to be contaminated by TPHs, PAHs, BTEX, ammonia, phenol and cyanide at concentrations exceeding the relevant trigger values for the protection of human health and aquatic ecosystems in the Australian and New Zealand Guidelines for Fresh and Marine Water Quality (ANZECC and ARMCANZ, 2000).

1.2 Data Gap Investigation

AECOM is currently completing a DGI within the VMP and PDA Remediation Works Area, which has considered information obtained during previous investigations. As a result, the nature, distribution and concentrations of contamination within this area are well documented.

The DGI has identified concentrations of CoPC including lead, TPH (C6-C9 and C10-C36), BTEX compounds, PAHs (including benzo(a)pyrene) and sulfate within soil and fill materials variably exceeding the adopted Site Investigation Criteria. Concentrations of some semi-volatile organic compounds (SVOCs) exceeding the laboratory limit of reporting (LOR) were also reported. The reported results are generally consistent with the findings of previous investigations with respect to the identified CoPC.

Dissolved-phase concentrations of contaminants were variably reported above the Site investigation criteria (e.g. lead, cadmium, chromium, cobalt, copper, mercury nickel, zinc, benzene, naphthalene and phenol) in groundwater.

Reported soil vapour results indicated some gasworks-derived impacts in locations closest to the former gasworks area and low concentrations of toluene, chloroform and tetrachloroethene (below soil vapour guidelines) in some locations. The reported results were below the Site investigation criteria with the exception of naphthalene which reported soil vapour concentrations exceeding the ambient air screening criteria (3.7 $\mu\text{g}/\text{m}^3$) in eight locations and the adopted soil vapour screening criteria (37 $\mu\text{g}/\text{m}^3$) in five locations.

The highest concentrations of soil, soil vapour and groundwater contamination were identified in the immediate vicinity of the former gasworks infrastructure.

1.3 General description of Encountered Conditions

Fill and Soil

Encountered stratigraphic conditions were variable across the VMP and PDA Area, but generally comprised fill material overlying natural weathered sandstone with clay components. Sandstone bedrock was generally present underlying natural weathered bedrock materials or in some instances directly underneath fill materials. Observations of odours, staining and sheen were generally more common in the overlying fill materials, although they were also noted within a number of locations within the natural soil and bedrock present on the Site.

Fill materials were generally shallower in the eastern portion of the Site closest to Hickson Road and deeper in the western portion of the Site. The thickness of fill material generally increased from east to west across the Site.

Observations during the test pitting works identified the presence of unconsolidated, highly variable fill materials, which generally comprised unconsolidated gravels, sand, bricks, sandstone, timber, slag and steel. Visual signs of contamination including black staining, tar and surface sheen (where groundwater was present) were noted in several test pits, predominantly located in the footprint of the former Retort House and Purifying Beds within Block 4.

Natural soils encountered across the Site comprised silty sands, gravelly sands, clays, weathered sandstone and sand with components of clay.

Tar was generally (but not exclusively) encountered within fill materials and was characterised by a strong naphthalene odour, black colour and a viscous consistency. Where hydrocarbon impact was detected in groundwater a surface sheen and odour were also identified. Tar mixed with groundwater was identified in the tar tank, located underlying Hickson Road. The material within the tar tank was black, odorous and unspeadeable.

Groundwater

Groundwater was encountered within the fill materials and underlying natural material. Groundwater was encountered at depths ranging from 1.38 to 2.92 m below ground surface (bgs) and is subject to tidal fluctuation. Water level monitoring within selected wells over a three day period confirmed that groundwater at the Site is tidally influenced, with the influence extending as far east (inland) as Hickson Road, although the degree of fluctuation is much less on the eastern portion of the Site towards Hickson Road.

Free phase tar was reported in several wells located within the footprint of the former gasworks site. Tar was observed within wells installed at varied depths throughout the profile, indicating dense non aqueous phase liquid (DNAPL) is present at the Site within the fill materials, natural sediments and bedrock.

1.4 OH&S Considerations

The nature of the contamination within the VMP and PDA Remediation Works Area is likely to prohibit the type of detailed excavation and recording practices associated with conventional archaeological excavations. It **would** also likely prohibit the specific requirements for the investigation of Indigenous archaeology, which AECOM understands may involve hand excavation, machine excavation and wet sieving of natural sands to collect artefacts, within the DECCW declared area.

AECOM understands it is proposed that a limited program of archaeological photographic recording/mapping is being considered within the VMP and PDA Remediation Works Area associated with Stage 1, and that the timing of these works is such that they will be undertaken in parallel with the proposed remedial works. The proposed archaeological works are associated with the former gasworks that once occupied the site.

Based on the nature and concentrations of reported contamination, AECOM notes that specific Occupational Health and Safety (OH&S) considerations will apply to the remediation works being undertaken. The remediation of gasworks waste is complex and requires appropriate consideration and management of chemical and other hazards. Remediation activities will only be undertaken following the completion of a rigorous OH&S plan incorporating a risk assessment and development of detailed management protocols for the proposed works.

AECOM notes that remediation works will likely be undertaken within an exclusion zone that will require additional protective measures to be taken. These measures may include the use of specialist equipment including respirators, air monitors and coveralls and will require adherence to appropriate decontamination practises.

The remediation works will entail the use of heavy machinery which will present a potential risk to the safety of Site workers. As such, the number of workers within the exclusion at any one time will be kept to a minimum to reduce the potential for health and safety incidents

The preferred approach to risk management would be to minimise the number of archaeological practitioners accessing the remediation area and for the archaeological works within this area to be restricted to photographic recording and associated mapping only, which is considered more appropriate given the nature of the hazardous environment expected during the remedial works within the Stage 1 VMP and PDA Remediation Works Area. Following the completion of appropriate inductions and subject to careful planning and management, limited archaeological works such as photographic recording and limited mapping in parallel with remedial works might be appropriate. Such works will need to be undertaken under the direct supervision of a specialist remediation contractor, and on the proviso that the archaeological practitioners are adequately trained and strictly conform to the appropriate health and safety management systems and practices implemented by the specialist remedial contractor. Only authorised personnel and equipment will be allowed into the exclusion zones and other areas associated with the remediation works.

2.0 Other Remediation Works (South) Area

The Other Remediation Works (South) Area (ORWS Area) is located to the south and west of the VMP and PDA Remediation Works Area and is outside the footprint of the former gasworks area. Consequently, concentrations of CoPC, although still present, were generally reported at concentrations below that identified within the VMP and PDA Area.

Encountered soil and fill conditions were generally similar to the VMP and PDA Area, although no evidence of liquid tar was identified.

AECOM considers that as reported concentrations of CoPC are not as high as the VMP and PDA Area, the ORWS Area will not require the same level of OH&S management. As such, a reduced level of personal protective equipment (PPE) than is considered necessary for the VMP and PDA Remediation Works Area may be adequate for works in this area. This will be subject to verification of the actual conditions encountered during archaeological excavation works.

It is noted that AECOM is currently preparing a Human Health and Environmental Risk Assessment (HHERA) for the VMP and PDA Remediation Works Area, which will be applicable to the ORWS Area. The HHERA will need to be considered in the context of the archaeological works being proposed at this location prior to the development of specific safe work procedures for this area.

Within the Other Remediation Works (South) Area (ORWS Area), AECOM considers that a more comprehensive program of archaeological excavation, mapping and recording would be possible, subject to the development and implementation of appropriate health and safety practices and systems which would be informed by the abovementioned HHERA. Such systems may include the utilisation of appropriate personnel protective equipment by archaeological practitioners and the environmental monitoring during the archaeological test pitting and excavation phases by appropriately qualified environmental practitioners to ensure exposure to in situ contaminants is within acceptable levels.

3.0 Recommendation

3.1 VMP and PDA Remediation Works Area

Given that the Stage 1 archaeological works within the VMP and PDA Work Areas are to be undertaken in parallel with the proposed ex situ remedial works, it is recommended that:

1. The nature of any future proposed archaeological works associated with the Archaeological Assessment and subsequent Research Design be restricted to photographic recording and associated mapping to limit exposure to contamination;
2. Given Recommendation 1, it is considered that it will not be practicable to remove artefacts or soil samples from the VMP and PDA Work Areas;
3. Development and implementation of appropriate health and safety practices and systems be undertaken; and
4. Archaeological practitioners be trained in these practices prior to entering the remediation work areas under the supervision of the specialist remedial contractor.

3.2 Other Remediation Works (South) Area

Within the Other Remediation Works (South) Area (ORWS Area), a more comprehensive program of archaeological excavation, mapping and recording would be possible, subject to the actual conditions encountered and the development and implementation of appropriate health and safety practices and systems which would be informed by the abovementioned HHERA.

We trust this provides the necessary information you require. Should you have any further queries, please contact the undersigned.

Yours sincerely,

AECOM Australia Pty Ltd



Anthony Davis
Senior Environmental Scientist



Brad Eismen
Technical Director - Environment

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